OXFORDSHIRE STRATEGIC RAILFREIGHT INTERCHANGE

HOST AUTHORITIES (HA)

COMMENTS ON FURTHER SUBMISSIONS RECEIVED AT DEADLINE 1 AND WRITTEN REPRESENTATIONS

DEADLINE 2 | 26 OCTOBER 2026

- Oxfordshire County Council
- Cherwell District Council

HOST AUTHORITIES

COMMENTS ON FURTHER SUBMISSIONS RECEIVED AT DEADLINE 1 AND WRITTEN REPRESENTATIONS

The Host Authorities (the "**HA**") are comprised of the following host authorities who are working collaboratively to represent constituents on key issues during this Examination and assist the Examining Authority ("**ExA**") with the Examination's smooth running:

- Cherwell District Council ("CDC")
- Oxfordshire County Council ("OCC")

In these submissions, the Host Authorities may be referred to variously as the HA, the Host Authorities or the Councils.

Purpose of this Submission

The purpose of this submission is to provide comments on further submissions provided by the applicant at Deadline 1 and to respond to Written Representations provided by interested parties at Deadline 1.

AI notice

AI was not used in the production of this response

Comments on Further Submissions Received at Deadline 1

[REP1-004] 3.1 Draft Development Consent Order (Tracked)(Rev 2)

The Host Authorities provided commentary on the draft DCO at Chapter 9 and Annex 3 of the Local Impact Report submitted at D1 **[REP1-029]**

The Host Authorities understand that further substantive changes to the draft DCO will be submitted alongside the proposed Change Request at Deadline 2. As such the Councils proposed to provide a response to all changes made to the DCO at both Deadline 1 and Deadline 2 collectively as part of the Councils' Deadline 3 submissions.

The Councils will continue engaging directly with the applicant on the drafting of the DCO.

The Councils continue to work with the applicant on the drafting of S106 agreements. OCC has been engaging with BWB who is working on behalf of the applicant to agree costings for the Highways contributions. It is the Council's understanding that one of these costings is sitting with OCC for response and another is with BWB. Once these costings have been agreed discussions on the drafting of the obligations can commence. OCC considers that agreement over the S106 drafting is likely during the examination period and will continue to work pro-actively with the applicant on the S106 agreement.

[REP1-016] 10.3 Applicant's Post Hearing Submissions - ISH1 ISH2 CAH1

The Councils revised the Local Impact Report following the hearings on the w/c28th September to ensure that the LIR adequately addressed any issues which had arisen from ISH1, ISH2 and CAH1. Having reviewed **[REP1-016]** the Councils are content that any commentary on issues raised by the applicant at the hearings has been adequately captured in the submitted LIR **[REP1-029]**.

In particular, Section 7 paragraphs 7.1.57 to 7.1.68 discuss issues relating to the applicant's justification for the quantum of warehousing. This issue is also addressed below in response to **[REP1-017]**.

Equally there are numerous references to issues raised by the applicant during ISH2 within section 8.5 Landscape and Visual Impact Assessment.

At Annex 2 at page 197 the Councils have requested that a pre-condition survey of roads proposed for construction routes be included in a revised CTMP to address concerns raised by Interested Parties and the ExA during ISH2.

[REP1-017] 10.3A Approach to Design including Quantum of Development

The Councils welcome the submission by applicants of the supplemental report "Approach to Design including Quantum of Development" dated October 2026 which seeks to address some of the issues raised by the ExA in section 13: Need, Location and Delivery of their written questions and requests for information (ExQ1).

The Councils recognise the national need for SRFI provision as outlined in the introduction to the report which follows the position as set out in the National Networks National Policy Statement, 2024 ('NNNPS') is recognised by the Councils. This national need is not disputed by the authorities and therefore, in principle, the establishment of new facilities is accepted.

However, as expressed in the joint LIR submission **[REP1-029]**, the Councils do not consider that the applicant has provided sufficient justification for the quantum of warehousing proposed at this location, at this time. This concern has been expressed as the proposed development as defined by the applicants Parameters Plan **[APP-040]** will have several detrimental impacts on the environment which could be reduced or even avoided if the quantum of development proposed for the site were to be reduced.

These impacts notably include the loss of best and most versatile agricultural land and detailed in section 8.12 of the LIR and detriment to the character of the landscape arising from scale and mass of the proposed structures on the site including both the main logistics buildings and the bunding proposed to mitigate their impact as set out in section 8.5 of the report.

The Councils are mindful that paragraph 4.28 of the NNNPS outlines that good design should include the application of the mitigation hierarchy, namely, to Avoid, Mitigate or as a last resort Compensate for the identified problems and existing adverse

impacts of a proposed development. This aim is supported by paragraph 3.97 of the NNNPS which seeks to ensure SRFI developments are sensitive to, respond to, and contribute to their environmental context and avoiding harm wherever possible. Where adverse impacts are unavoidable, the NNNPS goes on to state that developments should adequately mitigating or as a last resort, compensate for, and deliver, environmental enhancements.

Despite identifying how the general location for development was identified through the main site DAD, the Design Approach document does not set out clear evidence as to why the quantum of development being proposed is necessary to enable the successful delivery, and operation, of the rail interchange. Section 26(6) of the Planning Act clearly demonstrates that the purpose of and justification for warehousing associated with SRFIs is to provide a space for good delivered from the rail network. The unanswered question remains; would the proposed SRFI operate equally as well with less logistics floorspace provision and less environmental impact than that currently proposed and has sufficient evidence been provided linking the quantum of floorspace to the quantum of freight expected via the rail terminal.

Looking at the general location of the site within the wider national provision, the Council's accept that the site is in a general area where the National Policy Statement considers there to be "lesser provision". What the submission does not do however, is detail the geographical or market extents of this area of lesser provision and to what extent the proposal helps mitigate the under provision of rail based logistics facilities alluded to which cannot be met through existing sites.

Whilst the information provided from paragraph 4.5 onward is of note in understanding the design approach taken via the DAD to shaping the appearance of the proposed development, it does not define how the quantum of floorspace was identified which in turn would have driven the design work. Essentially, the scheme appears to have been developed around the idea of how much floorspace could be reasonably be provided within the limitations of the land available as opposed to identifying how much floorspace would be required to allow effective operation of the SRFI and then shaping the scheme to meet this target.

The comparison with other SRFI developments in Section 5 provides a useful understanding of rail based logistics provision in the heart of the Country it does not show why the proposed OxSRFI development must be the scale it is. Furthermore, the plans and

supporting information only give a high-level overview of the environmental impacts arising from each of the three comparison sites to allow for a considered understanding of the balance that may be drawn with regard to the relationship between economic gains that may arise and environmental harm that is also associated with each scheme.

In summary, the Council's remain of the view that little clear information has been supplied with the proposal to justify the specific quantum of logistics floorspace put forward as part of the proposal and how important this is to the effective operation of the rail facility. At this stage the Councils do not consider that balance between maximising economic gain and minimising environmental harms has been sufficiently stuck.

[REP1-018] 10.3B Passenger Rail OxSRFI Wider Benefits

Oxfordshire County Council notes paragraph 3.3 of this note where the applicant indicates that pre-feasibility work for Ardley Station has been undertaken. The Council will shortly be publishing this pre-feasibility study on its website and can submit this into the examination if the ExA believe it will be beneficial.

Paragraph 4.2 indicates that the former Ardley Station site is 'the site favoured by OCC'. OCC has not yet undertaken sufficient work on the Ardley Station proposal to definitively identify one station location. The former Ardley Station site has been identified as having advantages in terms of interaction with existing SSSIs, but the Council is not currently favouring any specific location for a new Ardley Station.

Comments on Written Representations

[REP1-021] Mid Cherwell Neighbourhood Plan Forum- Written Representation

Section 2, page 3 – of the representations **[REP1-021]** says that "*MCNPF is concerned that the Applicant Transport Assessment relies on the Bicester Transport Model Heyford Park Update Model 2018*." Appendix A sets out in detail their concerns that the model has a number of deficiencies.

This document has also been submitted to OCC outside of this examination and OCC has asked an independent modelling consultant who works on behalf of the authority, but has not been involved with the BTM, to check the concerns raised.

His rebuttal is below and concludes that the Bicester Transport Model is "*a reasonable basis for assessing traffic impacts*" of the various development scenarios and mitigation measures and that, "*the model clearly does include an ability to assess development impacts across the rural roads and villages surrounding Heyford Park*."

In order to support this rebuttal please find the Bicester Transport Model Local Validation Report (March 2017) and Bicester Transport Model Heyford Park Model Update: Addendum to Local Model Validation Report (August 2018) appended to this response.

1 Introduction

1.1 This rebuttal responds to the transport modelling concerns referred to in the written representations submitted on behalf of the Mid-Cherwell Neighbourhood Plan Forum **[REP1-021]**. The detailed concerns are set out in Appendix A of the Representations (ASSESSMENT OF THE BICESTER TRANSPORT MODEL HEYFORD PARK MODEL UPDATE 2018). The overall conclusions in Section 1 of the Representation Appendix A are that "*This review of the 2018 Local Model Validation Addendum and appendices identifies significant deficiencies in the model building and validation processes as*

well as multiple failures to meet Government Transport Analysis Guidance requirements (WebTAG). As a result, they do not demonstrate that the model can reliably assess traffic impacts on the local roads and villages around Heyford Park".

1.2 This rebuttal reviews the concerns, including fitness for purpose, compliance with relevant guidance and representation of local movements.

1.3 All modelling is subject to uncertainty, and no model can perfectly represent traffic flows and journey times on every road and at every junction in a network. However, taking account of relevant Department for Transport guidance on transport modelling and the validation of modelled flows and journey times, this Rebuttal concludes that the model is a reasonable basis for assessing traffic impacts of proposed developments in the local area.

1.4 This is confirmed by National Highways who have agreed that the model is a reasonable basis for assessing the traffic impacts of major developments in the local area.

1.5 Since the model was developed in 2018, further work has been carried out to determine if the model has been able to represent traffic in 2023. This work confirms that the model is a reasonable basis for forecasting traffic in the local area.

1.6 This rebuttal addresses each of the concerns stated in Appendix A of the Written Representations **[REP1-021]**.

2 Reasons set out in the Representations

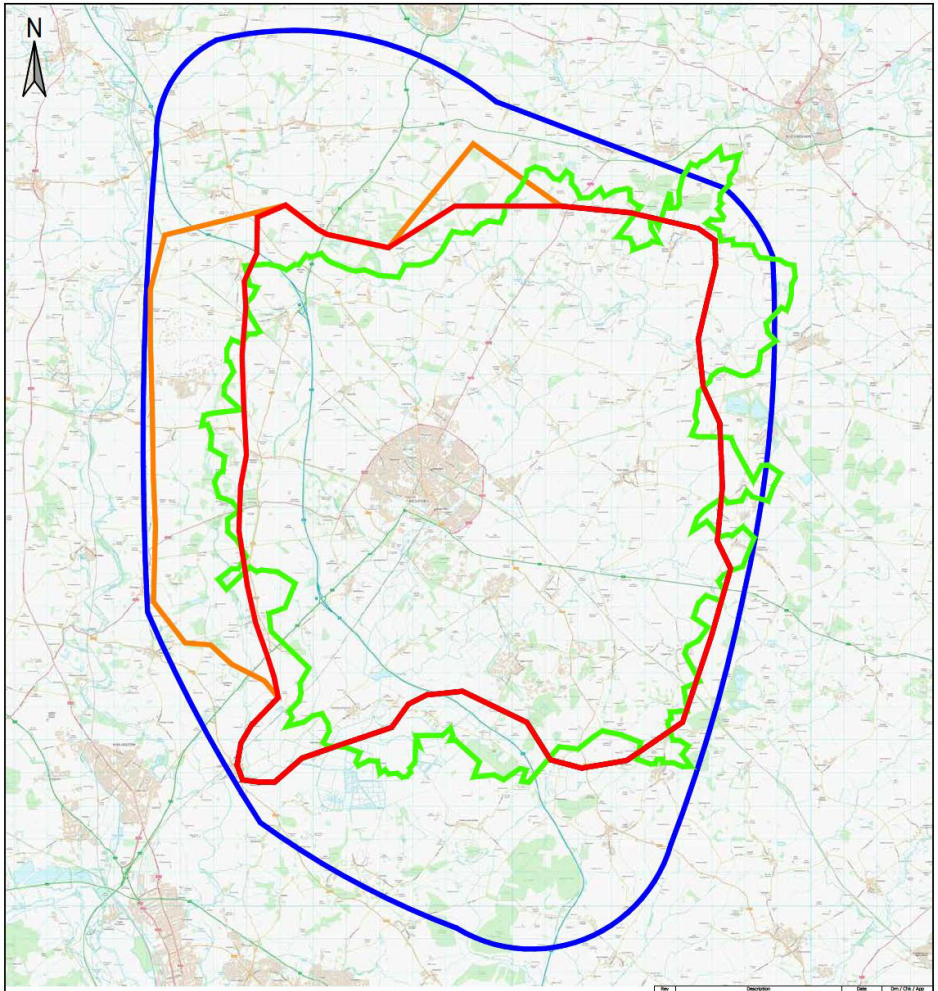
2.1 Use of the Model for a Purpose for which Fitness was not Demonstrated

2.1.1 The representation is that the scope of the model does not include an ability to assess development impacts across the rural roads and villages surrounding Heyford Park, and that the Addendum does not demonstrate that the updated model is 'fit for purpose' for this wider application.

2.1.2 Section 1.1.6 of the Addendum includes "*Therefore, model update is required to provide a more suitable base for option testing within the Upper Heyford/Middleton Stoney area.*" The area of detailed modelling was extended to cover rural roads and villages surrounding Heyford Park as shown in Figure 2 of the Addendum (reproduced below). The model clearly does include an ability to assess development impacts across the rural roads and villages surrounding Heyford Park.

Host Authorities (HA)

Oxfordshire Strategic Rail Freight Interchange (TR050008)



2.2 Failure to Report Validation of the Prior Trip Matrices

2.2.1 Section 4.2.1 of the Addendum states that calibration could not be achieved directly using the synthetic based matrices (which are the prior trip matrices). This means that use of the prior trip matrices without adjustment would not result in a model which provided a reasonable representation of traffic flows in the extended model area and therefore not achieve validation. The remainder of Section 4.2 describes the scale of adjustments to the trip matrices required to calibrate the trip matrices.

2.3 Failure to meet WebTAG Requirements for Matrix Estimation

2.3.1 The Addendum sets out the results of matrix estimation against the significance criteria set out in Table 5 of TAG Unit M3.1. Section 4.2.15 of the Addendum concludes that although the matrix estimation process does not meet all the various criteria, it is considered that the post estimation matrices are fit for purpose.

2.3.2 The MCNP representation [**REP1-021]** present achievement of the matrix estimation significance criteria as a requirement for the modelling set out in the Addendum. This is not correct.

2.3.3 As set out in TAG Unit M1 para 1.1.3:

"*The modelling and forecasting guidance in TAG was originally established to enable practitioners to produce adequate evidence to support the business cases for major transport schemes. It also serves as a best practice guide for other projects or studies."*

The modelling described in the Addendum is not being used to support a business case for a major transport scheme. It is intended to provide a reasonable representation of existing traffic in the modelled area so that the transport impact of major developments can be estimated.

Para 1.1.5 of TAG Unit M1 includes:

"*Where possible, TAG attempts to emphasise that any model or wider analysis should be proportionate to the issue at hand. Simplifications may be made to the design of a model where it is judged that a more detailed specification would not add materially to the analysis to be worth the time and cost of doing so. For example, assessments of smaller schemes may make proportionate use of parts of the guidance or use simpler methods in proportion with the size of the scheme*"

The modelling set out in the Addendum is a proportionate analysis of existing traffic in the modelled area. The fitness for purpose resulting from the proportionate analysis is discussed in Section 2.6.2 of this rebuttal.

2.3.4 The MCNP representation **[REP1-021]** reproduce para 8.3.15 of TAG Unit M3.1:

'*All exceedances of these criteria should be examined and assessed for their importance for the accuracy of the matrices in the fully modelled area or the area of influence of the scheme being assessed. Where the exceedances are important and statistically significant, the development of the prior matrix should be reconsidered. Where they are not considered important, the reasons should be documented in the LMVR*'.

In the case of the model described in the Addendum, the purpose of the model is to provide a basis for understanding the impacts of major new developments, rather than the appraisal of a major transport scheme. The validation of link flows using counts which are independent of the calibration counts used for matrix estimation is the reason that the exceedances are considered less important in determining the fitness for purpose of the modelling.

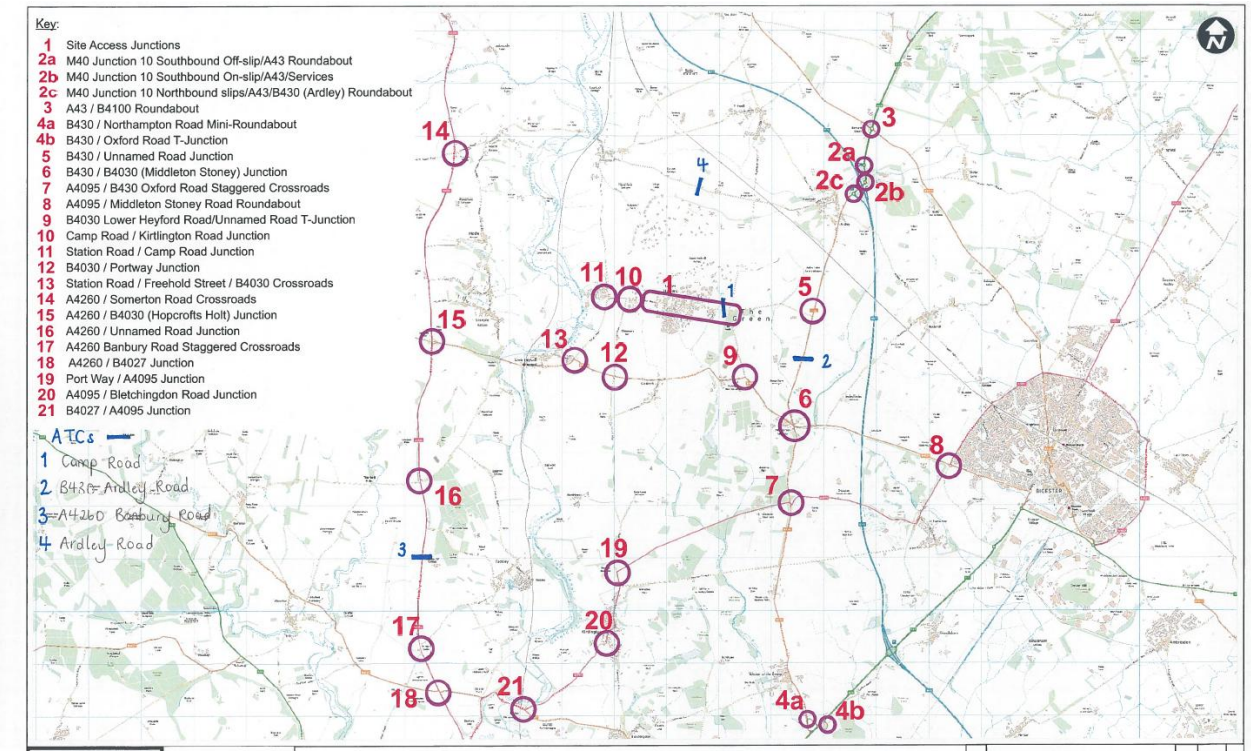
2.4 Failure to Demonstrate Reliable Origin/Destination Patterns

2.4.1 The model is intended to produce a reasonable representation of existing traffic flows in the model area. The reliability of the modelling is addressed by the validation against counts not used for the calibration on the trip matrices, including in the Heyford area.

2.5 Under Representation of Local Traffic Movements

2.5.1 Traffic along the A4260 and between the A4260 and Heyford is included in the model and not under-represented. The turning movement count locations are shown in Appendix A of the Addendum which is reproduced below. The count locations shown as red circles were used in the matrix calibration and details of how well the calibrated model represents the turning movements at each junction are shown in Appendix D of the Addendum and summarised in Table 11 of the Addendum.

2.5.2 Section 5.5.3 of the Addendum concludes "*As can be seen from Table 11, all counts achieve a high level of calibration for all three peak periods. Overall the results demonstrate very good model turning movement calibration for all three time periods".* The model provides a good representation of local traffic movements.



2.6 Inadequate Trip Matrix Validation

2.6.1 Link flows in the Heyford area have also been validated against independent traffic counts which have not been used as an input to matrix estimation. Validation of link flows is included at 4 locations around Heyford Park. The count locations are shown in blue in the location plan shown above. Detailed results are shown in Appendix F of the addendum.

2.6.2 For the 4 sites the results of the link flow validation are shown below. There are large % flow differences at site 4 (Ardley Road) but at very low levels of flow.

2.6.3 The Flow Validation Criteria and Acceptability Guidelines are set out in Table 10 of the Addendum, and are taken from TAG Unit M3.1 Table 2. The Guidelines are that for individual flows the GEH in 85% of cases should be less than 5. For roads with less than 700 vehicles/hour the flow differences should be less than 100 vehicles/hour, and for roads with between 700 and 2,700 vehicles/hour the flows should be within 15% of the counts, again in 85% of cases.

2.6.4 In the AM peak, 100% of the validation links meet the acceptability criteria. In the inter-peak, the criteria are met for either GEH or flow in 7 cases out of 8. In the PM peak 100% of cases meet either the flow or GEH criteria.

2.6.5 The results demonstrate that in the Heyford area the model meets TAG acceptability criteria in all 3 time periods using independent validation counts not used in the matrix estimation. This demonstrates that the model is fit for purpose to assess traffic in the Heyford area.

	AM Peak		Observed				Modelled				Total			
Site	Location	Direction	Car	LGV	HGV	Total	Car	LGV	HGV	Total	Diff	%	GEH	GEH criterion met
1	Camp Road	EB	236	21	5	262	170	13	9	192	-70	-27%	4.7	Yes
1	Camp Road	WB	257	15	4	276	197	15	6	219	-57	-21%	3.6	Yes
2	B430 Ardley	NB	176	12	5	192	158	3	20	182	-11	-5%	0.8	Yes
2	B430 Ardley	SB	442	34	12	488	389	57	16	461	-27	-5%	1.2	Yes
3	A4260 Banbury Rd	NB	248	36	5	290	258	43	28	328	38	13%	2.2	Yes
3	A4260 Banbury Rd	SB	821	61	7	888	772	73	22	866	-22	-2%	0.7	Yes
4	Ardley Rd	EB	10	0	0	10	22	5	0	27	16	158%	3.8	Yes
4	Ardley Rd	WB	6	0	0	6	10	6	0	16	9	148%	2.8	Yes

	Inter Peak		Observed				Modelled				Total			
Site	Location	Direction	Car	LGV	HGV	Total	Car	LGV	HGV	Total	Diff	%	GEH	GEH criterion met
1	Camp Road	EB	128	17	3	148	117	4	12	133	-15	-10%	1.3	Yes
1	Camp Road	WB	117	18	2	137	103	13	16	132	-5	-4%	0.4	Yes
2	B430 Ardley	NB	127	17	12	156	160	5	13	178	22	14%	1.7	Yes
2	B430 Ardley	SB	107	14	8	129	188	3	8	200	71	54%	5.5	No
3	A4260 Banbury Rd	NB	292	45	11	347	333	26	9	368	21	6%	1.1	Yes
3	A4260 Banbury Rd	SB	250	27	10	287	396	34	11	441	154	54%	8.1	No
4	Ardley Rd	EB	17	2	0	19	5	1	0	6	-13	66%	3.5	Yes
4	Ardley Rd	WB	17	3	0	20	9	2	0	11	-9	-44%	2.2	Yes

	PM Peak		Observed				Modelled				Total			
Site	Location	Direction	Car	LGV	HGV	Total	Car	LGV	HGV	Total	Diff	%	GEH	GEH criterion met
1	Camp Road	EB	270	8	1	279	184	7	3	194	-84	-30%	5.5	No
1	Camp Road	WB	208	10	1	219	150	9	9	168	-51	-23%	3.7	Yes
2	B430 Ardley	NB	272	8	1	281	294	27	6	327	46	16%	2.6	Yes
2	B430 Ardley	SB	143	4	3	150	160	0	3	163	13	9%	1.1	Yes
3	A4260 Banbury Rd	NB	688	38	3	730	668	33	10	711	-19	-3%	0.7	Yes
3	A4260 Banbury Rd	SB	303	13	1	317	316	17	0	334	17	5%	0.9	Yes
4	Ardley Rd	EB	25	3	0	29	10	4	0	14	-15	-51%	3.1	Yes
4	Ardley Rd	WB	16	1	0	17	11	3	0	13	-4	-23%	1	Yes

2.7 Inadequate Data for Highway Assignment Calibration and Validation

2.7.1 As shown in Appendix A of the Addendum (shown as part of Section 2.5 of this Rebuttal) a large number of link and turning movement counts have been used in the Heyford area for model calibration, with additional independent sites for model validation. There is comprehensive coverage of links and junctions throughout the model area (including Heyford).

2.7.2 As described in section 3 below, the model has also been tested against more recent count data collected in 2023 which is also independent of the calibration counts.

2.8 Incorrect Representation of HGV Movements

2.8.1 Guidance in TAG Unit M3.1 para 4.2.6 is that

"*Neither ATCs nor MCCs will yield counts of light and heavy goods vehicles which are sufficiently accurate for the validation of the assigned flows of these vehicle types on individual links*".

As recognised in the Representations, the counted HGVs through Lower Heyford are low. The Addendum does provide the results of heavy goods vehicle counts at each site, but to be consistent with guidance does not present calibration or validation statistics for goods vehicles separately. Calibration and validation comparisons are shown for cars and total vehicles separately in accordance with the guidance.

2.9 Incomplete Journey Time Validation

2.9.1 The results of journey time validation are described in Section 5.9 of the Addendum. Section 5.9.3 concludes that:

"*Tables 18 to 20 demonstrate that the models reproduce observed journey times accurately with more than 85% within 15% or 60 seconds of the observed total journey times for all three time periods as required by WebTAG*."

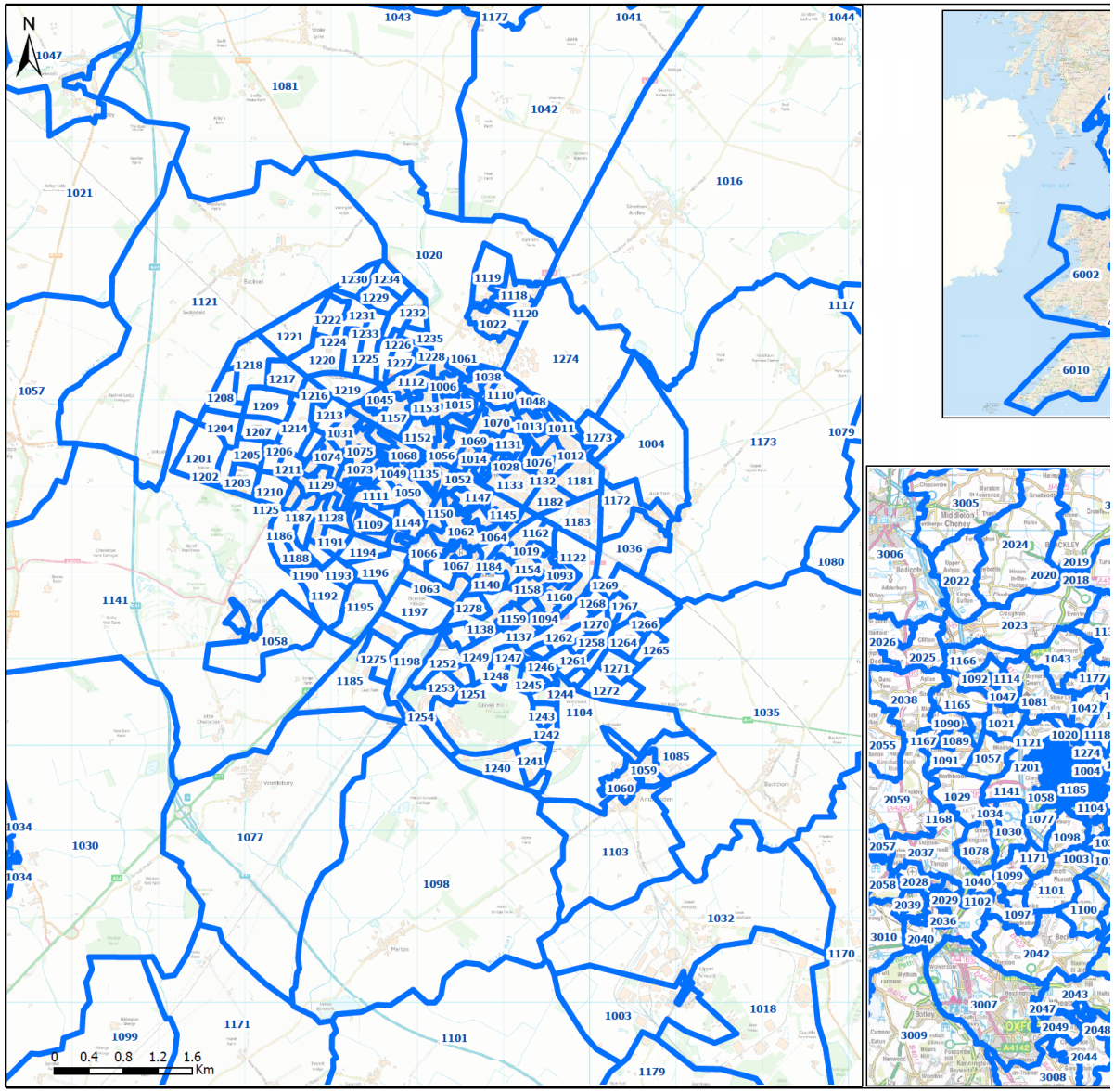
2.9.2 The representations are correct that none of the journey time routes include the B4030 through Lower Heyford, but they do include both the B4030 and Camp Road east of Lower Heyford which traffic currently uses between Lower Heyford and the Heyford Park site. The validation on both these routes meets the validation criteria.

2.10 Failure to Demonstrate Adequate Zoning and Trip Loading Arrangements

2.10.1 The zone plan from the 2017 LMVR is shown below before the additional zones in Heyford Park were included. The model zoning system is appropriate for the study area. It would not be possible to achieve a successful model calibration and validation if the zone sizes and zone connections were inadequate.

Host Authorities (HA)

Oxfordshire Strategic Rail Freight Interchange (TR050008)



3 Heyford Park Present Year Validation Check

3.1 A present year validation check has been carried out to determine if the model was able to represent traffic in 2023. This check compared observed data from 2023 with a model forecast for 2023. The observed data are independent from any of the data described in the Addendum, and no further matrix estimation was carried out to achieve modelled 2023 matrices.

3.2 The available survey data consisted of 31 junction turning counts provided by the Heyford Park developer, conducted in September and October of 2023, supplemented by 23 link counts provided by Oxfordshire County Council covering 2023. TomTom Journey time data has been obtained for four bidirectional routes.

3.3 The conclusions from the Present Year Validation were:

- The junction turning counts validate well in both peaks and all areas
- The Automatic link counts validate well in the PM peak and reasonably well in the AM peak
- For both peaks the journey time validation threshold is met
- It was therefore concluded that the model is suitable to forecast in the region of Heyford Park

3.4 A report on the Present Year Validation can be provided.

4 National Highways Review of the Model

4.1 National Highways have carried out extensive reviews of the performance of the model described in the Addendum. This was to satisfy Highways England that the model was a suitable basis for forecasting traffic on major roads taking account of proposed developments.

4.2 As part of the Cherwell Local Plan Review 2042, a Statement of Common Ground (SOCG) between Cherwell District Council, National Highways and Oxfordshire County Council was agreed in January 2026.

4.3 Among the conclusions in the SOCG, it was agreed in Section 4.2:
" *The transport evidence supporting the Local Plan, including modelling and topic papers, is considered robust and consistent with Department for Transport guidance and NH's planning principles. It provides a sound basis for assessing the plan's impact on the SRN."*

5 Conclusions

5.1 This Rebuttal addresses the concerns raised in the representations submitted on behalf of the Mid-Cherwell Neighbourhood Plan Forum **[REP1-021]**.

5.2 The model adequately represents existing traffic in the Heyford area, and in accordance with Department for Transport guidance is proportionate to the issue at hand.

5.3 The fitness for purpose of the model is demonstrated by validation against independent count data at a 2016 level, and also from the results of the present year validation at a 2023 level.

5.4 National Highways have reviewed the model and consider it is robust and consistent with Department for Transport guidance and NH's planning principles.

WYG Transport Planning

Oxfordshire County Council

Bicester Transport Model

Local Model Validation Report

WYG
Executive Park
Avalon Way
Anstey
Leicester
LE7 7GR

RT099211-001
Issue 2

March 2017
Copyright © WYG EPT Ltd 2017

REPORT CONTROL

Document:	Local Model Validation Report
Project:	Bicester Transport Model
Client:	Oxfordshire County Council
Job Number:	A099211
File Origin:	N:\Projects\A099211 - Bicester Transport Model Revalidation\reports\RT099211-001 LMVR_Issue2.docx

Document Checking:

Primary Author	[redacted]	Initialled:	[redacted]
Contributor		Initialled:	
Review By		Initialled:	

Issue	Date	Status	Checked for Issue
1	24-02-17	Draft	[redacted]
2	31-03-2017	Final	

Contents

1	INTRODUCTION	7
2	DATA SOURCES	8
3	TRAFFIC MODEL DESCRIPTION	10
4	MODEL STRUCTURE	14
5	MODEL ASSIGNMENT PROCEDURES	23
6	MODEL CALIBRATION AND VALIDATION	31
7	REALISM TESTING	40
8	SUMMARY AND CONCLUSION	43

Tables

Table 1 – Passenger Car Unit Conversion Factors 19

Table 2 - Value of Time (pence per minute) 21

Table 3 – VDM Internal Highway Assignment Convergence Statistics 25

Table 4 - Matrix Estimation: Matrix Totals 28

Table 5 – Significance of Matrix Estimation Changes Criteria 29

Table 6 – Matrix Estimation Trip Length Distribution Statistics 29

Table 7 – Matrix Estimation Sector to Sector Percentage Differences 30

Table 8 - Peak Period Convergence Statistics 32

Table 9 - Trip Matrix Validation 33

Table 10 – Flow Validation Criteria and Acceptability Guidelines 33

Table 11 – Turning Flow Calibration Results 34

Table 12 – Car Link Flow Calibration Results 35

Table 13 – Total Vehicle Link Flow Calibration Results 35

Table 14 – Car Link Flow Validation Results 36

Table 15 - Total Vehicle Link Flow Validation Results 36

Table 16 - Summary Journey Time Validation Results – AM Peak 37

Table 17 - Summary Journey Time Validation Results – Inter Peak 38

Table 18 - Summary Journey Time Validation Results – PM Peak 38

Table 19 – Car Fuel Cost Elasticities 41

Table 20 – Car Journey Time Elasticities 42

Figures

Figure 1 – Study Area

Figure 2 – Peak Period Trends

Figure 3 – Zone Boundary Plan

Figure 4 – Extent of Saturn Simulation/Buffer Coding

Figure 5 – Turn Flow Calibration Results

Figure 6 - Link Flow Validation Results

Figure 7a-d – Journey Time Validation Results

Appendices

Appendix A – Transport Survey Data

Appendix B – Modelled Speed Flow Curves

Appendix C – Matrix Estimation Analysis

Appendix D – Cordon and Screenline Data

Appendix E – Turn Count Calibration

Appendix F – Link Count Calibration

Appendix G – Link Flow Validation

Appendix H – Journey Time Validation

1 INTRODUCTION

1.1 BACKGROUND

1.1.1 Bicester is a historic market town located within Cherwell District, Oxfordshire located close to the strategic road network where the M40 meets the A41 and A34 and with good rail links to Oxford, London and beyond.

1.1.2 The Cherwell Local Plan identifies Bicester and Banbury as key locations for future growth and as such, there will be a significant increase in housing and employment in Bicester throughout the Local Plan period. The impact of the proposed developments on the highway infrastructure was evaluated in order to develop suitable mitigation measures as part of the Local Plan process.

1.1.3 The Bicester Transport model will be used for future year forecasting of traffic conditions in Bicester. This includes testing of proposed highways and development schemes in order to assess their comparative viability and to aid economic assessment. As such, it is important to ensure the model complies with modelling guidance and protocols outlined in the Design Manual for Roads and Bridges (DMRB) and with the Department for Transport (DfT) WebTAG guidance on modelling.

1.1.4 The model developed in 2016/17 supersedes the previous Bicester highway model; the model in its old form was sufficient to provide evidence for the Local Plan process, but did not comply with WebTAG guidance for transport models which is required in order to develop major schemes. Therefore, in order to ensure that WebTAG compliant processes can be undertaken the model has been enhanced and updated to a 2016 Base year.

1.1.5 The report details the process used to update the Bicester Transport Model and details its compliance with WebTAG guidance in order to provide a suitable platform for future year forecasting.

2 Data Sources

2.1 2016 TRAFFIC SURVEY DATA

2.1.1 2016 traffic surveys were commissioned by Oxfordshire County Council (OCC) in June 2016. These comprised 19 classified turning counts (CTC), 25 Automatic Traffic Counts (ATC) of which 13 included detailed vehicle classification and 4 two-way journey time survey routes.

2.1.2 The ATC surveys were carried out for a period of 2 weeks commencing Wednesday 15th June which is in a neutral month.

2.1.3 CTC's were carried out on Wednesday 15th June for sites 1-19. Data was collected for a 12 hour period from 7am to 7pm. Analysis of the counts was carried out against the ATC data to ensure that the day of survey was considered representative of local traffic conditions.

2.1.4 An additional count was carried out at the Bucknell Road/ Howes Lane junction on Thursday 11th August 2016. This survey date fell within the school holiday period. Analysis of the count data showed that the survey was consistent with the count carried out at the Bucknell Road/Lords Lane junction directly to the north although the traffic flows in the AM peak were seen to be lower than the June survey.

2.1.5 Two additional classified turning count surveys carried out in February 2016 were obtained by OCC. These covered the junctions of the A41/Ploughley Road and A41/B4011, Ambrosden.

2.1.6 Journey time surveys were also collected on Wednesday 15th June to ensure consistency with the turning count information. Surveys were collected using the moving observer method in accordance with WebTAG guidance. Due to a minor accident involving the yellow route survey vehicle, the yellow route surveys were repeated on Thursday 16th June. The survey company advised that traffic conditions on the revised day of survey were consistent with those on the 15th June. The incident involving the survey vehicle did not impact the other survey routes due to the limited severity of the incident with the exception of Run 4 of the Green Route which has been removed from the survey data set.

2.1.7 Traffic count locations and journey time routes and the summary survey data used in the modelling as supplied by OCC are given in **Appendix A**.

2.1.8 In addition to the 2016 counts detailed above, data was extracted from the Highways England (HE) WebTRIS data site. At the time of data extraction, the most up to date data available was for May 2016. This data was extracted and the weeks containing a bank holiday removed which includes that covering the local school half term. Data used was for average Tuesday to Thursday traffic flows for each of the remaining weeks to provide a representative set of data. Survey location and associated data are provided in **Appendix A**.

2.2 PUBLIC TRANSPORT DATA

2.2.1 Public transport surveys have not been carried out explicitly. Rather, data has been collated from the Traveline National Dataset (TNDS) for buses and ATOC (Association of Train Operating Companies) for rail journeys.

2.3 2011 CENSUS DATA

2.3.1 Data from the 2011 census has been used extensively in the model. Census output areas have been used as zones in the study area. Census output areas contain roughly 100-200 households and so represent a refined aggregation of population for the model. Further away from Bicester the output areas have been aggregated according to census higher groupings and ultimately by local authority, county and region.

2.3.2 Output areas from the census are focused on residential population. As a result some output area zones in Bicester that covered employment areas were quite large. Where this occurred these zones were subdivided in order to better represent trips on the network and to maintain a consistent zone size in the study area.

2.3.3 Structural data from the census has been used for the production and attraction levels for the gravity model. The structural data for each zone included:

- Number of households;
- Car availability; and
- Workplace population.

3 Traffic Model Description

3.1 INTRODUCTION

3.1.1 WebTAG guidance requires that analysis of a transport scheme is proportionate to the scheme being tested. Due to the volume of growth planned for Bicester and the likely size/monetary value of any schemes required to mitigate the associate transport impact, full Variable Demand Modelling would be required at the future year forecasting stage. In order to achieve this, linked demand, public transport and highway assignment models have been created as part of the Bicester Transport Model in order to satisfy current guidance. The following sections detail the setup of the models.

3.2 STUDY AREA

3.2.1 The model study area is centred on Bicester town, covers the Cherwell District and embraces the geographic area within which reassignment effects due to congestion or potential mitigation measures to be tested are likely to be significant. The study area is shown in **Figure 1**. This shows that the modelled highway network in the study area extends from the M40/A422 to the north, A41/A4157 to the east, A418 to the south and A44 to the west. The area also includes M40 Junctions 9 and 10, the M40, A34, A41 and A43 trunk routes and all significant local roads, for example the A4095 from London Oxford Airport through to Bicester and local roads through Middleton Stoney and Ambrosden.

3.2.2 Train lines and stations, and bus routes and stops are modelled in the study area and beyond. These represent the competing routes using other modes of transport.

3.3 SOFTWARE

3.3.1 The SATWIN 11 (Version 11.3.03) suite of programs has been used for the highway network modelling. This was the most up to date version of the SATURN software available at the start of modelling. The SATURN software has been retained from the previous modelling (albeit a more up to date version) in order to retain overarching consistency between the approach used previously.

3.3.2 SATURN (Simulation and Assignment of Traffic to Urban Road Networks) is a suite of flexible network analysis programs developed at the Institute for Transport Studies, University of Leeds and distributed by Atkins Limited since 1981. It has six basic functions:

- as a combined traffic simulation and assignment model for the analysis of road-investment schemes ranging from traffic management schemes over relatively localised networks through to major infrastructure improvements;
- as a "conventional" traffic assignment model for the analysis of much larger networks;
- as a simulation model of individual junctions;
- as a network editor, data base and analysis system;
- as a matrix manipulation package for the production of, e.g., trip matrices; and
- as a trip matrix demand model covering the basic elements of trip distribution, modal split etc.

3.3.3 SATURN can analyse relatively minor network changes such as changes to junction controls, bus-only streets, etc where evaluation requires a detailed analysis of traffic behaviour at junctions. It is also a traffic assignment model with the capability to deal with large conurbations, regional or even national models or it can be used as a pure junction simulation model.

3.3.4 The PTV VISUM (Version 15.00-11) suite of modelling programs has been used in the generation of Public Transport model information. This software has been used to supplement the main SATURN model due to its superior functionality in importing public transport data base information.

3.3.5 Both suites of software are DfT approved programs for carrying out transport modelling.

3.4 MODELLED TIME PERIODS

3.4.1 Analysis of the traffic survey data by OCC indicated that the local highway evening peak (PM) occurred between 17:00 and 18:00. The Inter peak has been taken as the average hour between 11:00 and 15:00 based on this analysis in order to avoid the peak shoulders after the morning (AM) peak and before the PM peak.

3.4.2 The AM peak period was harder to define across the whole modelled network area. Analysis of the count data indicated that there were three relatively distinct trends in the AM peak. These are illustrated graphically on **Figure 2** and consist of an early peak on the strategic road network, a 'middle' peak on radial routes into/out of Bicester and a later peak internal to

Bicester itself. These appear to correspond to differing trip purposes and trip lengths and were affected by local highway network conditions. For example, longer commute trips using the Strategic Road Network (SRN) to say, Oxford, would need to travel earlier in order to reach their destination for the 'usual' peak commute period due to the longer trip length and hence journey time taking into account congestion on the M40 and A34. These are likely to be dominated by external trips to Bicester which pass through the study area but do not necessarily have an origin or destination within the detailed model area. Middle trip length trips, such as a commute trip from a Cherwell area into Bicester would not need to travel as early as the longer distance trips in order to reach their destination giving the 'middle' peak at the radial sites. Trips internal to Bicester in the morning peak have much shorter trip lengths and contribute significantly to the later peak showing in central Bicester in the morning peak. This would include local commute trips and also education trips which are generally short distance trips.

3.4.3 Given how the model will be used for future year forecasting, it was agreed with OCC that the most suitable time period to be modelled would need to cover a significant portion of the middle/later peak period but take into account the earlier SRN peak. As such, the modelled AM peak period covers the 07:30 to 08:30 hour as the main modelled period with additional pre peak assignments to be carried out for the previous hour and the highway conditions from the pre peak passed to the peak hour assignment using the SATURN inbuilt PASSQ functionality. For consistency, the PASSQ option has been used for all three peak periods to ensure any local conditions such as congestion due to retail trips that are often higher in the Inter Peak or school pick up trips that occur prior to the main PM peak are also passed to the relevant peak hour models.

3.4.4 The PASSQ option requires a factor to be input for each modelled time period to scale the peak hour matrices to the pre peak totals based on survey information. This has been carried out using the surveyed count data separately for each modelled user class.

3.5 ZONING SYSTEM

3.5.1 A revised zoning system corresponding to the Office for National Statistics (ONS) 2011 Census Output Area (OA) digitised boundaries has been used in the model covering the whole of the country. The zone system covers the core area of Bicester in detail, where each zone corresponds to a census output area, the rest of the County in a little less detail and the rest of mainland Britain increasingly coarsely with increasing distance from the study area. This

level of spatial coverage is needed so as to capture the full extent of travel into and through the area including the destinations which compete with it for jobs, schools, shopping etc. The full extent of these trips is needed for the distribution models to operate properly.

3.5.2 The zoning system is shown on **Figure 3**. This is split into Internal (Bicester and the surrounding Cherwell District) and External areas outside of this area.

3.5.3 Zone connectors for zones outside the study area have been included with travel times and distances to where the zones connect to the modelled highway network based on GIS Network Analyst (new route) data in order to model full journey details as required by the variable demand model.

4 Model Structure

4.1 INTRODUCTION

4.1.1 The model constitutes four main parts:

i) The Public Transport (PT) Network;

ii) The Variable Demand Module (VDM);

iii) Fixed Trips Matrices; and

iv) The Highway Network.

4.1.2 The PT network is used to produce matrices of zone to zone travel times. They are not used directly to provide model assignments of PT flows but provide journey time data between origins and destinations for use in the VDM assessment allowing modal shift to be evaluated.

4.1.3 The Variable Demand Module produces synthetic trip matrices based on WebTAG data, the 2011 Census Data, National Travel Survey and Journey to Work Information in conjunction with the spatial data of the number of houses, the number of employees, the number of pupils and the retail floorspace within each zone being modelled. These matrices are initial estimates prior to the Matrix Estimation and cover the car and PT user classes with one or both Trip Ends within the Internal modelled area.

4.1.4 The Fixed Trip Matrices cover the car user class with both trip ends in the External area, Light Goods Vehicles (LGV) and Heavy Goods Vehicles (HGV). These are not affected by the VDM process but are used in the highway network assignments.

4.1.5 The Highway Network consists of the Saturn modelled road network including strategic and local routes within the modelled area.

4.1.6 Further information on each of the above four elements of the model are given in the following sections.

4.2 PUBLIC TRANSPORT NETWORK

4.2.1 A Public Transport (PT) network has been constructed using the PTV VISUM software. This incorporates data from the Traveline National Dataset (TNDS) for buses and ATOC (Association of Train Operating Companies) for rail journeys. The PT network is used to produce matrices of zone to zone travel times for use in the VDM assessment. They are not used directly to provide model assignments of PT flows.

4.2.2 All bus routes passing through the study area are coded in the PT model. All passenger rail services that stop within the study area have also been coded in the model. The PT routes are timetable based.

4.2.3 Skim matrices of 'perceived journey time' have been taken for the AM, IP and PM periods. The variable demand model then uses these PT network costs with the highway network costs to balance travel demand by mode.

4.3 VARIABLE DEMAND MODEL

4.3.1 The demand model is a bespoke variable demand model written in Python. It includes the demand responses of mode choice and distribution choice. The model has been set up as a nested logit model using logsum costs through the hierarchy as set out in WebTAG. Mode choice is above distribution choice as this is generally less sensitive.

4.3.2 There are ten trip purpose types modelled, both home-based (HB) and non home-based (NHB):

- HB Commute;
- HB Employer's Business;
- HB Education;
- HB Shopping;
- HB Rest (i.e. the rest of the HB purposes).
- NHB Commute;
- NHB Employer's Business;
- NHB Education;
- NHB Shopping;
- NHB Rest (i.e. the rest of the NHB purposes).

4.3.3 These purposes are aggregated into Commute, Employer's Business and Other for assignment.

4.3.4 The demand model form is an Absolute model. An Absolute model form has been used rather than an incremental form due to the large relative size of new developments proposed for the Bicester area compared to the existing settlement size. The new developments will increase the size of Bicester by 40-50%.

4.3.5 The demand model has been calibrated against road side interview data from 2007 and using the 2011 Census data/journey to work data. Synthetic Production and Attraction (PA) matrices for a 24 hour period are produced by the demand model, disaggregated by trip purpose, car availability and mode.

4.3.6 The output Production and Attraction prior matrices derived from the demand model are converted to AM, IP, PM and the Off Peak (OP) period origin destination matrices according to derived proportions. Peak period to peak hour factors for each purpose are used to calculate the peak hour matrices for the ten purpose types. (Note that the OP period is used within the VDM model only and not assessed as part of the highway assignment validation.)

4.3.7 The ten purpose OD highway matrices are aggregated for assignment giving the following car matrices: Car Commute; Car Employers Business and Car Other for each peak period where Car Other sums the Education, Shopping and Rest purpose types.

4.3.8 Additional matrices covering the vehicle types of Car External (i.e. through trips without an Origin or Destination trip end within the Bicester study area); Light Goods Vehicles and Heavy Goods Vehicles have been created based on the RSI surveys, the 2016 surveys and Highways England's long term automatic counter site data (WebTRIS). This is covered in more detail in later sections. These three matrices are not affected by the VDM process.

4.3.9 Values for generalised cost have been calculated and input into the model for each vehicle class based on current WebTAG values.

4.4 FIXED TRIP MATRICES

4.4.1 Three user classes are included in the modelling as fixed trip matrices. These are cars where both trip ends are outside of the internal model area i.e. externals and Light Goods Vehicles (LGVs) and Heavy Goods Vehicles (HGVs) for both External and Internal movements.

4.4.2 Examples of external trips are longer distance trunk road trips travelling on the M40. These trip ends are not generated by the variable demand model and as such, are not directly affected by changes in the provision of say, the number of houses in Bicester although they are able to reroute within the highway assignment model. These external trips are further split into two groups, the Strategic Road Network (SRN) trips that use the M40, A34 and A43 and non-SRN trips which use the local road network.

4.4.3 The SRN trips are assumed to travel between loading points on the Highway Network for the M40 north of J10, A43 near Brackley, the M40 south of J9, the A34 and the A41 east of M40.

4.4.4 Long term data from the HE WebTRIS database has been extracted in order to derive the total number of SRN trips. A small area matrix estimation procedure has been used to assign these between the loading points in a matrix format. Generation of the SRN external trips are taken outside of the area where the B430 meets the M40 at J10 and the A34 west of M40 Junction 9 so that any long distance trips that reroute to this known local rat run (via Weston on the Green) are included in the matrix building.

4.4.5 RSI survey information provides more details than automatic counts such as trip purpose and origin and destination data. Therefore, the trips using the A41 east of M40 J9, which would pass through the A41 RSI site, are removed from these matrices in order to use the more data rich information for the RSI survey. This also allows any of the trips using the A41 with an Origin or Destination in the Internal area to be affected by the VDM process.

4.4.6 Based on the modelled study area, the non-SRN External trips that do not pass through an RSI site (other than the B430 trips already discussed) have not been estimated partly due to lack of additional data. This is not considered a deficiency of the model and does not impact WebTAG compliancy as the extents of the model are not fully modelled for local trips but network calibration has been carried out to ensure these routes are not unduly desirable. This is discussed in further detail later in this report.

4.4.7 For the non-SRN external Car trips and any LGV and HGV trips that pass through the RSI locations, the Origin/Destination (O/D) data have been plotted using the GIS software ArcView, to allow each point to be aggregated into the modelled zoning system before being converted into a zone matrix format.

4.4.8 Logic checks have been carried out on the raw data by examining the plotted origins and destinations against the location of the survey site. A judgement was made as to whether the surveyed trips were likely to have passed through the survey site in travelling to/from their origin/destination. Spurious results have been removed from the records.

4.4.9 The vehicles surveyed at the RSI sites were recorded by vehicle type using the standard six COBA classifications; motorcycle, car/taxi, LGV, OGV1, OGV2, and bus/coach. A manual classified count (MCC) was carried out at the RSI locations in 2016 to allow each sampled vehicle type to be expanded to the total number of trips passing through the site. Expansion factors by vehicle type for each period to be included in the model have been calculated.

4.4.10 In deriving the expanded Inter peak O/D data from the RSI information, the 6 hour Inter peak period RSI results have been used in combination with average inter peak hour traffic flows to produce a 1 hour average inter peak matrix.

4.4.11 At the RSI survey sites the data was collected for inbound (towards Bicester) traffic only. The non-surveyed direction has been derived by reversing the trip origins and destinations observed in the opposing peak hour, that is, the non-surveyed AM peak hour origins and destinations are the transpose of the PM surveyed flows. The volume of traffic differs during the day so the origins and destinations have been factored according to the observed flow in that time period.

4.4.12 The resultant SRN and non-SRN matrices are combined to produce the following fixed trip matrices for each peak period:

- Car External;
- LGV; and
- HGV.

4.4.13 The HGV O/D trip matrices for each modelled time period have been converted to PCUs using the factors in **Table 1** below which have been derived from 2016 classified count information.

Period:	HGV Vehicle to PCU Factor
Morning Peak	1.797
Inter Peak	1.794
Evening Peak	1.779
Daily	1.793

Table 1 – Passenger Car Unit Conversion Factors

4.4.14 The PCU value factor varies by peak period based on the relative weighting of Other Goods Vehicles 1 and 2 observed during each peak period based on the classified surveys. A higher proportion of OGV2 corresponds to a higher PCU factor.

4.5 HIGHWAY NETWORK

4.5.1 The existing 2007 Saturn highway network has been reviewed and used as a basis for the 2016 network. A coding methodology was introduced so that all links and junctions are coded in a consistent manner across the network e.g. the same input capacity values were used for all left turns at three arm priority junctions that have a similar level of visibility. The area of coverage has been expanded, enhanced and where appropriate, updated for infrastructure that has been built between 2007 and 2016.

4.5.2 In accordance with WebTAG Unit M3.1, a standard set of speed flow curves based on the COBA (DMRB Vol. 13, Section 1, Part 5, Chapter 9) speed-flow relationships have been introduced for all links over 100m outside of the Bicester Urban area. The speed flow curves used are given in **Appendix B**. Fixed cruise speeds have been used in the fully modelled urban areas in order to reflect mean speeds on a link.

4.5.3 Simulation coding is used for the whole of the Bicester urban area and the surrounding local network. Simulation coding allows detailed representation of each junction to be modelled. Buffer network coding is used to represent less important study links such as outlying areas that provide alternative routes around the study area. Buffer coding does not allow junction details to be incorporated directly but uses speed flow curves to represent the delay incurred at junctions. The extent of the simulation/buffer coding is illustrated in **Figure 4**.

4.5.4 AM, Inter and PM peak models have been constructed in tandem to ensure consistency between the networks. Each of the three peak models draws on a single peak un-specific network file ensuring that the network is consistent between the three periods.

Supplementary peak period traffic signal files allow peak specific data at signalised junctions to be called independently by the relevant peak period model. Where available, traffic signal information, as supplied by OCC and Highways England, was used directly. Where this was in the form of variable traffic signal timings such as for those junctions operated by a SCOOT or MOVA system, average peak hourly timings were calculated as Saturn is unable to vary the timings within the modelled time period. For newly signalised junctions where no data was available, timings were taken from the relevant Transport Assessment. Any other junctions were assessed in either the traffic signal specialist program LINSIG for complex junctions or within SATURN itself for simple junctions using experience, best practice and surveyed information to produce suitable timings. Checks were carried out on the junctions within an initial model assignment to ensure each junction was performing to an appropriate standard.

4.5.5 Public Transport routes and frequencies have been coded directly into the Saturn models by peak, based on data supplied by OCC. These routes allow Saturn to model the fixed bus routes as vehicles but do not model public transport passengers individually.

4.5.6 Weight and height restrictions have been defined based on available restrictions data which restricts the user class heavies for using the appropriate links within the network.

4.5.7 A Saturn 'Scenic' file has been derived for the networks. This applies a weighted penalty based on link classification and distance to links outside of the Bicester urban area. Longer distance trips are more likely to use higher classification road types e.g. long distance trips predominantly use the Strategic Road Network. Applying this scaled time penalty by link type allows vehicles' longer distance routes to obey the hierarchy. A multiplier of 0.01 is used for Car External and LGV trips while a multiplier of 0.2 is used for HGV trips based on calibration of the network recognising that heavy vehicles are unlikely to use local roads except to access/egress higher classification and trunk road links. No multiplier is used for internal car trips in order to allow these to user any route within the simulation link area.

4.5.8 Modelled zones are connected to the highway network using centroid connectors. These are placed at appropriate points to allow the traffic from each zone to load onto the network in a realistic manner.

4.5.9 A Park and Ride (P&R) site has been included accessing the A41/Vendee Drive roundabout. The Saturn network cannot specifically model mode interchange from car to P&R bus. In order to simulate this interchange of mode, zone connectors to the zones that are served by the P&R site are attached to links within the P&R area. These links have been calibrated

against the manual classified count at the junction by applying travel time penalties for each zone centroid by peak to simulate the time taken to access and utilise the P&R facilities and the subsequent bus travel time.

4.5.10 For the six user classes, Car Commute, Car Employers Business, Car Other, Car External, LGV and HGV, Values of Time (VOT) and Vehicle Operating Costs (VOC) were calculated by using the July 2016 Values of Time and Operating Costs from WebTAG guidance. The values of time used are summarised in **Table 2** below.

Vehicle Type	Purpose	AM	IP	PM	OP
Car	Employer's Business	56.70	55.41	54.51	54.96
	Commute	14.05	13.95	13.75	13.77
	Other	17.85	18.56	19.11	18.69
	External	23.14	23.14	23.14	23.14
LGV	Work	23.36	23.36	23.36	23.36
	Non-work	16.51	16.51	16.51	16.51
HGV	Work	34.05	34.05	34.05	34.05

Table 2 - Value of Time (pence per minute)

4.5.11 Values of Time and Distance are converted to Pence Per Minute and Pence Per Kilometre ratios for direct input into the Saturn files by peak period and user class.

4.5.12 Generally, Saturn model assignments are based on the representation of a single modelled hour. Where significant volumes of traffic travel in the pre peak, this can underestimate the conditions in the network during the peak hour as over capacity queues should already be present in the peak hour network. To allow sufficient traffic to be present, the PASSQ function in Saturn can be used to provide a 'warm up' period to the peak. This has the advantage over preloading of flows/queues into the peak model of allowing changes in network conditions in the future (such as new infrastructure) to alter the level/location of queues present at the start of the peak.

4.5.13 PASSQ works by assigning a matrix to the network for the pre-peak period. The residual queues at the end of the first time period and any suppressed traffic (i.e. trips that cannot complete their journey within the pre peak due to queuing upstream) are calculated. The suppressed trips are then added within Saturn as "fixed" link and turn flows in the second time period. In addition, the residual queues per turn are converted into an effective fixed

flow (in PCUs/hr) which is added to the link entry flow for the purposes of the assignment. The residual queues from the previous time period are also taken into account in the delay calculations for the current time period for those specific turning movements.

4.5.14 The PASSQ network in this case is identical to the peak period but with the peak hour matrices factored by user class based on observed information for the traffic surveys.

5 Model Assignment Procedures

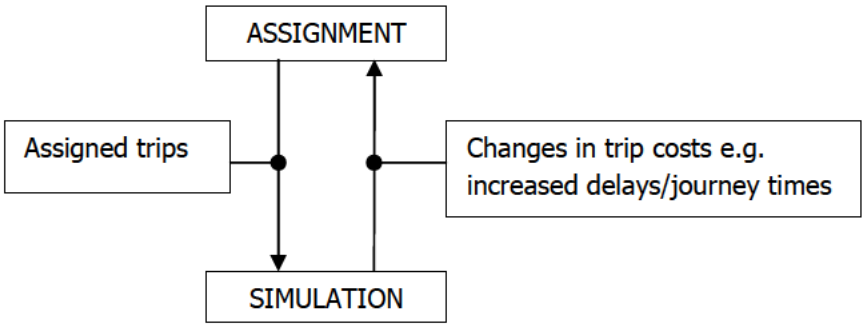
5.1.1 The model assignment procedures consist of staged iterative loops. Initially, the public transport time skims are fed to the VDM. This then uses the input structural data as described in **Section 4.3**, and time/distance skims from the highway network to produce initial estimates of the demand matrices by user class (UC).

5.1.2 The initial estimated user class 1-3 matrices are 'stacked' with the fixed trip highway matrices (UC4-6) and then assigned within the Saturn Highway model.

5.1.3 The assignment procedure used is based on Wardrop's Principle of traffic equilibrium, where traffic routes through a congested network such that the cost of travel on all routes used between each Origin Destination (OD) pair is equal to the minimum cost of travel and all unused routes have equal or greater cost. The cost of travel is calculated after all traffic has been loaded onto the network based on the total assigned traffic per link and the cost-flow curves.

5.1.4 After each assignment the trip information is simulated in the model producing a new set of costs that include the effects of all of the trips being made e.g. increased travel time due to congestion. This can make the previously chosen route less attractive as its cost increases and alternative routes may become more attractive as their cost may not increase to the same extent. The revised costs are fed back into the assignment stage and the trips in the next increment are assigned based on the new costs. The process is summarised below:

Model Assignment-Simulation Loop



5.1.5 This feedback process is repeated in order to achieve a Wardrop Equilibrium such that no traveller may reduce his generalised cost by using an alternative route for any OD pair. In this instance, the feedback process is repeated until a stable situation is reached i.e. an equilibrium assignment or more often, user defined equilibrium criteria are met (when a total equilibrium situation cannot be achieved). How close to the equilibrium assignment the model reaches is defined in terms of convergence.

5.1.6 Assignment within the highway model uses Origin-Based Assignment (OBA) (Bar Gera 2002). OBA is effectively an intermediate between Link-based and Path-based Assignment in that it stores the link flows as generated by each individual origin:

$$V_a^i = \sum_i T_{ij} P_{ija}$$

where:
Pija is the proportion of the trips Tij from origin i to destination j which use link a.

5.1.7 The main theoretical advantage of OBA is that it provides virtually exact solutions to the Wardrop Equilibrium without requiring either excessive memory or excessive processing time, eliminating 'non-optimal' paths (and associated 'noise') which are routine by-products of the standard Frank-Wolfe based solutions for equilibrium. In practice, exact solutions may still be difficult to obtain, particularly for complex assignments where an iterative process with a junction simulation model is involved and convergence criteria are used to stop the assignment once a sufficiently close solution is reached.

5.1.8 WebTAG defines two set of convergence measures: Proximity to the assignment objective (i.e. how close is it to equilibrium?) and Stability of the model outcomes between consecutive iterations. The following criteria are set:

Proximity measures:

- Delta (δ) < 0.1%; and
- %GAP (if relevant) < 0.1%.

Stability measures:

- RAAD in flows < 0.1%; and
- %Links with Flows changing by less than 1% > 98% ("P1"); and
- %Links with Costs changing by less than 1% > 98% ("P2").

5.1.9 It is recommended that, in addition to satisfying the convergence measures described above, assignment model iterations should continue until at least four successive values of 'P1' or 'P2' in excess of 98% have been obtained.

5.1.10 For Origin Based Assignment both proximity and stability should be satisfied with the proximity measures seen as the most valuable indicators of overall model convergence. Although at least one of the Stability measures is required by WebTAG, it is acknowledged in the SATURN guidance that a problem with the use of %Links with Flows changing by less than 1% (P1) as the stopping criterion is that it may depend on the "accuracy" of the assignment method used. Thus if one uses an extremely accurate assignment such as OBA the true difference in link flows between loops n-1 and n will be obtained (to a good approximation) whereas with a less accurate technique, such as the default Frank-Wolfe algorithm, there is less scope for the assignment in loop n to move away from the assignment in loop n-1; hence the differences in link flows tend to be reduced and P1 measure increased. Hence, despite being a better assignment method with better convergence properties, OBA may perversely appear less convergent than Frank-Wolfe in terms of P1.

5.1.11 The converged assignments are then skimmed for time and distance and the skims fed back into the VDM iterative process. The VDM model iterations continue until convergence is reached at this outer level.

5.1.12 The convergence statistics for the last of the highway assignments is given in **Table 3** below. Please note that the SATURN suite of programs does not output P2.

Model	Assignment-Simulation Loops	Iterations	Proximity		Stability	
			δ (%)	GAP (%)	% Flows (P)	RAAD
AM	10	5	0.00001	0.00004	99.9	0.007
Inter	7	3	0.00002	0.00002	99.8	0.006
PM	11	4	0.00001	0.00012	99.9	0.010
Off	5	3	0.00013	0.00013	99.8	0.004

Table 3 – VDM Internal Highway Assignment Convergence Statistics

5.1.13 The recommended criterion for measuring VDM convergence i.e. between the demand and supply models is the demand/supply gap defined by:

$$\frac{\Sigma_a C(X_a{}^n)\left|D(C(X_a{}^n)) - X_a{}^n\right|}{\Sigma_a C(X_a{}^n)X_a{}^n} * 100$$

Where:

$X_a{}^n$ is cell *a* in the previous assignment matrix for iteration *n*

$C(X_a{}^n)$ is cell *a* in the generalised costs resulting from assigning that matrix

$D(C(X_a{}^n))$ is cell *a* in the matrix output by the demand model based on costs. In models where the matrix output by the demand model is used directly as the assignment matrix (as will usually be the case in variable demand models), this will be equal to $X_a{}^{n+1}$ 9.

a represents every combination of origin, destination, demand segment/user class, time period and mode.

5.1.14 WebTAG Unit M2 Section 6.3 recommends a %GAP value of less than 0.1% with more problematic systems nearer to 0.2% for the Variable Demand Model convergence. The %Gap for the converged VDM is 0.0015% which is well within the criteria.

5.1.15 Therefore, convergence for both the internal (Highway Assignment) and outer (VDM) loops satisfies the WebTAG criteria.

5.1.16 Using the post VDM highway assignments, a calibration check was carried out against the turning movements collected as part of the data collection exercise. It was observed that the overall level of calibration was not within acceptable limits. This was expected due to the synthetic nature of the matrix building process through the VDM.

5.1.17 Network checks were carried out to ensure the level of calibration was not due to routing errors caused by coding deficiencies within the network. Once these were completed, the results from the VDM process were passed to a matrix estimation process in order to calibrate the matrices.

5.2 MATRIX ESTIMATION

5.2.1 As model calibration could not be achieved directly using the synthetic based matrices matrix manipulation has been carried out using a matrix estimation process in order to satisfy the calibration and, later, validation criteria.

5.2.2 Matrix estimation is the adjustment of prior trip matrices so that, when assigned, the resulting flows accord more closely with counts used as constraints in the process.

5.2.3 It is recommended in WebTAG that link counts from ATC's over a two week period are used in the matrix estimation process or that any classified turning counts are used to weight the ATC flows. Due to the availability of data and the format of the VDM process, it was determined that the classified turning count data collected be used within the matrix estimation process in order to refine the matrix at the most detailed level possible. To ensure that the turning count data was suitable for use, the aggregate link flows have been compared against the ATC's collected at the same locations over a two week period by OCC. Details of the comparisons made are given in the OCC traffic survey data collection report.

5.2.4 The Saturn program allows multiple user classes of the same vehicle type to be estimated against count data that observed as the aggregate vehicle type. In this case, the purpose types of Car Commute, Car Employers Business, Car Other and Car External are retained as separate matrices but estimated against the combined car vehicle type. This allows the individual trip purposes to be retained for use in the VDM process for future year forecasting.

5.2.5 LGV and HGV matrices are both separate user and vehicle classes and as such are estimated independently.

5.2.6 The prior and resultant matrix totals post matrix estimation (ME2) are given in **Table 4** below. The figures identified as Prior matrices represent the synthetic matrices produced as part of the VDM process.

AM	Prior	Post ME2	Diff	% Diff
Car	22680	21506	-1175	-5.2%
LGV	2388	2557	169	7.1%
HGV	3371	3400	30	0.9%
IP	**Prior**	**Post ME2**	**Diff**	**% Diff**
Car	16528	15501	-1027	-6.2%
LGV	1625	1942	317	19.5%
HGV	3794	4034	240	6.3%
PM	**Prior**	**Post ME2**	**Diff**	**% Diff**
Car	28642	26625	-2017	-7.0%
LGV	2250	2576	326	14.5%
HGV	2202	2476	274	12.5%

Table 4 - Matrix Estimation: Matrix Totals

5.2.7 WebTAG requires that the changes brought about by matrix estimation should be carefully monitored by the following means:

- scatter plots of matrix zonal cell values, prior to and post matrix estimation, with regression statistics (slopes, intercepts and R^2 values);
- scatter plots of zonal trip ends, prior to and post matrix estimation, with regression statistics (slopes, intercepts and R^2 values);
- trip length distributions, prior to and post matrix estimation, with means and standard deviations; and
- sector to sector level matrices, prior to and post matrix estimation, with absolute and percentage changes.

5.2.8 The changes brought about by matrix estimation should not be significant. The criteria by which the significance of the changes brought about by matrix estimation may be judged are given in **Table 5** below.

Measure	Significance Criteria
Matrix zonal cell values	Slope within 0.98 and 1.02 Intercept near zero R^2 in excess of 0.95
Matrix zonal trip ends	Slope within 0.99 and 1.01 Intercept near zero R^2 in excess of 0.98
Trip length distributions	Means within 5% Standard deviations within 5%
Sector to sector level matrices	Differences within 5%

Table 5 – Significance of Matrix Estimation Changes Criteria

5.2.9 The matrix estimation statistics for matrix zonal cell values and trip ends by vehicle class are given in **Appendix C**.

5.2.10 The statistics indicate that the matrix estimation does not in general meet the criteria for slope or R^2 for any vehicle class or peak period. The intercept criterion is met in all cases. **Section 5.2.16** below discusses the implications of these results in more detail.

5.2.11 The trip length distributions statics are given in **Table 6** below:

	AM			IP			PM		
Car	**Prior**	**Post**	**% Change**	**Prior**	**Post**	**% Change**	**Prior**	**Post**	**% Change**
Mean	41.9	40.6	-3.2%	38.6	34.1	-11.6%	45.6	40.8	-10.6%
Standard Deviation	46.5	46.3	-0.5%	51.7	49.0	-5.3%	43.9	43.4	-1.1%
LGV	**Prior**	**Post**	**% Change**	**Prior**	**Post**	**% Change**	**Prior**	**Post**	**% Change**
Mean	61.6	52.2	-15.3%	65.7	56.8	-13.6%	62.0	60.3	-2.7%
Standard Deviation	62.7	56.8	-9.4%	63.3	61.9	-2.2%	63.4	62.5	-1.4%
HGV	**Prior**	**Post**	**% Change**	**Prior**	**Post**	**% Change**	**Prior**	**Post**	**% Change**
Mean	108.9	128.6	18.1%	75.7	74.4	-1.6%	113.3	116.9	3.2%
Standard Deviation	97.6	106.1	8.7%	75.6	74.9	-0.8%	97.0	106.8	10.1%

Table 6 – Matrix Estimation Trip Length Distribution Statistics

5.2.12 As can be seen from **Table 6** above, the trip distribution criteria are not met in all cases.

5.2.13 The sector to sector percentage difference statics are given in **Table 7** below:

		AM			IP			PM		
From	**To**	**Car**	**LGV**	**HGV**	**Car**	**LGV**	**HGV**	**Car**	**LGV**	**HGV**
Internal	Internal	3%	74%	1%	18%	133%	30%	33%	57%	50%
Internal	External	8%	-16%	-10%	-16%	73%	2%	-15%	31%	-23%
External	Internal	-15%	17%	-42%	-22%	26%	0%	-12%	5%	-13%
External	External	-8%	3%	6%	-6%	1%	6%	-14%	10%	14%

Table 7 – Matrix Estimation Sector to Sector Percentage Differences

5.2.14 Again, **Table 7** above indicates that the sector to sector criterion is not met in all cases.

5.2.15 Scatter plots and trip length distribution plots are given in **Appendix C**.

5.2.16 The statistics discussed above are not unexpected due to the nature of the synthetic model. This uses trip length distributions from the 2011 census data in the matrix building process that are unlikely to fully reflect the mixed nature of the local conditions and in particular, potentially underestimates the frequency of shorter distance trips by private vehicle modes and the need to estimate the internal to internal LGV and HGV movements where limited observed data was available. The reduction in external-internal trips and corresponding increase in internal-internal trips uses the observed classified vehicle data at the RSI sites which effectively form a cordon around Bicester. The use of this observed data and the replication of the trips through the cordon sites is therefore important to ensure that the model is accurately replicating the correct sector to sector movements.

5.2.17 It is widely accepted that the strict WebTAG thresholds for matrix estimation are intrinsically hard to achieve with an absolute model such as this one. However, the absolute form of the model design is required to forecast the very high levels of growth planned for Bicester. The ME2 statistics are a trade-off and so are considered acceptable in this case.

5.2.18 Therefore, although the matrix estimation process does not meet all of the various criteria, it is considered that the post estimation matrices are fit for purpose provided the cordon calibration discussed later in this report meets WebTAG criteria.

5.2.19 These resultant matrices were then assigned to the highways networks as discussed in the next section.

6 Model Calibration and Validation

6.1 INTRODUCTION

6.1.1 Model calibration and validation is the method of comparing the modelled network with the observed conditions in order to form an opinion of how well the one represents the other. DfT WebTAG guidance (Tag Unit M3.1: Highways Assignment Modelling) sets out criteria against which models are compared which can be used as acceptability guidelines. Calibration involves the adjustment of the transport model to match observed data whereas data used for validation purposes are independent of those used for calibration.

6.1.2 The criteria are aggregated into five sections namely:

- Assignment Convergence
- Trip Matrix Validation
- Assignment Calibration
- Link Flow Validation
- Journey Time Validation

Each of these is addressed below.

6.2 ASSIGNMENT CONVERGENCE

6.2.1 The model was 'run' with the appropriate matrix and network data files for each time period. The number of assignment loops, which assess all potential O/D paths, simulation loops, which assess each O/D path and calculates speeds and delays, and the number of assignment-simulation loops, which combines the first two processes, can all be greater than 1 before an acceptable equilibrium state is achieved. The following paragraphs provide an analysis of relevant convergence criteria.

6.2.2 As discussed in **Section 5**, WebTAG sets out the assignment convergence criteria required to ensure a stable model. **Table 8** below presents the convergence statistics from the three peak period models.

Model	Assignment-Simulation Loops	Iterations	Proximity		Stability	
			δ (%)	GAP (%)	% Flows (P)	RAAD
AM	8	4	0.00000	0.00002	99.97	0.006
Inter	5	2	0.00000	0.00000	99.70	0.008
PM	11	2	0.00000	0.00004	99.35	0.012

Table 8 - Peak Period Convergence Statistics

6.2.3 The convergence statistics presented above indicate that all three models converge well within accepted limits.

6.3 TRIP MATRIX VALIDATION

6.3.1 Trip matrix validation is assessed by comparing the percentage differences between modelled flows and counts at screenline level. The criterion and acceptability guideline for screenline flows is that all or nearly all screenlines should show differences between modelled and observed flows of less than 5%.

6.3.2 Trip Matrix calibration and validation were assessed here using a cordon around Bicester for calibration and a north/south screenline for validation.

6.3.3 The cordon consists of the road side interview sites using the classified turning count link totals. Please note that this does not form a 'water tight' cordon but does cover all of the significant links.

6.3.4 The screenline uses the ATC counts which were not classified. The screenline runs northeast-northwest along the railway line capturing the main north-south movements. Note that the Banbury Road site has been excluded from this assessment as investigation of this count indicated it was not consistent with the surrounding counts which indicated a problem with this location. As such, the screenline is not continuous but is still considered a good indicator for trip matrix validation.

6.3.5 **Table 9** gives the % difference for modelled and observed data with further details given in **Appendix D**.

Cordon	Inbound	Outbound
AM	1.9%	-1.5%
IP	3.2%	-1.0%
PM	4.3%	1.8%
Screenline	**Northbound**	**Southbound**
AM	3.7%	-5.9%
IP	1.5%	-2.5%
PM	5.4%	5.3%

Table 9 - Trip Matrix Validation

6.3.6 As can be seen from **Table 9** above, the cordon comparison is within 5% for each peak and direction. The screenline comparison also compares well but with three of the six marginally over the 5% criteria but all below 6%. Of these, the PM peak is above 5% for both north and southbound flows and indicates that the matrix is likely to be slightly higher than the observed for north-south movements within Bicester.

6.4 LINK FLOW AND TURNING MOVEMENT CRITERIA

6.4.1 The acceptability guidelines for calibration and validation are set out in DfT WebTAG Unit M3.1 and are summarised in **Table 10** below:

Criteria	Description of Criteria	Acceptability Guideline
1	Individual flows within 100 veh/h of counts for flows less than 700 veh/h	>85% of cases
	Individual flows within 15% of counts for flows from 700 to 2,700 veh/h	>85% of cases
	Individual flows within 400 veh/h of counts for flows more than 2700 veh/h	>85% of cases
2	GEH < 5 for individual flows	>85% of cases

Table 10 – Flow Validation Criteria and Acceptability Guidelines

6.4.2 The following notes are referenced to the above table in WebTAG:

- the above criteria should be applied to both link flows and turning movements;
- the acceptability guideline should be applied to link flows but may be difficult to achieve for turning movements;

- the comparisons should be presented for cars and all vehicles but not for light and other goods vehicles unless sufficiently accurate link counts have been obtained;
- the comparisons should be presented separately for each modelled period; and
- it is recommended that comparisons using both measures are reported in the model validation report.

6.4.3 The GEH (Geoffrey E. Havers) error statistic has been used to compare the observed and modelled flows. It is defined as:

$$\sqrt{\left[\frac{(Y - X)^2}{0.5(Y + X)}\right]}$$

where X = observed flow
Y = modelled flow

6.5 TURNING COUNT CALIBRATION

6.5.1 As discussed previously, where available, observed turning movements were included in the matrix estimation data set in order to produce the most accurate matrices possible with the available data. The assigned modelled flows have then been compared against the turning movement data set for calibration. The turning movement calibration results are shown on **Figure 5**, presented in detail in **Appendix E** and summarised in **Table 11** below:

Turn Calibration	Count	Cars		Total Vehicles			
		< 5 GEH	% < 5.0 GEH	Count	< 5 GEH	% < 5.0 GEH	Meets Criteria?
AM Peak	262	239	91%	274	241	88%	Yes
Inter Peak	262	255	97%	262	252	96%	Yes
PM Peak	262	235	90%	274	240	88%	Yes

Table 11 – Turning Flow Calibration Results

6.5.2 Please note that additional turning counts were available and included in the data set for the AM and PM peak period compared to the Inter peak period although these were not disaggregated by vehicle type.

6.5.3 As can be seen from **Table 11**, all counts achieve a high level of calibration for all three peak periods. Overall the results demonstrate very good model turning movement calibration for all three time periods.

6.6 LINK FLOW CALIBRATION

6.6.1 In order to assess the link flow calibration, the turning movements from the calibration data set were summed to provide approach links at each junction. This was carried out as a small difference in each turn from a particular link might not be outside the 5 GEH level but the sum of the differences for all possible turning movements from a link might place the link as a whole outside of the criteria. Further, a number of link flows were used in the calibration process that were not used in the matrix estimation process by turn, for example, the link flows on the strategic road network. The model has been calibrated against 172 total vehicle counts in the AM and PM peak periods and 166 counts in the Inter peak based on the availability of survey data.

6.6.2 The link flow calibration results are presented in detail in **Appendix F** and summarised in **Tables 12 and 13** below for Cars and Total Vehicles respectively:

	Car			
Link Calibration	**Count**	**< 5 GEH**	**% < 5.0 GEH**	**GEH Criteria?**
AM Peak	158	143	92%	Yes
Inter Peak	158	148	97%	Yes
PM Peak	158	151	96%	Yes

Table 12 – Car Link Flow Calibration Results

	Total Vehicle						
Link Calibration	**Count**	**< 5 GEH**	**% < 5.0 GEH**	**Meets GEH Criteria?**	**Link Flow No.**	**Link Flow %**	**Link Flow Criteria?**
AM Peak	172	157	91%	Yes	156	91%	Yes
Inter Peak	166	160	96%	Yes	165	99%	Yes
PM Peak	172	159	92%	Yes	160	93%	Yes

Table 13 – Total Vehicle Link Flow Calibration Results

6.6.3 As can be seen from the above tables, the model calibrates well for link flows in all three peak periods.

6.7 HIGHWAY LINK FLOW VALIDATION

6.7.1 The purpose of validation is to ensure that modelled flows are compatible with observed independent transport survey data, that is, data that have not been used in the matrix building or calibration processes.

6.7.2 The model validation process has been carried out with reference to DfT WebTAG Unit M3.1 guidelines for links. Each of the three modelled time periods have been validated against independent data using the validation criteria as set out in **Table 10**. The model has been validated against 66 total vehicle counts in the AM and PM peak periods and 60 counts in the Inter peak based on the availability of survey data. These have also been assessed for the Car vehicle type in accordance with WebTAG guidance where possible. The locations and results for counts used for validation are shown on **Figure 6**. A plan reference number is also shown on **Figure 6** which corresponds to the detailed validation data for each site presented in **Appendix G**.

6.7.3 The results are summarised in **Tables 14** and **15** below:

	Car			
Link Validation	**Count**	**< 5 GEH**	**% < 5.0 GEH**	**GEH Criteria?**
AM Peak	19	16	84%	No
Inter Peak	19	14	74%	No
PM Peak	19	18	95%	Yes

Table 14 – Car Link Flow Validation Results

Link Validation	**Total Vehicles**							
	Count	**< 5 GEH**	**% < 5.0 GEH**	**Meets GEH Criteria?**	**Link Flow No.**	**Link Flow %**	**Link Flow Criteria?**	**Validates?**
AM Peak	66	60	91%	Yes	60	91%	Yes	Yes
Inter Peak	60	56	93%	Yes	56	93%	Yes	Yes
PM Peak	66	59	89%	Yes	58	88%	Yes	Yes

Table 15 - Total Vehicle Link Flow Validation Results

6.7.4 **Table 14** shows link flow validation based on cars only does not meet the validation criteria. This is likely affected by the low number of counts available with data disaggregated by vehicle type and that these counts were predominantly Automatic Traffic Counter sites which

cannot always reliably differentiate between cars and light goods vehicles. As such, this is not considered to indicate a poor level of validation as long as the total vehicle counts meet the criteria and other model calibration/validation is good.

6.7.5 It can be seen from **Table 15** above that the three peak period models validate within the GEH and Link flow criteria for total vehicles. Therefore, the model is considered to be validated for link flows.

6.8 JOURNEY TIME VALIDATION

6.8.1 Modelled journey times have been validated against surveyed journey times for four two-way routes shown in **Figures 7a** to **d**

6.8.2 In accordance with WebTAG criteria the modelled journey times have been compared to the average observed journey times and assessed against percentage difference criteria. The journey time validation results are summarised in **Tables 16 to 18** below with detailed results provided in **Appendix H**.

AM Peak		Average Time (s)						
Route	**Direction**	**Observed**	**Modelled**	**Diff**	**%Diff**	**Within 15%**	**Within 60s**	**Validate?**
Blue	NB	723	760	37	5%	yes	yes	yes
	SB	741	806	65	9%	yes	no	yes
Green	EB	531	485	-46	-9%	yes	yes	yes
	WB	714	531	-183	-26%	no	no	no
Purple	NB	559	533	-26	-5%	yes	yes	yes
	SB	615	618	3	0%	yes	yes	yes
Yellow	CW	770	739	-31	-4%	yes	yes	yes
	Anti-CW	708	728	20	3%	yes	yes	yes
								88%

Table 16 - Summary Journey Time Validation Results – AM Peak

Inter Peak		Average Time (s)						
Route	Direction	Observed	Modelled	Diff	%Diff	Within 15%	Within 60s	Validate?
Blue	NB	831	743	-88	-11%	yes	no	yes
	SB	877	764	-113	-13%	yes	no	yes
Green	EB	513	456	-57	-11%	yes	yes	yes
	WB	549	472	-77	-14%	yes	no	yes
Purple	NB	538	522	-16	-3%	yes	yes	yes
	SB	540	535	-5	-1%	yes	yes	yes
Yellow	CW	725	694	-31	-4%	yes	yes	yes
	Anti-CW	654	692	38	6%	yes	yes	yes
								100%

Table 17 - Summary Journey Time Validation Results – Inter Peak

PM Peak		Average Time (s)						
Route	Direction	Observed	Modelled	Diff	%Diff	Within 15%	Within 60s	Validate?
Blue	NB	803	818	15	2%	yes	yes	yes
	SB	916	808	-108	-12%	yes	no	yes
Green	EB	603	530	-73	-12%	yes	no	yes
	WB	707	563	-144	-20%	no	no	no
Purple	NB	671	606	-65	-10%	yes	no	yes
	SB	644	581	-63	-10%	yes	no	yes
Yellow	CW	763	810	47	6%	yes	yes	yes
	Anti-CW	681	771	90	13%	yes	no	yes
								88%

Table 18 - Summary Journey Time Validation Results – PM Peak

6.8.3 **Tables 16 to 18** demonstrate that the models reproduce observed journey times accurately with 88% or more within 15% or 60 seconds of the observed total journey times for all three time periods as required by WebTAG.

7 REALISM TESTING

7.1 BACKGROUND

7.1.1 It is important to ensure that a variable demand model behaves 'realistically' and responds correctly to known cost changes. The model demand responses are tested by changing the various components of travel costs and times and checking that the overall demand response is appropriate.

7.1.2 Section 6 of (WebTAG) Unit M2 Variable Demand Modelling (Jan 2014) details the required realism testing of transport models. The two realism tests required by the guidance are the Car Fuel Cost Elasticity Test and the Car Journey Time Elasticity Test. The formula to calculate elasticity is given below.

7.1.3 Demand elasticity is calculated using the following formula:

$$e = (\log T_1 - \log T_0) / (\log C_1 - \log C_0), \qquad (1)$$

where

e = Demand Elasticity,

T_0 = Total car-kilometres (or car trips) before the change,

C_0 = Car fuel cost (or journey time cost) before the change,

T_1 = Total car-kilometres (or car trips) after the change,

C_1 = Car fuel cost (or journey time cost) after the change,

log = The natural logarithm function.

7.1.4 Realism testing is designed to demonstrate that the VDM part of the model is behaving as expected. All realism tests check the elasticity of demand in response to a change in one of the controlling parameters.

7.1.5 The realism test for car fuel cost involves artificially increasing the cost of fuel by 10% and re-running the whole transport model to convergence. If a 4% reduction in car-kilometres compared to the original model run is evident, then the elasticity of demand in response to car fuel cost is (about) -0.2.

7.1.6 The realism test for car journey time involves artificially increasing the cost of car journey time by 10% and re-running the whole transport model for a single iteration. If a 5%

reduction in car trips compared to the original model run is evident, then the elasticity of demand in response to car journey time cost is (about) -0.5.

7.1.7 Empirical studies suggest that in real life the car fuel cost elasticity is roughly -0.3. The WebTAG guidance requires that the overall model response yields a car fuel cost elasticity of between -0.35 and -0.25.

7.1.8 WebTAG guidance requires that the model responses yield a car journey time elasticity of between -2.0 and 0.

7.2 CAR FUEL COST REALISM TESTING

7.2.1 The calculated car fuel cost elasticities from the model are to be compared with observed fuel cost elasticities, which have been based on research. The observed elasticities are based on revealed preference surveys implying the model should be run to convergence. The realism test has been undertaken for the base year 2016.

7.2.2 The car fuel cost realism test requires that the fuel-only part of the cost in the demand model is increased by 10%. The model is then run to convergence. The resultant change in car-kms is then used to calculate the car fuel cost elasticity.

7.2.3 **Table 19** below sets out the car fuel-cost elasticities from the realism testing of the variable demand model.

	AM	**IP**	**PM**
Car Fuel Cost Elasticity	-0.317	-0.298	-0.340

Table 19 – Car Fuel Cost Elasticities

7.2.4 The overall car fuel-cost elasticity should lie between -0.35 and -0.25. As can be seen from **Table 19** above, the fuel cost elasticity criteria are met for all three peak periods.

7.3 CAR JOURNEY TIME REALISM TESTING

7.3.1 It is also a requirement to test the car journey time elasticities to ensure they are not too high. WebTAG guidance states that the car journey time demand elasticity should be between -2 and 0. It is important to note that this demand elasticity is tested with a single iteration of the variable demand model since the underpinning research is based on stated preference surveys.

7.3.2 A 10% increase was then applied to the time cost coefficient to represent a 10% increase in journey times across the network. The demand model was then run for one iteration and the change in car trips calculated. These yielded the car journey time elasticities as presented in the table below:

Peak	Demand Elasticity
AM	-0.075
IP	-0.049
PM	-0.092

Table 20 – Car Journey Time Elasticities

7.3.3 WebTAG guidance indicates that journey time elasticities should lie in the range -2.0 to 0. As can be seen from **Table 20**, the journey time elasticity of each demand segment satisfies this requirement.

7.4 CONCLUSION

7.4.1 The demand response of the model to journey time was then investigated by running the model with an increased cost coefficient for time. The elasticities were well within the acceptable maximum as given in WebTAG.

7.4.2 The demand model has passed the required WebTAG realism tests and so is considered to have responses that are realistic. Therefore the model is fit to be used for forecasting future travel demand.

6.8.4 The exceptions are the Green route westbound in the AM and PM peak period. However, as discussed in Section 2, journey time surveys for the yellow route were conducted on a different day to the rest of the surveys. The section of the green route that does not validate is also covered by the Yellow Route but show differing observed journey times over the two survey dates. It is not therefore possible to achieve validation for both the Green and Yellow routes in the north/east bound direction and as such it is not considered to indicate a substandard model.

6.8.5 All three peak periods show greater than 85% of journey times within the DMRB criteria of 15% of observed journey times and therefore validation to journey times is considered excellent for all three peak periods.

6.9 MODEL VALIDATION SUMMARY

6.9.1 Overall it is considered that given the excellent model calibration results, good link flow validation and excellent journey time validation, the 2016 model accurately reflects the 2016 base year conditions.

8 Summary and Conclusion

8.1 SUMMARY

8.1.1 This report has detailed the updating and validation of the Bicester Transport model to a 2016 base year.

8.1.2 The model constitutes four main parts:

i) The Public Transport (PT) Network;

ii) The Variable Demand Module (VDM);

iii) Fixed Trips Matrices; and

iv) The Highway Network.

8.1.3 The VDM produces synthetic matrices for assignment. The VDM model converges both for the internal highway assignment and outer loops within the recommended Department for Transport (DfT) WebTAG criteria.

8.1.4 As model calibration could not be achieved directly using the synthetic based matrices matrix manipulation has been carried out using a matrix estimation process in order to satisfy the calibration and, later, validation criteria. Monitoring of the Matrix Estimation Changes indicated that some of the indicators were outside of the strict WebTAG criteria. However this is deemed to be a consequence of the absolute form of the model design required to forecast the very high levels of growth planned for Bicester. It is widely accepted that the Matrix Estimation criteria are difficult to achieve for absolute form models and the results are therefore considered acceptable.

8.1.5 Highway assignments using the final matrices converged within WebTAG criteria.

8.1.6 Turning flow calibration and car link flow calibration results met WebTAG criteria.

8.1.7 Although link flow validation results were less that recommended in the AM and Inter Peak for the Car user class in isolation this is accepted as likely affected by the low number of counts available with data disaggregated by vehicle type and that these counts were predominantly Automatic Traffic Counter sites which cannot always reliably differentiate between cars and light goods vehicles and does not indicate a poor level of validation.

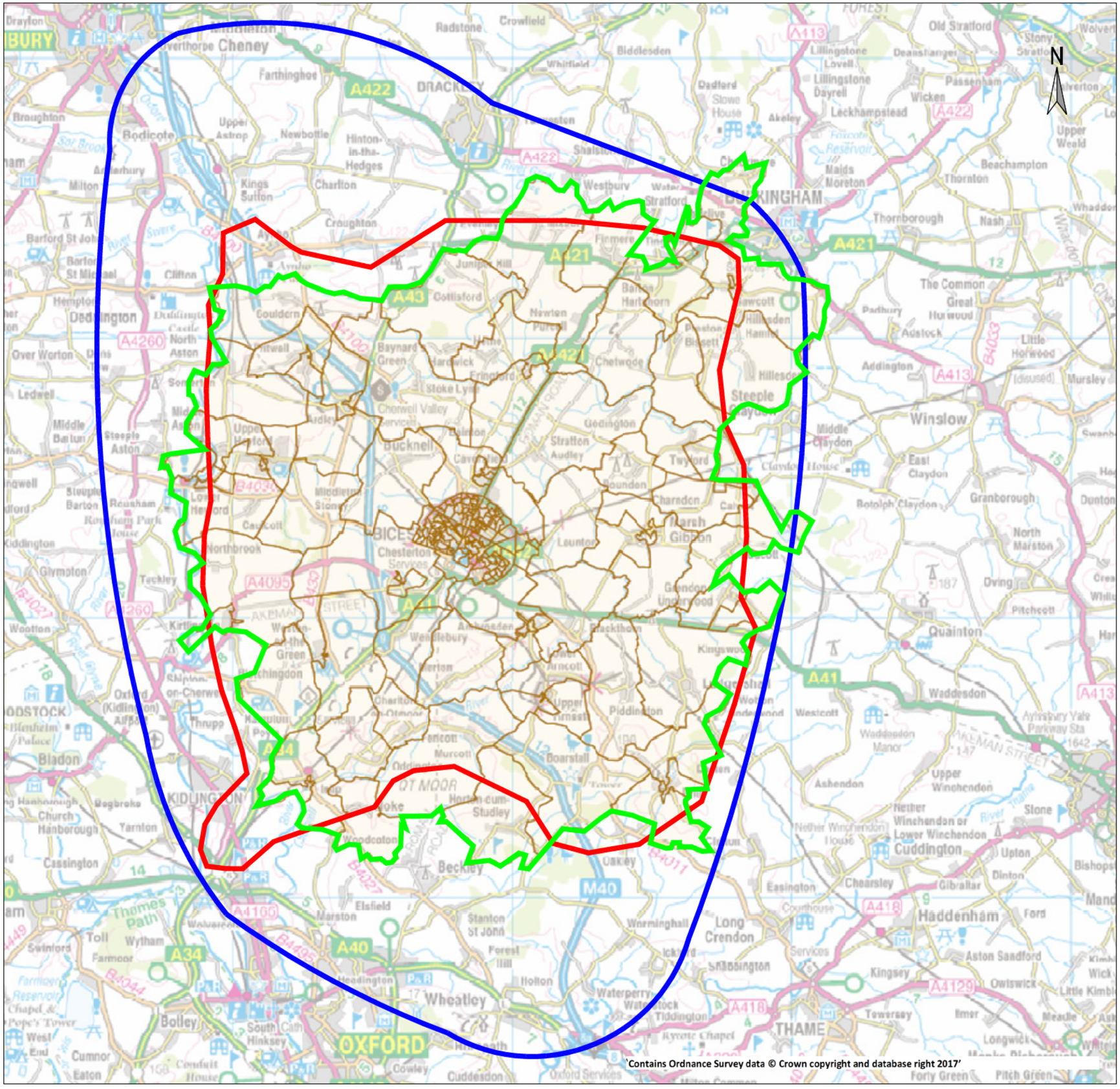
8.1.8 Total vehicle link flow validation results were within WebTAG criteria.

8.1.9 Modelled journey times validate well against independent observed data, meeting WebTAG criteria.

8.1.10 The realism testing has produced the appropriate demand response parameters required during the demand forecasting according to the WebTAG guidelines.

8.1.11 As a result of this base year model validation and realism testing it is considered that the Bicester transport model represents a robust basis for use in future year transport forecasting and for the purpose of operational, economic and environmental assessments.

DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS



'Contains Ordnance Survey data © Crown copyright and database right 2017'

Key:

- Study area
- Extent of SImulatIon Network CodIng
- Extent of 'Internal' Modelled Area
- Boundaries for Internal Zones

External zones lie outside of the internal zone area and cover the rest of mainland Britain.

Buffer network coding lies outside of the simulation coding boundary but within the study area with the exceptIon of addItIonal buffer feeder lInks for the strategic road network..

REV	DESCRIPTION	BY	CHK	APP	DATE

Client

Oxfordshire County Council

EXECUTIVE PARK
AVALON WAY
ANSTEY
LEICESTER
LE7 7GR
TEL: +44 (0)116 234 8000
FAX: +44 (0)116 234 8001
e-mail: leicester@wyg.com

Project:

BICESTER TRANSPORT MODEL

Drawing Title:

Figure 1
Study Area

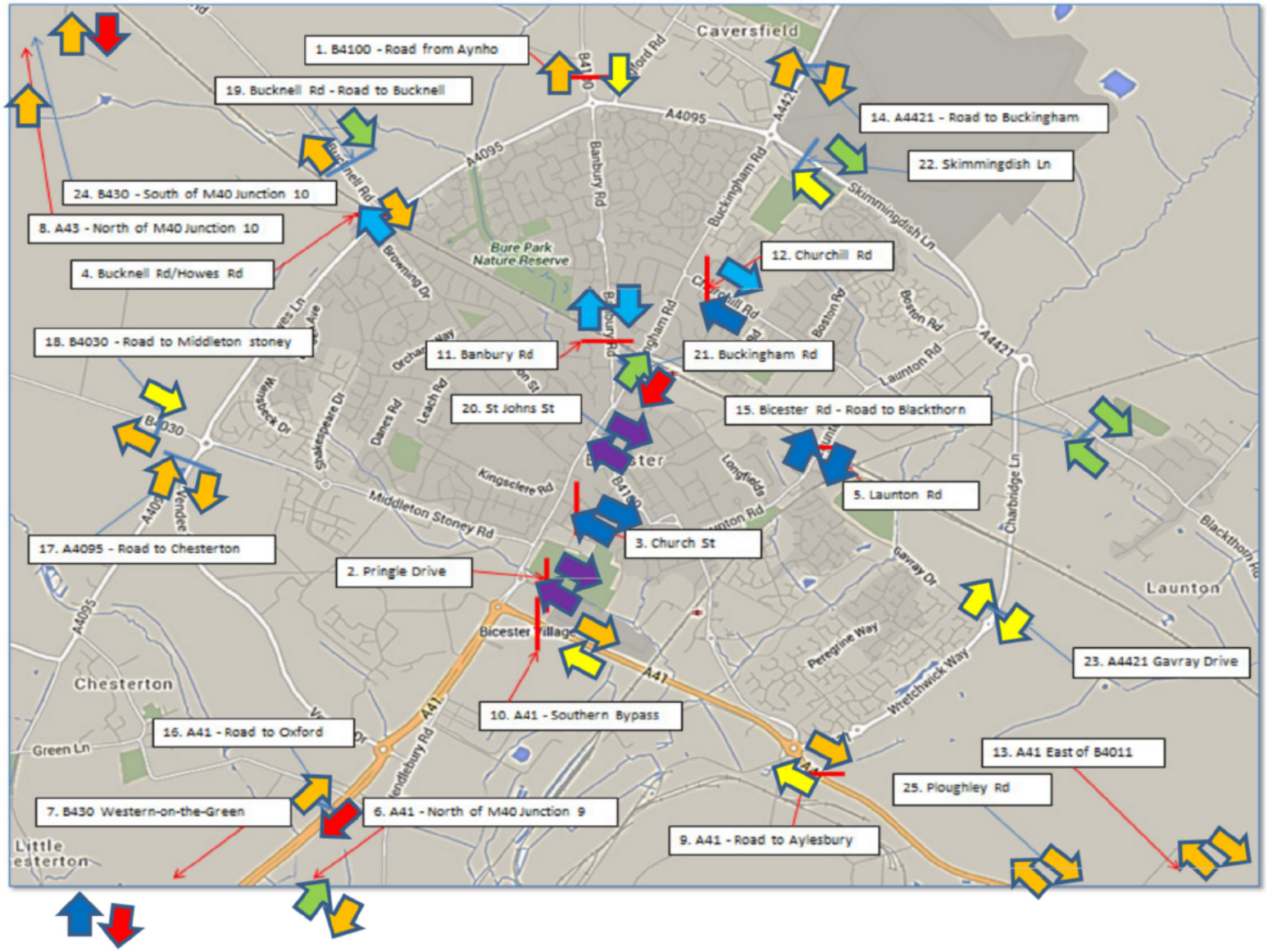
Scale @ A	Drawn	Date	Checked	Date	Approved	Date
NTS	RJW	16/03/17	GD	16/03/17	CRS	16/03/17

Project No.	Office	Type	Drawing No.	Revision
A099211	35	18	010	-

© WYG Group Ltd.

FILENAME: N:\PROJECTS\A099211 - BICESTER TRANSPORT MODEL REVALIDATION\ACAD\DWGS\A099211-010 STUDY AREA.DWG | PLOTTED BY: RACHAEL.WALKER | PLOTTED DATE: 16 March 2017 11:52:29

DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS



Key:

AM peak hour by time starting:

- 07:00
- 07:15
- 07:30
- 07:45
- 08:00
- 08:15
- 08:30

Arrow Indicates direction of travel

Notes:
Possible directional transposition of Site 4 to be confirmed.

Site 21 shows earlier peak than surrounding sites. This to be confirmed by turning counts/long term data as under counting due to queuing over loop possible at this location.

General trend shows earlier peak for external to Bicester trips, Intermediate peak on strategic links circulating Bicester and later peaks nearer to town centre. This trend is logical when considering patterns of local trips compared to longer distance commute trips.

REV	DESCRIPTION	BY	CHK	APP	DATE

Client

Oxfordshire County Council

EXECUTIVE PARK
AVALON WAY
ANSTEY
LEICESTER
LE7 7GR
TEL: +44 (0)116 234 8000
FAX: +44 (0)116 234 8001
e-mail: leicester@wyg.com

Project:

BICESTER TRANSPORT MODEL REVALIDATION

Drawing Title:

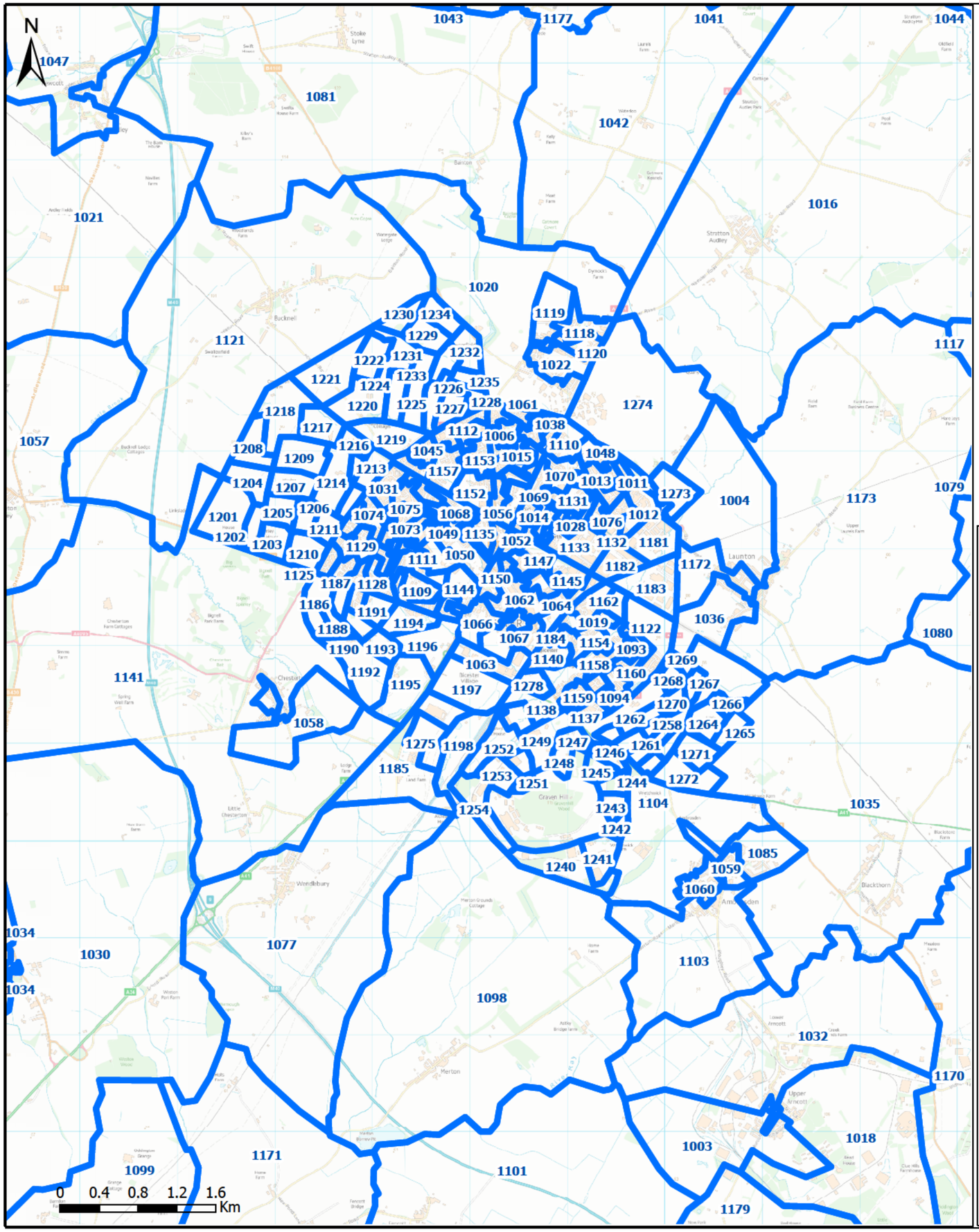
Figure 2
Peak Hour Directions by Site

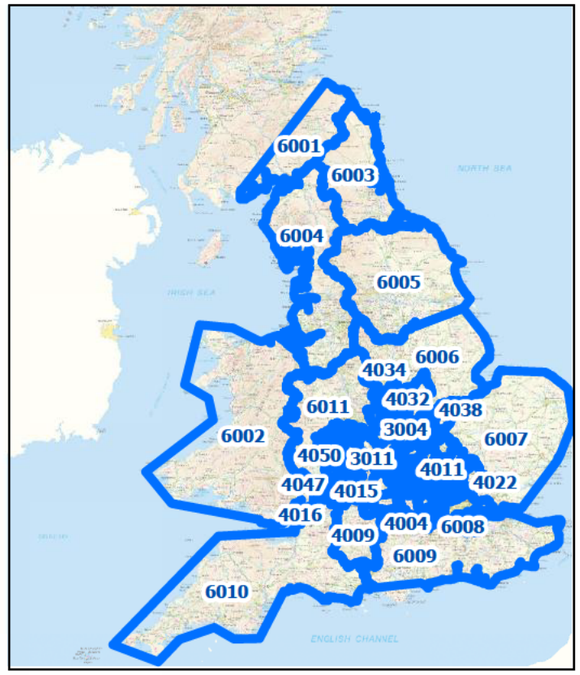
Scale @ A4	Drawn	Date	Checked	Date	Approved	Date
NTS	RW	08/08/16	CS	08/08/16	CS	08/08/16

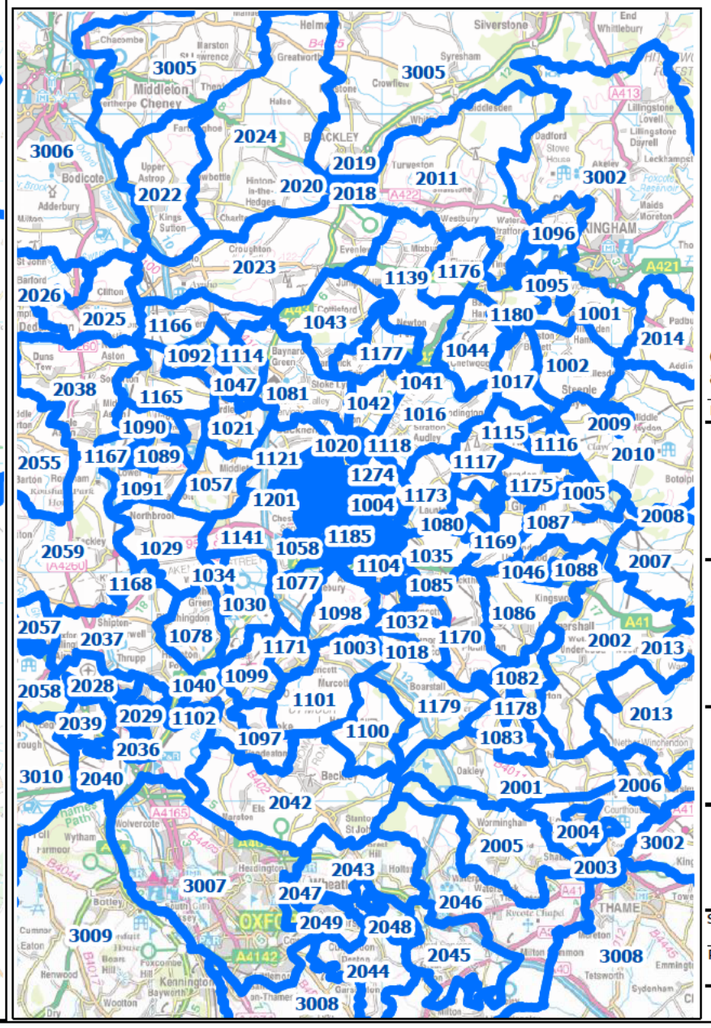
Project No.	Office	Type	Drawing No.	Revision
A099211	35	18	001	-

© WYG Group Ltd.

FILENAME : N:\PROJECTS\A099211 - BICESTER TRANSPORT MODEL REVALIDATION\ACAD\DWGS\A099211-001 LYR.P02.2 ROADDIRECTIONS.DWG | PLOTTED BY : RACHAEL.WALKER | PLOTTED DATE : 05 April 2017 09:45:14







Legend

Bicester Model Zones

Contains Ordnance Survey data © Crown copyright and database right 2013.

REV	DESCRIPTION	BY	CHK	APP	DATE

Client:

OXFORDSHIRE COUNTY COUNCIL

EXECUTIVE PARK
AVALON WAY
ANSTEY
LEICESTER
LE7 7GR
TEL: +44 (0)116 234 8000
FAX: +44 (0)116 234 8001
e-mail: leicester@wyg.com

Project:

Bicester Transport Model Revalidation

Drawing Title:

Figure 3

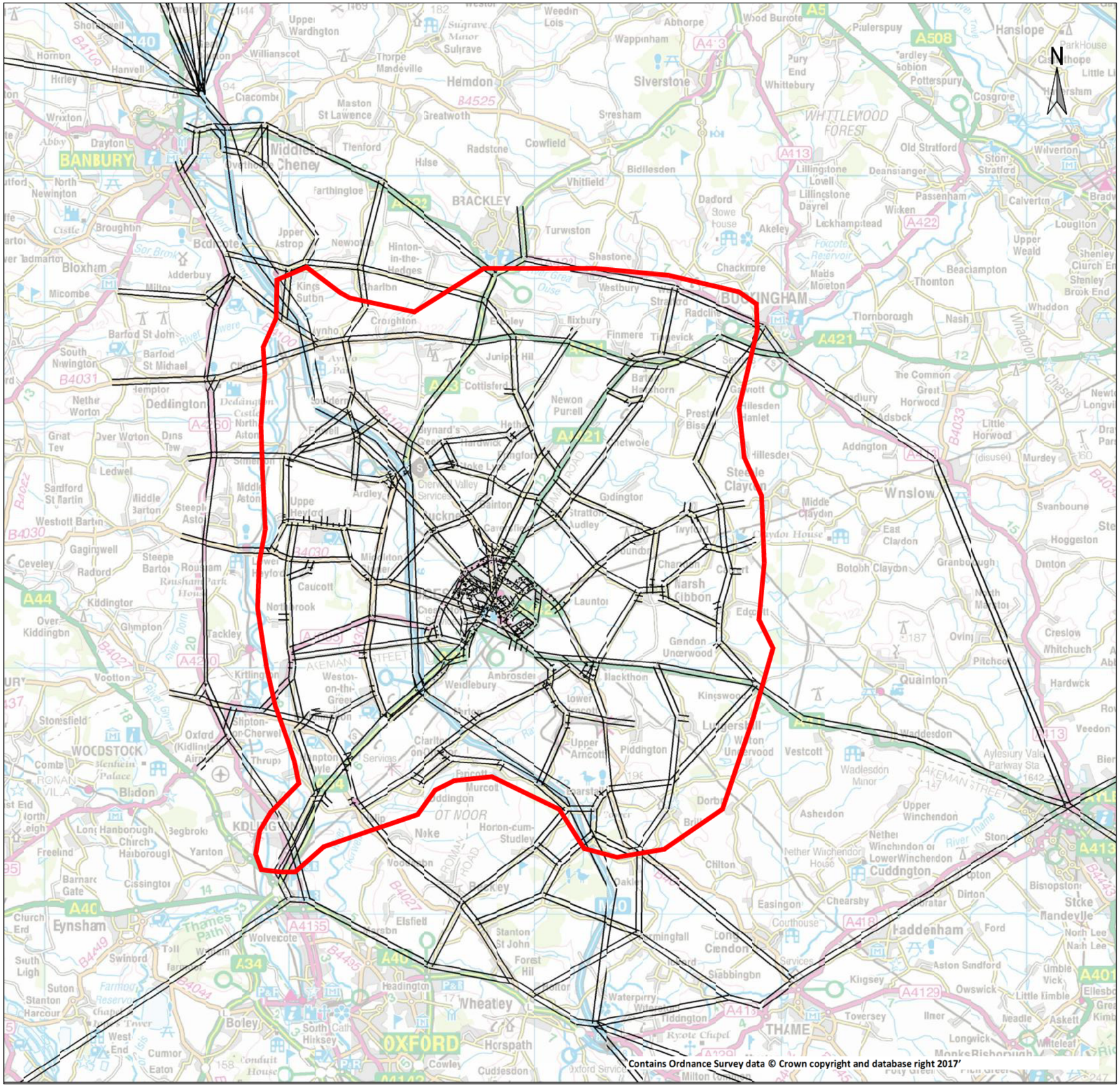
Model Development Zones

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	AM	24/02/17	RW	24/02/17	XXX	xx/xx/xx

Project No.	Office	Type	Drawing No.	Revision
A099211	35	18	008	-

Copyright © WYG EPT Ltd 2012

DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS



Key:

Modelled Links

Extent of Simulation Network Coding

Buffer network coding includes all links outside of the simulation coding boundary

Please note: Links are shown here as the shortest path between the nodes/ junctions at each end. As such, they do not always lie along the exact path of the road they represent particularly for longer links.

REV	DESCRIPTION	BY	CHK	APP	DATE

Client

Oxfordshire County Council

EXECUTIVE PARK
AVALON WAY
ANSTEY
LEICESTER
LE7 7GR
TEL: +44 (0)116 234 8000
FAX: +44 (0)116 234 8001
e-mail: leicester@wyg.com

Project:

BICESTER TRANSPORT MODEL

Drawing Title:

Figure 4

Extend of Saturn Network Coding

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	RJW	16/03/17	GD	16/03/17	CRS	16/03/17

Project No.	Office	Type	Drawing No.	Revision
A099211	35	18	011	-

© WYG Group Ltd.

FILENAME : N:\PROJECTS\A099211 - BICESTER TRANSPORT MODEL REVALIDATION\ACAD\DWGS\A099211-011 LMVR FIG 4 SIMULATIONBUFFER.DWG | PLOTTED BY : RACHAEL.WALKER | PLOTTED DATE : 16 March 2017 12:18:49

DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS

Key:

GEH by turn:

R	RR	U	
2.17	0.99	1.41	AM Peak
0.13	0.01	1.22	Inter Peak
0.27	1.00	1.41	PM Peak

Turning Movement:
U = U-Turn
RR = Hard right
R = Right
A = Ahead
L = Left
LL = Hard left

'Contains Ordnance Survey data © Crown copyright and database right 2017'

REV	DESCRIPTION	BY	CHK	APP	DATE

Client
Oxfordshire County Council

EXECUTIVE PARK
AVALON WAY
ANSTEY
LEICESTER
LE7 7GR
TEL: +44 (0)116 234 8000
FAX: +44 (0)116 234 8001
e-mail: leicester@wyg.com

Project:
BICESTER TRANSPORT MODEL

Drawing Title:
Figure 5
Turn Count Calibration
G.E.H. Statistics by Turn

Scale @ A1	Drawn	Date	Checked	Date	Approved	Date
NTS	RJW	14/03/17	GD	14/03/17	CRS	14/03/17

Project No.	Office	Type	Drawing No.	Revision
A099211	35	18	012	-

© WYG Group Ltd.

FILENAME : N:\PROJECTS\A099211 - BICESTER TRANSPORT MODEL REVALIDATION\ACAD\DWGS\A099211-012 LMVR FIG 5 CALIBRATION TURNS.DWG | PLOTTED BY : RACHAEL.WALKER | PLOTTED DATE : 05 April 2017 12:38:59

DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS

N

Key:

GEH:

GEH	DMRB	
1.7	Yes	AM Peak
0.6	Yes	Inter Peak
0.8	Yes	PM Peak

'Contains Ordnance Survey data © Crown copyright and database right 2017'

REV	DESCRIPTION	BY	CHK	APP	DATE

Scale @ A1 NTS	Drawn	Date	Checked	Date	Approved	Date	Project No.	Office	Type	Drawing No.	Revision
	RW	03.04.17	GD	03.04.17	CRS	03.04.17	A099211	35	18	014	-

EXECUTIVE PARK
AVALON WAY
ANSTEY
LEICESTER
LE7 7GR
TEL: +44 (0)116 234 8000
FAX: +44 (0)116 234 8001
e-mail: leicester@wyg.com

Client: Oxfordshire County Council

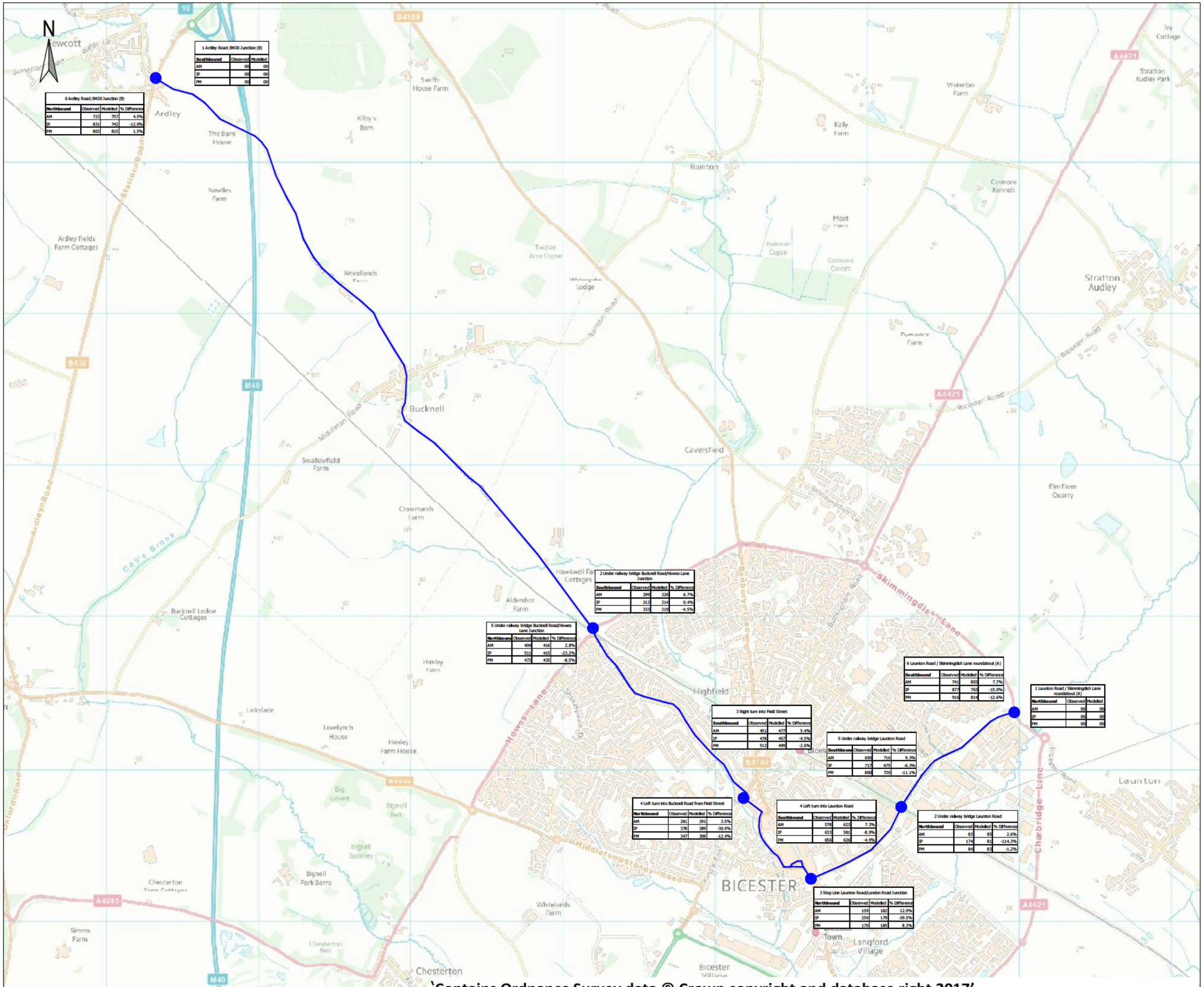
Project: Bicester Transport Modelling

Drawing Title: Figure 6 Link Flow Validation

© WYG Group Ltd.

FILENAME : N:\PROJECTS\A099211 - BICESTER TRANSPORT MODEL REVALIDATION\ACAD\DWGS\A099211-014 LMVR FIG 6 VALIDATION LINKS.DWG | PLOTTED BY : RACHAEL.WALKER |
PLOTTED DATE : 05 April 2017 10:36:46

DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS



1 Ardley Road /B430 Junction (B)

Southbound	Observed	Modelled
AM	00	00
IP	00	00
PM	00	00

6 Ardley Road /B430 Junction (B)

Northbound	Observed	Modelled	% Difference
AM	723	757	4.5%
IP	831	742	-12.0%
PM	803	815	1.5%

2 Under railway bridge Bucknell Road/Howes Lane Junction

Southbound	Observed	Modelled	% Difference
AM	299	320	6.7%
IP	313	314	0.4%
PM	333	319	-4.5%

5 Under railway bridge Bucknell Road/Howes Lane Junction

Northbound	Observed	Modelled	% Difference
AM	406	416	2.8%
IP	511	415	-23.2%
PM	472	435	-8.5%

6 Launton Road / Skimmingdish Lane roundabout (A)

Southbound	Observed	Modelled	% Difference
AM	741	803	7.7%
IP	877	763	-15.0%
PM	916	814	-12.6%

1 Launton Road / Skimmingdish Lane roundabout (A)

Northbound	Observed	Modelled
AM	00	00
IP	00	00
PM	00	00

3 Right turn into Field Street

Southbound	Observed	Modelled	% Difference
AM	451	477	5.4%
IP	478	457	-4.5%
PM	512	499	-2.6%

5 Under railway bridge Launton Road

Southbound	Observed	Modelled	% Difference
AM	650	716	9.3%
IP	717	675	-6.3%
PM	800	720	-11.1%

4 Left turn into Bucknell Road from Field Street

Northbound	Observed	Modelled	% Difference
AM	281	291	3.5%
IP	378	288	-30.9%
PM	347	308	-12.4%

4 Left turn into Launton Road

Southbound	Observed	Modelled	% Difference
AM	578	623	7.3%
IP	633	581	-8.9%
PM	656	626	-4.9%

2 Under railway bridge Launton Road

Northbound	Observed	Modelled	% Difference
AM	83	85	2.6%
IP	174	81	-114.3%
PM	84	83	-1.2%

3 Stop Line Launton Road/London Road Junction

Northbound	Observed	Modelled	% Difference
AM	159	182	12.9%
IP	250	179	-39.5%
PM	170	185	8.3%

Key:

Timing Point

'Contains Ordnance Survey data © Crown copyright and database right 2017'

REV	DESCRIPTION	BY	CHK	APP	DATE

Client

Oxfordshire County Council

EXECUTIVE PARK
AVALON WAY
ANSTEY
LEICESTER
LE7 7GR
TEL: +44 (0)116 234 8000
FAX: +44 (0)116 234 8001
e-mail: leicester@wyg.com

Project:

BICESTER TRANSPORT MODEL

Drawing Title:

Figure 7a

Route 1 Modelled versus Observed Journey Times

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	RJW	14/03/17	GD	14/03/17	CRS	14/03/17

Project No.	Office	Type	Drawing No.	Revision
A099211	35	18	004	-

© WYG Group Ltd.

FILENAME : N:\PROJECTS\A099211 - BICESTER TRANSPORT MODEL REVALIDATION\ACAD\DWGS\A099211-004 FIG 7A ROUTE 1 JTS.DWG | PLOTTED BY : RACHAEL.WALKER | PLOTTED DATE : 14 March 2017 11:09:31

DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS

N

3 Cross stopline Esso roundabout towards Boundary Way			
Eastbound	Observed	Modelled	% Difference
AM	209	192	-8.2%
IP	219	191	-14.5%
PM	272	208	-30.6%

3 Cross stopline Esso roundabout towards Boundary Way			
Westbound	Observed	Modelled	% Difference
AM	481	313	-53.6%
IP	314	266	-18.2%
PM	453	339	-33.6%

2 Cross stopline Vendee Drive roundabout			
Eastbound	Observed	Modelled	% Difference
AM	123	98	-25.1%
IP	125	98	-27.5%
PM	141	101	-39.7%

4 Cross stopline Vendee Drive roundabout			
Westbound	Observed	Modelled	% Difference
AM	567	397	-42.9%
IP	392	347	-13.1%
PM	542	431	-25.8%

4 Cross stopline London Road roundabout towards A41			
Eastbound	Observed	Modelled	% Difference
AM	334	300	-11.5%
IP	321	290	-10.6%
PM	394	332	-18.7%

2 Cross stopline London Road roundabout towards A41			
Westbound	Observed	Modelled	% Difference
AM	226	209	-5.9%
IP	198	182	-8.6%
PM	228	227	-0.4%

5 Under railway bridge at Marsh Gibbon turning (B)			
Eastbound	Observed	Modelled	% Difference
AM	536	480	-9.9%
IP	513	456	-12.4%
PM	603	530	-13.9%

1 Under railway bridge at Marsh Gibbon turning (B)		
Westbound	Observed	Modelled
AM	00	00
IP	00	00
PM	00	00

1 M40/A41 Roundabout (A)		
Eastbound	Observed	Modelled
AM	00	00
IP	00	00
PM	00	00

5 M40/A41 Roundabout (A)			
Westbound	Observed	Modelled	% Difference
AM	714	531	-34.4%
IP	548	472	-16.3%
PM	707	560	-26.2%

Key:

- Timing Point

'Contains Ordnance Survey data © Crown copyright and database right 2017'

REV	DESCRIPTION	BY	CHK	APP	DATE

Client

Oxfordshire County Council

EXECUTIVE PARK
AVALON WAY
ANSTEY
LEICESTER
LE7 7GR
TEL: +44 (0)116 234 8000
FAX: +44 (0)116 234 8001
e-mail: leicester@wyg.com

Project:

BICESTER TRANSPORT MODEL

Drawing Title:

Figure 7b

Route 2 Modelled versus Observed Journey Times

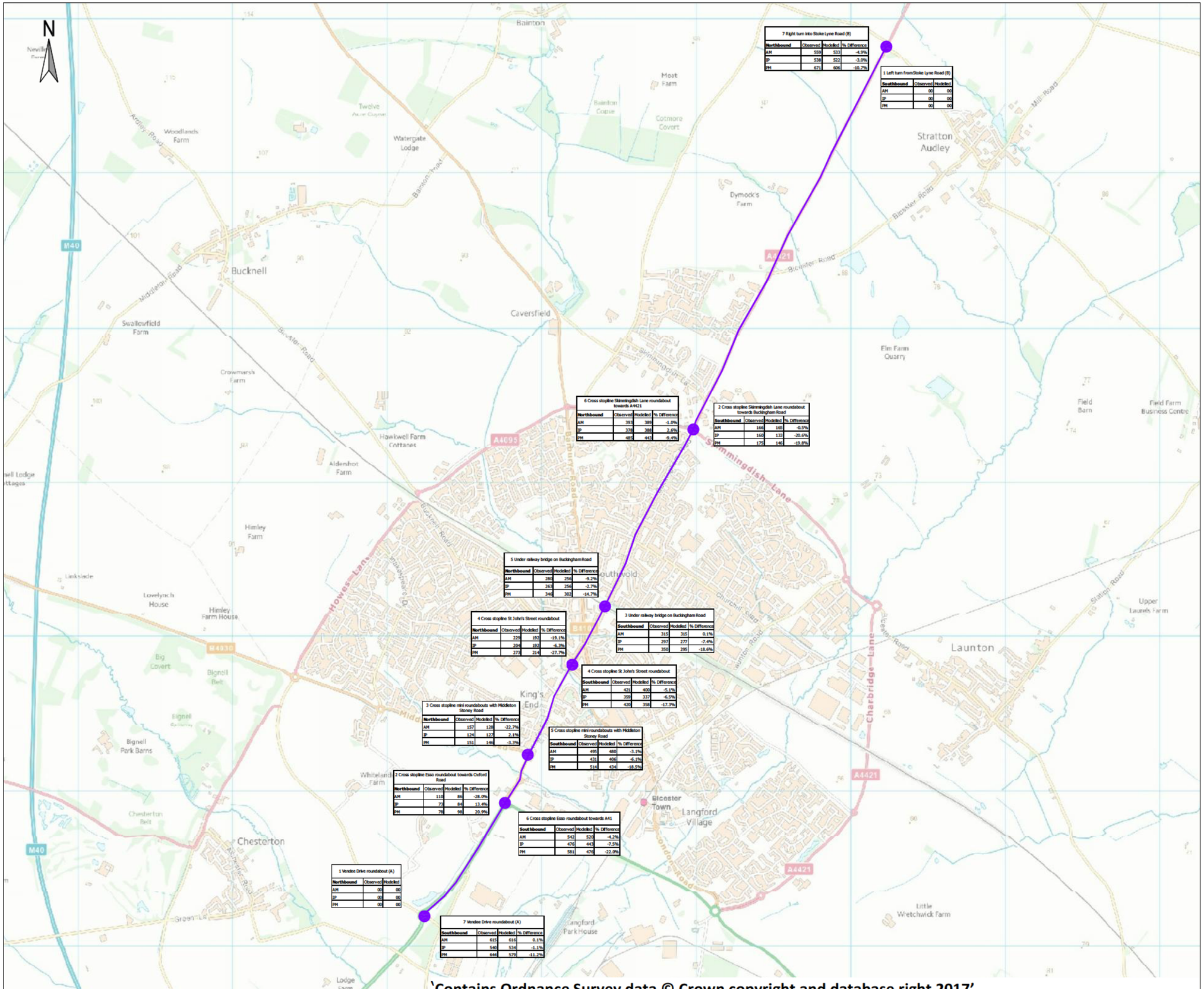
Scale @ A3	Drawn Date	Checked Date	Approved Date
NTS	RJW 14/03/17	GD 14/03/17	CRS 14/03/17

Project No.	Office	Type	Drawing No.	Revision
A099211	35	18	005	-

© WYG Group Ltd.

FILENAME : N:\PROJECTS\A099211 - BICESTER TRANSPORT MODEL REVALIDATION\ACAD\DWGS\A099211-005 FIG 7B ROUTE 2 JTS.DWG | PLOTTED BY : RACHAEL.WALKER | PLOTTED DATE : 14 March 2017 11:23:42

DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS



7 Right turn into Stoke Lyne Road (B)

Northbound	Observed	Modelled	% Difference
AM	559	533	-4.9%
IP	538	522	-3.0%
PM	671	606	-10.7%

1 Left turn fromStoke Lyne Road (B)

Southbound	Observed	Modelled
AM	00	00
IP	00	00
PM	00	00

6 Cross stopline Skimmingdish Lane roundabout towards A4421

Northbound	Observed	Modelled	% Difference
AM	393	389	-1.0%
IP	378	388	2.6%
PM	485	443	-9.4%

2 Cross stopline Skimmingdish Lane roundabout towards Buckingham Road

Southbound	Observed	Modelled	% Difference
AM	168	165	-0.5%
IP	166	133	-20.6%
PM	175	146	-19.8%

5 Under railway bridge on Buckingham Road

Northbound	Observed	Modelled	% Difference
AM	280	256	-8.2%
IP	263	256	-2.7%
PM	346	302	-14.7%

4 Cross stopline St John's Street roundabout

Northbound	Observed	Modelled	% Difference
AM	229	192	-19.1%
IP	204	193	-6.3%
PM	273	214	-27.7%

3 Under railway bridge on Buckingham Road

Southbound	Observed	Modelled	% Difference
AM	315	315	0.1%
IP	297	277	-7.4%
PM	350	295	-18.6%

4 Cross stopline St John's Street roundabout

Southbound	Observed	Modelled	% Difference
AM	421	400	-5.1%
IP	359	337	-6.5%
PM	420	358	-17.3%

3 Cross stopline mini roundabouts with Middleton Stoney Road

Northbound	Observed	Modelled	% Difference
AM	157	128	-22.7%
IP	124	127	2.1%
PM	151	146	-3.3%

5 Cross stopline mini roundabouts with Middleton Stoney Road

Southbound	Observed	Modelled	% Difference
AM	495	480	-3.1%
IP	431	406	-6.1%
PM	514	434	-18.5%

2 Cross stopline Esso roundabout towards Oxford Road

Northbound	Observed	Modelled	% Difference
AM	110	86	-28.0%
IP	73	84	13.4%
PM	78	98	20.9%

6 Cross stopline Esso roundabout towards A41

Southbound	Observed	Modelled	% Difference
AM	542	520	-4.2%
IP	476	443	-7.5%
PM	581	476	-22.0%

1 Vendee Drive roundabout (A)

Northbound	Observed	Modelled
AM	00	00
IP	00	00
PM	00	00

7 Vendee Drive roundabout (A)

Southbound	Observed	Modelled	% Difference
AM	615	616	0.1%
IP	540	534	-1.1%
PM	644	579	-11.2%

Key:

Timing Point

'Contains Ordnance Survey data © Crown copyright and database right 2017'

REV	DESCRIPTION	BY	CHK	APP	DATE

Client

Oxfordshire County Council

EXECUTIVE PARK
AVALON WAY
ANSTEY
LEICESTER
LE7 7GR
TEL: +44 (0)116 234 8000
FAX: +44 (0)116 234 8001
e-mail: leicester@wyg.com

Project:

BICESTER TRANSPORT MODEL

Drawing Title:

Figure 7c

Route 3 Modelled versus Observed Journey Times

Scale @ A3	Drawn	Date	Checked	Date	Approved	Date
NTS	RJW	14/03/17	GD	14/03/17	CRS	14/03/17

Project No.	Office	Type	Drawing No.	Revision
A099211	35	18	006	-

© WYG Group Ltd.

FILENAME : N:\PROJECTS\A099211 - BICESTER TRANSPORT MODEL REVALIDATION\ACAD\DWGS\A099211-006 FIG 7C ROUTE 3 JTS.DWG | PLOTTED BY : RACHAEL.WALKER | PLOTTED DATE : 14 March 2017 11:37:21

DO NOT SCALE: CONTRACTOR TO CHECK ALL DIMENSIONS AND REPORT ANY OMISSIONS OR ERRORS

N

Key:

Timing Point

4 Cross stopline Banbury Road roundabout towards A4095

Clockwise	Observed	Modelled	% Difference
AM	248	247	-0.5%
IP	242	243	0.4%
PM	255	301	15.2%

5 Cross stopline A4421 roundabout towards Skimmingdish Lane

Clockwise	Observed	Modelled	% Difference
AM	306	302	-1.2%
IP	296	290	-2.2%
PM	312	360	13.3%

7 Cross stopline Banbury Road roundabout

Anti-clockwise	Observed	Modelled	% Difference
AM	445	476	6.4%
IP	407	457	10.9%
PM	419	525	20.2%

3 Under railway bridge Bucknell Road/Howes Lane Junction

Clockwise	Observed	Modelled	% Difference
AM	174	178	2.2%
IP	169	176	4.0%
PM	176	206	14.7%

6 Cross stopline A4421 roundabout towards A4095

Anti-clockwise	Observed	Modelled	% Difference
AM	385	425	9.4%
IP	357	411	13.2%
PM	359	460	22.0%

8 Under railway bridge Bucknell Road/Howes Lane Junction

Anti-clockwise	Observed	Modelled	% Difference
AM	518	550	5.8%
IP	480	524	8.3%
PM	492	598	17.7%

6 Cross stopline Launton road roundabout towards Chartridge Lane

Clockwise	Observed	Modelled	% Difference
AM	384	403	4.7%
IP	380	387	1.9%
PM	416	458	9.2%

5 Cross stopline Launton Road roundabout towards Skimmingdish Lane

Anti-clockwise	Observed	Modelled	% Difference
AM	292	333	12.3%
IP	280	321	12.7%
PM	274	362	24.2%

9 Cross stopline Howes Lane towards Vendee Drive at Middleton Stoney Road roundabout (A)

Anti-clockwise	Observed	Modelled	% Difference
AM	624	635	1.8%
IP	573	606	5.4%
PM	597	682	12.5%

2 Cross stopline towards Howes Lane from Middleton Stoney roundabout

Clockwise	Observed	Modelled	% Difference
AM	84	93	9.9%
IP	81	92	11.5%
PM	86	100	13.6%

1 Vendee Drive roundabout (B)

Anti-clockwise	Observed	Modelled
AM	00	00
IP	00	00
PM	00	00

4 Cross stopline roundabout with Gavray Drive

Anti-clockwise	Observed	Modelled	% Difference
AM	169	259	34.6%
IP	159	249	36.0%
PM	160	288	44.6%

7 Cross stopline roundabout with Gavray Drive

Clockwise	Observed	Modelled	% Difference
AM	507	475	-6.8%
IP	513	458	-12.0%
PM	536	530	-1.2%

10 Vendee Drive roundabout

Anti-clockwise	Observed	Modelled	% Difference
AM	708	728	2.8%
IP	654	692	5.6%
PM	681	770	11.6%

3 Cross stopline London Road roundabout towards A4421

Anti-clockwise	Observed	Modelled	% Difference
AM	84	191	55.9%
IP	83	180	54.1%
PM	87	218	60.1%

1 Vendee Drive roundabout (A)

Clockwise	Observed	Modelled
AM	00	00
IP	00	00
PM	00	00

10 Vendee Drive roundabout

Clockwise	Observed	Modelled	% Difference
AM	770	738	-4.3%
IP	725	693	-4.7%
PM	763	809	5.7%

8 Cross stopline roundabout with London Road towards A41

Clockwise	Observed	Modelled	% Difference
AM	603	549	-9.9%
IP	603	529	-14.0%
PM	616	604	-2.0%

'Contains Ordnance Survey data © Crown copyright and database right 2017'

REV	DESCRIPTION	BY	CHK	APP	DATE

Client

Oxfordshire County Council

EXECUTIVE PARK
AVALON WAY
ANSTEY
LEICESTER
LE7 7GR
TEL: +44 (0)116 234 8000
FAX: +44 (0)116 234 8001
e-mail: leicester@wyg.com

Project:

BICESTER TRANSPORT MODEL

Drawing Title:

Figure 7d

Route 4 Modelled versus Observed Journey Times

Scale @ A3	Drawn Date	Checked Date	Approved Date
NTS	RJW 14/03/17	GD 14/03/17	CRS 14/03/17

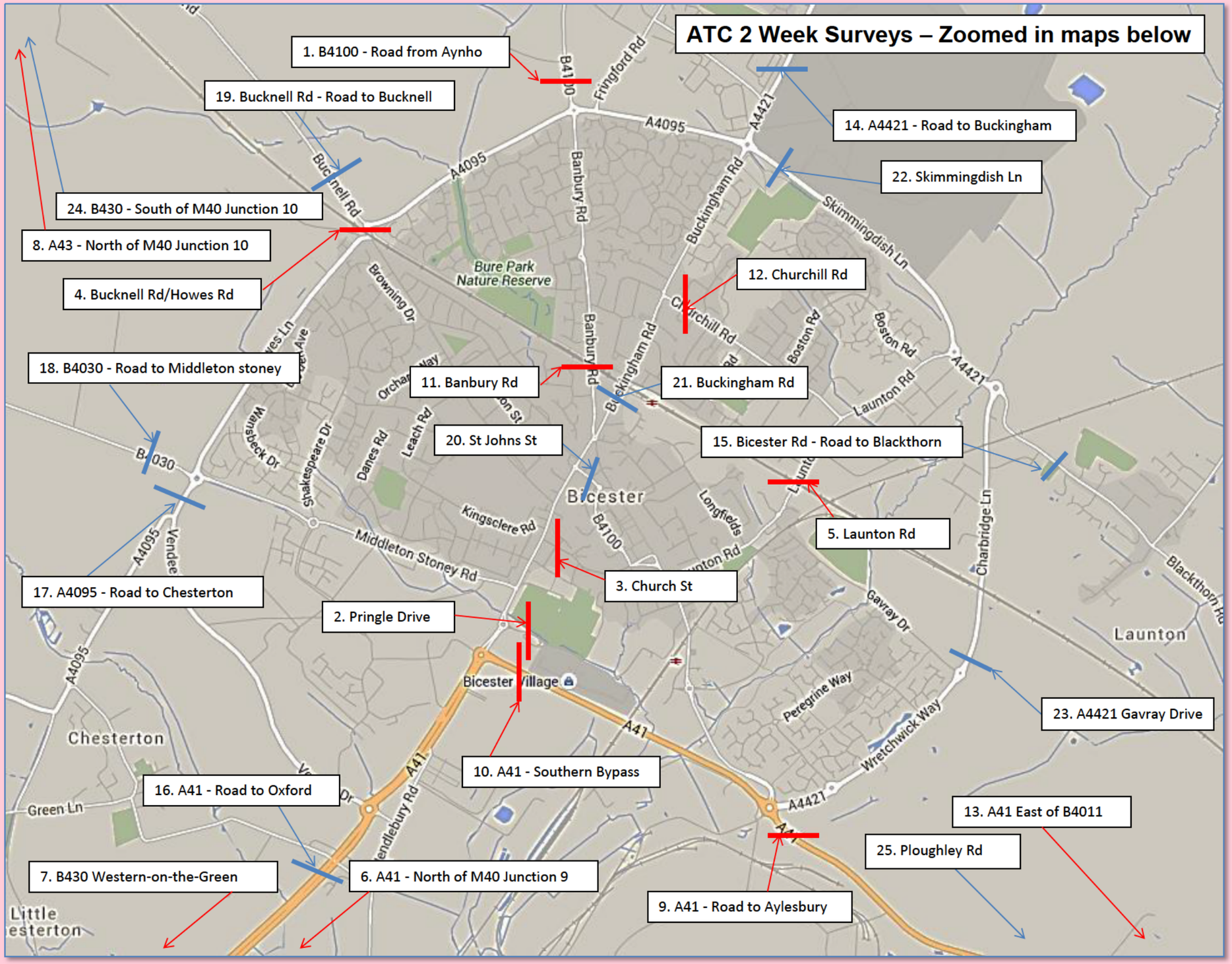
Project No.	Office	Type	Drawing No.	Revision
A099211	35	18	007	-

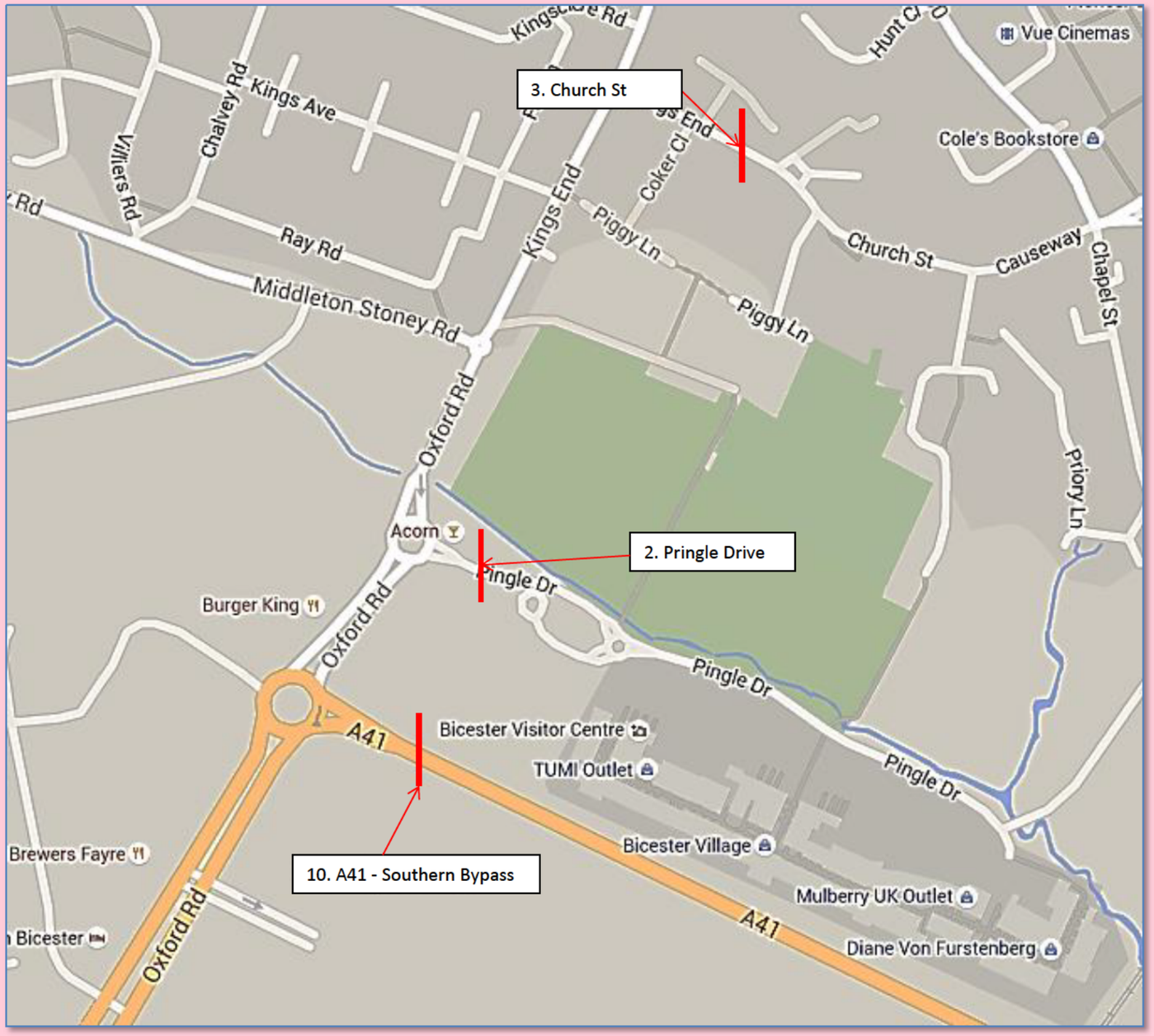
© WYG Group Ltd.

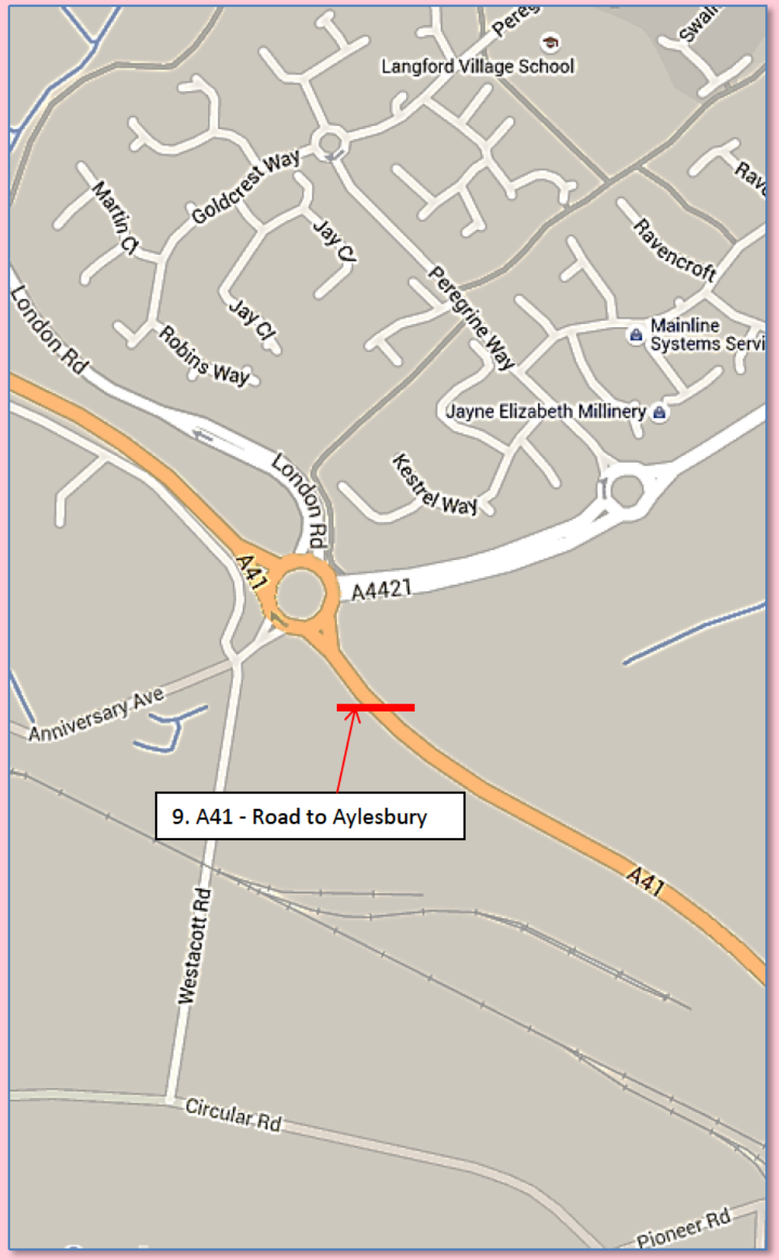
FILENAME : N:\PROJECTS\A099211 - BICESTER TRANSPORT MODEL REVALIDATION\ACAD\DWGS\A099211-007 FIG 7D ROUTE 4 3TS.DWG | PLOTTED BY : RACHAEL.WALKER | PLOTTED DATE : 14 March 2017 11:59:36

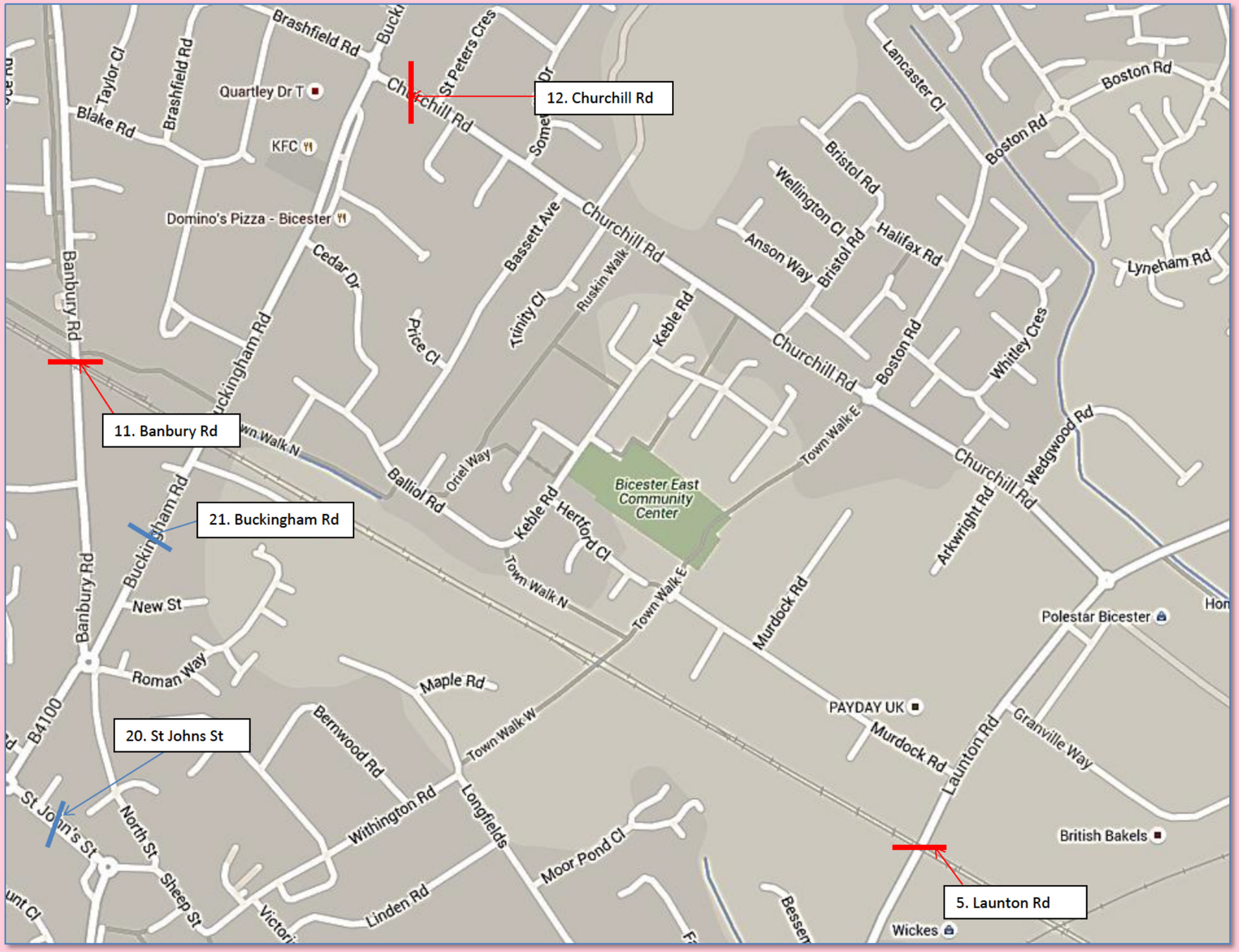
Appendix A – Transport Survey Data

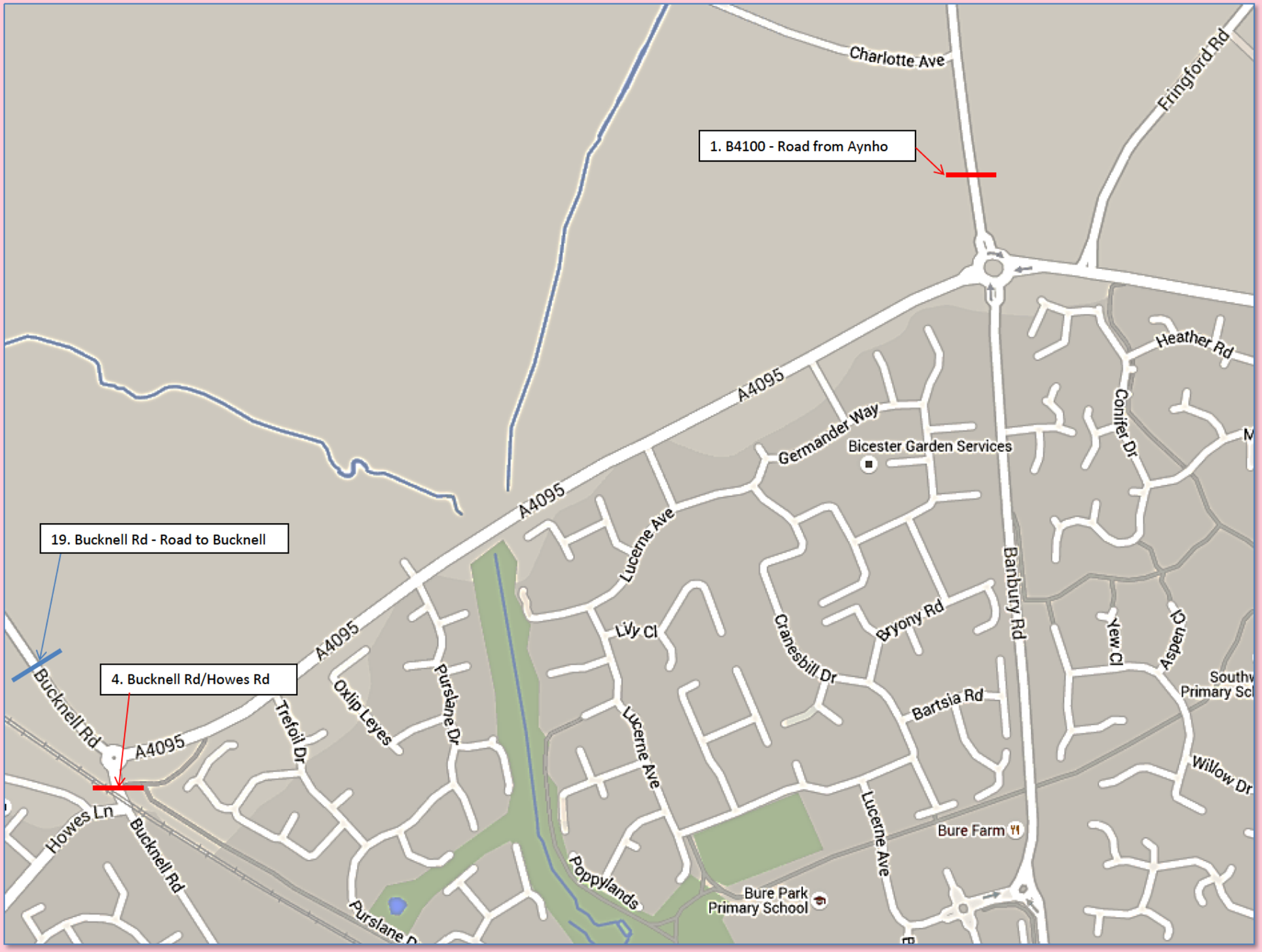

Classified Turning Count 12h (07:00 - 19:00)
1. Banbury Rd/A4095/B4100
2. Buckingham Rd/Skimmingdish Ln/A4095/A4421
9. Bucknell Rd/A4095
14. Buckingham Rd/Brashfield Rd/Church Hill Rd
3. Skimmingdish Ln/Launton Rd/ A4421
8. Howes Ln/Middleton Stoney Rd/Vendee
13. Field St/Banbury
11. Oxford Rd/Middleton Stoney Rd/Kings End
12. Queens Ave/St Johns St/B4100
15. London Rd/Launton Rd/Wessex Way
10. Oxford Rd/Pringle Dr
6. A41/Oxford Rd
4. Gavray Dr/Charbridge Ln/Wetchwick Way
7. A41/Vendee DR/P&R
5. A41/London Rd/Neunkirchen Way/Graven Hill Rd
Caversfield
Bure Park Nature Reserve
Bicester
Bicester Village
Launton
Chesterton
Little Chesterton
B4100
A4095
A4421
A41
B4030
Fringford Rd
Bucknell Rd
Banbury Rd
Buckingham Rd
Skimmingdish Ln
Churchill Rd
Keble Rd
Launton Rd
Orchard Way
Middleton Stoney Rd
Vendee Dr
Wendlebury Rd
Peregrine Way
Green Ln
Charbridge Ln

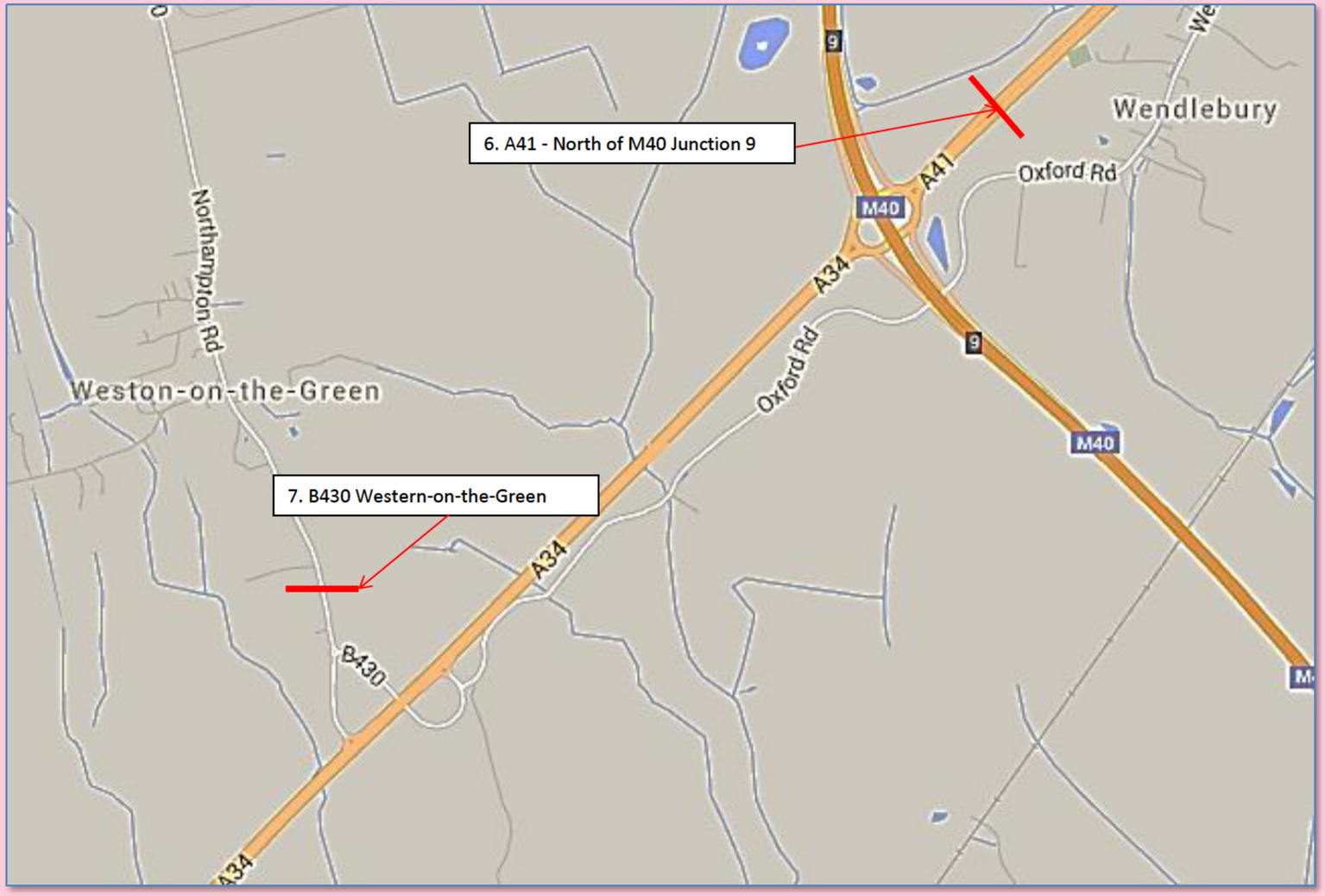

ATC 2 Week Surveys – Zoomed in maps below
1. B4100 - Road from Aynho
19. Bucknell Rd - Road to Bucknell
24. B430 - South of M40 Junction 10
8. A43 - North of M40 Junction 10
4. Bucknell Rd/Howes Rd
18. B4030 - Road to Middleton stoney
11. Banbury Rd
21. Buckingham Rd
20. St Johns St
15. Bicester Rd - Road to Blackthorn
14. A4421 - Road to Buckingham
22. Skimmingdish Ln
12. Churchill Rd
5. Launton Rd
3. Church St
17. A4095 - Road to Chesterton
2. Pringle Drive
10. A41 - Southern Bypass
23. A4421 Gavray Drive
16. A41 - Road to Oxford
13. A41 East of B4011
25. Ploughley Rd
7. B430 Western-on-the-Green
6. A41 - North of M40 Junction 9
9. A41 - Road to Aylesbury
A4095
A4421
A41
B4100
B4030
Fringford Rd
Banbury Rd
Buckingham Rd
Skimmingdish Ln
Bure Park Nature Reserve
Browning Dr
Churchill Rd
Boston Rd
Launton Rd
Wansbeck Dr
Shakespeare Dr
Danes Rd
Leach Rd
Bicester
Kingsclere Rd
Middleton Stoney Rd
Longfields
Gavray Dr
Charbridge Ln
Launton
Bicester Village
Peregrine Way
Wretchwick Way
Chesterton
Green Ln
Vendee Dr
Lyne Ave
Middleton Rd
Little Chesterton

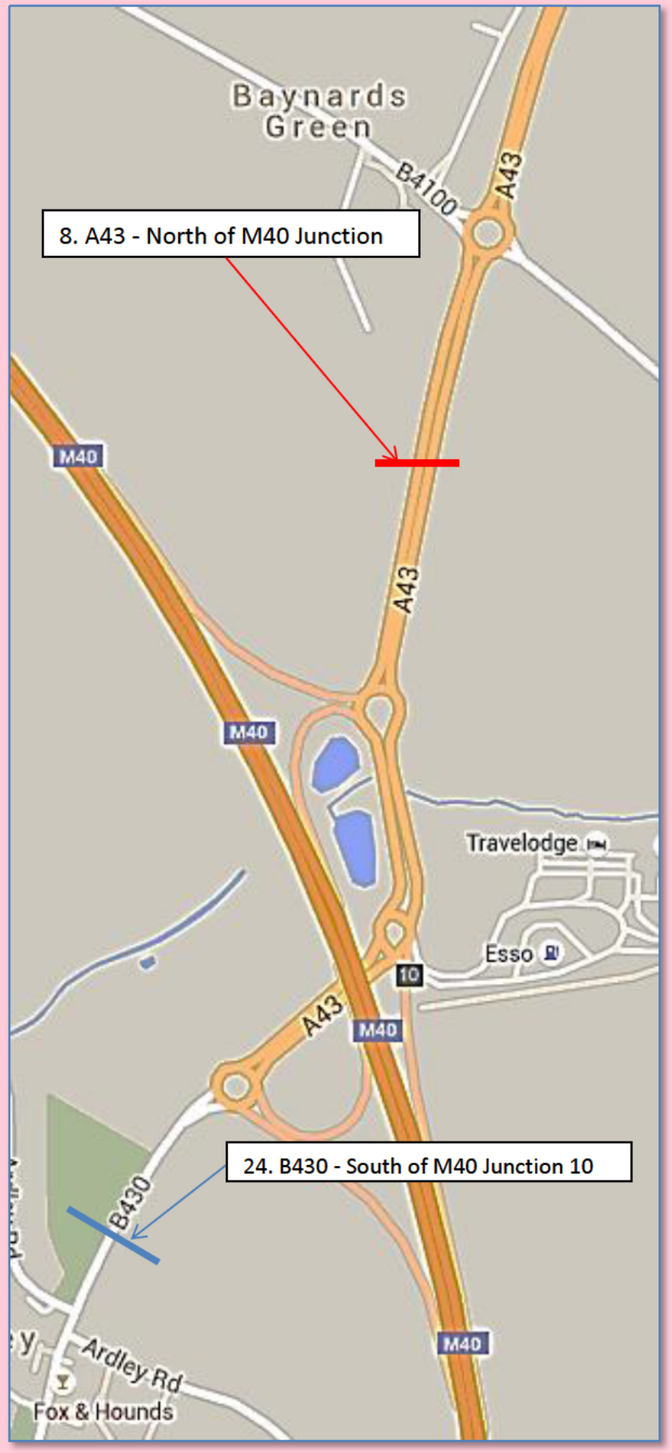

3. Church St
2. Pringle Drive
10. A41 - Southern Bypass
Kingsclere Rd
Chalvey Rd
Kings Ave
Villiers Rd
Ray Rd
Middleton Stoney Rd
Kings End
Coker Cl
End
Piggy Ln
Piggy Ln
Church St
Causeway
Chapel St
Priory Ln
Vue Cinemas
Cole's Bookstore
Oxford Rd
Acorn
Burger King
Pingle Dr
Pingle Dr
Pingle Dr
A41
Bicester Visitor Centre
TUMI Outlet
Bicester Village
Mulberry UK Outlet
Diane Von Furstenberg
Brewers Fayre
Bicester
Oxford Rd
A41

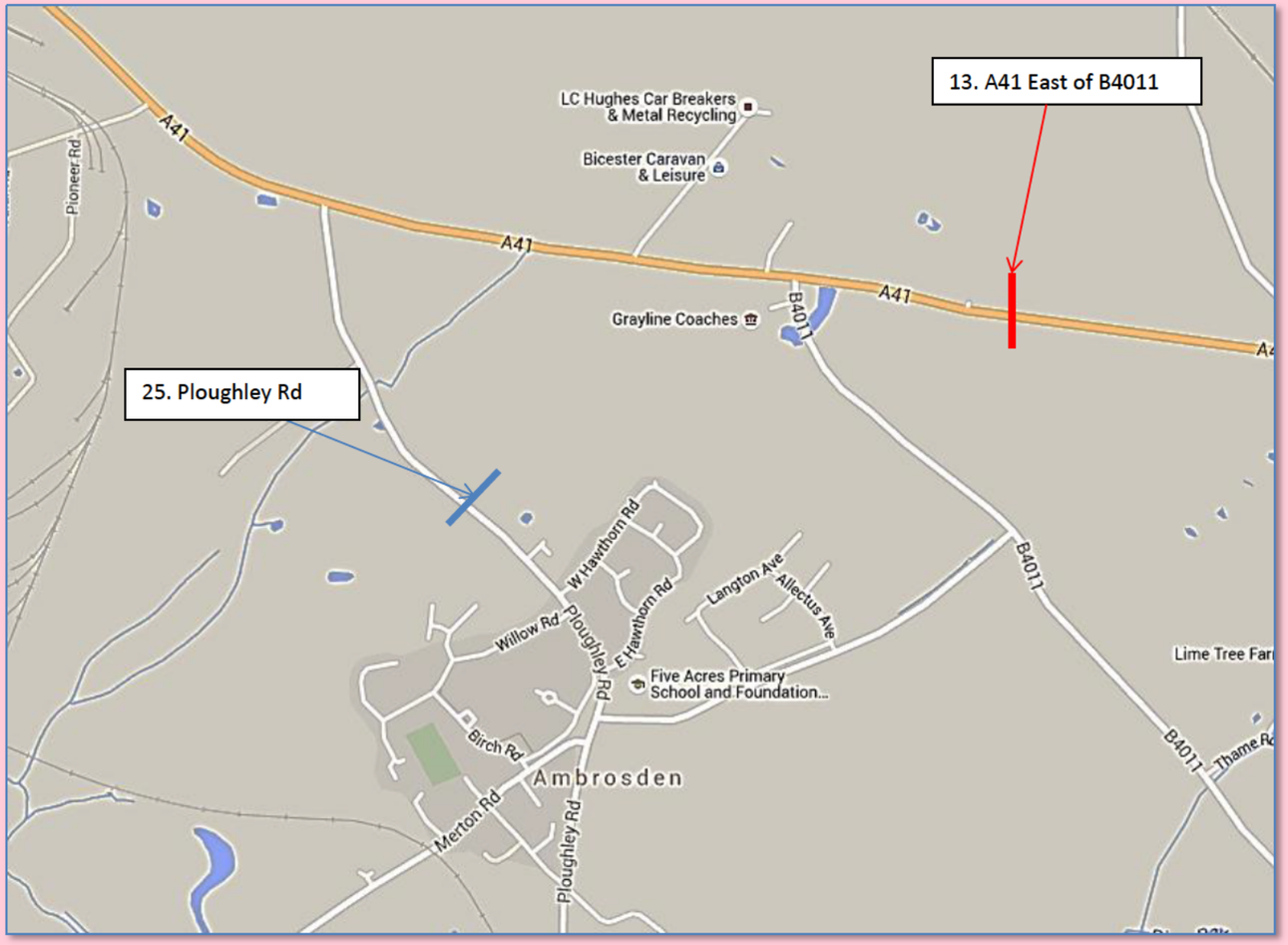

9. A41 - Road to Aylesbury
Langford Village School
Goldcrest Way
Martin Ct
Jay Cl
Jay Cl
Peregrine Way
Ravencroft
Robins Way
London Rd
Mainline Systems Servi
Jayne Elizabeth Millinery
Kestrel Way
London Rd
A41
A4421
Anniversary Ave
A41
Westacott Rd
Circular Rd
Pioneer Rd

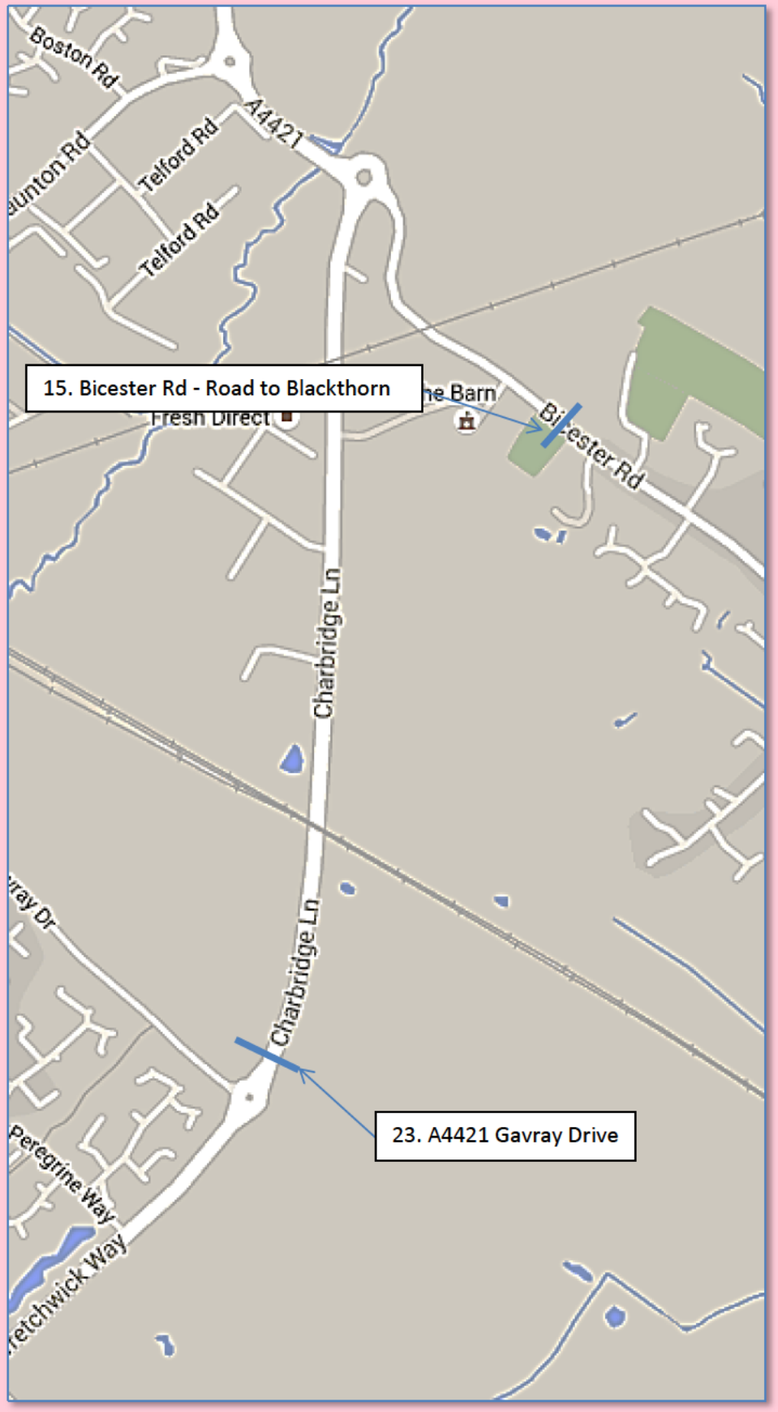

12. Churchill Rd
11. Banbury Rd
21. Buckingham Rd
20. St Johns St
5. Launton Rd
Brashfield Rd
Taylor Cl
Blake Rd
Quartley Dr T
KFC
Domino's Pizza - Bicester
Cedar Dr
Price Cl
Bassett Ave
Trinity Cl
Ruskin Walk
Churchill Rd
Keble Rd
Anson Way
Wellington Cl
Bristol Rd
Halifax Rd
Lancaster Cl
Boston Rd
Lyneham Rd
Whitley Cres
Wedgwood Rd
Arkwright Rd
Banbury Rd
Buckingham Rd
Town Walk N
Balliol Rd
Oriel Way
Hertford Cl
Bicester East Community Center
Town Walk E
Murdock Rd
Polestar Bicester
New St
Roman Way
Maple Rd
Bernwood Rd
Town Walk W
PAYDAY UK
Granville Way
Launton Rd
British Bakels
B4100
St John's St
North St
Sheep St
Withington Rd
Longfields
Moor Pond Cl
Linden Rd
Wickes


1. B4100 - Road from Aynho
19. Bucknell Rd - Road to Bucknell
4. Bucknell Rd/Howes Rd
Charlotte Ave
Fringford Rd
A4095
Germander Way
Bicester Garden Services
Heather Rd
Conifer Dr
Lucerne Ave
Ivy Cl
Cranesbill Dr
Bryony Rd
Banbury Rd
Yew Cl
Aspen Cl
Bartsia Rd
Willow Dr
Bucknell Rd
Howes Ln
Trefoil Dr
Oxlip Leyes
Purslane Dr
Poppylands
Bure Farm
Bure Park
Primary School

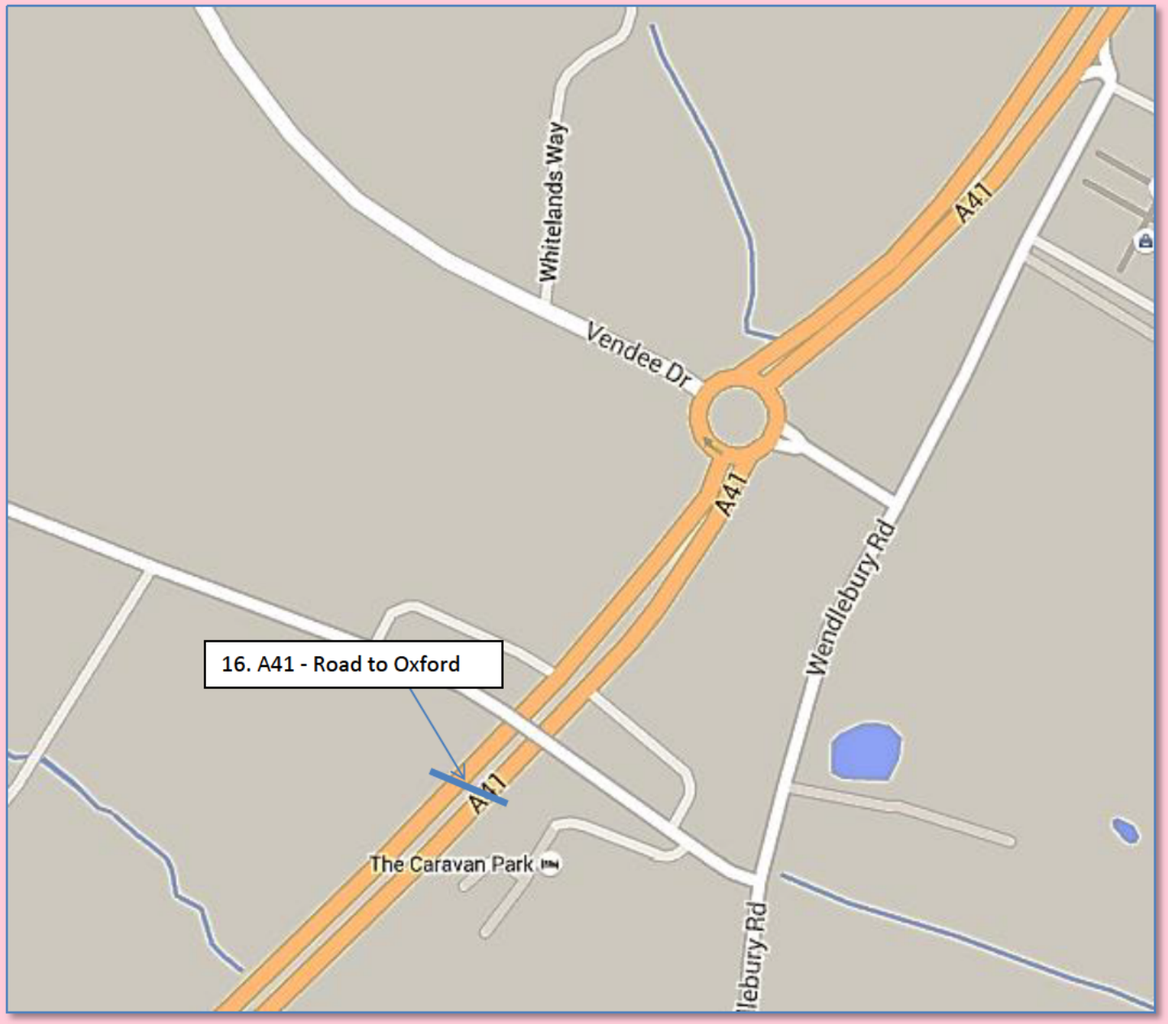

6. A41 - North of M40 Junction 9
7. B430 Western-on-the-Green
Wendlebury
Oxford Rd
A41
M40
A34
Weston-on-the-Green
Northampton Rd
B430
9

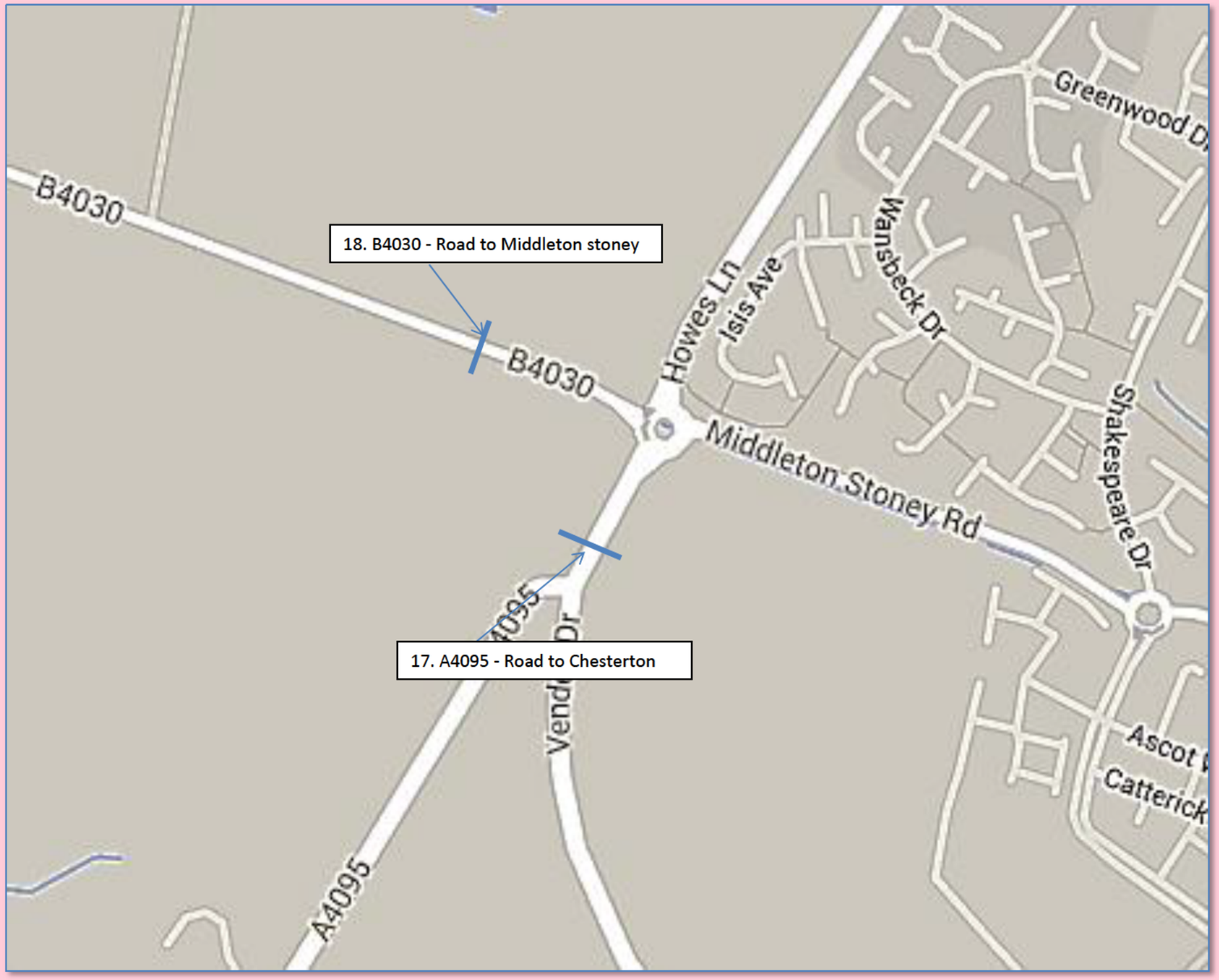

8. A43 - North of M40 Junction
24. B430 - South of M40 Junction 10
Baynards Green
B4100
A43
M40
Travelodge
Esso
10
Ardley Rd
Fox & Hounds
B430

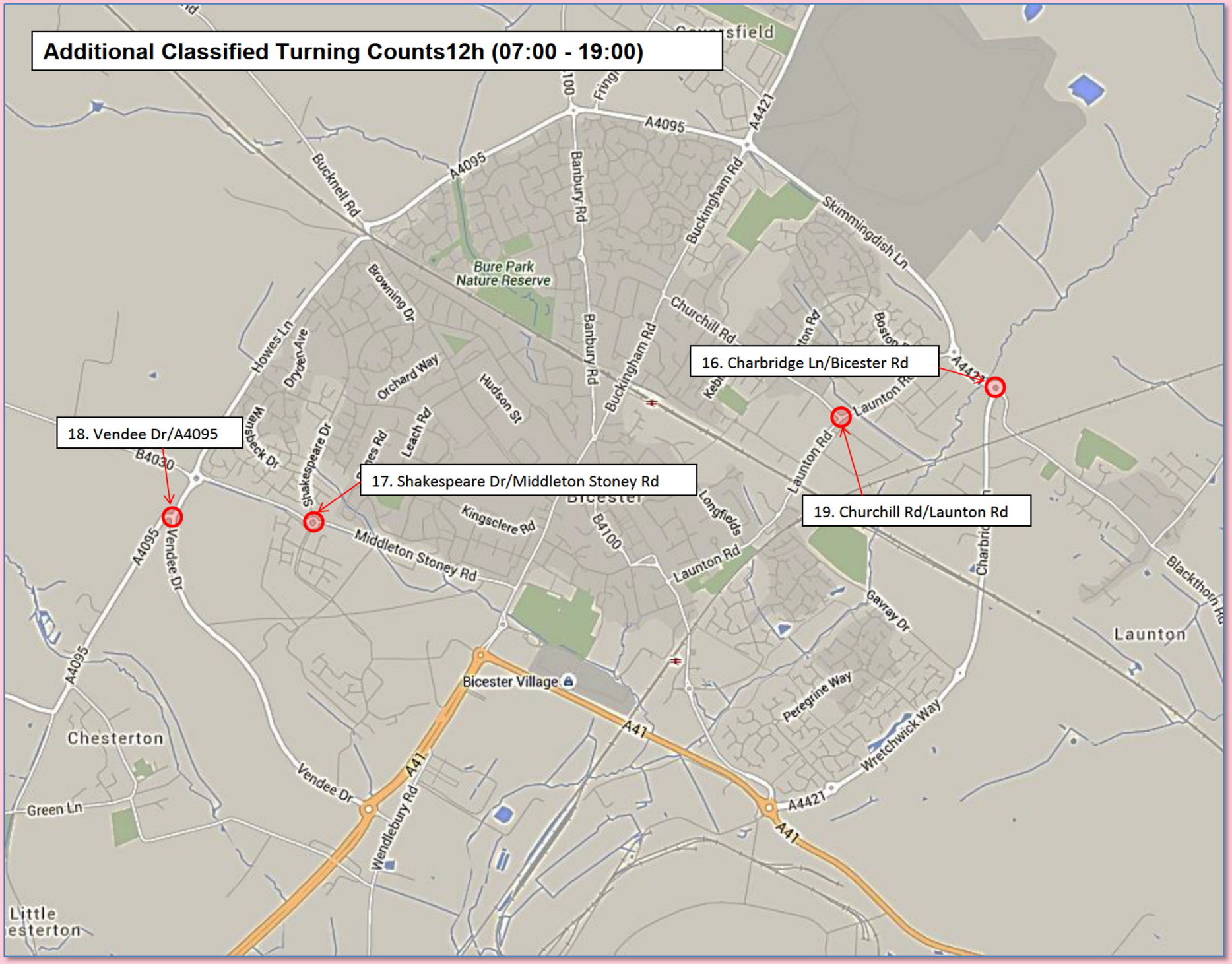

13. A41 East of B4011
25. Ploughley Rd
A41
A41
A41
LC Hughes Car Breakers & Metal Recycling
Bicester Caravan & Leisure
Grayline Coaches
B4011
Pioneer Rd
W Hawthorn Rd
E Hawthorn Rd
Langton Ave
Allectus Ave
Willow Rd
Ploughley Rd
Five Acres Primary School and Foundation...
Birch Rd
Merton Rd
Ploughley Rd
Ambrosden
B4011
B4011
Lime Tree Farm


15. Bicester Rd - Road to Blackthorn
23. A4421 Gavray Drive
Boston Rd
A4421
Telford Rd
Telford Rd
Fresh Direct
Bicester Rd
Charbridge Ln
Charbridge Ln
Peregrine Way
Fretchwick Way


Bicester Rd
A4421
Thompson Dr
Caversfield
Skimmingdish Ln
Turnpike Rd
14. A4421 - Road to Buckingham
Windrushers
Gliding Club
22. Skimmingdish Ln
Hornbeam Rd
Buckingham Rd
Fair Cl
Sunderland Dr
Skimmingdish Ln

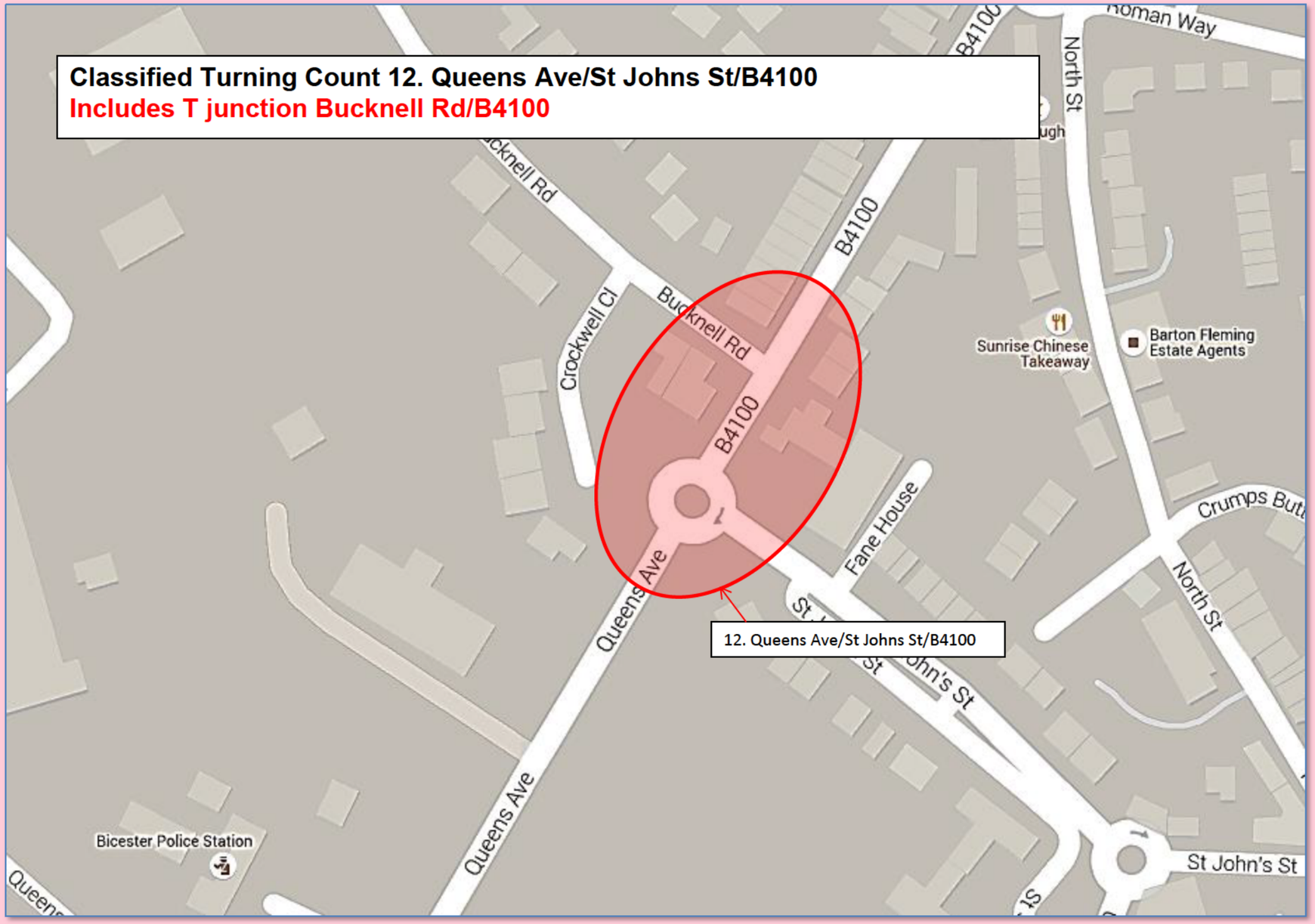

Whitelands Way
Vendee Dr
A41
Wendlebury Rd
16. A41 - Road to Oxford
The Caravan Park

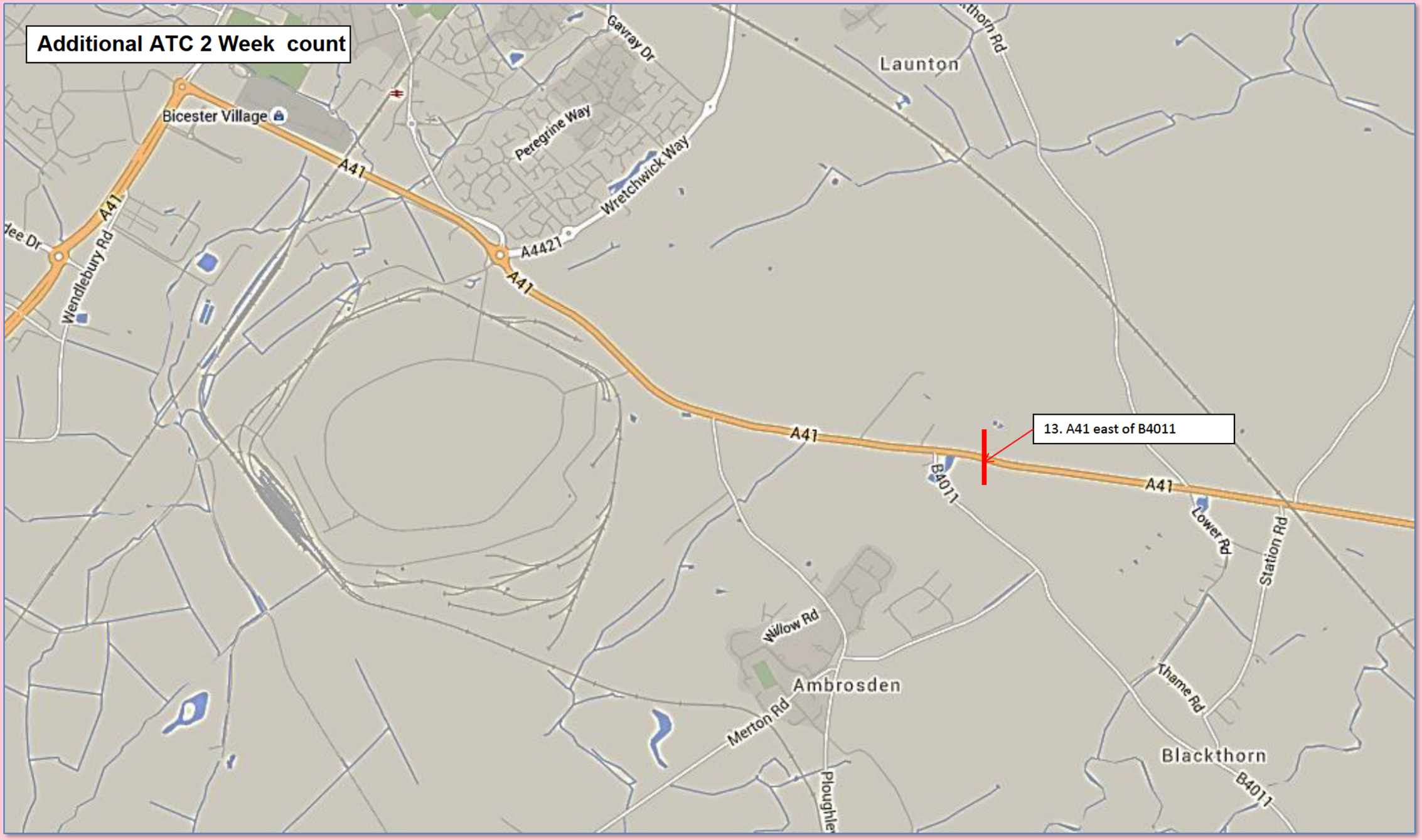

B4030
18. B4030 - Road to Middleton stoney
B4030
Howes Ln
Isis Ave
Wansbeck Dr
Greenwood Dr
Shakespeare Dr
Middleton Stoney Rd
17. A4095 - Road to Chesterton
A4095
A4095
Ascot
Catterick


Additional Classified Turning Counts12h (07:00 - 19:00)
16. Charbridge Ln/Bicester Rd
18. Vendee Dr/A4095
17. Shakespeare Dr/Middleton Stoney Rd
19. Churchill Rd/Launton Rd
A4095
A4421
Bucknell Rd
Banbury Rd
Buckingham Rd
Skimmingdish Ln
Bure Park Nature Reserve
Churchill Rd
Howes Ln
Dryden Ave
Browning Dr
Orchard Way
Hudson St
Leach Rd
Shakespeare Dr
B4030
Vendee Dr
Middleton Stoney Rd
Kingsclere Rd
B4100
Launton Rd
Longfields
Gavray Dr
Peregrine Way
Wretchwick Way
Launton
Blackthorn Rd
Bicester Village
A41
Chesterton
Green Ln
Wendlebury Rd
Little Chesterton

Classified Turning Count 12. Queens Ave/St Johns St/B4100

Includes T junction Bucknell Rd/B4100

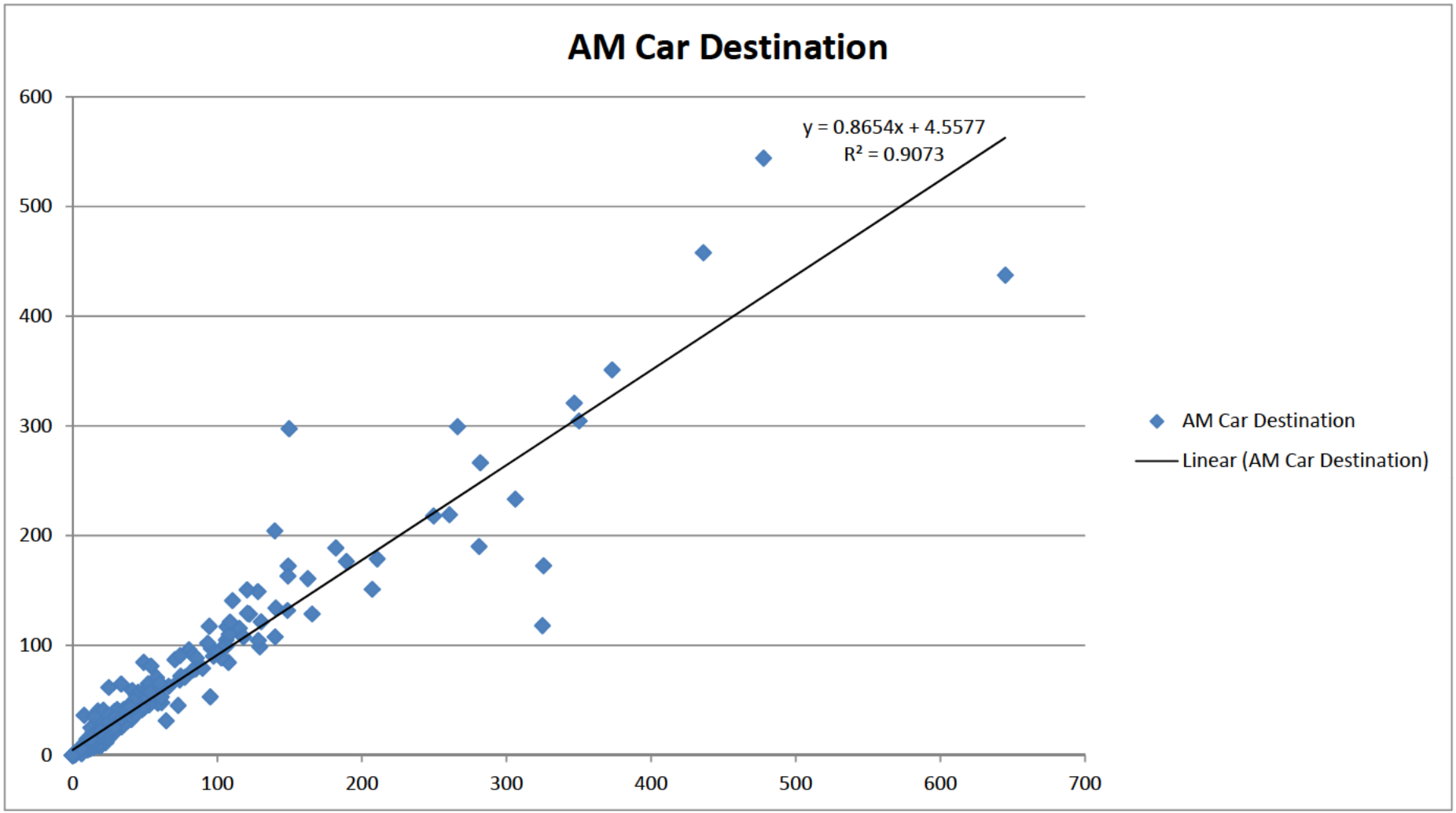


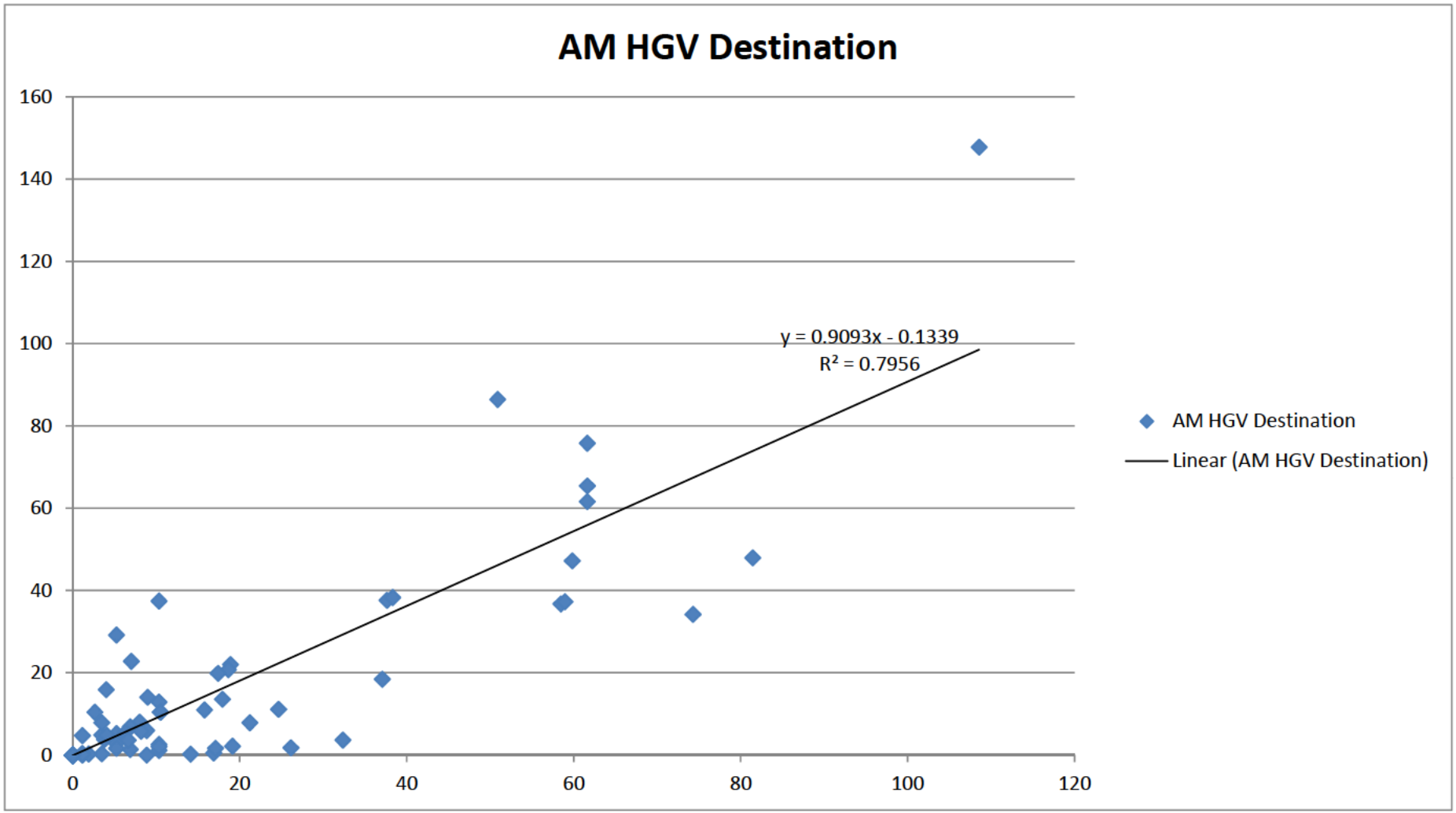

Additional ATC 2 Week count
Bicester Village
A41
Wendlebury Rd
A41
A4421
Gavray Dr
Peregrine Way
Wretchwick Way
A41
Launton
13. A41 east of B4011
A41
B4011
Lower Rd
Station Rd
Willow Rd
Ambrosden
Merton Rd
Thame Rd
Blackthorn
B4011

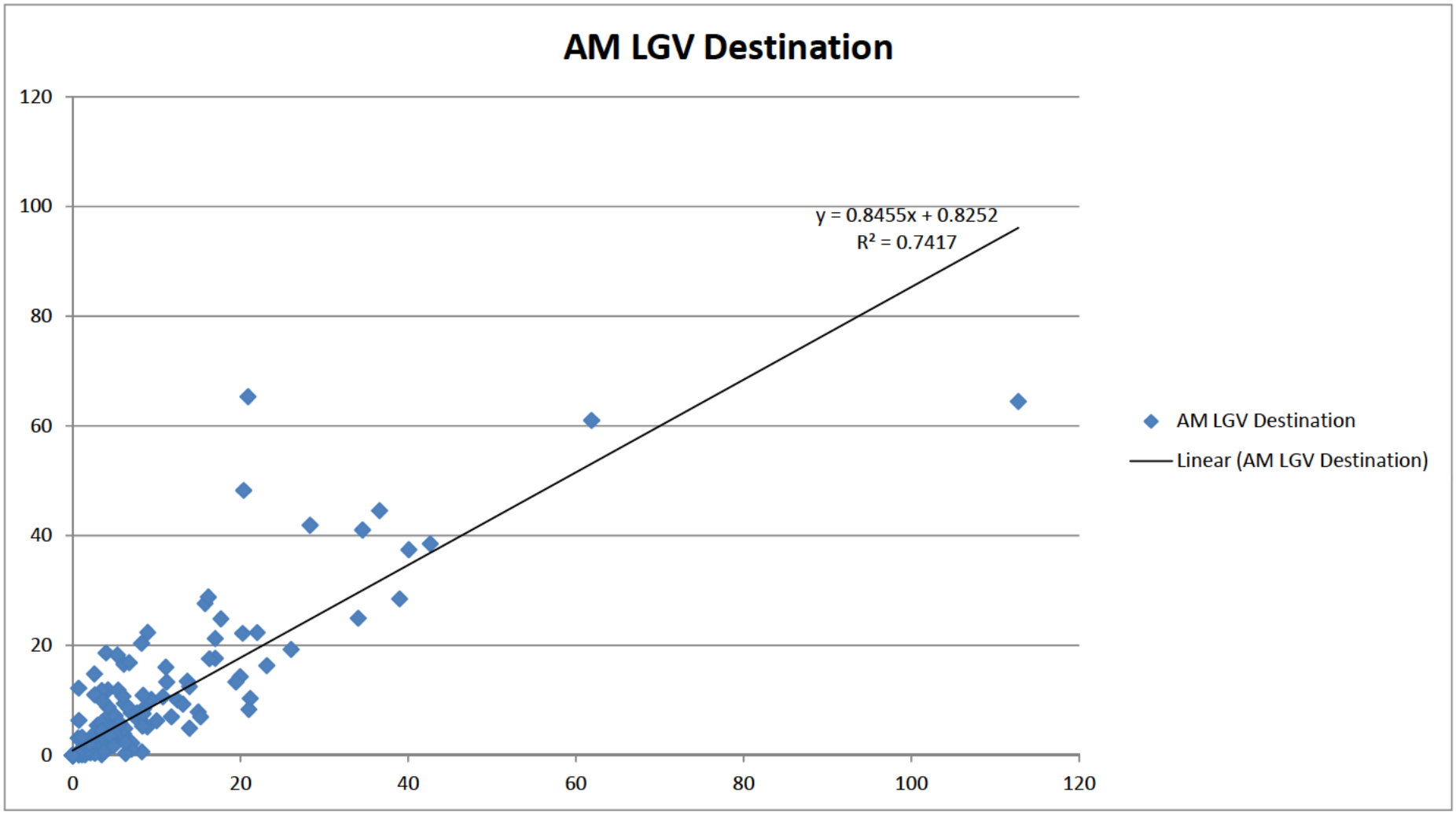
Appendix B – Modelled Speed Flow Curves

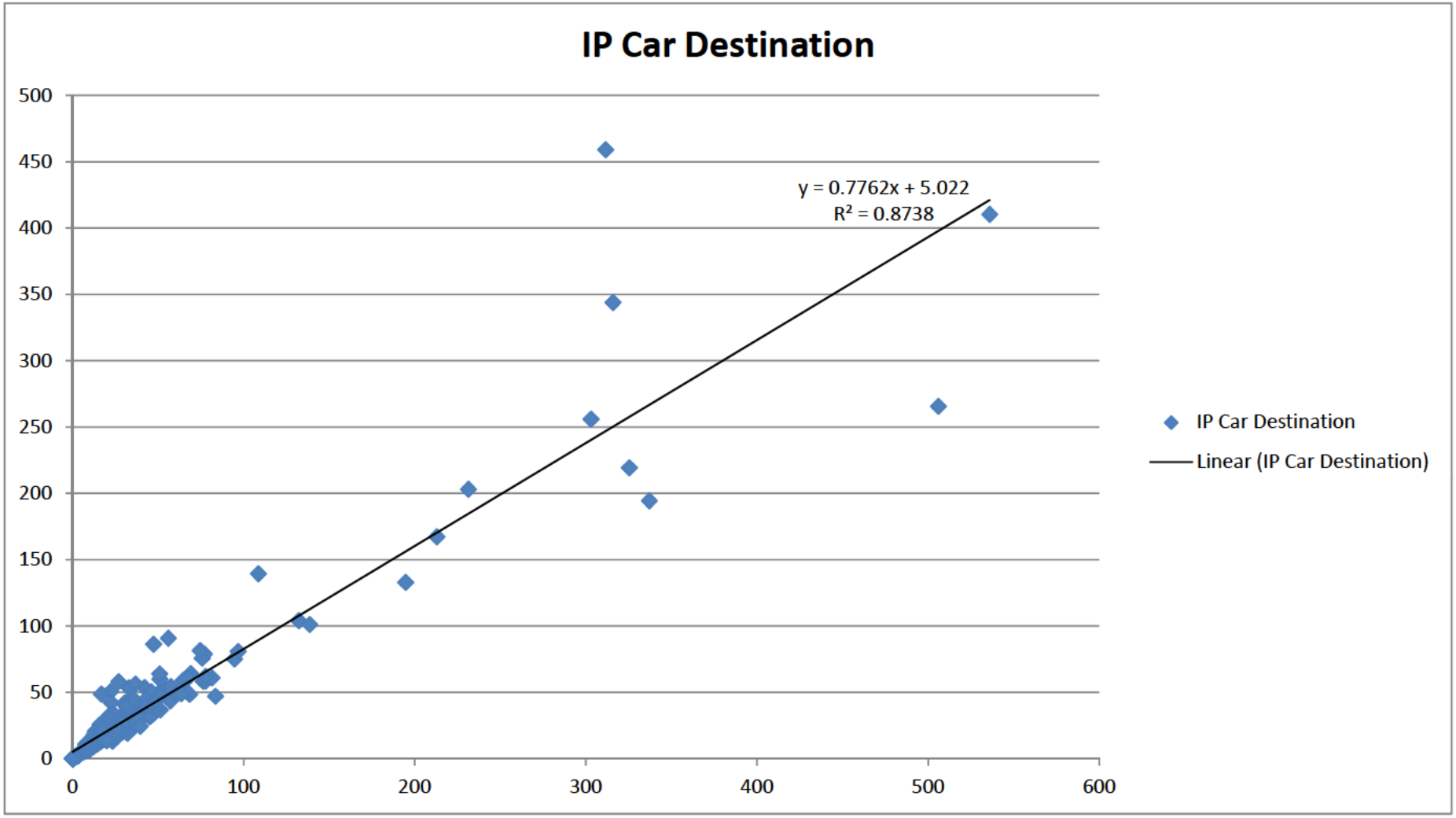
```
* WYG Interpreted SFCs below (PREFIX INDEX + 100)
*Note: Max Speeds reduced to incorporate dealys at junctions for buffer network
*                       S0   S2 C(PCU)            N  IndeX Descr Area MaXSkph
D                      117   79 6563   S         3.8  101 *D3M Rural 113
D                      110   72 4376   S         3.9  102 *D2M Rural 113
D                      113   79 5915   S         3.7  103 *D3AP Rural 113
D                      107   73 3944   S         3.9  104 *D2AP Rural 113
D                       99   62 1670   S         2.2  105 *S10(GOOD) Rural 96
D                       90   54 1670   S         2.1  106 *S10(TYPICAL) Rural 96
D                       89   62 1315   S         2.2  107 *S7.3(GOOD) Rural 96
D                       83   56 1259   S         2.1  108 *S7.0(TYPICAL) Rural 96
D                       58   52 1153   S         1.8  109 *S6.5(BAD) Rural 96
D                       79   32 3000   S         3.3  110 *DUAL (SLIGHT DEV SubU 6
D                       74   27 3000   S         2.0  111 *DUAL (TYPICAL DEV SubU
D                       68   22 3000   S         1.4  112 *DUAL (HEAVY DEV SubU 64
D                       59   22 1500   S         3.7  113 *SINGLE (SLIGHT DEV SubU
D                       54   17 1500   S         2.3  114 *SINGLE (TYP DEV SubU 64
D                       48   12 1500   S         1.6  115 *SINGLE (HEAVY DEV SubU
D                       55   31  800   S         1.7  116 *NON-CENT 50% DEV Urb 48
D                       51   27  800   S         1.6  117 *NON-CENT 80% DEV Urb 48
D                       47   23  800   S         1.5  118 *NON-CENT 100% DEV Urb 4
D                       37   13  800   S         1.8  119 *CENT INT=2 Good Urb 48
D                       34   10  800   S         1.7  120 *CENT INT=4.5 Typl Urb 4
D                       28    4  800   S         1.6  121 *CENT INT=9 Poor Urb 48
D                       53   30 1200   S         3.0  122 *35% DEV Small Town 48
D                       46   24 1200   S         3.4  123 *60% DEV Small Town 48
D                       38   17 1200   S         2.5  124 *90% DEV Small Town 48
D                       46   24 1100   S         1.8  201 *rural cruise buffer curve
```

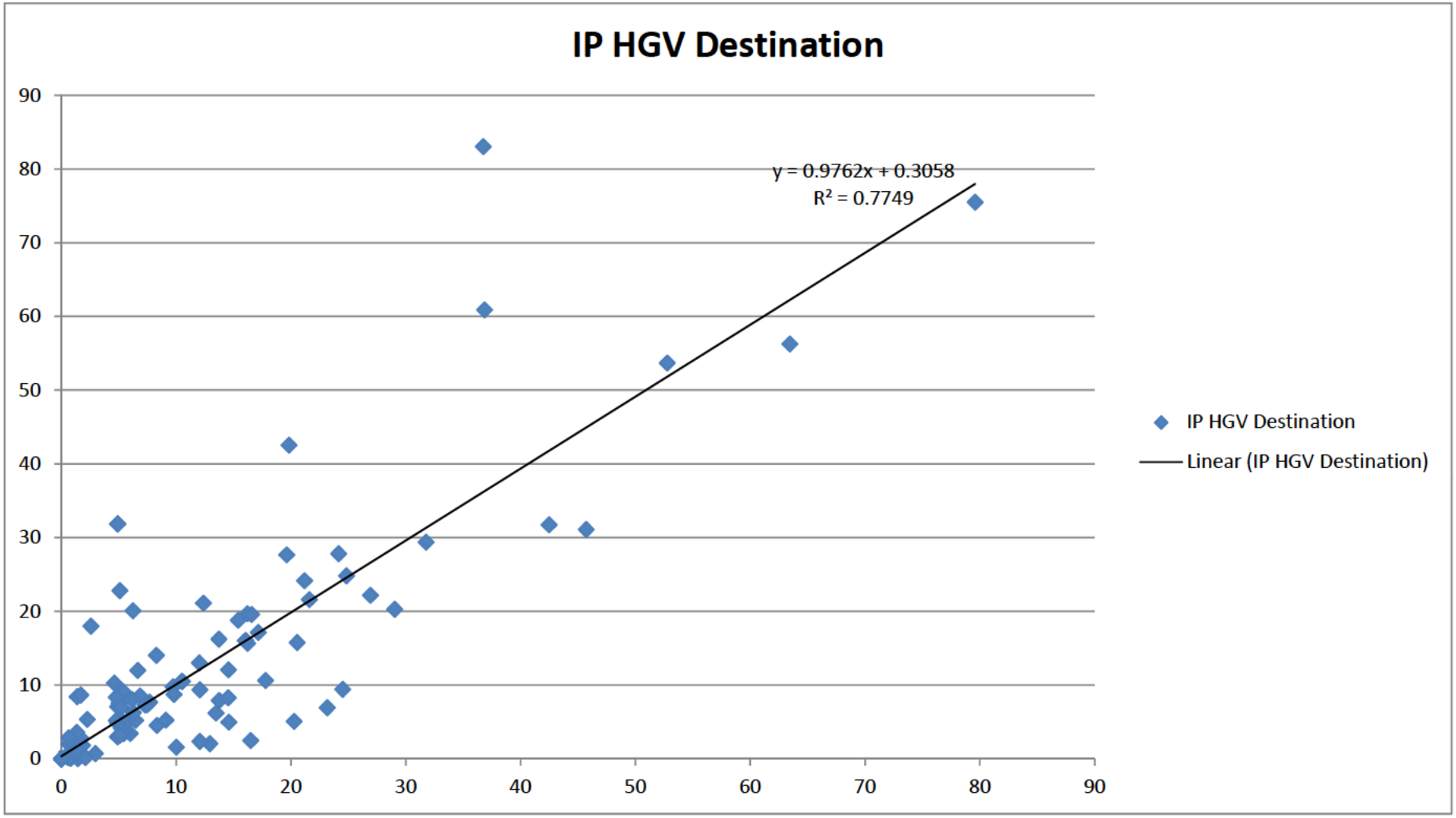
Appendix C – Matrix Estimation Analysis

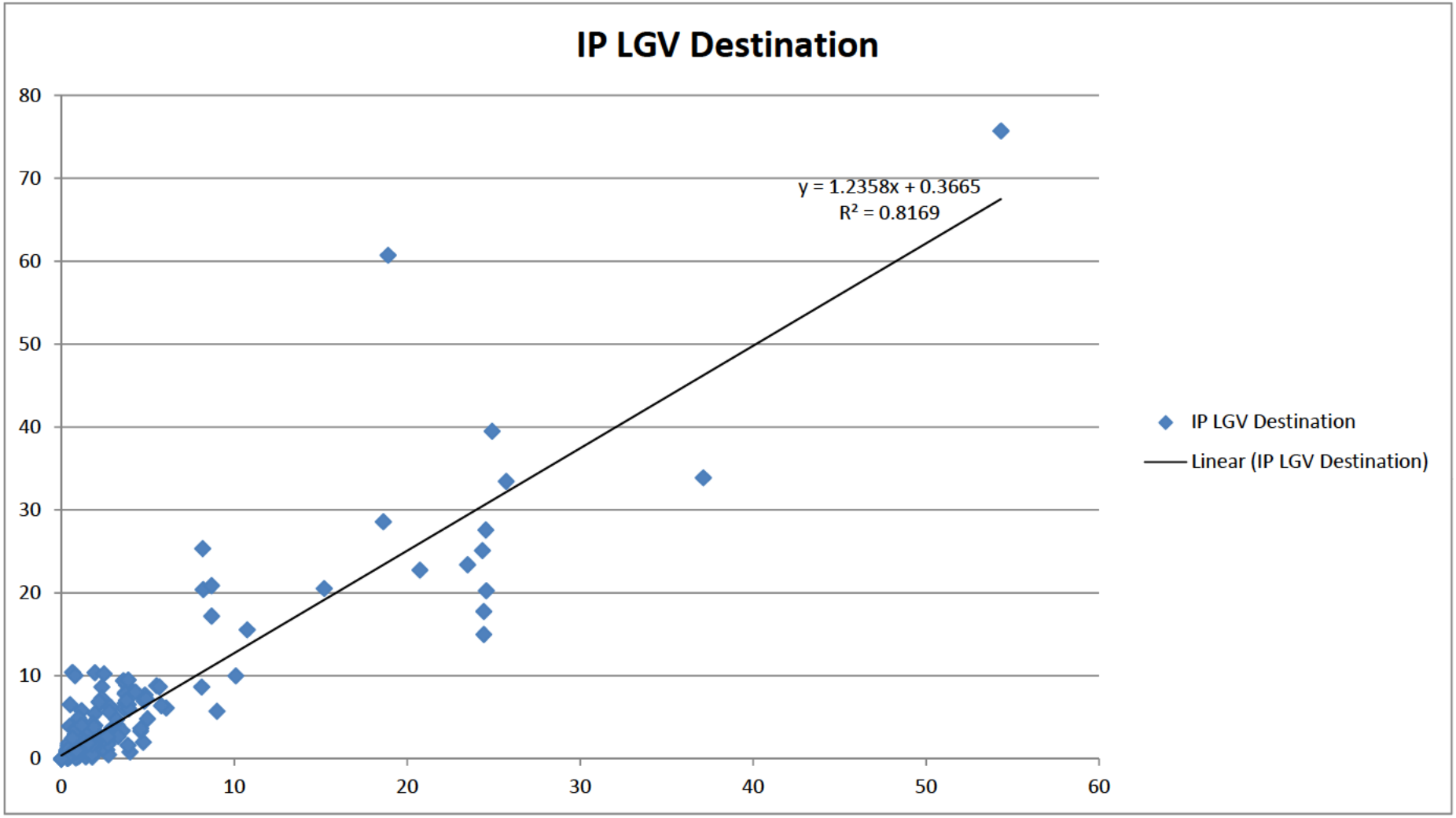

AM Car Destination
y = 0.8654x + 4.5577
R² = 0.9073
600
500
400
300
200
100
0
0
100
200
300
400
500
600
700
AM Car Destination
Linear (AM Car Destination)

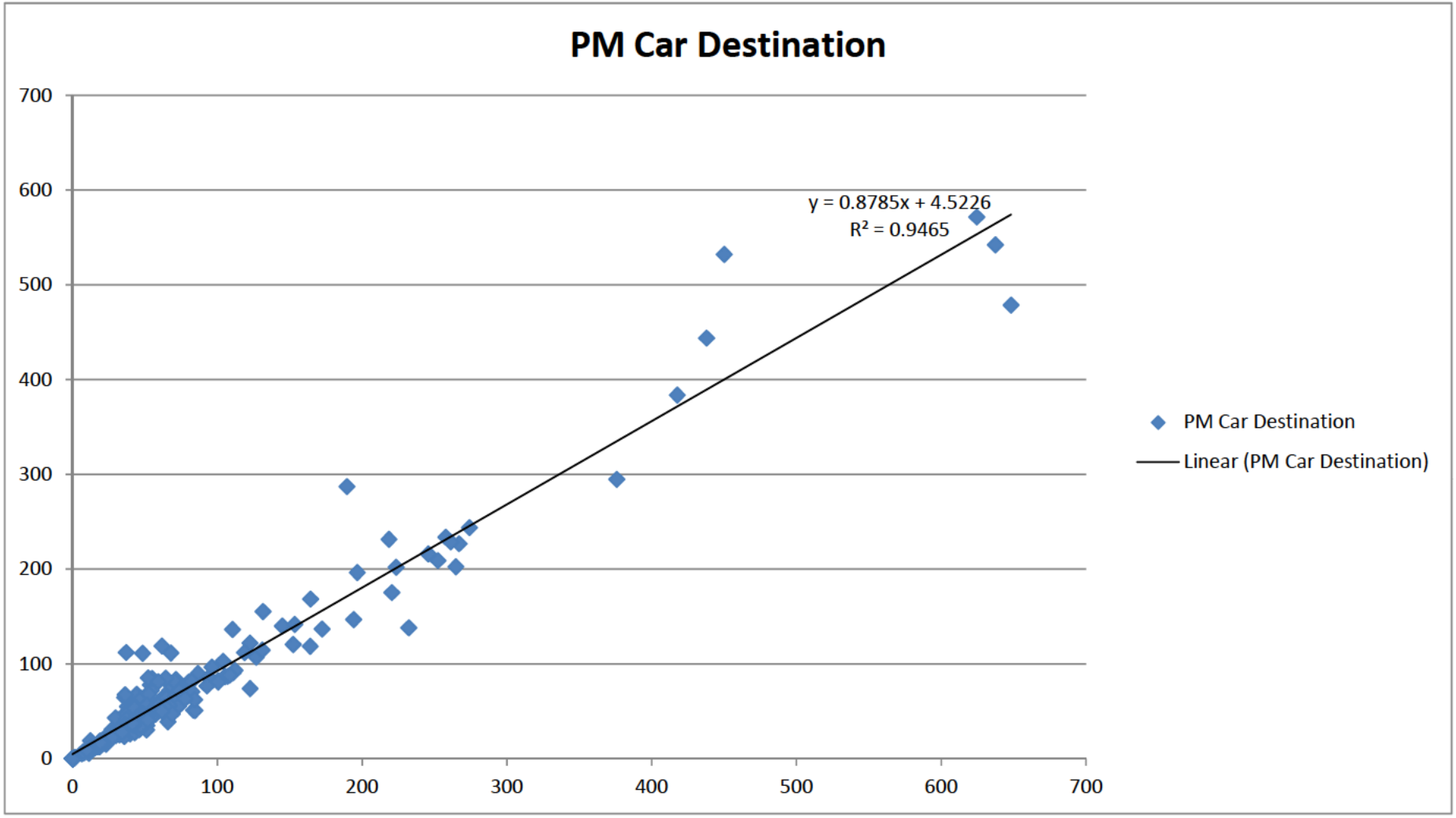

AM HGV Destination
160
140
120
100
80
60
40
20
0
0
20
40
60
80
100
120
y = 0.9093x - 0.1339
R² = 0.7956
AM HGV Destination
Linear (AM HGV Destination)

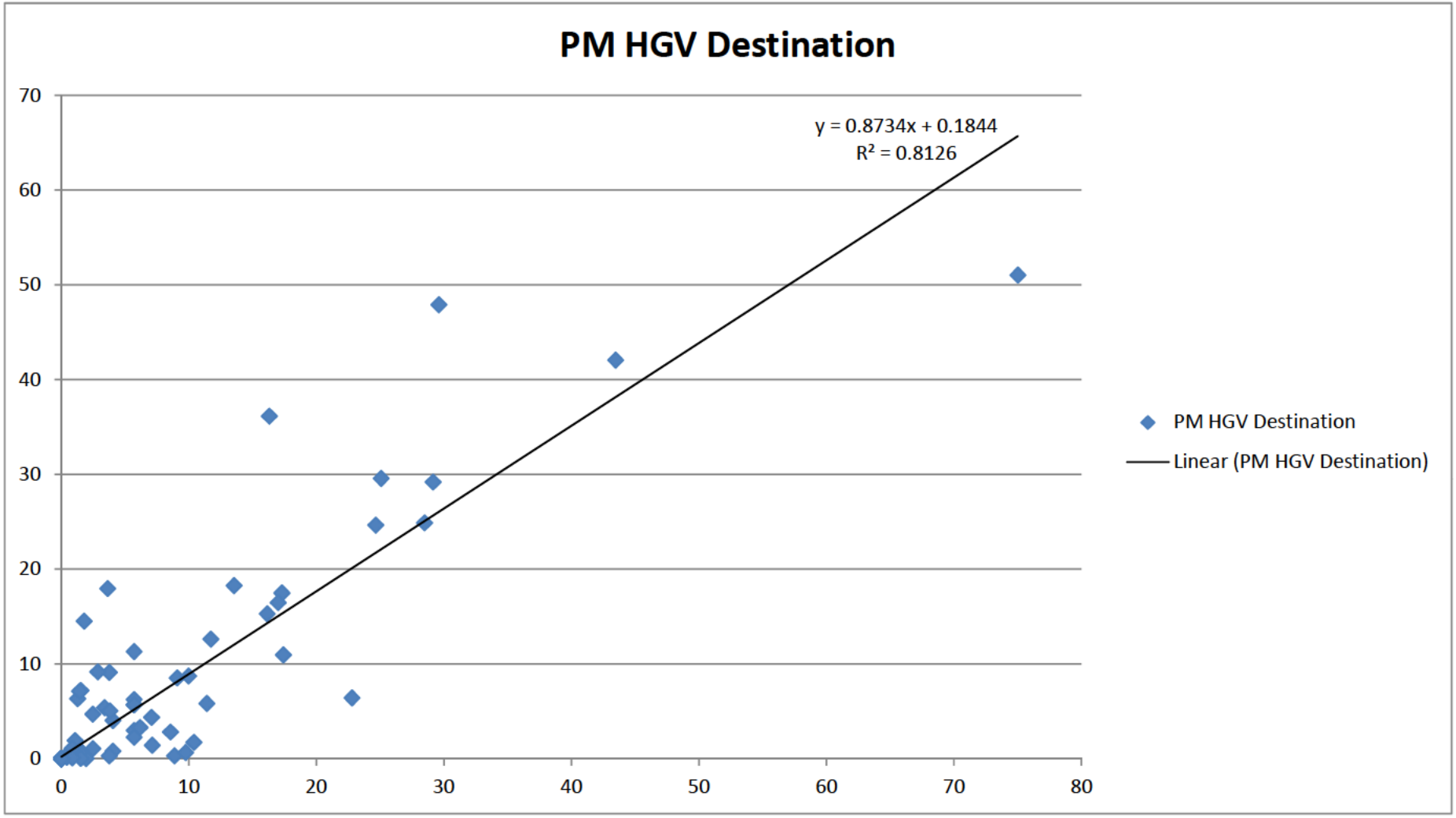

AM LGV Destination
120
100
80
60
40
20
0
0
20
40
60
80
100
120
y = 0.8455x + 0.8252
R² = 0.7417
AM LGV Destination
Linear (AM LGV Destination)

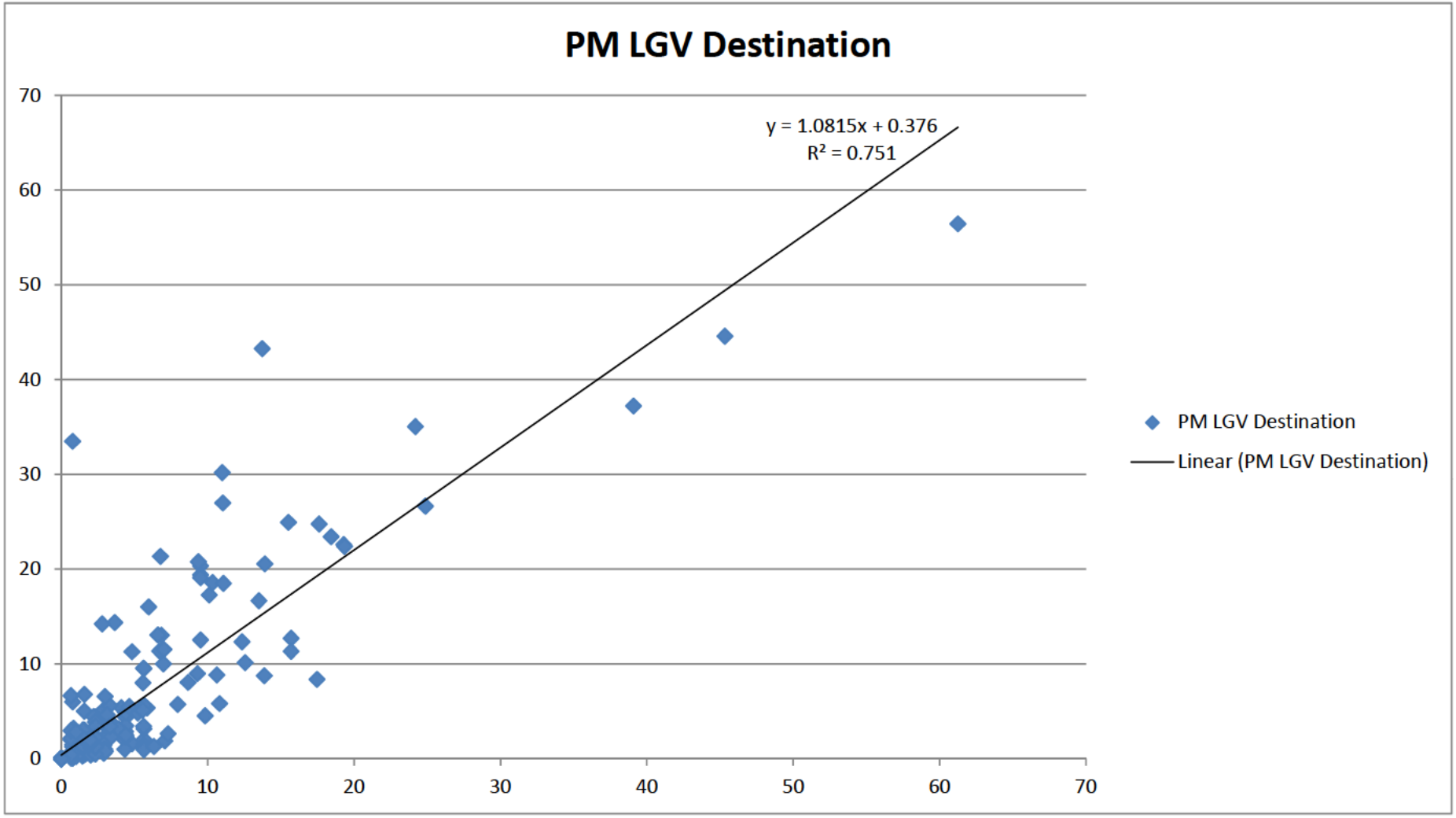

IP Car Destination
y = 0.7762x + 5.022
R² = 0.8738
500
450
400
350
300
250
200
150
100
50
0
0
100
200
300
400
500
600
IP Car Destination
Linear (IP Car Destination)

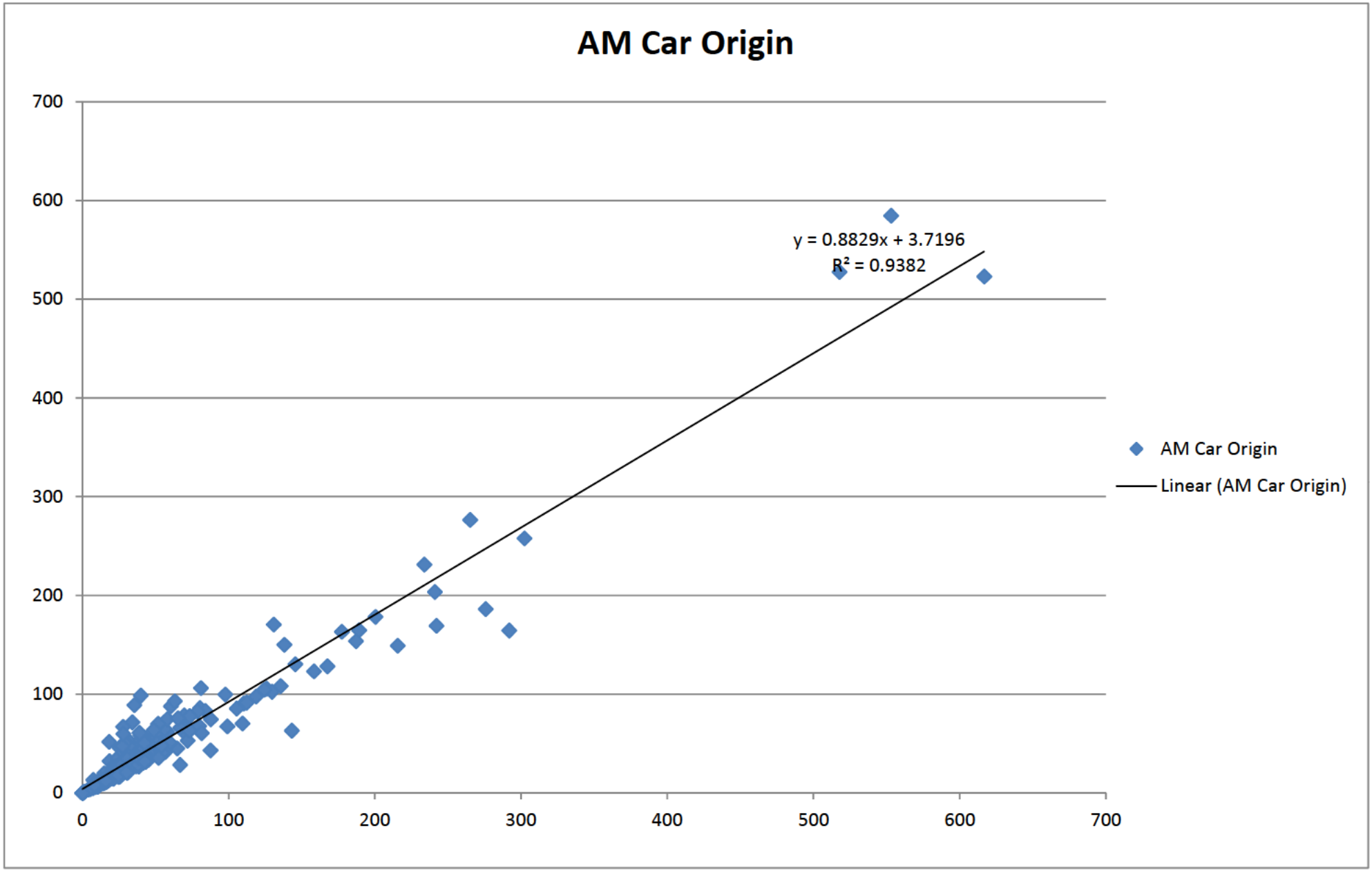

IP HGV Destination
y = 0.9762x + 0.3058
R² = 0.7749
IP HGV Destination
Linear (IP HGV Destination)
0
10
20
30
40
50
60
70
80
90

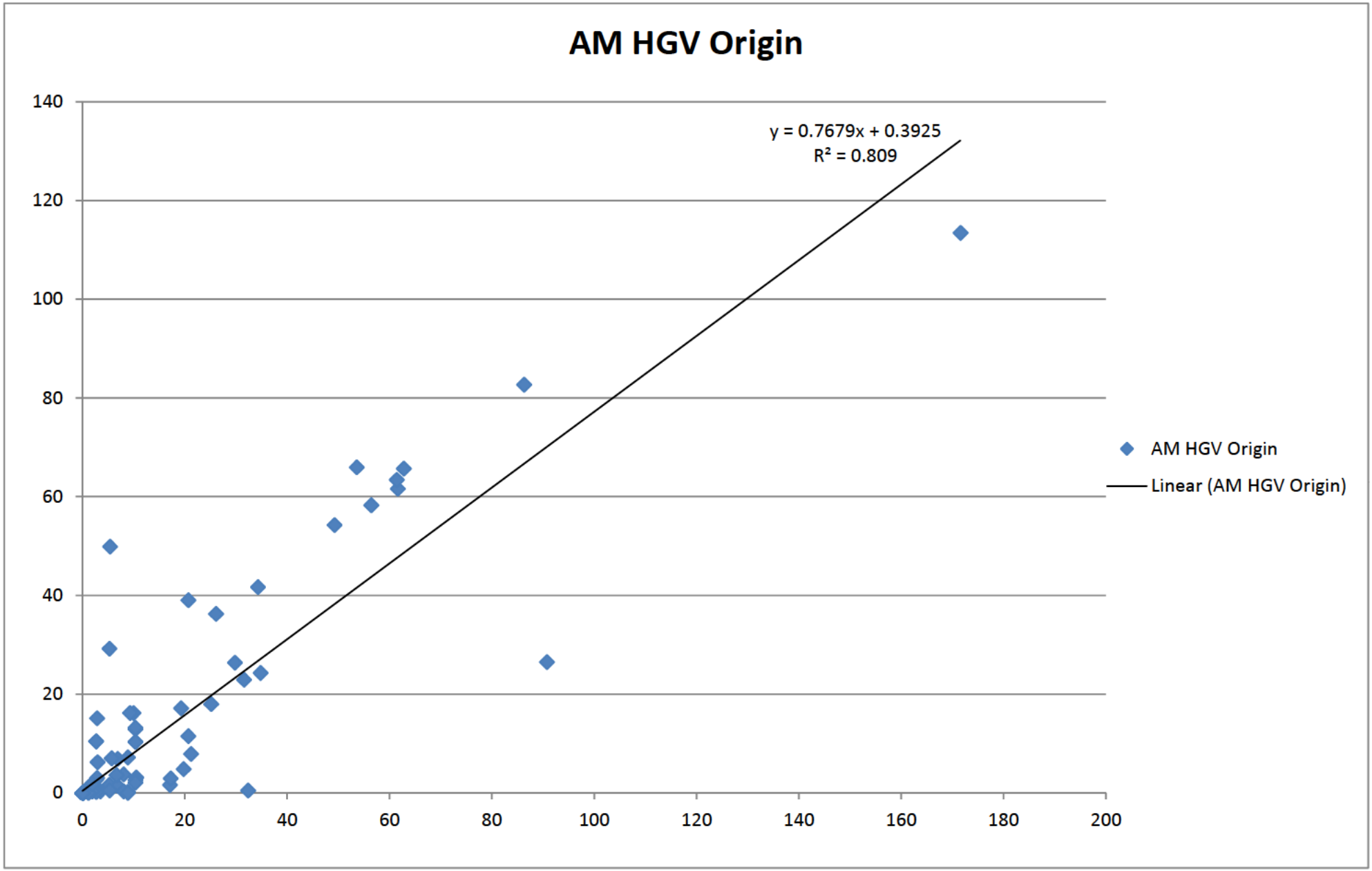

IP LGV Destination
y = 1.2358x + 0.3665
R² = 0.8169
IP LGV Destination
Linear (IP LGV Destination)
0
10
20
30
40
50
60
70
80

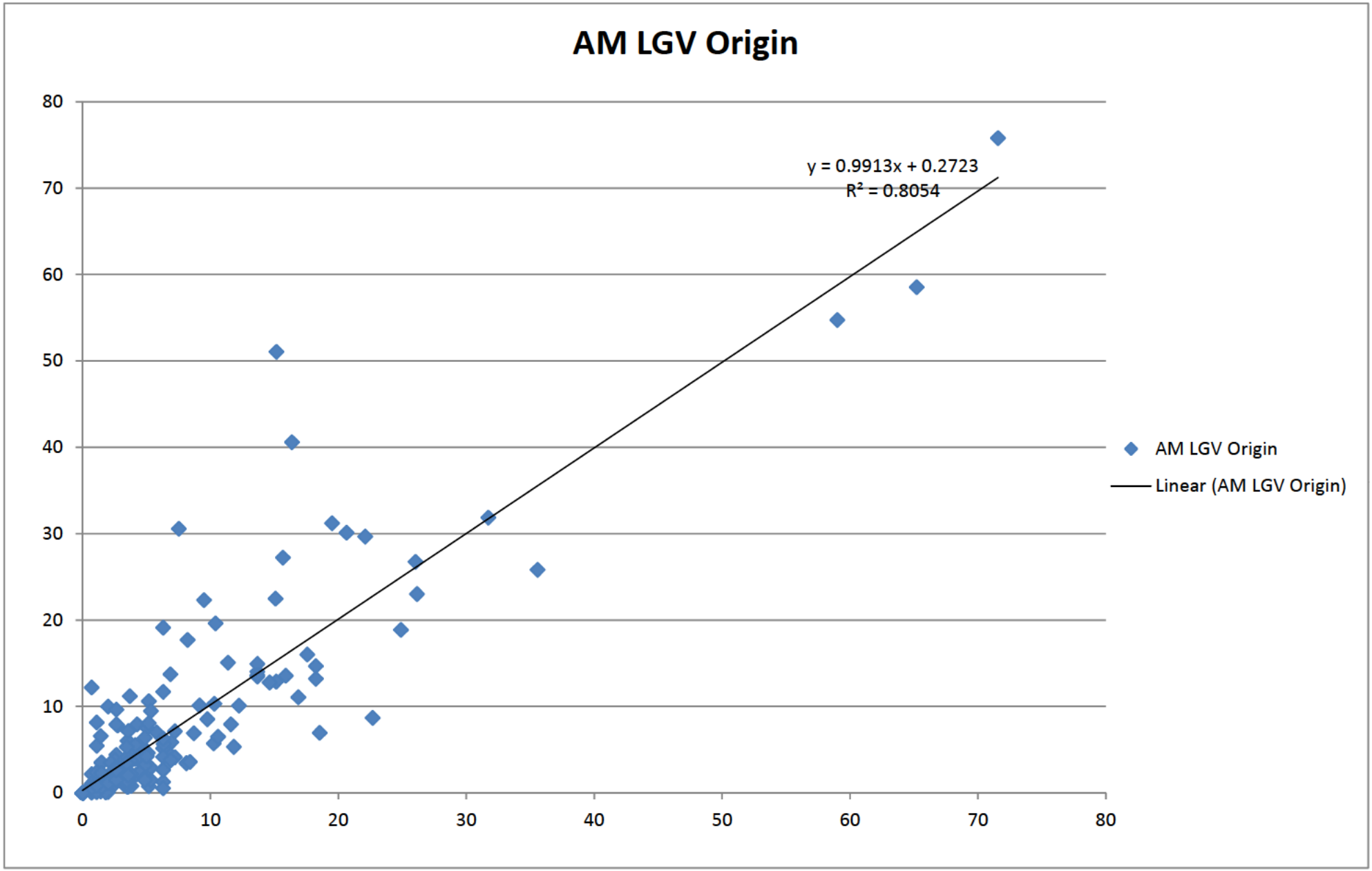

PM Car Destination
y = 0.8785x + 4.5226
R² = 0.9465
0
100
200
300
400
500
600
700
PM Car Destination
Linear (PM Car Destination)

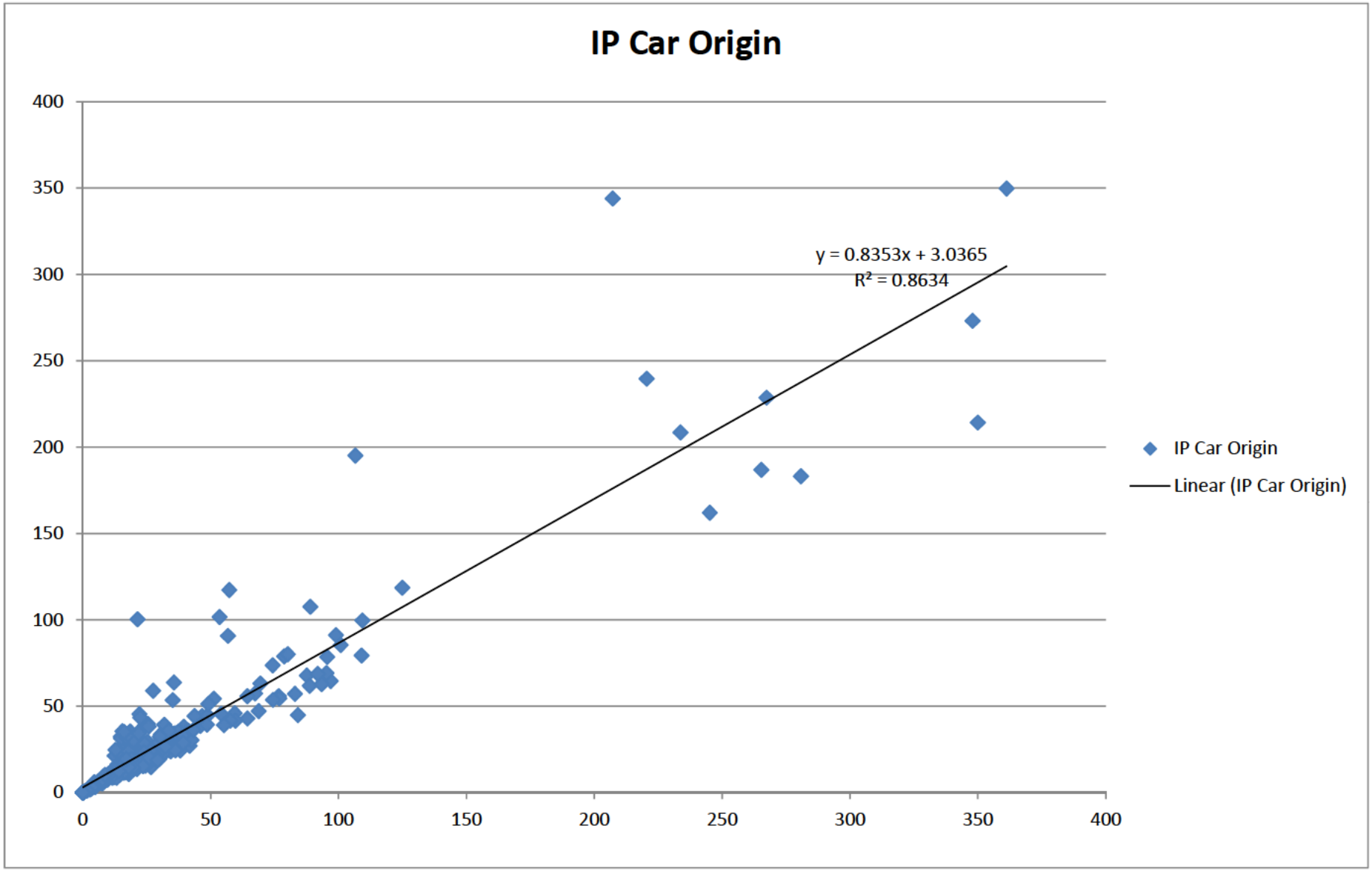

PM HGV Destination
y = 0.8734x + 0.1844
R² = 0.8126
70
60
50
40
30
20
10
0
0
10
20
30
40
50
60
70
80
PM HGV Destination
Linear (PM HGV Destination)

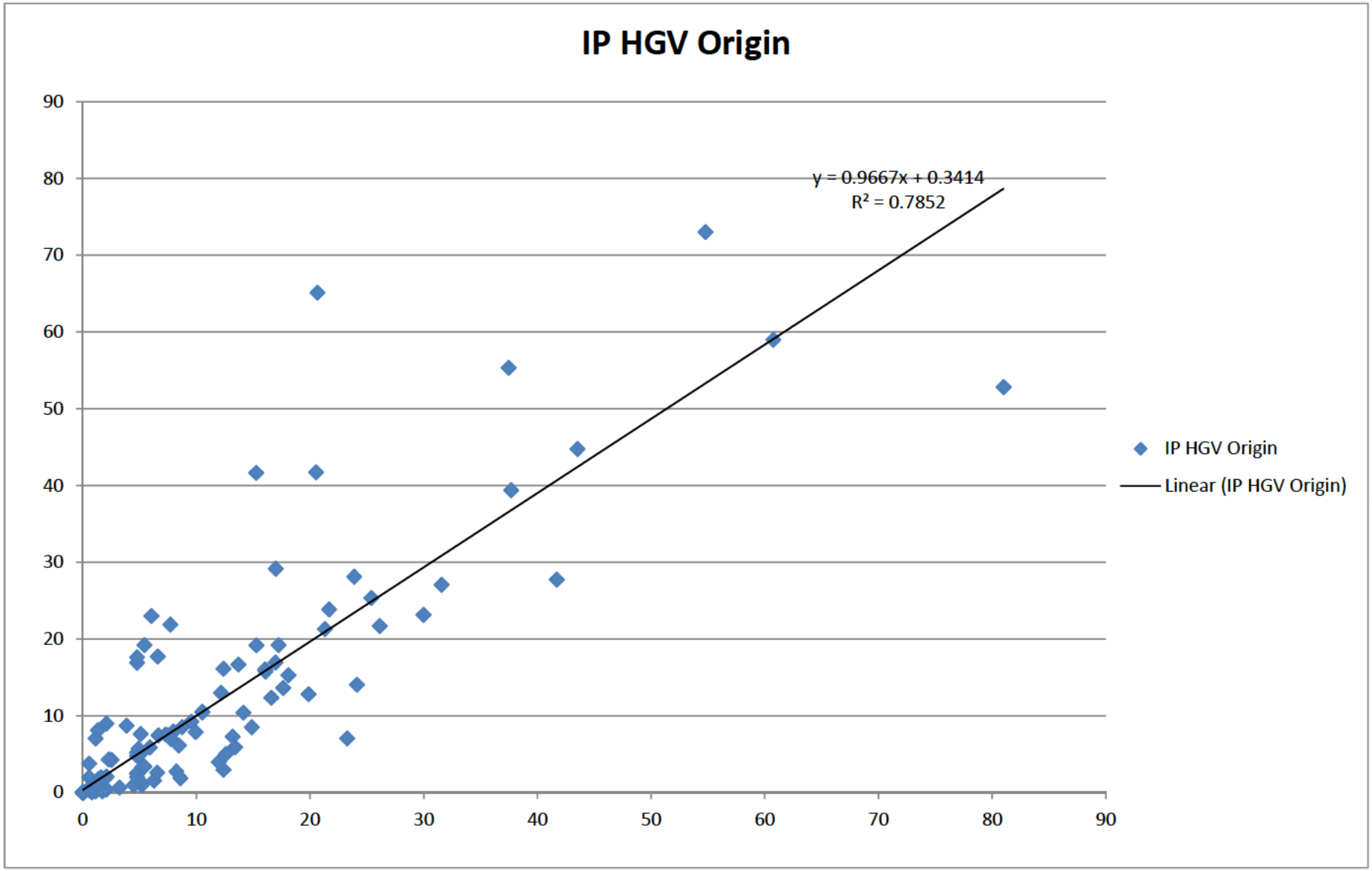

PM LGV Destination
y = 1.0815x + 0.376
R² = 0.751
70
60
50
40
30
20
10
0
0
10
20
30
40
50
60
70
PM LGV Destination
Linear (PM LGV Destination)

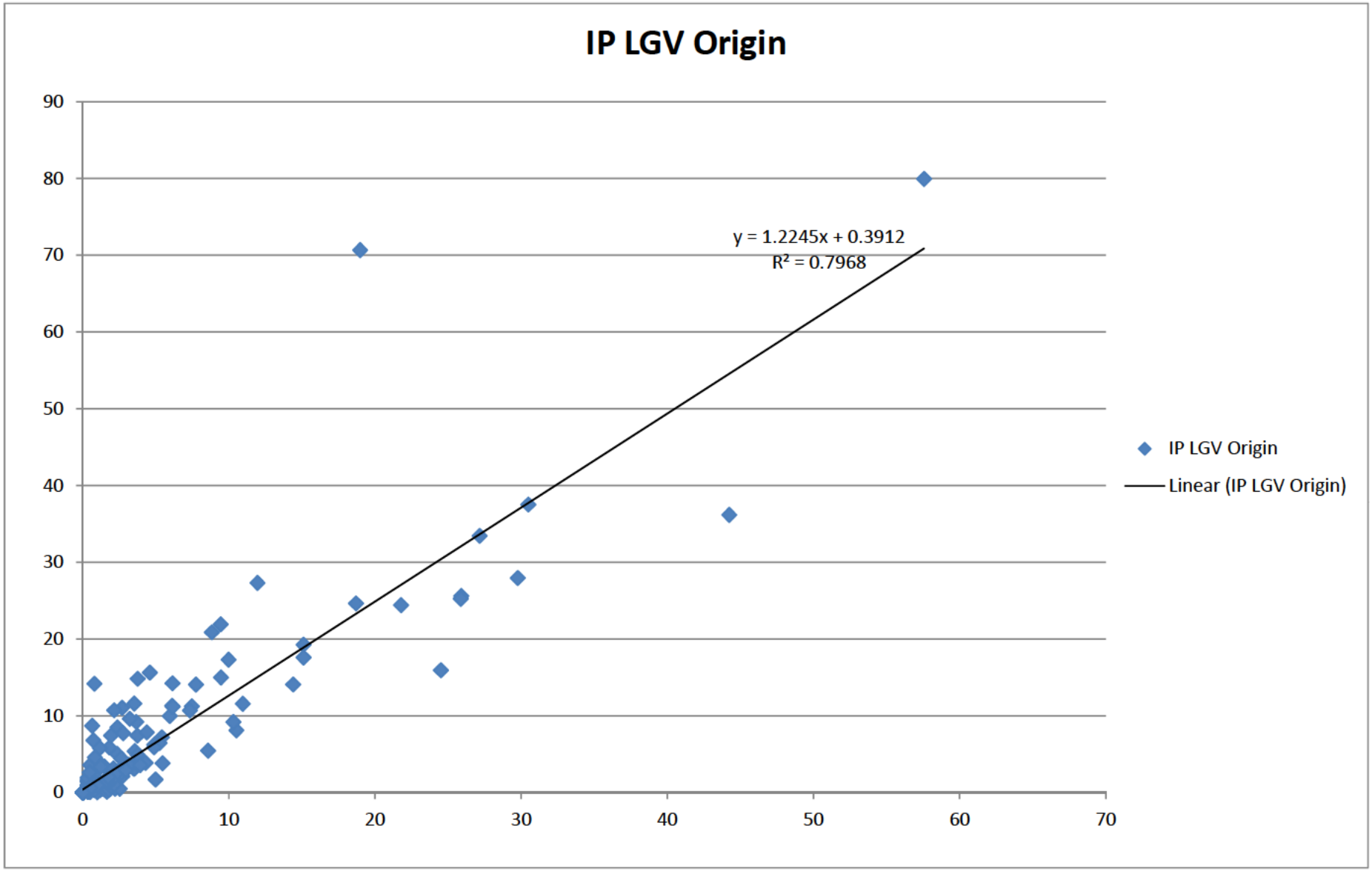

AM Car Origin
700
600
500
400
300
200
100
0
0
100
200
300
400
500
600
700
y = 0.8829x + 3.7196
R² = 0.9382
AM Car Origin
Linear (AM Car Origin)

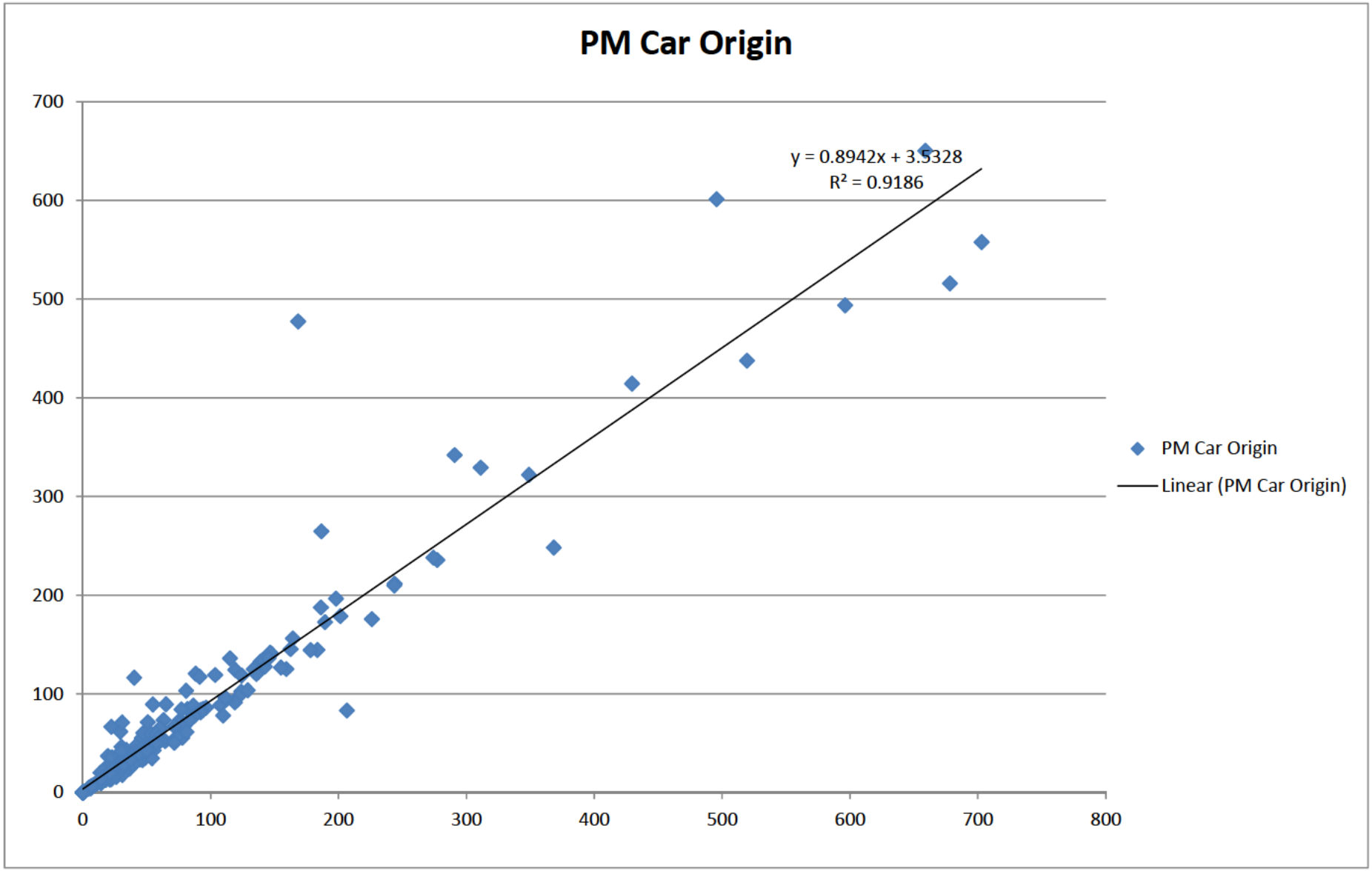

AM HGV Origin
y = 0.7679x + 0.3925
R² = 0.809
140
120
100
80
60
40
20
0
0
20
40
60
80
100
120
140
160
180
200
AM HGV Origin
Linear (AM HGV Origin)

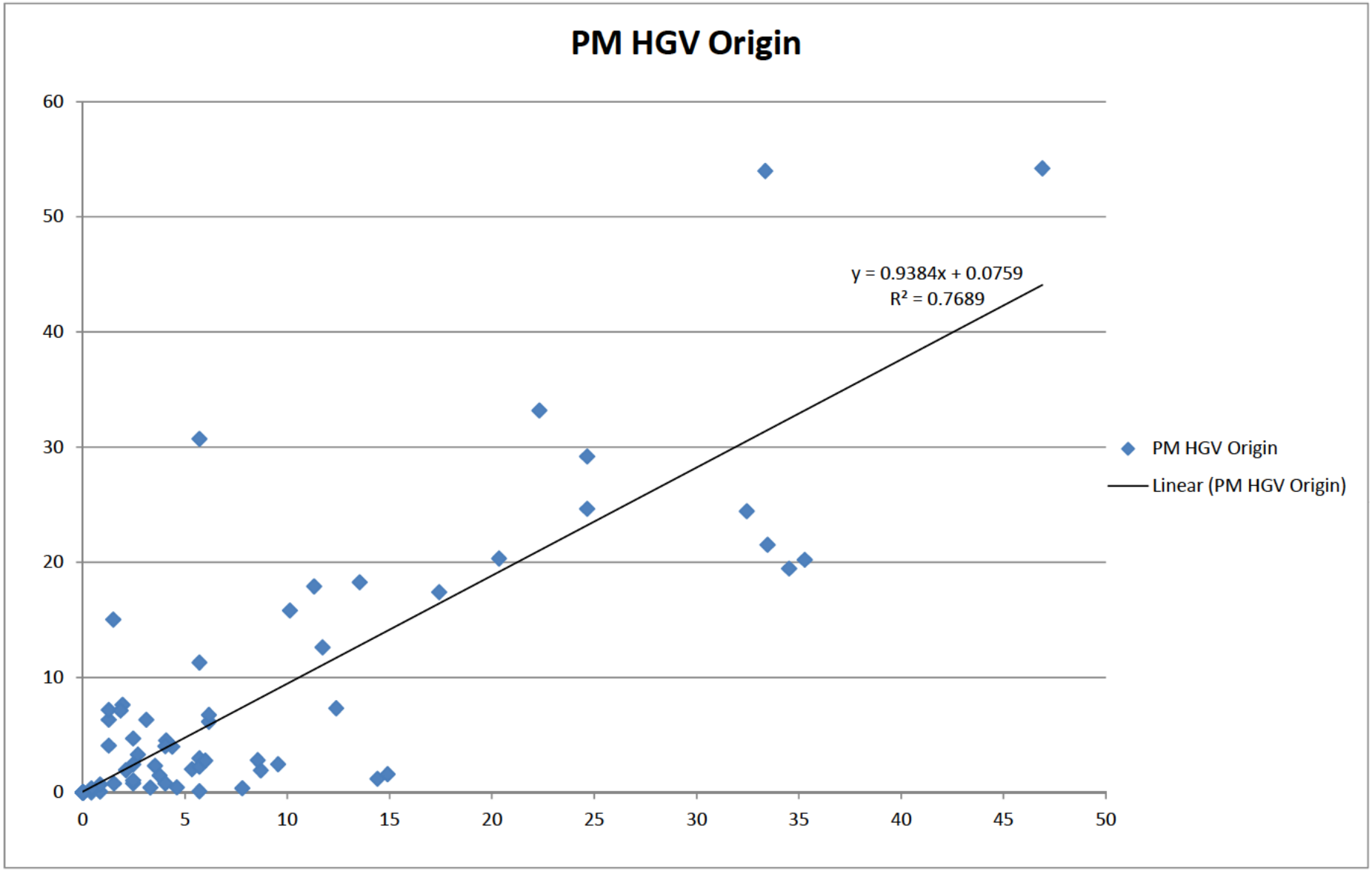

AM LGV Origin
y = 0.9913x + 0.2723
R² = 0.8054
AM LGV Origin
Linear (AM LGV Origin)
0
10
20
30
40
50
60
70
80

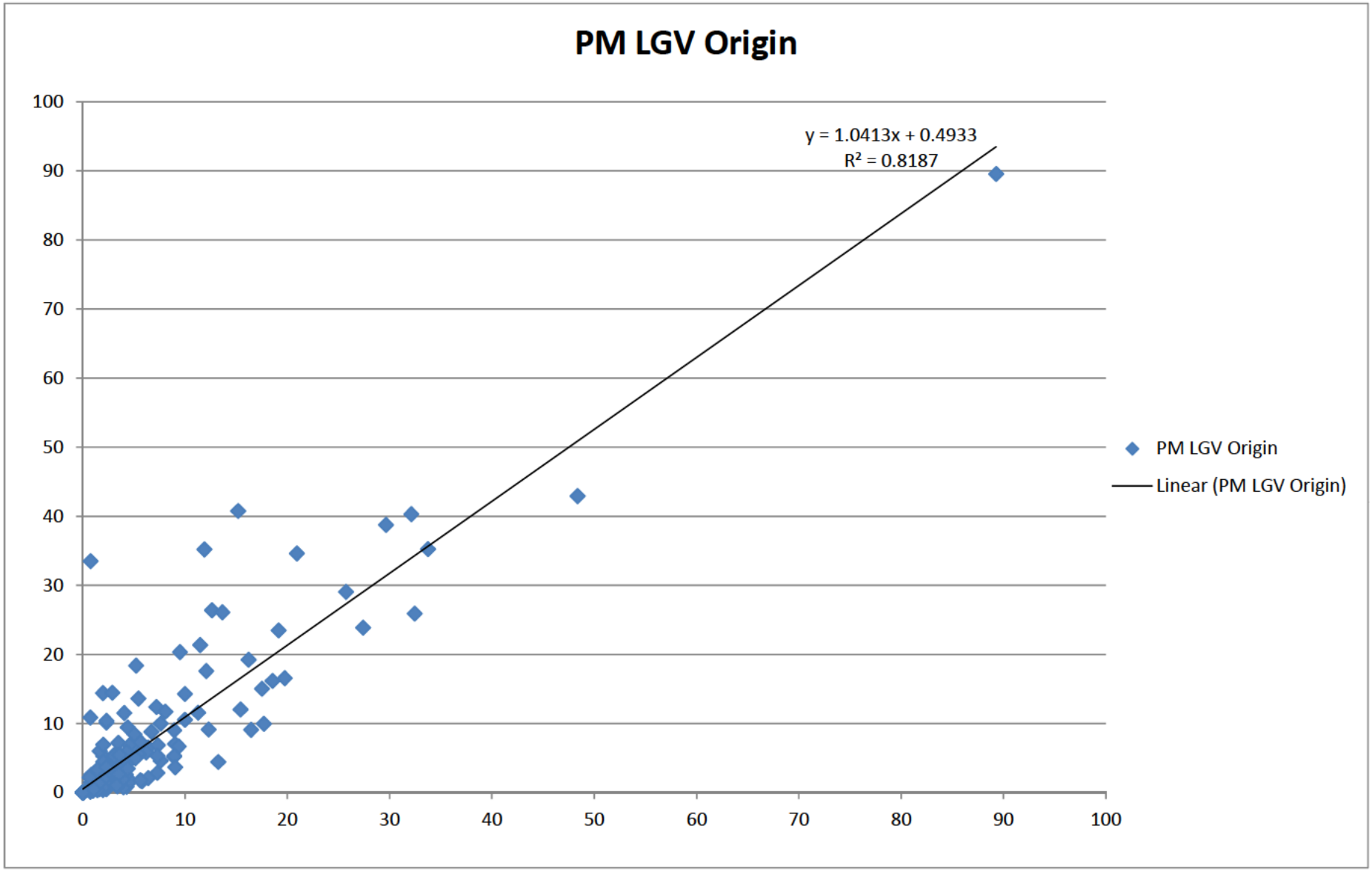

IP Car Origin
y = 0.8353x + 3.0365
R² = 0.8634
IP Car Origin
Linear (IP Car Origin)
0
50
100
150
200
250
300
350
400


IP HGV Origin
y = 0.9667x + 0.3414
R² = 0.7852
IP HGV Origin
Linear (IP HGV Origin)
0
10
20
30
40
50
60
70
80
90

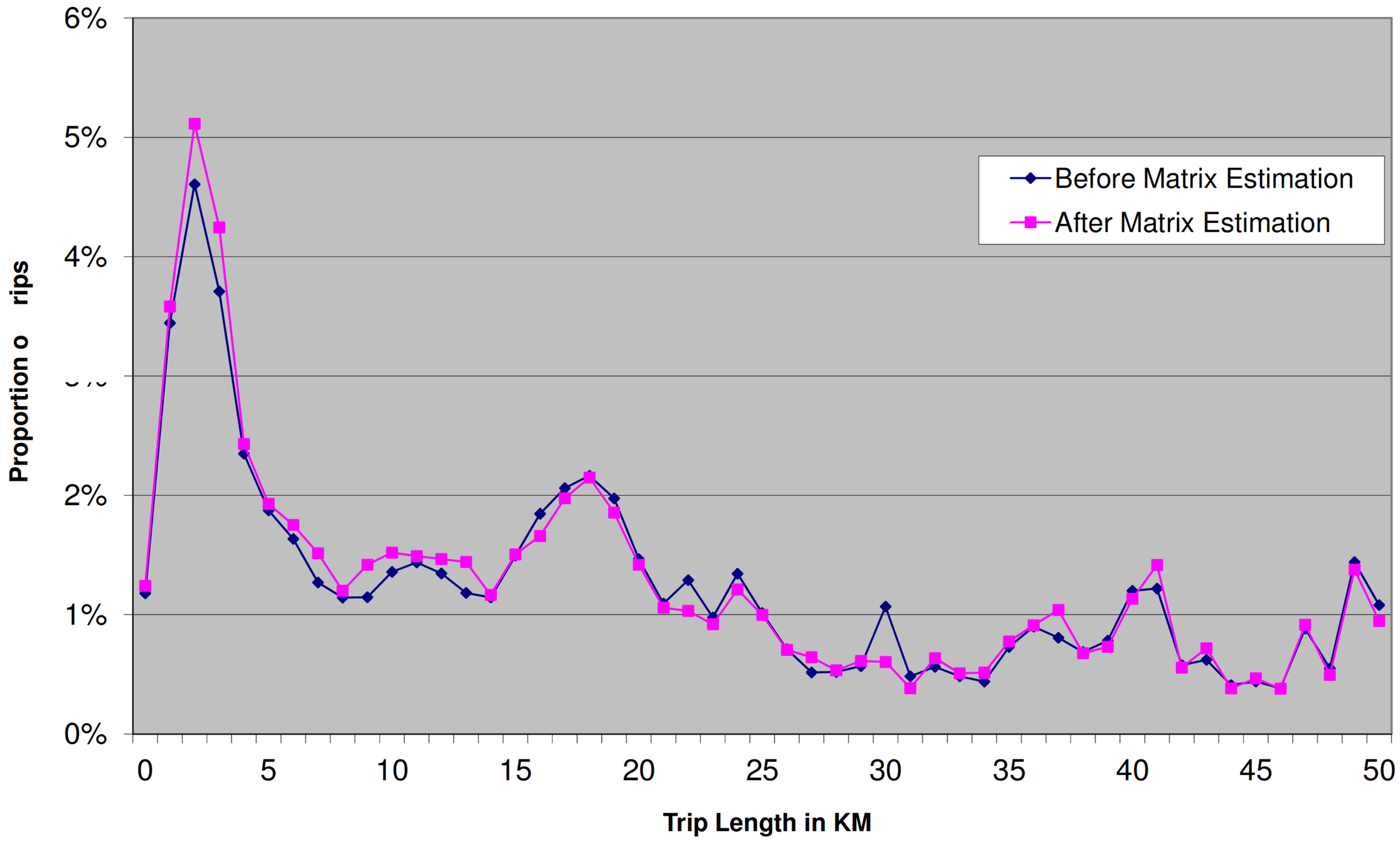

IP LGV Origin
y = 1.2245x + 0.3912
R² = 0.7968
IP LGV Origin
Linear (IP LGV Origin)
0
10
20
30
40
50
60
70
80
90


PM Car Origin
y = 0.8942x + 3.5328
R² = 0.9186
700
600
500
400
300
200
100
0
0
100
200
300
400
500
600
700
800
PM Car Origin
Linear (PM Car Origin)

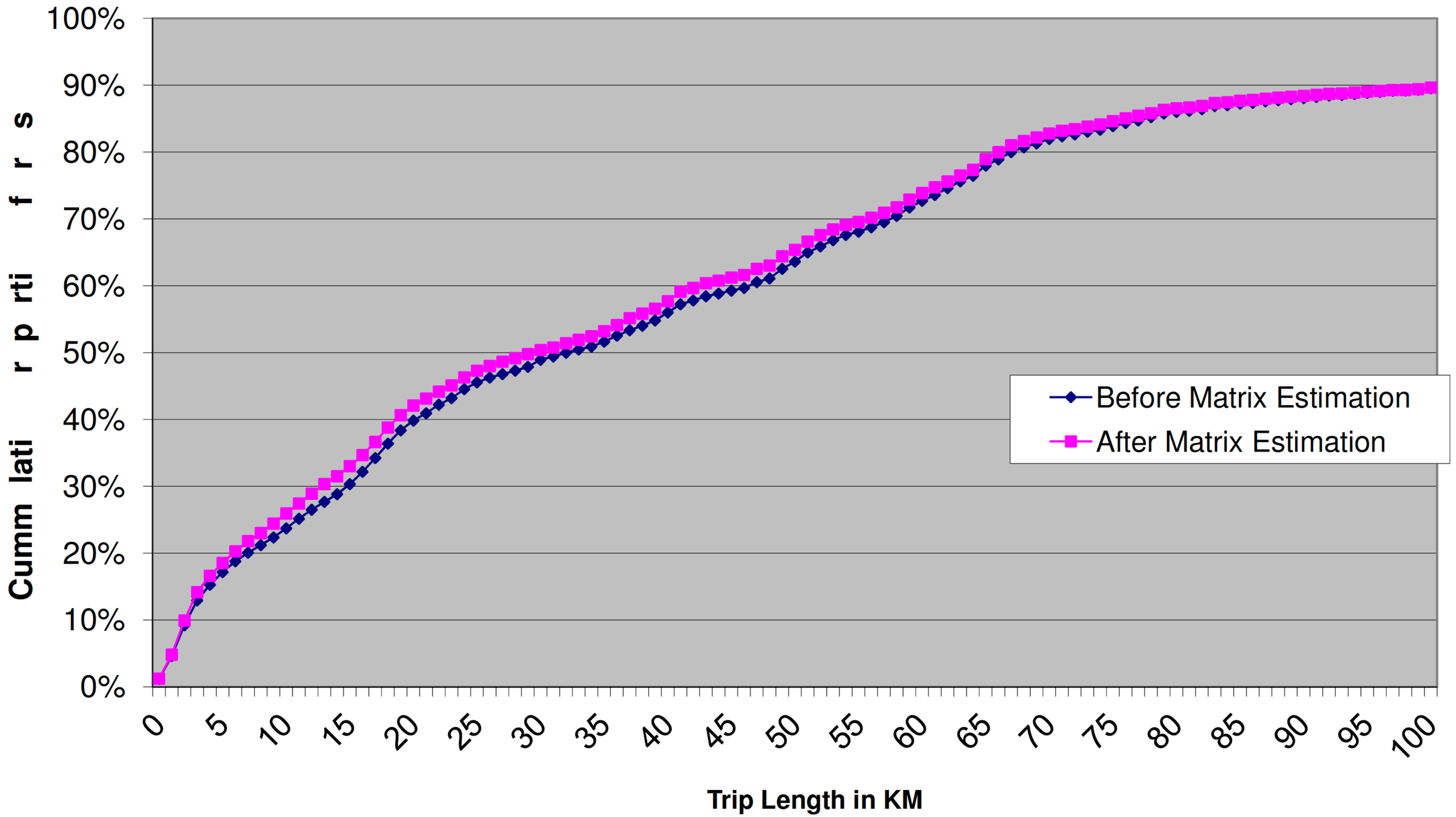

PM HGV Origin
y = 0.9384x + 0.0759
R² = 0.7689
PM HGV Origin
Linear (PM HGV Origin)
60
50
40
30
20
10
0
0
5
10
15
20
25
30
35
40
45
50


PM LGV Origin
y = 1.0413x + 0.4933
R² = 0.8187
100
90
80
70
60
50
40
30
20
10
0
0
10
20
30
40
50
60
70
80
90
100
PM LGV Origin
Linear (PM LGV Origin)

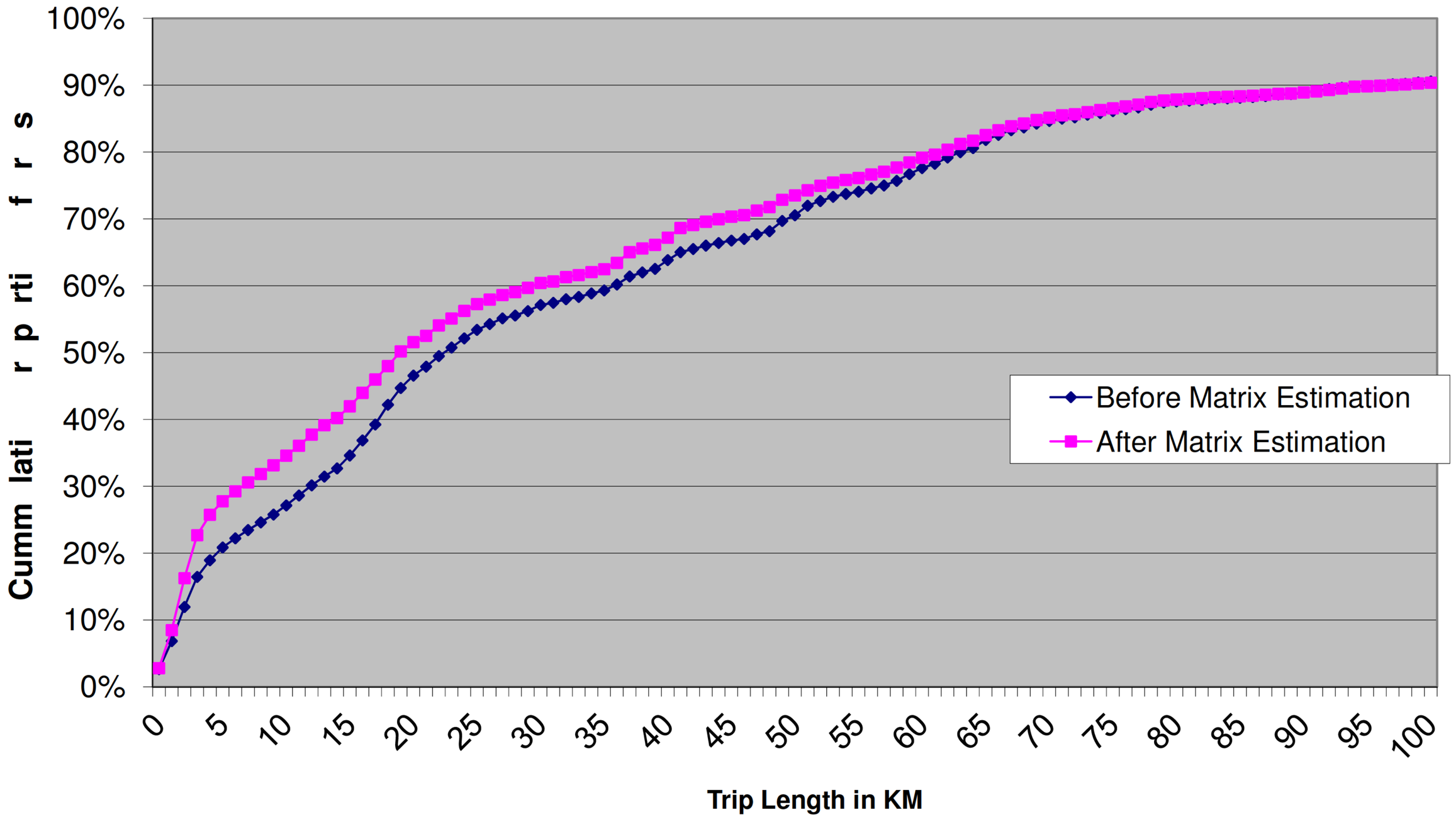
Trip Length Frequency Distribution - AM Peak



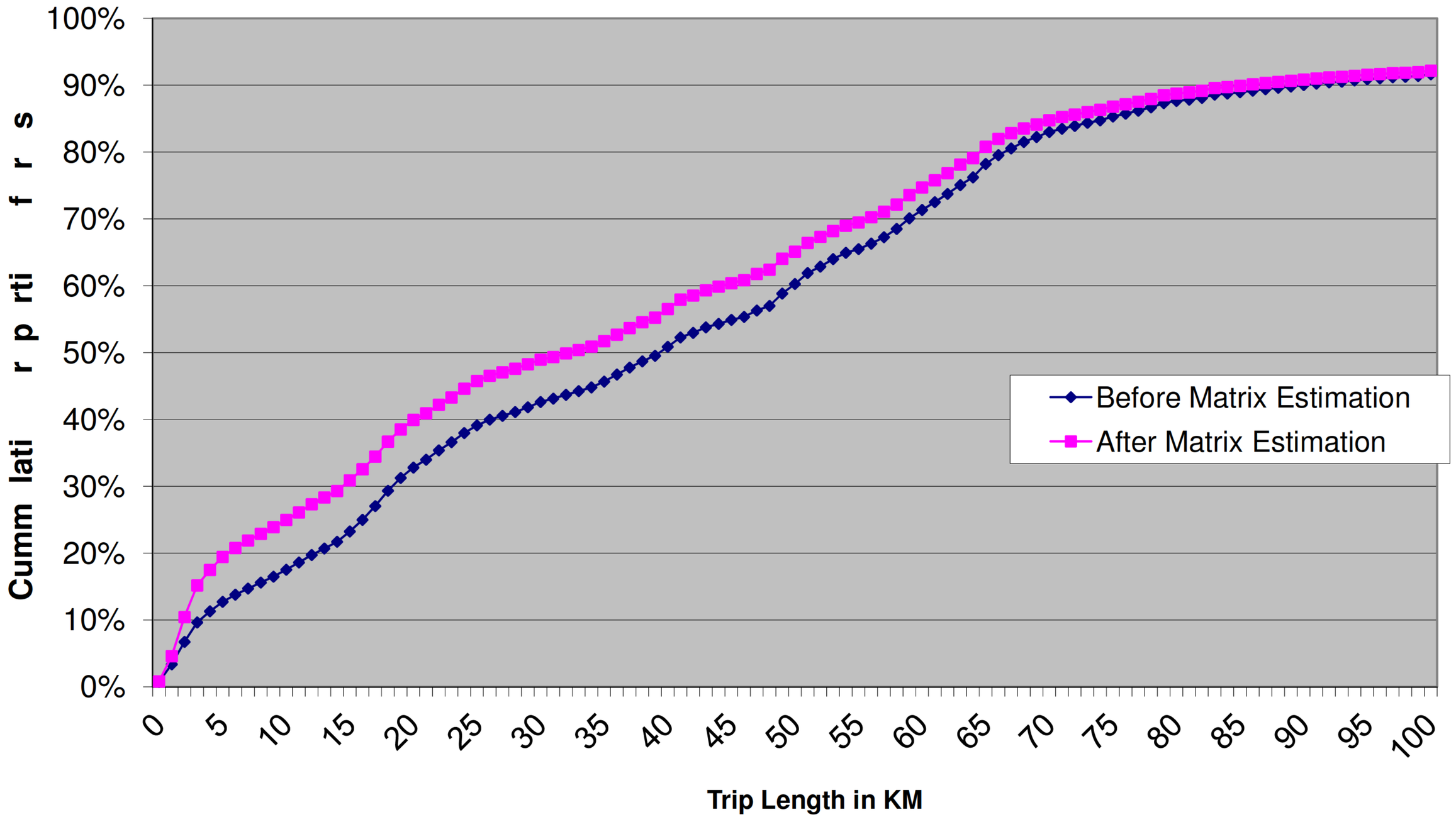
Trip Length Frequency Distribution - AM Peak



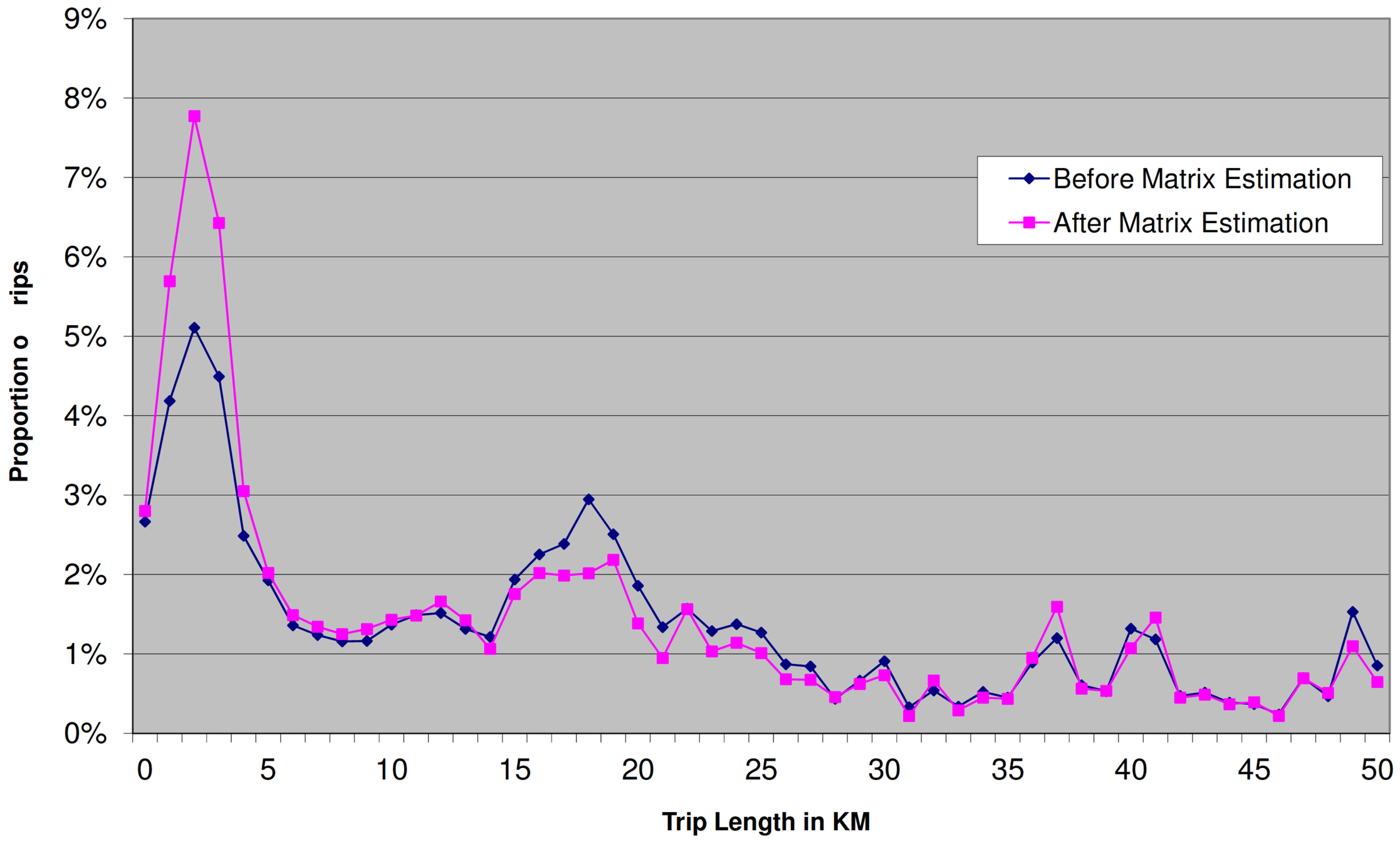
Trip Length Frequency Distribution - Inter Peak



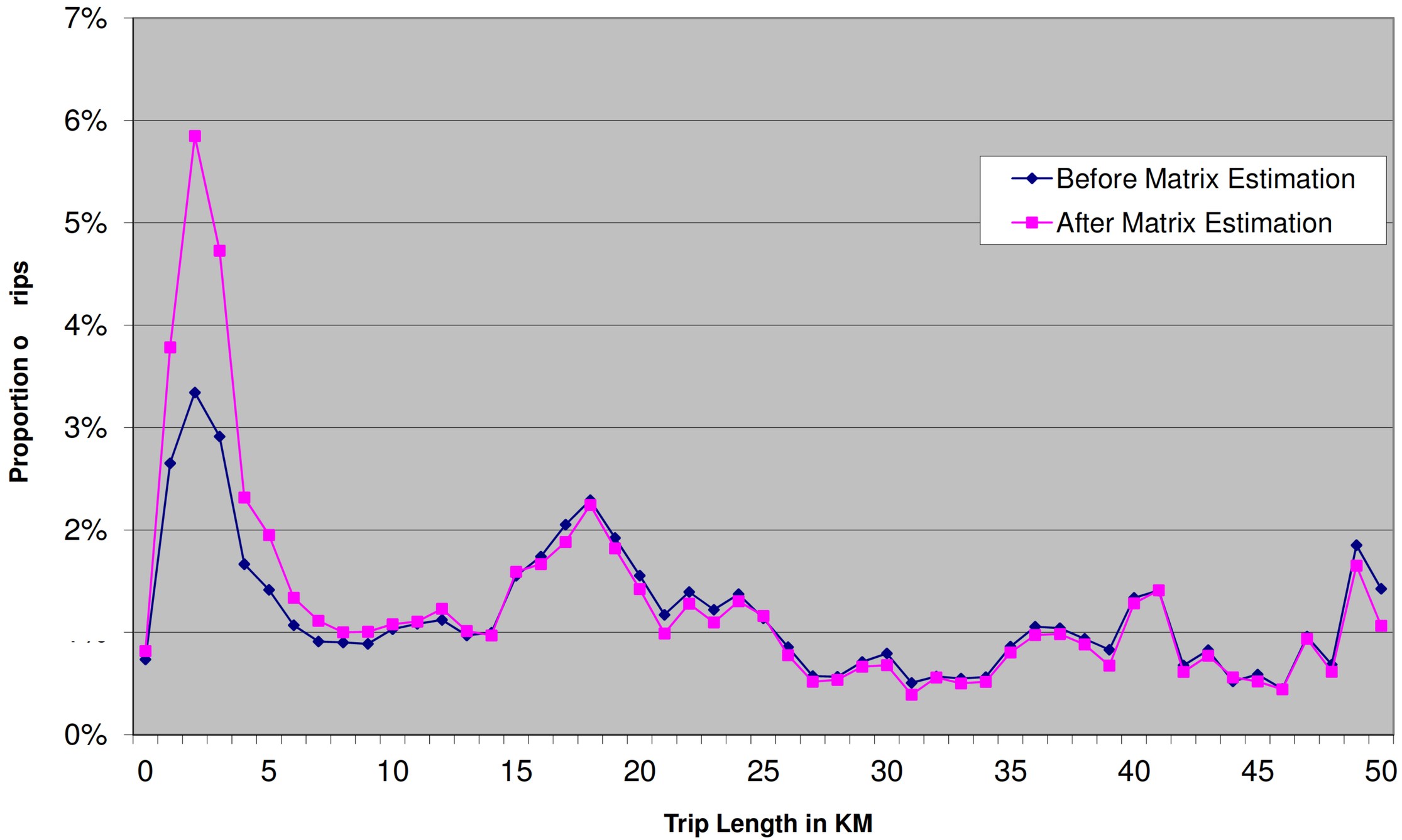
Trip Length Frequency Distribution - PM Peak

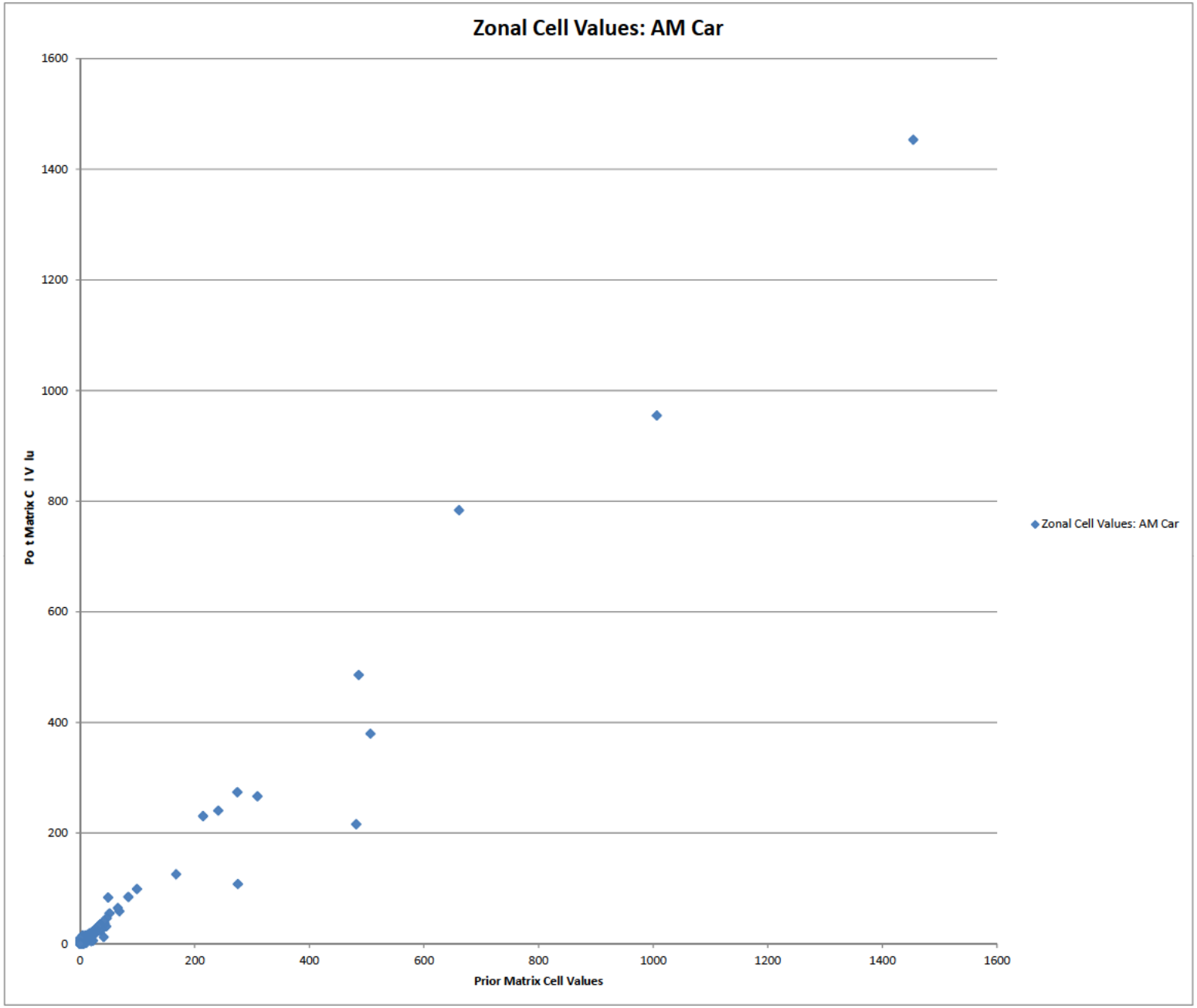


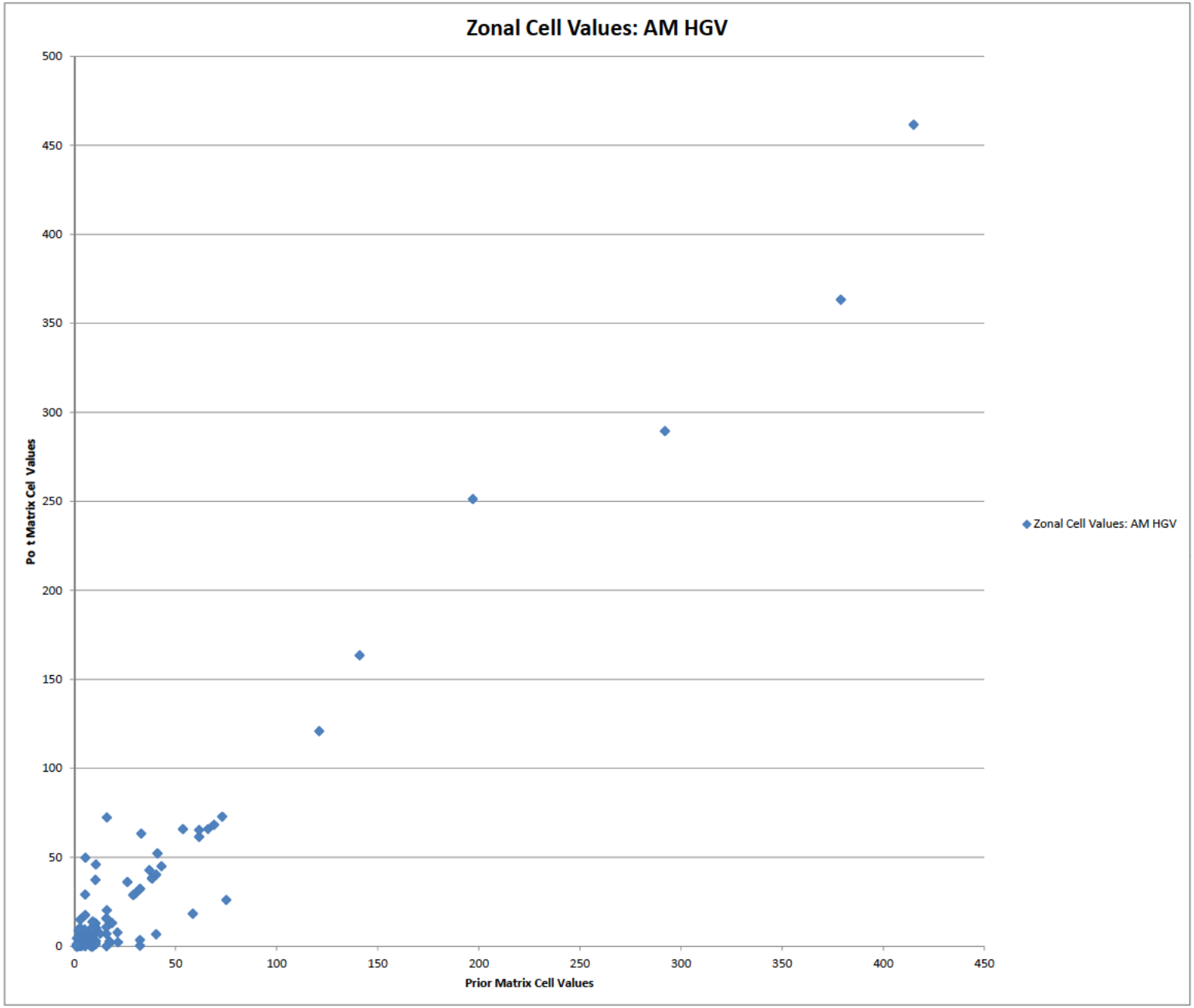
Trip Length Frequency Distribution - Inter Peak

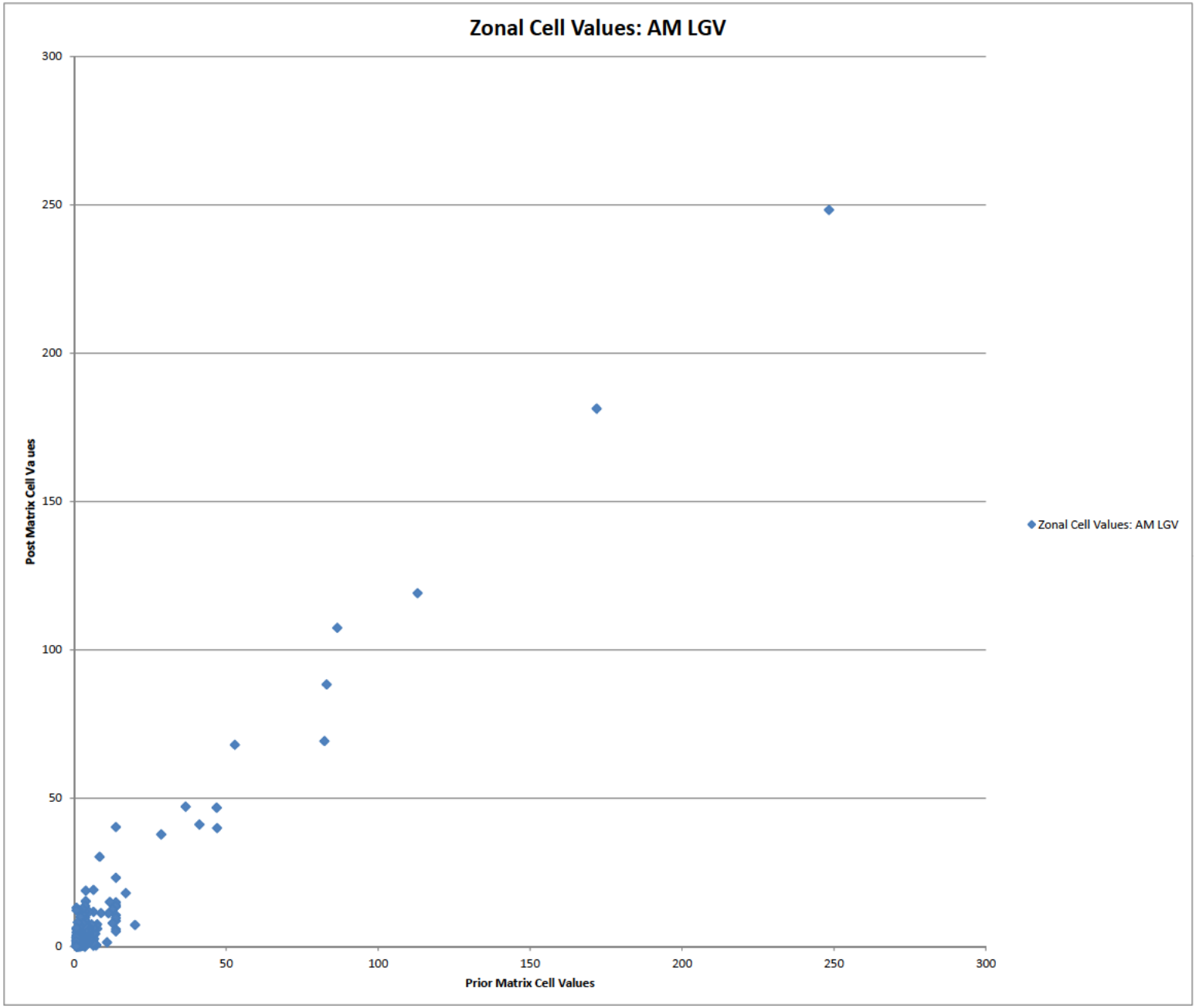


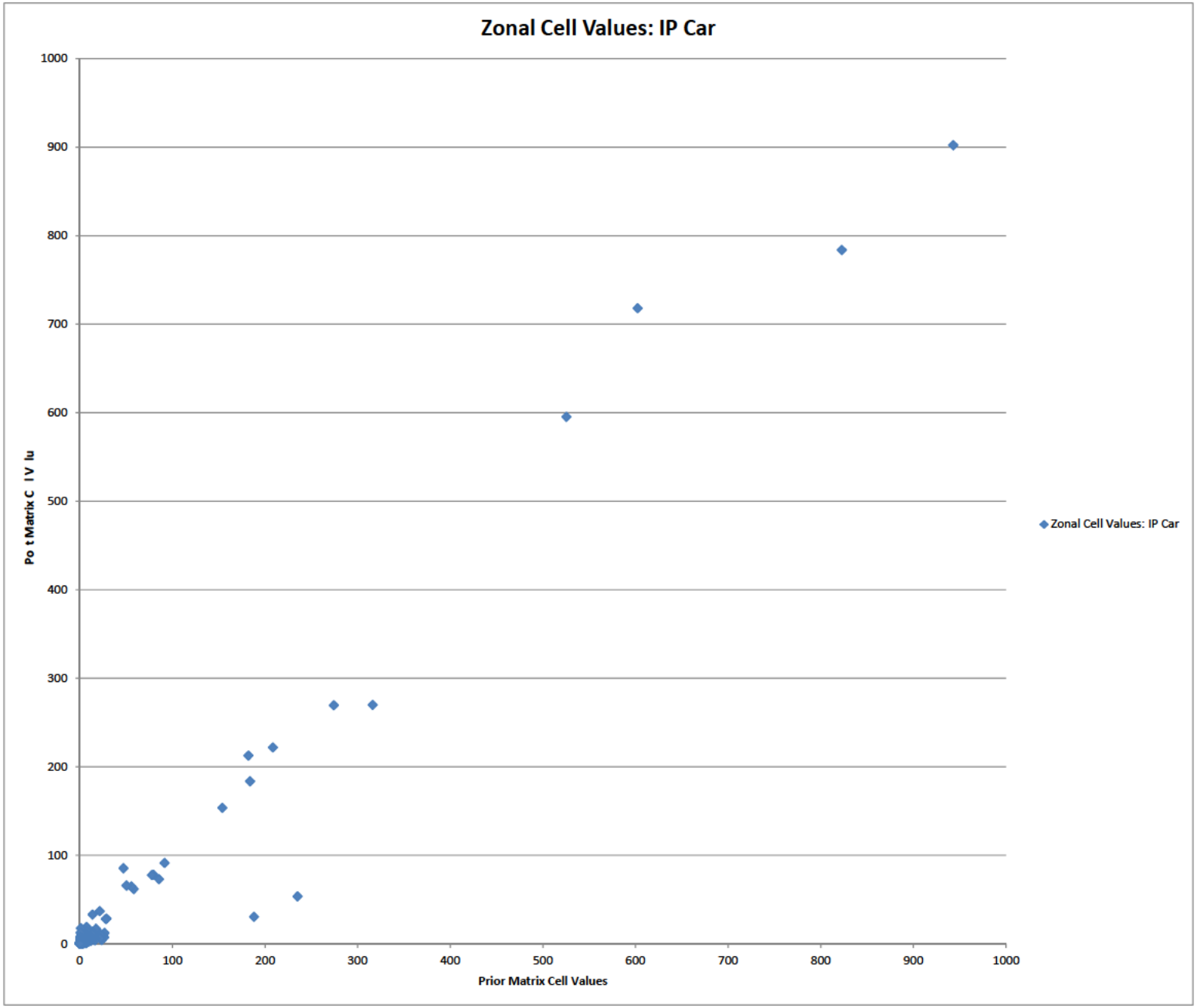
Trip Length Frequency Distribution - PM Peak

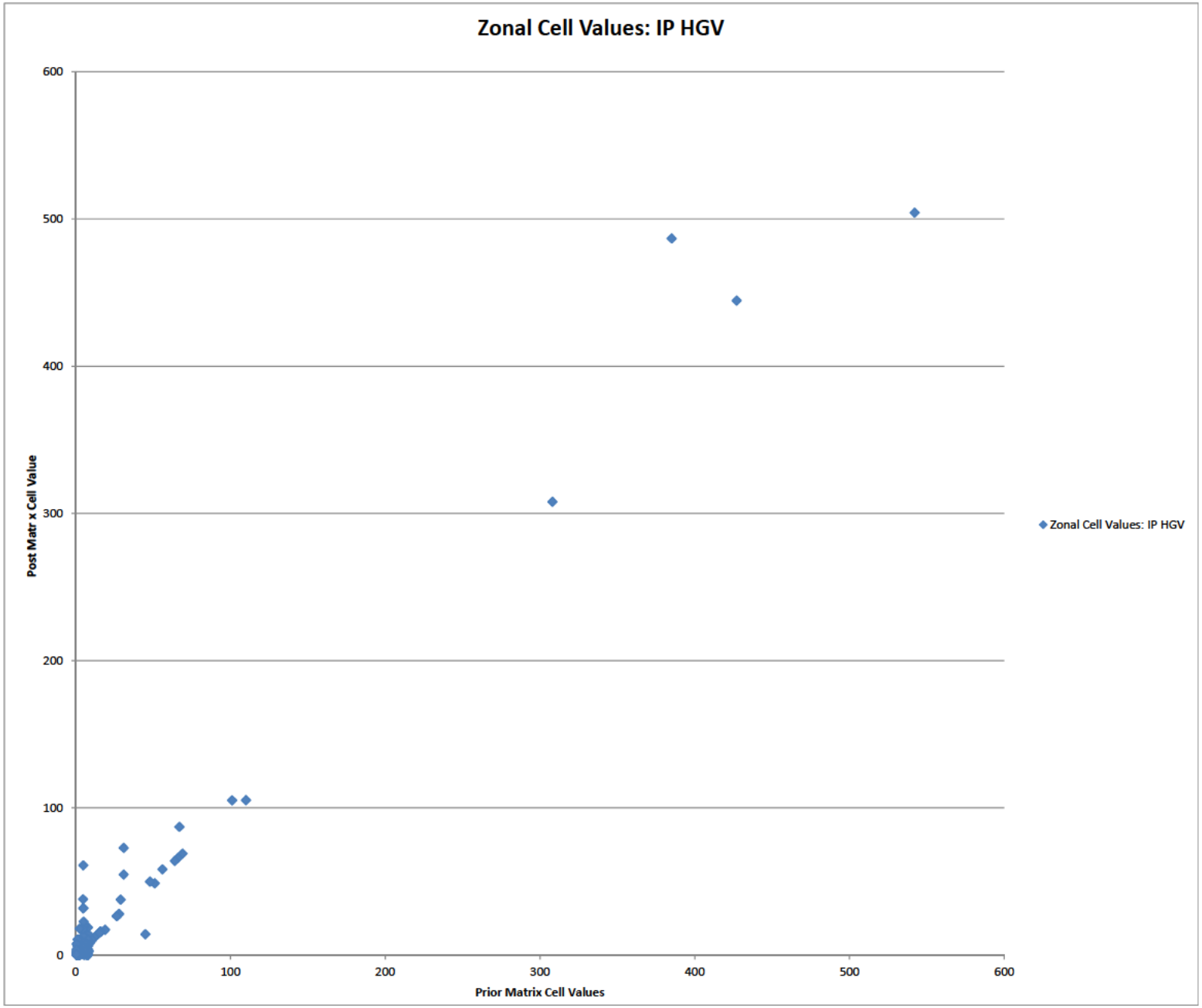


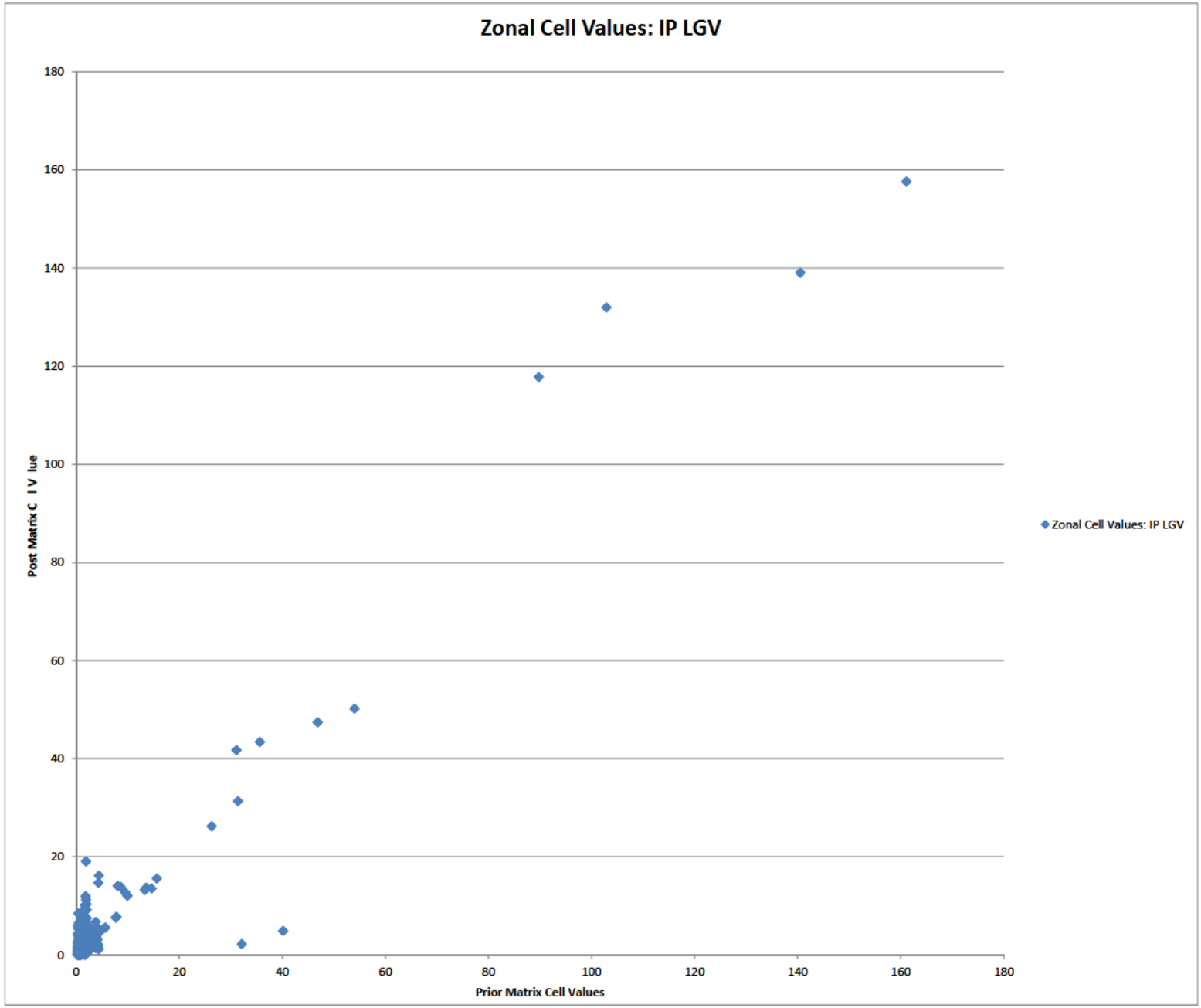

Zonal Cell Values: AM Car
1600
1400
1200
1000
800
600
400
200
0
0
200
400
600
800
1000
1200
1400
1600
Prior Matrix Cell Values
Zonal Cell Values: AM Car

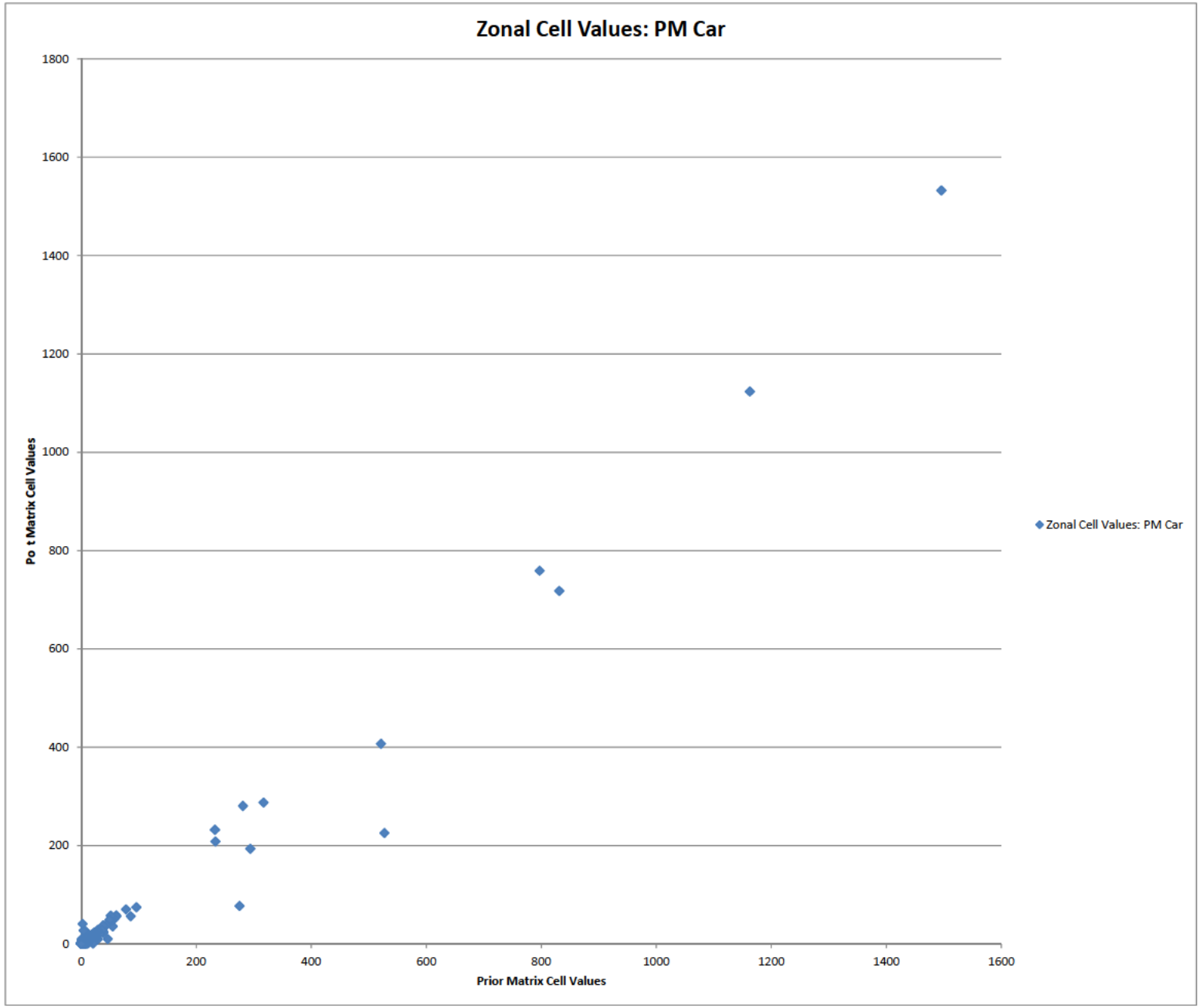

Zonal Cell Values: AM HGV
500
450
400
350
300
250
200
150
100
50
0
Po t Matrix Cel Values
0
50
100
150
200
250
300
350
400
450
Prior Matrix Cell Values
Zonal Cell Values: AM HGV

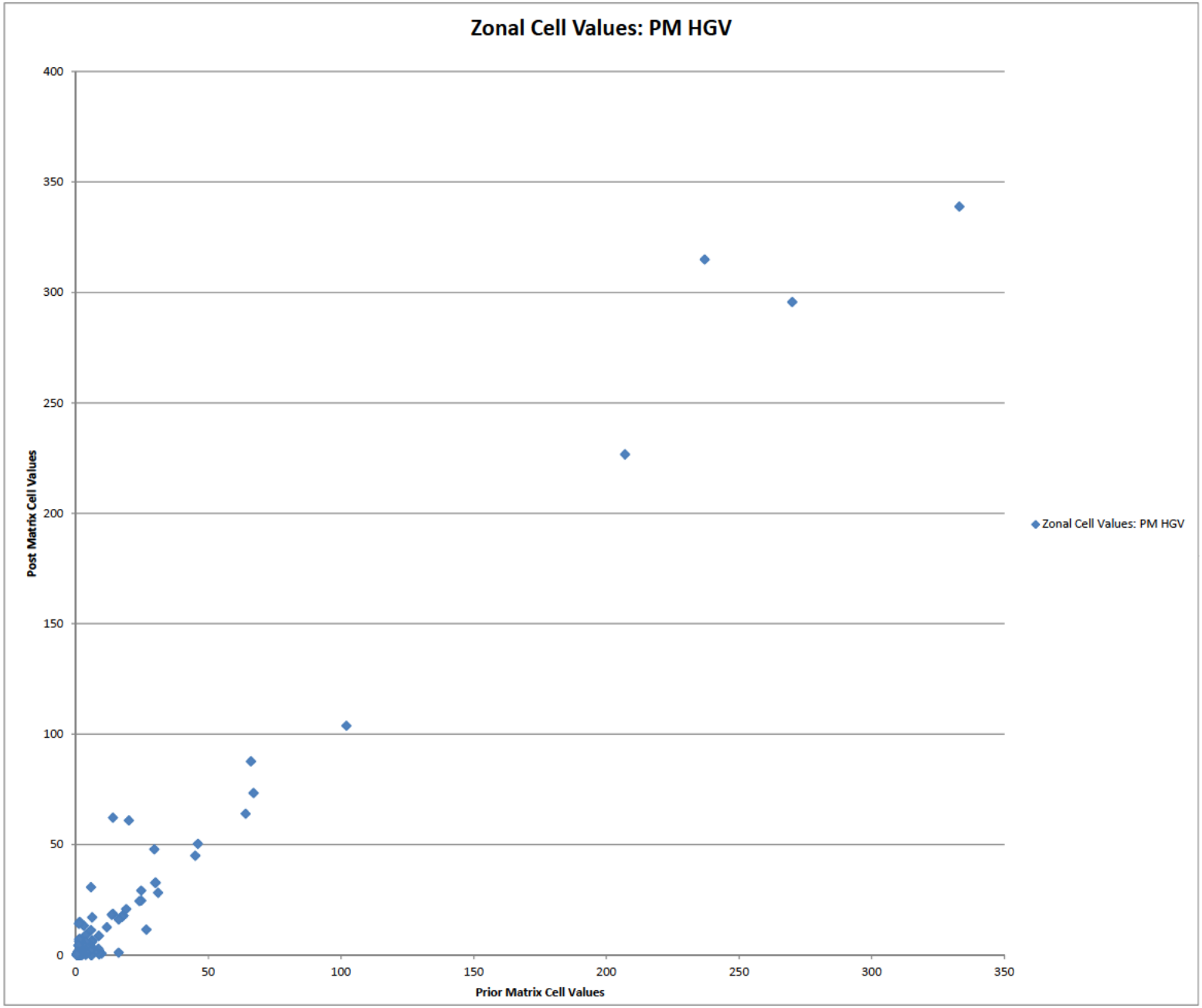

Zonal Cell Values: AM LGV
300
250
200
150
100
50
0
Post Matrix Cell Va ues
0
50
100
150
200
250
300
Prior Matrix Cell Values
Zonal Cell Values: AM LGV

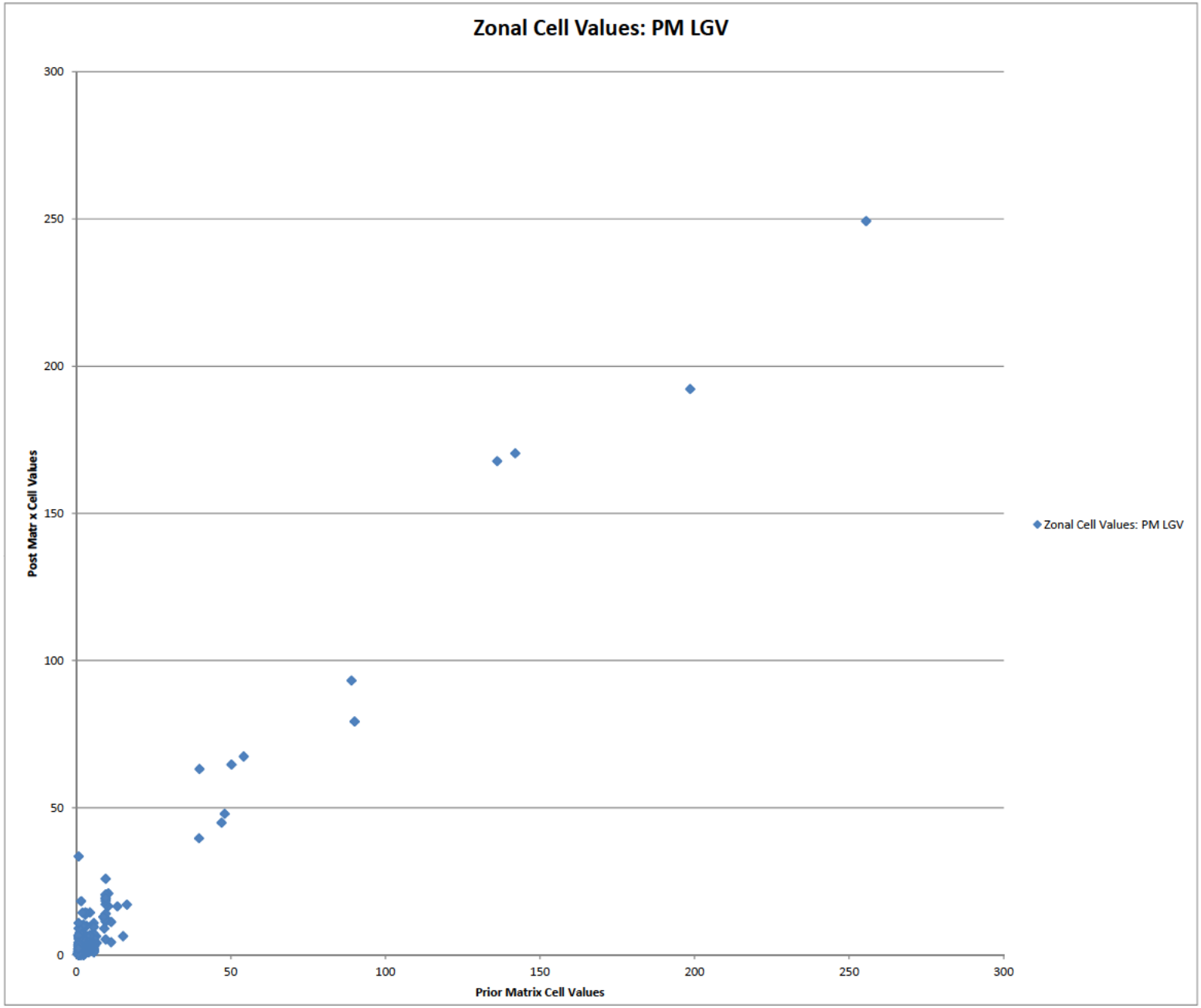

Zonal Cell Values: IP Car
1000
900
800
700
600
500
400
300
200
100
0
Po t Matrix C I V lu
0
100
200
300
400
500
600
700
800
900
1000
Prior Matrix Cell Values
Zonal Cell Values: IP Car


Zonal Cell Values: IP HGV
600
500
400
300
200
100
0
Post Matr x Cell Value
0
100
200
300
400
500
600
Prior Matrix Cell Values
Zonal Cell Values: IP HGV


Zonal Cell Values: IP LGV
Post Matrix C I V lue
Prior Matrix Cell Values
0
20
40
60
80
100
120
140
160
180
Zonal Cell Values: IP LGV


Zonal Cell Values: PM Car
1800
1600
1400
1200
1000
800
600
400
200
0
Po t Matrix Cell Values
0
200
400
600
800
1000
1200
1400
1600
Prior Matrix Cell Values
Zonal Cell Values: PM Car


Zonal Cell Values: PM HGV
400
350
300
250
200
150
100
50
0
Post Matrix Cell Values
0
50
100
150
200
250
300
350
Prior Matrix Cell Values
Zonal Cell Values: PM HGV


Zonal Cell Values: PM LGV
300
250
200
150
100
50
0
Post Matr x Cell Values
0
50
100
150
200
250
300
Prior Matrix Cell Values
Zonal Cell Values: PM LGV

Appendix C: Significance of Matrix Estimation Changes

Measure	Significance Criteria			
	Slope lower	Slope Upper	Intercept limit	R squared
Matrix zonal cell values	0.98	1.02	5.0	0.95
Matrix zonal trip ends	0.99	1.01	5.0	0.98

2016_AM_Car_PiJa.ME2

ZONE-TO-ZONE REGRESSION:

SLOPE	0.951	Fail
INTERCEPT	-0.001	Pass
R-SQUARED	0.970	Pass

ORIGIN TRIP END REGRESSION:

SLOPE	0.883	Fail
INTERCEPT	3.720	Pass
R-SQUARED	0.938	Fail

DESTINATION TRIP END REGRESSION:

SLOPE	0.865	Fail
INTERCEPT	4.558	Pass
R-SQUARED	0.907	Fail

2016_AM_LGV_PiJa.ME2

ZONE-TO-ZONE REGRESSION:

SLOPE	1.031	Fail
INTERCEPT	0.001	Pass
R-SQUARED	0.961	Pass

ORIGIN TRIP END REGRESSION:

SLOPE	0.991	Pass
INTERCEPT	0.272	Pass
R-SQUARED	0.805	Fail

DESTINATION TRIP END REGRESSION:

SLOPE	0.846	Fail
INTERCEPT	0.825	Pass
R-SQUARED	0.742	Fail

2016_AM_HGV_PiJa.ME2

ZONE-TO-ZONE REGRESSION:

SLOPE	1.036	Fail
INTERCEPT	-0.001	Pass
R-SQUARED	0.959	Pass

ORIGIN TRIP END REGRESSION:

SLOPE	0.768	Fail
INTERCEPT	0.393	Pass
R-SQUARED	0.809	Fail

DESTINATION TRIP END REGRESSION:

SLOPE	0.909	Fail
INTERCEPT	0.134	Pass
R-SQUARED	0.796	Fail

2016_IP_Car_PiJa.ME2

ZONE-TO-ZONE REGRESSION:

SLOPE	0.982	Pass
INTERCEPT	-0.006	Pass
R-SQUARED	0.965	Pass

ORIGIN TRIP END REGRESSION:

SLOPE	0.835	Fail
INTERCEPT	3.037	Pass
R-SQUARED	0.863	Fail

DESTINATION TRIP END REGRESSION:

SLOPE	0.776	Fail
INTERCEPT	5.022	Fail
R-SQUARED	0.874	Fail

2016_IP_LGV_PiJa.ME2

ZONE-TO-ZONE REGRESSION:

SLOPE	1.043	Fail
INTERCEPT	0.002	Pass
R-SQUARED	0.932	Fail

ORIGIN TRIP END REGRESSION:

SLOPE	1.225	Fail
INTERCEPT	0.391	Pass
R-SQUARED	0.797	Fail

DESTINATION TRIP END REGRESSION:

SLOPE	1.236	Fail
INTERCEPT	0.367	Pass
R-SQUARED	0.817	Fail

2016_IP_HGV_PiJa.ME2

ZONE-TO-ZONE REGRESSION:

SLOPE	1.036	Fail
INTERCEPT	0.001	Pass
R-SQUARED	0.972	Pass

ORIGIN TRIP END REGRESSION:

SLOPE	0.967	Fail
INTERCEPT	0.341	Pass
R-SQUARED	0.785	Fail

DESTINATION TRIP END REGRESSION:

SLOPE	0.976	Fail
INTERCEPT	0.306	Pass
R-SQUARED	0.775	Fail

2016_PM_Car_PiJa.ME2

ZONE-TO-ZONE REGRESSION:

SLOPE	0.926	Fail
INTERCEPT	0.001	Pass
R-SQUARED	0.971	Pass

ORIGIN TRIP END REGRESSION:

SLOPE	0.894	Fail
INTERCEPT	3.533	Pass
R-SQUARED	0.919	Fail

DESTINATION TRIP END REGRESSION:

SLOPE	0.879	Fail
INTERCEPT	4.523	Pass
R-SQUARED	0.947	Fail

2016_PM_LGV_PiJa.ME2

ZONE-TO-ZONE REGRESSION:

SLOPE	1.046	Fail
INTERCEPT	0.002	Pass
R-SQUARED	0.964	Pass

ORIGIN TRIP END REGRESSION:

SLOPE	1.041	Fail
INTERCEPT	0.493	Pass
R-SQUARED	0.819	Fail

DESTINATION TRIP END REGRESSION:

SLOPE	1.082	Fail
INTERCEPT	0.376	Pass
R-SQUARED	0.751	Fail

2016_PM_HGV_PiJa.ME2

ZONE-TO-ZONE REGRESSION:

SLOPE	1.109	Fail
INTERCEPT	0.000	Pass
R-SQUARED	0.973	Pass

ORIGIN TRIP END REGRESSION:

SLOPE	0.938	Fail
INTERCEPT	0.076	Pass
R-SQUARED	0.769	Fail

DESTINATION TRIP END REGRESSION:

SLOPE	0.873	Fail
INTERCEPT	0.184	Pass
R-SQUARED	0.813	Fail

Appendix D – Cordon and Screenline Data

Appendix D: Cordon Data

This is a roadside interview cordon using the CTC link totals. It is imperfect.

Cordon1 - Inbound

Cordon around Bicester town

			AM Peak				Inter Peak				PM Peak			
			Observed	Modelled (Actual)	% difference		Observed	Modelled (Actual)	% difference		Observed	Modelled (Actual)	% difference	
Site	type	direction	Total	Total	Total	GEH	Total	Total	Total	GEH	Total	Total	Total	GEH
JUNCTION DESCRIPTION: Banbury Rd/ A4095/ B4100	MCC	ARM A: B4100 (North)A Southbound	765	789	3.2%		347	465	34.0%		567	664	17.1%	
JUNCTION DESCRIPTION: Buckingham Rd/ A4095/ A4421/ Skimmingdish Ln	MCC	ARM A: A4421 (North)A Southbound	1033	910	-11.9%		443.25	458	3.3%		608	693	14.0%	
JUNCTION DESCRIPTION: A4421/ Bicester Rd/ Charbridge Ln	MCC	ARM B: Bicester Rd (East)B Westbound	339	314	-7.4%		190	210	10.6%		295	322	9.2%	
JUNCTION DESCRIPTION: London Rd/ A4421/ A41 S/ Gravenhill Rd/ A41 N	MCC	ARM C: A41 (South)C Northbound	887	980	10.5%		689.5	693	0.5%		1089	1134	4.2%	
JUNCTION DESCRIPTION: London Rd/ A4421/ A41 S/ Gravenhill Rd/ A41 N	MCC	ARM D: Gravenhill Rd (West)D Eastbound	15	3	-79.1%		38.5	0	-100.0%		39	67	71.7%	
JUNCTION DESCRIPTION: A41 N/ Unlabelled Rd/ A41 S/ P&R/ Vendee Dr	MCC	ARM C: A41 (South)C Northbound	1088	1127	3.6%		1096	1084	-1.1%		1643	1458	-11.3%	
JUNCTION DESCRIPTION: Vendee Dr N/ Vendee Dr S/ A4095	MCC	ARM C: A4095 (West)C Eastbound	220	236	7.2%		181	172	-5.0%		438	401	-8.5%	
JUNCTION DESCRIPTION: Howes Ln/ Middleton Stoney Rd/ Vendee Dr/ B4030	MCC	ARM D: B4030 (West)D Eastbound	273	267	-2.0%		180	165	-8.1%		296	274	-7.6%	
JUNCTION DESCRIPTION: A4095/ Bucknell Rd S/ Bucknell Rd W	MCC	ARM C: Bucknell Rd (West)C Eastbound	118	200	69.6%		79	101	27.5%		120	300	150.1%	
		Total	4738	4826	1.9%	1.28	3244	3348	3.2%	1.81	5095	5313	4.3%	3.02

This is a roadside interview cordon using the CTC link totals. It is imperfect.

Cordon1 - Outbound

Cordon around Bicester town

			AM Peak				Inter Peak				PM Peak			
			Observed	Modelled (Actual)	% difference		Observed	Modelled (Actual)	% difference		Observed	Modelled (Actual)	% difference	
Site	type	direction	Total	Total	Total	GEH	Total	Total	Total	GEH	Total	Total	Total	GEH
JUNCTION DESCRIPTION: Banbury Rd/ A4095/ B4100	MCC	ARM A: B4100 (North)A Northbound	467	512	9.6%		329	366.00	11.2%		623	841	35.0%	
JUNCTION DESCRIPTION: Buckingham Rd/ A4095/ A4421/ Skimmingdish Ln	MCC	ARM A: A4421 (North)A Northbound	557	591	6.1%		462.25	473.44	2.4%		972	797	-18.0%	
JUNCTION DESCRIPTION: A4421/ Bicester Rd/ Charbridge Ln	MCC	ARM B: Bicester Rd (East)B Eastbound	273	295	8.2%		207	219.69	6.1%		347	348	0.2%	
JUNCTION DESCRIPTION: London Rd/ A4421/ A41 S/ Gravenhill Rd/ A41 N	MCC	ARM C: A41 (South)C Southbound	1118	1094	-2.2%		661.25	675.40	2.1%		1026	1075	4.8%	
JUNCTION DESCRIPTION: London Rd/ A4421/ A41 S/ Gravenhill Rd/ A41 N	MCC	ARM D: Gravenhill Rd (West)D Westbound	27	8	-71.1%		28.25	3.46	-87.8%		8	0	-100.0%	
JUNCTION DESCRIPTION: A41 N/ Unlabelled Rd/ A41 S/ P&R/ Vendee Dr	MCC	ARM C: A41 (South)C Southbound	1624	1530	-5.8%		1058	1009.28	-4.6%		1313	1291	-1.7%	
JUNCTION DESCRIPTION: Vendee Dr N/ Vendee Dr S/ A4095	MCC	ARM C: A4095 (West)C Westbound	441	436	-1.2%		151	148.88	-1.4%		250	262	4.9%	
JUNCTION DESCRIPTION: Howes Ln/ Middleton Stoney Rd/ Vendee Dr/ B4030	MCC	ARM D: B4030 (West)D Westbound	291	255	-12.5%		161	153.71	-4.5%		239	226	-5.5%	
JUNCTION DESCRIPTION: A4095/ Bucknell Rd S/ Bucknell Rd W	MCC	ARM C: Bucknell Rd (West)C Westbound	184	188	2.3%		92.0	66.9	-27.3%		140	167	19.3%	
		Total	4982	4909	-1.5%	1.04	3150	3117	-1.0%	0.59	4918	5008	1.8%	1.28

Appendix D: Screenline Data

This is a validation screenline using ATC's that only recorded total vehicles.

Screenline1 - Northbound NB

Screenline E-W along the railway line

			AM Total Vehicles			IP Total Vehicles			PM Total Vehicles		
Site	type	direction	Observed	Modelled	% diff	Observed	Modelled	% diff	Observed	Modelled	% diff
Bucknell Rd/ Howes Lane	ATC	Northbound	482	586	21.6%	399	412	3.4%	898	1019	13.5%
Banbury Rd	ATC	Northbound	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!
Buckingham Rd	ATC	Northbound	436	396	-9.1%	440	376	-14.5%	613	587	-4.2%
Launton Road	ATC	Northbound	370	405	9.6%	452	547	21.0%	557	581	4.3%
A4421 Gavray Drive	ATC	Northbound	624	596	-4.5%	382	361	-5.4%	604	629	4.1%
Total			1912	1983	3.7%	1672	1697	1.5%	2672	2816	5.4%

GEH		
AM	IP	PM
1.62	0.60	2.75

Screenline1 - Southbound SB

Screenline E-W along the railway line

			AM Total Vehicles			IP Total Vehicles			PM Total Vehicles		
Site	type	direction	Observed	Modelled	% diff	Observed	Modelled	% diff	Observed	Modelled	% diff
Bucknell Rd/ Howes Lane	ATC	Southbound	864	801	-7.3%	383	377	-1.6%	663	718	8.3%
Banbury Rd	ATC	Southbound	0	0	#DIV/0!	0	0	#DIV/0!	0	0	#DIV/0!
Buckingham Rd	ATC	Southbound	468	496	6.0%	411	393	-4.3%	491	487	-0.7%
Launton Road	ATC	Southbound	387	298	-23.0%	421	353	-16.0%	495	513	3.5%
A4421 Gavray Drive	ATC	Southbound	608	595	-2.1%	388	439	13.1%	609	660	8.5%
Total			2325	2189	-5.9%	1603	1562	-2.5%	2257	2378	5.3%

GEH		
AM	IP	PM
2.87	1.01	2.51

Appendix E – Turn Count Calibration

| | | | | AM Peak | | | |

			AM Peak														Inter Peak														PM Peak													
			Observed				Modelled (Actual)				Car	LGV	HGVeh	Total Veh			Observed				Modelled (Actual)				Car	LGV	HGVeh	Total Veh			Observed				Modelled (Actual)				Car	LGV	HGVe	Total Veh		
MCC	From	TO	Car	LGV	HGV	Total	Car	LGV	HGVeh	Total	GEH	GEH	GEH	Diff	% Diff	GEH	Car	LGV	HGV	Total	Car	LGV	HGV	Total	GEH	GEH	GEH	Diff	% Diff	GEH	Car	LGV	HGV	Total	Car	LGV	HGV	Total	GEH	GEH	GEH	Diff	% Diff	GEH
182 SITE 13	ARM E: Field St (South)	ARM A: Banbury Rd (North)	136	21	3	160	148	11	0	159	0.97	2.50	2.45	-1	-1%	0.11	198	16	6	220	193	15	0	208	0.37	0.33	3.32	-12	-5%	0.82	322	20	0	342	329	14	0	343	0.38	1.39	0.00	1	0%	0.06
183 SITE 13	ARM E: Field St (South)	ARM B: Buckingham Rd (North)	365	34	12	411	353	30	13	395	0.64	0.76	0.21	-16	-4%	0.78	345	48	10	403	319	47	10	376	1.44	0.08	0.11	-27	-7%	1.38	549	61	9	619	494	82	10	585	2.41	2.44	0.26	-34	-5%	1.37
184 SITE 13	ARM E: Field St (South)	ARM E: Field St (South)	7	2	0	9	0	0	0	0	3.74	2.00	0.00	-9	-100%	4.24	12	0	0	12	0	0	0	0	4.80	0.71	0.71	-12	-100%	4.90	17	0	0	17	0	0	0	0	5.83	0.00	0.00	-17	-100%	5.83
185 SITE 14	ARM A: Buckingham Rd (North)	ARM A: Buckingham Rd (North)	0	1	0	1	0	0	0	0	0.57	1.41	0.00	-1	-84%	1.10	1	0	0	1	0	0	0	0	1.20	0.00	0.00	-1	-98%	1.20	0	0	0	0	0	0	0	0	0.80	0.00	0.00	0	#DIV/0!	0.80
186 SITE 14	ARM A: Buckingham Rd (North)	ARM B: Churchill Rd (East)	152	13	2	167	135	13	0	148	1.40	0.09	2.00	-19	-11%	1.52	71	10	3	83	62	12	0	73	1.05	0.39	2.24	-10	-12%	1.10	118	19	0	137	103	21	0	124	1.42	0.36	0.00	-13	-10%	1.16
187 SITE 14	ARM A: Buckingham Rd (North)	ARM C: Buckingham Rd (South)	318	33	10	361	349	36	27	412	1.69	0.44	3.99	51	14%	2.58	209	21	4	234	229	15	13	257	1.31	1.35	3.00	23	10%	1.44	237	25	4	266	302	29	7	338	3.98	0.75	1.31	72	27%	4.16
188 SITE 14	ARM A: Buckingham Rd (North)	ARM D: Brashfield Rd (West)	8	1	0	9	8	0	0	8	0.12	1.41	0.00	-1	-7%	0.23	8	0	0	8	8	0	0	8	0.02	0.71	0.00	0	-4%	0.11	13	0	0	13	19	0	0	19	1.57	0.00	0.00	6	48%	1.57
189 SITE 14	ARM B: Churchill Rd (East)	ARM A: Buckingham Rd (North)	93	15	1	109	102	14	0	117	0.96	0.25	1.41	8	7%	0.71	74	13	4	92	74	12	0	86	0.02	0.36	2.83	-5	-6%	0.58	208	16	2	226	173	10	0	183	2.55	1.72	2.00	-43	-19%	3.03
190 SITE 14	ARM B: Churchill Rd (East)	ARM B: Churchill Rd (East)	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41	1	0	0	1	0	0	0	0	1.22	0.00	0.71	-1	-100%	1.41	2	0	0	2	0	0	0	0	2.00	0.00	0.00	-2	-100%	2.00
191 SITE 14	ARM B: Churchill Rd (East)	ARM C: Buckingham Rd (South)	117	17	5	139	120	18	0	138	0.29	0.15	3.16	-1	-1%	0.10	120	13	3	136	118	13	3	134	0.16	0.06	0.13	-2	-1%	0.15	208	13	1	222	176	13	0	189	2.32	0.06	1.39	-33	-15%	2.30
192 SITE 14	ARM B: Churchill Rd (East)	ARM D: Brashfield Rd (West)	34	3	2	39	23	6	0	29	2.11	1.45	2.00	-10	-26%	1.75	45	4	1	49	43	5	0	48	0.33	0.73	1.00	-1	-2%	0.17	101	6	1	108	125	9	0	134	2.23	1.05	1.41	26	24%	2.32
193 SITE 14	ARM C: Buckingham Rd (South)	ARM A: Buckingham Rd (North)	202	19	9	230	204	21	18	243	0.13	0.51	2.49	13	6%	0.87	220	31	9	260	213	30	15	258	0.45	0.17	1.80	-1	-1%	0.09	401	45	8	454	345	50	17	413	2.88	0.78	2.65	-41	-9%	1.96
194 SITE 14	ARM C: Buckingham Rd (South)	ARM B: Churchill Rd (East)	150	20	3	173	130	15	3	148	1.69	1.07	0.22	-25	-14%	1.97	123	21	4	148	90	21	3	115	3.19	0.03	0.09	-33	-22%	2.88	149	16	3	168	145	34	0	179	0.32	3.52	2.45	11	6%	0.81
195 SITE 14	ARM C: Buckingham Rd (South)	ARM C: Buckingham Rd (South)	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41	2	0	0	2	0	0	0	0	1.73	0.00	0.00	-2	-100%	1.73	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
196 SITE 14	ARM C: Buckingham Rd (South)	ARM D: Brashfield Rd (West)	4	0	0	4	2	0	0	2	0.99	0.00	0.00	-2	-44%	0.99	10	1	0	11	9	0	0	9	0.24	1.41	0.00	-2	-16%	0.55	18	1	0	19	18	0	0	18	0.03	1.41	0.00	-1	-6%	0.27
197 SITE 14	ARM D: Brashfield Rd (West)	ARM A: Buckingham Rd (North)	14	0	0	14	12	0	0	12	0.55	0.00	0.00	-2	-14%	0.55	7	0	0	7	6	0	0	6	0.46	0.71	0.00	-1	-19%	0.55	17	2	1	20	18	0	0	18	0.26	2.00	1.41	-2	-9%	0.44
198 SITE 14	ARM D: Brashfield Rd (West)	ARM B: Churchill Rd (East)	64	8	1	73	88	8	0	96	2.75	0.15	1.41	23	32%	2.54	31	2	0	33	51	0	0	51	3.11	1.87	0.71	18	54%	2.76	47	2	1	50	57	1	0	58	1.40	1.26	1.41	8	15%	1.04
199 SITE 14	ARM D: Brashfield Rd (West)	ARM C: Buckingham Rd (South)	19	1	0	20	1	0	0	1	5.75	1.41	0.00	-19	-96%	5.92	8	1	0	8	0	0	0	0	3.67	1.22	0.00	-8	-97%	3.87	19	1	0	20	1	0	0	1	5.89	1.41	0.00	-19	-97%	6.06
200 SITE 14	ARM D: Brashfield Rd (West)	ARM D: Brashfield Rd (West)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
201 SITE 15	ARM A: Launton Rd (East)	ARM A: Launton Rd (East)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	2	0	0	2	0	0	0	0	2.00	0.00	0.00	-2	-100%	2.00
202 SITE 15	ARM A: Launton Rd (East)	ARM B: London Rd (South)	114	36	8	158	116	22	0	138	0.15	2.52	4.00	-20	-13%	1.65	120	32	9	161	121	32	7	159	0.07	0.00	0.81	-2	-1%	0.12	234	28	3	265	242	10	2	254	0.53	4.11	0.56	-11	-4%	0.66
203 SITE 15	ARM A: Launton Rd (East)	ARM C: Wessex Wy (West)	1	0	1	2	0	0	0	0	1.41	0.00	1.41	-2	-100%	2.00	2	0	0	2	0	0	0	0	2.00	0.00	0.00	-2	-100%	2.00	2	0	0	2	0	0	0	0	2.00	0.00	0.00	-2	-100%	2.00
204 SITE 15	ARM A: Launton Rd (East)	ARM D: London Rd (North)	67	24	3	94	69	0	0	69	0.28	6.93	2.45	-25	-26%	2.73	136	17	5	158	137	0	0	137	0.06	5.83	3.16	-21	-14%	1.76	132	14	0	146	92	0	0	92	3.77	5.29	0.00	-54	-37%	4.94
205 SITE 15	ARM B: London Rd (South)	ARM A: Launton Rd (East)	125	14	10	149	140	10	6	156	1.32	1.20	1.57	7	4%	0.54	101	29	9	139	100	34	9	143	0.07	0.83	0.02	4	3%	0.33	188	40	2	230	188	24	0	211	0.04	2.83	2.00	-19	-8%	1.25
206 SITE 15	ARM B: London Rd (South)	ARM B: London Rd (South)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
207 SITE 15	ARM B: London Rd (South)	ARM C: Wessex Wy (West)	0	0	0	0	0	0	0	0	0.00	0.00	0.60	0	#DIV/0!	0.60	2	1	1	4	0	0	0	0	2.00	1.41	1.41	-4	-100%	2.83	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
208 SITE 15	ARM B: London Rd (South)	ARM D: London Rd (North)	138	15	3	156	145	15	3	163	0.61	0.09	0.19	7	4%	0.52	129	17	2	148	129	4	2	135	0.03	3.98	0.16	-13	-9%	1.10	258	21	0	279	267	24	1	291	0.53	0.58	1.36	12	4%	0.72
209 SITE 15	ARM C: Wessex Wy (West)	ARM A: Launton Rd (East)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	2	0	0	2	0	0	0	0	2.00	0.00	0.00	-2	-100%	2.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
210 SITE 15	ARM C: Wessex Wy (West)	ARM B: London Rd (South)	0	0	1	1	0	0	0	0	0.00	0.00	1.41	-1	-100%	1.41	4	0	0	4	0	0	0	0	2.83	0.00	0.00	-4	-100%	2.83	0	0	0	0	0	0	0	0	0.00	0.00	0.58	0	#DIV/0!	0.58
211 SITE 15	ARM C: Wessex Wy (West)	ARM C: Wessex Wy (West)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
212 SITE 15	ARM C: Wessex Wy (West)	ARM D: London Rd (North)	2	0	0	2	0	0	0	0	2.00	0.00	0.00	-2	-100%	2.00	3	1	0	4	0	0	0	0	2.45	1.41	0.00	-4	-100%	2.83	8	0	0	8	0	0	0	0	4.00	0.00	0.00	-8	-100%	4.00
213 SITE 15	ARM D: London Rd (North)	ARM A: Launton Rd (East)	176	40	6	222	212	26	9	247	2.61	2.53	1.06	25	11%	1.62	195	28	8	231	259	25	7	292	4.27	0.56	0.22	61	26%	3.77	218	33	3	254	189	1	0	190	2.00	7.76	2.45	-64	-25%	4.26
214 SITE 15	ARM D: London Rd (North)	ARM B: London Rd (South)	135	19	1	155	131	20	1	151	0.37	0.13	0.11	-4	-2%	0.29	132	15	4	151	129	4	5	138	0.25	3.56	0.59	-13	-8%	1.05	213	18	2	233	218	17	1	236	0.37	0.32	0.88	3	1%	0.20
215 SITE 15	ARM D: London Rd (North)	ARM C: Wessex Wy (West)	2	0	0	2	0	0	0	0	2.00	0.00	0.00	-2	-100%	2.00	3	0	0	3	0	0	0	0	2.45	0.00	0.00	-3	-100%	2.45	3	0	0	3	0	0	0	0	2.45	0.00	0.00	-3	-100%	2.45
216 SITE 15	ARM D: London Rd (North)	ARM D: London Rd (North)	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41	3	1	0	4	0	0	0	0	2.45	1.41	0.00	-4	-100%	2.83	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41
217 SITE 16	ARM A: A4421 (North)	ARM A: A4421 (North)	3	0	0	3	0	0	0	0	2.45	0.00	0.00	-3	-100%	2.45	2	1	0	3	0	0	0	0	2.00	1.41	0.00	-3	-100%	2.45	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41
218 SITE 16	ARM A: A4421 (North)	ARM B: Bicester Rd (East)	200	39	6	245	215	45	6	266	1.04	0.89	0.07	21	9%	1.31	127	24	5	156	128	34	5	166	0.05	1.78	0.01	10	6%	0.79	264	28	2	294	262	29	4	295	0.09	0.11	1.14	1	0%	0.06
219 SITE 16	ARM A: A4421 (North)	ARM C: Charbridge Ln (South)	515	87	57	659	525	77	36	638	0.44	1.08	3.05	-21	-3%	0.81	280	46	42	368	338	35	32	406	3.33	1.72	1.58	38	10%	1.93	454	43	23	520	539	41	11	591	3.83	0.30	2.91	71	14%	3.03
220 SITE 16	ARM B: Bicester Rd (East)	ARM A: A4421 (North)	222	41	5	268	205	46	3	253	1.18	0.70	1.13	-15	-6%	0.92	117	25	6	148	117	41	6	165	0.04	2.85	0.05	17	11%	1.35	217	32	0	249	244	34	1	279	1.76	0.31	1.67	30	12%	1.84
221 SITE 16	ARM B: Bicester Rd (East)	ARM B: Bicester Rd (East)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
222 SITE 16	ARM B: Bicester Rd (East)	ARM C: Charbridge Ln (South)	57	8	1	66	53	6	1	61	0.49	0.63	0.12	-5	-8%	0.66	31	6	1	38	31	13	1	45	0.00	2.30	0.11	7	19%	1.12	38	4	1	43	39	4	0	43	0.21	0.00	1.41	0	1%	0.04
223 SITE 16	ARM C: Charbridge Ln (South)	ARM A: A4421 (North)	464	51	31	546	450	51	13	514	0.67	0.02	3.89	-32	-6%	1.41	266	50	39	355	253	37	28	318	0.78	1.93	1.98	-37	-10%	2.00	566	51	9	626	602	44	5	651	1.50	1.09	1.59	25	4%	0.97
224 SITE 16	ARM C: Charbridge Ln (South)	ARM B: Bicester Rd (East)	18	7	0	25	21	9	0	30	0.65	0.61	0.00	5	18%	0.88	36	9	2	47	36	15	2	54	0.03	1.77	0.16	7	14%	0.93	45	5	1	51	46	5	1	53	0.22	0.02	0.13	2	3%	0.23
225 SITE 16	ARM C: Charbridge Ln (South)	ARM C: Charbridge Ln (South)	2	0	0	2	0	0	0	0	2.00	0.00	0.00	-2	-100%	2.00	2	1	0	3	0	0	0	0	2.00	1.41	0.00	-3	-100%	2.45	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41
226 SITE 17	ARM A: Shakespeare Dr (North)	ARM A: Shakespeare Dr (North)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
227 SITE 17	ARM A: Shakespeare Dr (North)	ARM B: Middleton Stoney Rd (East)	152	14	1	167	154	14	0	168	0.15	0.01	1.41	1	0%	0.06	77	7	1	85	78	7	0	84	0.11	0.18	1.41	-1	-1%	0.06	109	9	1	119	108	1	0	109	0.14	3.39	1.41	-10	-9%	0.95
228 SITE 17	ARM A: Shakespeare Dr (North)	ARM C: B4100 (South)	28	7	0	35	33	2	0	35	0.96	2.57	0.00	0	0%	0.00	20	2	0	22	25	2	4	32	1.11	0.05	2.91	10	44%	1.85	25	2	0	27	24	1	6	32	0.12	0.83	3.56	5	17%	0.87
229 SITE 17	ARM A: Shakespeare Dr (North)	ARM D: A4095 (West)	93	6	0	99	83	4	0	87	1.09	0.66	0.00	-12	-12%	1.22	26	3	1	30	25	3	1	29	0.14	0.08	0.11	-1	-2%	0.14	32	10	0	42	24	0	0	24	1.58	4.47	0.00	-18	-44%	3.20
230 SITE 17	ARM B: Middleton Stoney Rd (East)	ARM A: Shakespeare Dr (North)	32	4	0	36	33	4	0	37	0.26	0.00	0.00	1	4%	0.24	67	6	2	75	59	3	0	62	0.98	1.62	2.00	-13	-18%	1.59	118	9	0	127	119	12	0	131	0.10	0.96	0.00	4	3%	0.37
231 SITE 17	ARM B: Middleton Stoney Rd (East)	ARM B: Middleton Stoney Rd (East)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
232 SITE 17	ARM B: Middleton Stoney Rd (East)	ARM C: B4100 (South)	13	3	1	17	6	0	0	6	2.13	2.45	1.41	-11	-62%	3.11	27	2	1	30	27	0	0	27	0.03	2.00	1.41	-3	-9%	0.53	45	3	0	48	39	0	0	39	0.92	2.45	0.00	-9	-19%	1.36
233 SITE 17	ARM B: Middleton Stoney Rd (East)	ARM D: A4095 (West)	106	18	6	130	103	16	0	119	0.26	0.51	3.46	-11	-8%	0.96	99	13	5	117	98	13	0	111	0.15	0.00	3.16	-6	-6%	0.61	157	11	4	172	138	11	0	148	1.60	0.15	2.83	-24	-14%	1.89
234 SITE 17	ARM C: B4100 (South)	ARM A: Shakespeare Dr (North)	20	1	0	21	20	1	1	22	0.09	0.00	1.70	1	5%	0.23	19	2	0	21	27	1	4	32	1.70	1.13	2.86	11	52%	2.13	44	3	0	47	98	3	0	101	6.43	0.01	0.00	54	115%	6.30
235 SITE 17	ARM C: B4100 (South)	ARM B: Middleton Stoney Rd (East)	51	5	1	57	41	0	0	41	1.51	3.16	1.41	-16	-28%	2.32	24	1	2	27	24	0	0	24	0.02	1.41	2.00	-3	-11%	0.58	22	0	1	23	20	0	0	20	0.51	0.00	1.41	-3	-14%	0.72
236 SITE 17	ARM C: B4100 (South)	ARM C: B4100 (South)	0	0	1	1	0	0	0	0	0.00	0.00	1.41	-1	-100%	1.41	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
237 SITE 17	ARM C: B4100 (South)	ARM D: A4095 (West)	51	2	0	53	51	0	0	51	0.00	2.00	0.00	-2	-4%	0.28	11	4	1	16	15	0	0	15	1.04	2.83	1.41	-1	-8%	0.33	8	4	0	12	5	0	2	8	1.01	2.83	2.12	-4	-36%	1.39
238 SITE 17	ARM D: A4095 (West)	ARM A: Shakespeare Dr (North)	25	4	3	32	14	0	0	14	2.48	2.83	2.45	-18	-56%	3.74	34	4	1	39	16	2	1	19	3.56	1.40	0.11	-20	-51%	3.73	122	10	2	134	73	10	0	83	4.92	0.00	2.00	-51	-38%	4.86
239 SITE 17	ARM D: A4095 (West)	ARM B: Middleton Stoney Rd (East)	170	24	7	201	160	24	0	184	0.77	0.08	3.74	-17	-8%	1.19	124	18	7	149	128	18	0	146	0.33	0.00	3.74	-3	-2%	0.27	177	16	2	195	189	48	0	238	0.91	5.70	2.00	43	22%	2.90
240 SITE 17	ARM D: A4095 (West)	ARM C: B4100 (South)	14	11	1	26	20	0	10	30	1.45	4.69	3.93	4	17%	0.82	10	2	1	13	12	0	2	14	0.59	2.00	0.94	1	9%	0.31	35	6	0	41	36	0	4	40	0.11	3.46	2.87	-1	-3%	0.19
241 SITE 17	ARM D: A4095 (West)	ARM D: A4095 (West)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
242 SITE 18	ARM A: Vendee Dr (North)	ARM B: Vendee Dr (South)	428	38	19	485	287	9	0	296	7.48	5.87	6.16	-189	-39%	9.57	122	16	18	156	122	8	16	146	0.03	2.31	0.48	-10	-7%	0.84	207	14	3	224	217	1	0	218	0.69	4.73	2.45	-6	-3%	0.40
243 SITE 18	ARM A: Vendee Dr (North)	ARM C: A4095 (West)	338	44	3	385	344	42	12	398	0.30	0.33	3.35	13	3%	0.64	106	13	3	122	107	18	4	129	0.06	1.31	0.60	7	6%	0.62	187	18	2	207	197	27	2	227	0.75	1.98	0.19	20	10%	1.36
244 SITE 18	ARM B: Vendee Dr (South)	ARM A: Vendee Dr (North)	141	23	7	171	199	1	9	209	4.44	6.27	0.72	38	22%	2.77	142	19	10	171	161	14	10	185	1.57	1.22	0.01	14	8%	1.08	441	40	8	489	438	40	8	486	0.15	0.05	0.04	-3	-1%	0.13
245 SITE 18	ARM B: Vendee Dr (South)	ARM C: A4095 (West)	38	7	4	49	38	0	0	38	0.02	3.74	2.83	-11	-22%	1.65	20	4	3	27	20	0	0	20	0.00	2.83	2.45	-7	-26%	1.45	35	5	2	42	35	0	0	35	0.02	3.16	2.00	-7	-16%	1.11
246 SITE 18	ARM C: A4095 (West)	ARM A: Vendee Dr (North)	164	22	7	193	184	26	4	214	1.53	0.74	1.10	21	11%	1.48	128	18	4	150	142	20	6	168	1.22	0.43	0.76	18	12%	1.41	342	35	7	384	314	68	8	389	1.57	4.59	0.29	5	1%	0.27
247 SITE 18	ARM C: A4095 (West)	ARM B: Vendee Dr (South)	17	1	4	22	22	0	0	22	1.09	1.41	2.83	0	-1%	0.05	23	3	3	29	4	0	0	4	5.13	2.45	2.45	-25	-86%	6.12	40	5	2	47	11	0	0	11	5.66	3.16	2.00	-36	-76%	6.61
248 SITE 19	ARM A: Churchill Rd (North)	ARM A:

Appendix F – Link Count Calibration

All flows in **Veh** unless otherwise stated
All modelled flows are **Actuals**

AM Peak

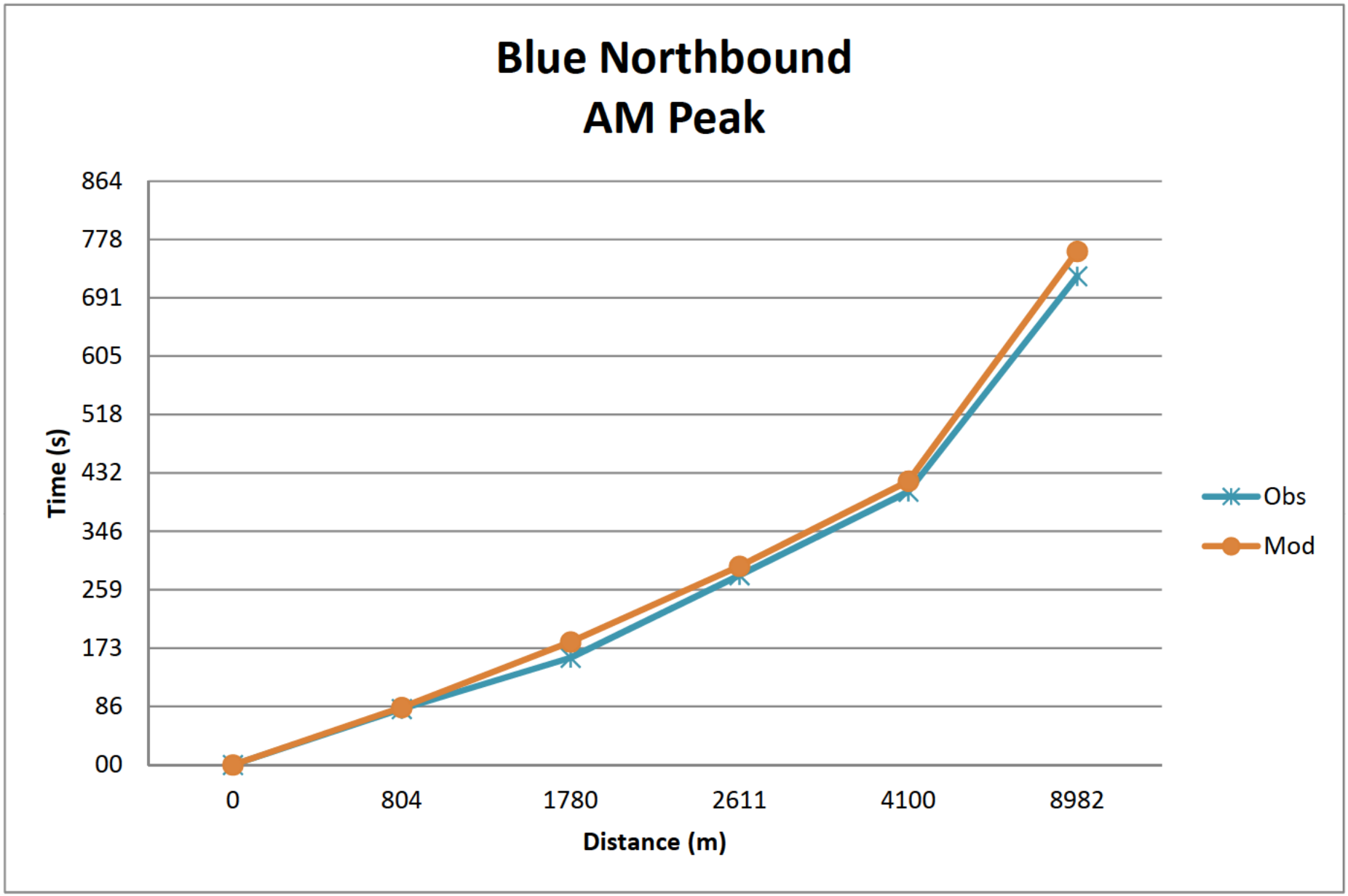
Link/Junction		Direction/Approach	Observed				Modelled (Actual)				Total Veh						
			Car	LGV	HGV	Total	Car	LGV	HGV	HGVeh	Total	GEH	GEH	GEH	Diff	% Diff	GEH	Link Flow?
11 A41 - North of M40 Jn 9	ATC	Northbound	832	82	65	984	963	114	68	1145		4.39	3.27	0.37	161	16%	4.94	No
12 A41 - North of M40 Jn 9	ATC	Southbound	1207	120	66	1408	1177	177	84	1437		0.86	4.65	2.09	30	2%	0.78	Yes
13 B430 Weston on the Green	ATC	Northbound	171	19	6	198	172	19	6	197		0.09	0.00	0.03	-1	-1%	0.09	Yes
14 B430 Weston on the Green	ATC	Southbound	444	36	5	489	246	0	0	246		10.67	8.43	3.16	-243	-50%	12.68	No
51 JUNCTION DESCRIPTION: Banbury F MCC		ARM A: B4100 (North)A Northbound	366	67	27	467	389	94	29	512		1.17	2.99	0.45	45	10%	2.03	Yes
52 JUNCTION DESCRIPTION: Buckingh MCC		ARM A: B4100 (North)A Southbound	619	100	42	765	617	124	49	789		0.08	2.23	0.97	24	3%	0.87	Yes
53 JUNCTION DESCRIPTION: Banbury F MCC		ARM B: A4095 (East)B Eastbound	722	110	38	908	780	119	54	953		0.30	0.80	2.33	27	3%	0.87	Yes
54 JUNCTION DESCRIPTION: Banbury F MCC		ARM B: A4095 (East)B Westbound	908	129	38	1085	788	134	42	964		4.11	0.42	0.58	-121	-11%	3.79	Yes
55 JUNCTION DESCRIPTION: Banbury F MCC		ARM C: B4100 (South)C Northbound	216	32	3	257	154	17	0	170		4.58	3.15	2.45	-87	-34%	5.94	Yes
56 JUNCTION DESCRIPTION: Banbury F MCC		ARM C: B4100 (South)C Southbound	337	34	9	381	272	53	0	325		3.72	2.81	4.24	-56	-15%	3.00	Yes
57 JUNCTION DESCRIPTION: Banbury F MCC		ARM D: A4095 (West)D Eastbound	478	49	8	536	497	53	5	554		0.84	0.50	1.21	18	3%	0.77	Yes
58 JUNCTION DESCRIPTION: Banbury F MCC		ARM D: A4095 (West)D Westbound	746	99	17	869	613	62	12	687		5.09	4.14	1.25	-182	-21%	6.51	No
59 JUNCTION DESCRIPTION: Buckingh MCC		ARM A: A4421 (North)A Northbound	456	64	29	557	512	66	12	591		2.55	0.31	3.67	34	6%	1.41	Yes
60 JUNCTION DESCRIPTION: Buckingh MCC		ARM A: A4421 (North)A Southbound	874	103	47	1033	766	110	34	910		3.76	0.68	2.11	-123	-12%	3.94	Yes
61 JUNCTION DESCRIPTION: Buckingh MCC		ARM B: Skimmingdish Ln (East)B East	929	134	60	1131	977	140	56	1172		1.55	0.49	0.55	41	4%	1.22	Yes
62 JUNCTION DESCRIPTION: Buckingh MCC		ARM B: Skimmingdish Ln (East)B Wes	480	101	43	630	488	100	27	615		0.35	0.07	2.64	-15	-2%	0.58	Yes
63 JUNCTION DESCRIPTION: Buckingh MCC		ARM C: Buckingham Rd (South)C Nor	396	44	12	458	275	25	10	310		6.63	3.14	0.61	-148	-32%	7.55	No
64 JUNCTION DESCRIPTION: Buckingh MCC		ARM C: Buckingham Rd (South)C Sou	377	38	12	433	304	30	15	349		3.98	1.32	0.85	-84	-19%	4.25	Yes
65 JUNCTION DESCRIPTION: Buckingh MCC		ARM D: A4095 (West)D Eastbound	747	111	37	903	765	108	55	927		0.64	0.25	2.59	24	3%	0.81	Yes
66 JUNCTION DESCRIPTION: Buckingh MCC		ARM D: A4095 (West)D Westbound	735	123	38	903	501	108	42	651		9.42	1.43	0.69	-252	-28%	9.04	No
67 JUNCTION DESCRIPTION: Skimming MCC		ARM A: Skimmingdish Ln (North)A Nc	494	100	46	640	488	100	27	615		0.28	0.03	3.08	-30	-5%	1.18	Yes
68 JUNCTION DESCRIPTION: Skimming MCC		ARM A: Skimmingdish Ln (North)A So	913	134	58	1112	943	133	56	1132		1.00	0.11	0.29	20	2%	0.59	Yes
69 JUNCTION DESCRIPTION: Skimming MCC		ARM B: A4421 (South)B Northbound	677	93	36	814	654	97	16	767		0.88	0.38	4.02	-47	-6%	1.68	Yes
70 JUNCTION DESCRIPTION: Skimming MCC		ARM B: A4421 (South)B Southbound	721	129	63	921	740	122	42	904		0.70	0.63	2.85	-17	-2%	0.55	Yes
71 JUNCTION DESCRIPTION: Skimming MCC		ARM C: Launton Rd (West)C Eastbou	396	105	45	554	400	98	20	519		0.22	0.69	4.35	-35	-6%	1.53	Yes
72 JUNCTION DESCRIPTION: Skimming MCC		ARM C: Launton Rd (West)C Westbou	771	103	30	914	767	102	22	891		0.14	0.09	1.58	-23	-2%	0.76	Yes
73 JUNCTION DESCRIPTION: Charbridg MCC		ARM A: Charbridge Ln (North)A Nortl	540	51	36	630	523	60	13	596		0.73	1.19	4.70	-34	-5%	1.38	Yes
74 JUNCTION DESCRIPTION: Charbridg MCC		ARM A: Charbridge Ln (North)A Soutl	488	83	55	631	486	84	25	595		0.08	0.06	4.72	-36	-6%	1.46	Yes
75 JUNCTION DESCRIPTION: Charbridg MCC		ARM B: Wretchwick Wy (South)B Nor	485	50	36	573	453	60	13	526		1.48	1.33	4.70	-47	-8%	2.02	Yes
76 JUNCTION DESCRIPTION: Charbridg MCC		ARM B: Wretchwick Wy (South)B Sou	504	81	54	647	484	84	25	592		0.92	0.28	4.59	-55	-8%	2.20	Yes
77 JUNCTION DESCRIPTION: Charbridg MCC		ARM C: Gavray Dr (West)C Eastboun	109	3	0	116	95	0	0	95		1.35	2.45	0.00	-21	-18%	2.00	Yes
78 JUNCTION DESCRIPTION: Charbridg MCC		ARM C: Gavray Dr (West)C Westboun	38	4	1	43	28	0	0	28		1.81	2.83	1.41	-15	-36%	2.59	Yes
79 JUNCTION DESCRIPTION: London Rd MCC		ARM A: London Rd (North)A Northbo	317	40	16	383	328	44	27	398		0.61	0.60	2.30	15	4%	0.78	Yes
80 JUNCTION DESCRIPTION: London Rd MCC		ARM A: London Rd (North)A Southbo	244	48	8	307	229	30	0	259		0.96	2.87	4.00	-48	-16%	2.83	Yes
81 JUNCTION DESCRIPTION: London Rd MCC		ARM B: A4421 (East)B Eastbound	321	52	36	411	337	48	13	398		1.58	0.51	4.70	-13	-3%	0.64	Yes
82 JUNCTION DESCRIPTION: London Rd MCC		ARM B: A4421 (East)B Westbound	681	85	54	830	643	95	25	763		1.47	1.01	4.59	-67	-8%	2.38	Yes
83 JUNCTION DESCRIPTION: London Rd MCC		ARM C: A41 (South)C Northbound	693	112	67	887	768	125	87	980		2.77	1.18	2.30	93	10%	3.04	Yes
84 JUNCTION DESCRIPTION: London Rd MCC		ARM C: A41 (South)C Southbound	855	164	85	1118	853	161	79	1094		0.05	0.23	0.64	-24	-2%	0.73	Yes
85 JUNCTION DESCRIPTION: London Rd MCC		ARM D: Gravenhill Rd (West)D Eastb	6	6	3	15	0	0	3	3		3.46	3.46	0.08	-12	-79%	3.94	Yes
86 JUNCTION DESCRIPTION: London Rd MCC		ARM D: Gravenhill Rd (West)D Westt	14	8	5	27	0	0	8	8		5.29	4.00	1.11	-19	-71%	4.60	Yes
87 JUNCTION DESCRIPTION: Shakespe MCC		ARM A: Shakespeare Dr (North)A No	741	107	80	941	786	111	72	968		1.64	0.43	0.95	28	3%	0.92	Yes
88 JUNCTION DESCRIPTION: London Rd MCC		ARM E: A41 (North)E Southbound	624	120	90	841	664	115	83	862		1.59	0.43	0.80	21	3%	0.73	Yes
89 JUNCTION DESCRIPTION: Oxford Rd MCC		ARM A: Oxford Rd (North)A Northbo	606	91	24	732	636	98	28	762		1.21	0.76	0.72	30	4%	1.11	Yes
90 JUNCTION DESCRIPTION: Oxford Rd MCC		ARM A: Oxford Rd (North)A Southbo	720	113	40	894	841	144	40	1025		4.33	2.75	0.07	131	15%	4.21	Yes
91 JUNCTION DESCRIPTION: Oxford Rd MCC		ARM B: A41 (East)B Eastbound	649	124	98	871	664	115	83	862		0.60	0.79	1.62	-16	-2%	0.53	Yes
92 JUNCTION DESCRIPTION: Oxford Rd MCC		ARM B: A41 (East)B Westbound	730	114	81	939	786	111	72	969		2.04	0.24	1.07	30	3%	0.98	Yes
93 JUNCTION DESCRIPTION: Oxford Rd MCC		ARM C: A41 (South)C Northbound	893	165	112	1181	929	162	110	1202		1.19	0.20	0.17	21	2%	0.59	Yes
94 JUNCTION DESCRIPTION: Oxford Rd MCC		ARM C: A41 (South)C Southbound	1087	175	111	1402	1254	198	109	1561		4.88	1.67	0.18	159	11%	4.13	Yes
95 JUNCTION DESCRIPTION: Oxford Rd MCC		ARM D: Unlabelled Rd (West)D Eastb	60	37	18	121	60	15	0	75		0.03	4.39	5.86	-46	-38%	4.67	Yes
96 JUNCTION DESCRIPTION: Oxford Rd MCC		ARM D: Unlabelled Rd (West)D West	61	39	18	123	62	21	2	85		0.07	3.24	5.04	-38	-31%	3.74	Yes
97 JUNCTION DESCRIPTION: A41 N/ U MCC		ARM A: A41 (North)A Northbound	862	163	104	1140	856	162	102	1120		0.22	0.05	0.15	-20	-2%	0.58	Yes
98 JUNCTION DESCRIPTION: A41 N/ U MCC		ARM A: A41 (North)A Southbound	956	158	95	1209	1093	188	93	1373		4.27	2.25	1.47	118	9%	3.27	Yes
99 JUNCTION DESCRIPTION: A41 N/ U MCC		ARM B: Unlabelled Rd (East)B Eastbo	18	7	3	28	16	0	0	16		0.46	3.74	2.45	-12	-43%	2.54	Yes
100 JUNCTION DESCRIPTION: A41 N/ U MCC		ARM B: Unlabelled Rd (East)B Westbo	79	9	6	95	38	51	37	125		5.43	7.67	6.64	30	32%	2.88	Yes
101 JUNCTION DESCRIPTION: A41 N/ U MCC		ARM C: A41 (South)C Northbound	804	176	98	1088	945	114	67	1127		4.78	5.16	3.37	39	4%	1.16	Yes
102 JUNCTION DESCRIPTION: A41 N/ U MCC		ARM C: A41 (South)C Southbound	1271	189	121	1624	1252	195	83	1530		0.54	0.43	3.72	-94	-6%	2.36	Yes
103 JUNCTION DESCRIPTION: A41 N/ U MCC		ARM D: P&R (West)D Eastbound	12	0	0	22	10	0	0	10		0.46	0.00	0.00	-12	-53%	2.87	Yes
104 JUNCTION DESCRIPTION: A41 N/ U MCC		ARM D: P&R (West)D Westbound	57	1	0	68	54	0	0	54		0.42	1.41	0.00	-14	-21%	1.81	Yes
105 JUNCTION DESCRIPTION: Banbury F MCC		ARM E: Vendee Dr (North)E Northbo	159	36	11	208	230	29	2	261		5.00	7.73	0.16	163	16%	2.22	Yes
106 JUNCTION DESCRIPTION: A41 N/ U MCC		ARM E: Vendee Dr (North)E Southbo	516	53	27	608	335	9	0	345		8.76	7.80	7.35	-263	-43%	12.06	No
107 JUNCTION DESCRIPTION: Howes Ln MCC		ARM A: Howes Ln (North)A Northbou	265	29	9	305	331	30	4	365		3.83	1.16	7.67	6.64	30	2.88	Yes
108 JUNCTION DESCRIPTION: Howes Ln MCC		ARM A: Howes Ln (North)A Southbou	713	88	8	820	521	59	14	594		7.72	3.36	1.73	-226	-28%	8.50	No
109 JUNCTION DESCRIPTION: Howes Ln MCC		ARM B: Middleton Stoney Rd (East)B	209	41	11	267	194	24	10	229		1.05	2.90	0.20	-38	-14%	2.42	Yes
110 JUNCTION DESCRIPTION: Howes Ln MCC		ARM B: Middleton Stoney Rd (East)B	255	27	7	296	237	20	0	258		1.14	1.35	3.74	-38	-13%	2.31	Yes
111 JUNCTION DESCRIPTION: Howes Ln MCC		ARM C: Vendee Dr (South)C Northbo	304	45	13	368	383	27	13	423		4.27	3.04	0.11	55	15%	2.78	Yes
112 JUNCTION DESCRIPTION: Howes Ln MCC		ARM C: Vendee Dr (South)C Southbo	780	78	22	894	630	51	12	694		5.64	3.33	2.36	-200	-22%	7.11	No
113 JUNCTION DESCRIPTION: Buckingh MCC		ARM D: B4030 (West)D Eastbound	218	28	25	273	229	10	11	250		3.49	0.17	3.49	-6	-2%	0.34	Yes
114 JUNCTION DESCRIPTION: Buckingh MCC		ARM D: B4030 (West)D Westbound	236	40	11	291	214	30	11	255		1.45	1.72	0.15	-36	-13%	2.21	Yes
115 JUNCTION DESCRIPTION: A4095/ B MCC		ARM A: A4095 (North)A Northbound	412	49	9	472	474	58	5	537		2.93	1.23	1.55	65	14%	2.88	Yes
116 JUNCTION DESCRIPTION: A4095/ B MCC		ARM A: A4095 (North)A Southbound	844	101	14	971	678	73	12	763		6.00	3.06	0.48	-208	-21%	7.06	No
117 JUNCTION DESCRIPTION: A4095/ B MCC		ARM B: Bucknell Rd (South)B Northb	442	59	8	512	517	64	4	586		3.43	0.69	1.46	74	14%	3.16	Yes
118 JUNCTION DESCRIPTION: A4095/ B MCC		ARM B: Bucknell Rd (South)B Southb	824	95	13	945	709	80	12	801		4.17	1.63	0.22	-144	-15%	4.89	No
119 JUNCTION DESCRIPTION: A4095/ B MCC		ARM C: Bucknell Rd (West)C Northbo	105	9	1	118	165	35	0	200		5.16	5.57	1.41	82	70%	6.51	Yes
120 JUNCTION DESCRIPTION: A4095/ B MCC		ARM C: Bucknell Rd (West)C Southbo	155	25	1	184	152	36	1	188		0.25	1.97	0.52	4	2%	0.32	Yes
121 JUNCTION DESCRIPTION: Oxford Rd MCC		ARM A: Oxford Rd (North)A Northbo	547	81	16	655	574	90	23	687		1.13	0.99	1.54	32	5%	1.22	Yes
122 JUNCTION DESCRIPTION: Oxford Rd MCC		ARM A: Oxford Rd (North)A Southbo	829	111	36	1003	957	140	35	1132		4.29	2.61	0.18	129	13%	3.96	Yes
123 JUNCTION DESCRIPTION: Oxford Rd MCC		ARM B: Pingle Dr (East)B Eastbound	235	22	19	281	242	18	10	270		0.45	1.01	2.30	-11	-4%	0.68	Yes
124 JUNCTION DESCRIPTION: Oxford Rd MCC		ARM B: Pingle Dr (East)B Westbound	63	18	14	96	63	13	10	86		0.01	1.21	1.15	-10	-10%	1.02	Yes
125 JUNCTION DESCRIPTION: Oxford Rd MCC		ARM C: Oxford Rd (South)C Northbo	601	89	25	726	636	98	28	762		1.41	0.97	0.52	36	5%	1.33	Yes
126 JUNCTION DESCRIPTION: Oxford Rd MCC		ARM C: Oxford Rd (South)C Southbo	711	115	40	889	841	144	40	1025		4.66	2.56	0.07	136	15%	4.38	No
127 JUNCTION DESCRIPTION: Kings Ed/ MCC		ARM A: Kings Ed (North)A Northbour	652	79	17	761	578	61	20	659		2.99	2.09	0.72	-102	-13%	3.81	Yes
128 JUNCTION DESCRIPTION: Kings Ed/ MCC		ARM A: Kings Ed (North)A Southbou	636	86	31	773	653	108	28	815		1.82	1.90	0.60	42	5%	1.50	Yes
129 JUNCTION DESCRIPTION: Kings Ed/ MCC		ARM B: Oxford Rd (South)B Northbo	584	81	16	652	574	90	23	687		1.26	0.99	1.54	35	5%	1.34	Yes
130 JUNCTION DESCRIPTION: Kings Ed/ MCC		ARM B: Oxford Rd (South)B Southbo	826	111	36	998	957	140	35	1132		4.39	2.61	0.18	134	13%	4.12	Yes
131 JUNCTION DESCRIPTION: Kings Ed/ MCC		ARM C: Middleton Stoney Rd (West)C	442	52	12	516	372	36	7	415		3.46	1.56	1.01	-20	-5%	4.67	No
132 JUNCTION DESCRIPTION: Kings Ed/ MCC		ARM C: Middleton Stoney Rd (West)C	144	29	6	182	94	29	3	125		4.62	0.07	1.58	-57	-31%	4.60	Yes
133 JUNCTION DESCRIPTION: Field St/ S MCC		ARM A: Field St (North)A Northbound	503	57	15	593	501	41	13	554		0.11	2.33	0.60	-39	-7%	1.83	Yes
134 JUNCTION DESCRIPTION: Field St/ S MCC		ARM A: Field St (North)A Southbound	764	76	23	882	819	100	15	934		1.96	2.55	1.81	52	6%	1.73	Yes
135 JUNCTION DESCRIPTION: Field St/ S MCC		ARM B: St John's St (East)B Eastbou	318	36	5	381	339	35	1	375		1.18	0.22	1.99	-6	-1%	0.29	Yes
136 JUNCTION DESCRIPTION: Field St/ S MCC		ARM B: St John's St (East)B Westbou	374	60	12	471	382	43	16	440		0.39	2.41	1.08	-31	-6%	1.43	Yes
137 JUNCTION DESCRIPTION: Skimming MCC		ARM C: Queens Av (South)C Northbo	417	46	13	494	417	52	11	480		0.00	0.85	0.52	-14	-3%	0.63	Yes
138 JUNCTION DESCRIPTION: Field St/ S MCC		ARM C: Queens Av (South)C Southbo	777	96	29	925	793	112	28	933		0.58	1.58	0.22	8	1%	0.27	Yes
139 JUNCTION DESCRIPTION: Field St/ S MCC		ARM D: Bucknell Rd (West)D Eastbou	149	23	1	176	150	9	0	160		0.12	3.41	1.41	-16	-9%	1.25	Yes
140 JUNCTION DESCRIPTION: Field St/ S MCC		ARM D: Bucknell Rd (West)D Westbo	106	16	0	124	123	15	0	138		1.61	0.32	0.15	14	11%	1.23	Yes
141 JUNCTION DESCRIPTION: Banbury F MCC		ARM A: Banbury Rd (North)A Northb	142	21	3	171	148	11	0	159		0.49	2.50	2.45	-12	-7%	0.94	Yes
142 JUNCTION DESCRIPTION: Banbury F MCC		ARM A: Banbury Rd (North)A Southbo	377	33	10	426	389	50	0	440		0.63	2.69	4.47	14	3%	0.66	Yes
143 JUNCTION DESCRIPTION: Banbury F MCC		ARM B: Buckingham Rd (North)B Nor	389	37	12	453	354	30	13	396		1.83	1.26	0.21	-57	-13%	2.75	Yes
144 JUNCTION DESCRIPTION: Banbury F MCC		ARM B: Buckingham Rd (North)B Sou	421	49	13	503	431	49	15	495		0.49	0.07	0.57	-7	-1%	0.64	Yes
145 JUNCTION DESCRIPTION: Banbury F MCC		ARM C: Roman Wy (East)C Eastbound	4	0	0	5	9	1	0	11		2.00	1.70	0.00	6	111%	1.99	Yes
146 JUNCTION DESCRIPTION: Banbury F MCC		ARM C: Roman Wy (East)C Westboun	18	0	0	19	11	0	6	16		1.99	0.00	3.41	-3	-14%	0.64	Yes
147 JUNCTION DESCRIPTION: Banbury F MCC		ARM D: North St (South)D Northbour	4	0	0	6	9	1	0	11		2.00	1.70	0.00	5	76%	1.58	Yes
148 JUNCTION DESCRIPTION: Banbury F MCC		ARM D: North St (South)D Southbou	18	0	0	25	11	0	6	16		1.99	0.00	3.41	-9	-35%	1.91	Yes
149 JUNCTION DESCRIPTION: Banbury F MCC		ARM E: Field St (South)E Northbound	508	57	15	598	501	41	13	554		0.33	2.33	0.60	-44	-7%	1.83	Yes
150 JUNCTION DESCRIPTION: Banbury F MCC		ARM E: Field St (South)E Southbound	775	81	23	898	819	100	15	934		1.57	1.98	1.81	36	4%	1.20	Yes
151 JUNCTION DESCRIPTION: Buckingh MCC		ARM A: Buckingham Rd (North)A Nor	309	35	10	364	319	35	10	364		0.54	0.06	0.04	0	0%	0.00	Yes
152 JUNCTION DESCRIPTION: Buckingh MCC		ARM A: Buckingham Rd (North)A Sou	478	48	12	550	493	48	15	556		0.67	0.04	0.85	6	1%	0.26	Yes
153 JUNCTION DESCRIPTION: Buckingh MCC		ARM B: Churchill Rd (East)B Eastbou	367	41	6	427	353	37	3	393		0.72	0.70	1.62	-34	-8%	1.70	Yes
154 JUNCTION DESCRIPTION: Buckingh MCC		ARM B: Churchill Rd (East)B Westbo	245	35	8	299	245	38	0	283		0.02	0.46	4.00	-16	-6%	0.96	Yes
155 JUNCTION DESCRIPTION: Buckingh MCC		ARM C: Buckingham Rd (South)C Nor	357	39	12	420	336	37	13	386		1.12	0.36	0.21	-34	-8%	1.71	Yes
156 JUNCTION DESCRIPTION: Buckingh MCC		ARM C: Buckingham Rd (South)C Sou	455	51	15	539	470	53	15	538		0.69	0.30	0.03	-1	0%	0.04	Yes
157 JUNCTION DESCRIPTION: Buckingh MCC		ARM D: Brashfield Rd (West)D Eastbo	97	9	1	113	101	8	0	109		0.39	0.19	1.41	-4	-3%	0.35	Yes
158 JUNCTION DESCRIPTION: Buckingh MCC		ARM D: Brashfield Rd (West)D Westb	46	4	2	52	33	6	0	39		2.02	0.93	2.00	-13	-24%	1.87	Yes
159 JUNCTION DESCRIPTION: Launton R MCC		ARM A: Launton Rd (East)A Eastbou	301	54	16	380	353	35	14	402		2.85	2.79	0.38	22	6%	1.13	Yes
160 JUNCTION DESCRIPTION: Launton R MCC		ARM A: Launton Rd (East)A Westbou	182	60	12	265	185	22	0	207		0.22	5.86	4.90	-58	-22%	3.75	Yes
161 JUNCTION DESCRIPTION: Launton R MCC		ARM B: London Rd (South)B Northbo	263	29	13	319	285	25	8	318		1.35	0.87	1.38	0	0%	0.04	Yes
162 JUNCTION DESCRIPTION: Launton R MCC		ARM B: London Rd (South)B Southbo	249	55	10	335	246	42	1	289		0.17	1.88	3.77	-46	-14%	2.58	Yes
163 JUNCTION DESCRIPTION: Launton R MCC		ARM C: Wessex Wy (West)C Eastbou	2	0	1	3	0	0	0	0		2.00	0.00	1.41	-3	-100%	2.45	Yes
164 JUNCTION DESCRIPTION: Launton R MCC		ARM C: Wessex Wy (West)C Westbou	3	0	1	4	0	0	0	0		2.45	0.00	1.07	-4	-98%	2.64	Yes
165 JUNCTION DESCRIPTION: Launton R MCC		ARM D: London Rd (North)D Northbc	208	39	6	268	215	15	3	232		0.45	4.70	1.59	-36	-13%	2.28	Yes
166 JUNCTION DESCRIPTION: Launton R MCC		ARM D: London Rd (North)D Southbc	314	59	7	400	343	45	10	398		1.61	1.93	1.03	-2	0%	0.09	Yes
167 JUNCTION DESCRIPTION: A4421/ Bi MCC		ARM A: A4421 (North)A Northbound	689	92	36	824	654	97	16	767		1.34	0.49	4.02	-57	-7%	2.03	Yes
168 JUNCTION DESCRIPTION: A4421/ Bi MCC		ARM A: A4421 (North)A Southbound	718	126	63	914	740	122	42	904		0.81	0.36	2.85	-10	-1%	0.32	Yes
169 JUNCTION DESCRIPTION: A4421/ Bi MCC		ARM B: Bicester Rd (East)B Eastbou	218	46	6	273	236	53	6	295		1.19	1.06	0.07	22	8%	1.33	Yes
170 JUNCTION DESCRIPTION: A4421/ Bi MCC		ARM B: Bicester Rd (East)B Westbou	279	49	6	339	258	52	4	314		1.27	0.41	0.94	-25	-7%	1.39	Yes
171 JUNCTION DESCRIPTION: A4421/ Bi MCC		ARM C: Charbridge Ln (South)C Nortl	484	58	31	576	470	60	13	543		0.62	0.24	3.89	-33	-6%	1.39	Yes
172 JUNCTION DESCRIPTION: A4421/ Bi MCC		ARM C: Charbridge Ln (South)C Soutl	574	95	58	732	578	84	37	699		0.18	1.22	3.00	-33	-4%	1.23	Yes
173 JUNCTION DESCRIPTION: Shakespe MCC		ARM A: Shakespeare Dr (North)A No	77	9	3	92	67	5	1	74		1.16	1.51	1.15	-18	-20%	2.02	Yes
174 JUNCTION DESCRIPTION: Shakespe MCC		ARM A: Shakespeare Dr (North)A So	273	27	1	311	270	20	0	290		0.19	1.41	1.41	-21	-7%	1.21	Yes
175 JUNCTION DESCRIPTION: Shakespe MCC		ARM B: Middleton Stoney Rd (East)B	373	43	9	432	355	38	0	393		0.96	0.71	4.24	-39	-9%	1.32	Yes
176 JUNCTION DESCRIPTION: Shakespe MCC		ARM B: Middleton Stoney Rd (East)B	151	25	7	186	143	20	0	163		0.64	1.08	3.74	-23	-12%	1.73	Yes
177 JUNCTION DESCRIPTION: Shakespe MCC		ARM C: B4100 (South)C Northbound	122	8	2	132	111	1	1	114		0.98	3.30	0.42	-18	-14%	1.64	Yes
178 JUNCTION DESCRIPTION: Shakespe MCC		ARM C: B4100 (South)C Southbound	55	21	3	81	60	2	10	72		0.62	5.75	2.85	-9	-11%	1.07	Yes
179 JUNCTION DESCRIPTION: Shakespe MCC		ARM D: A4095 (West)D Eastbound	209	39	11	265	194	24	10	229		1.05	2.59	0.20	-36	-14%	2.30	Yes

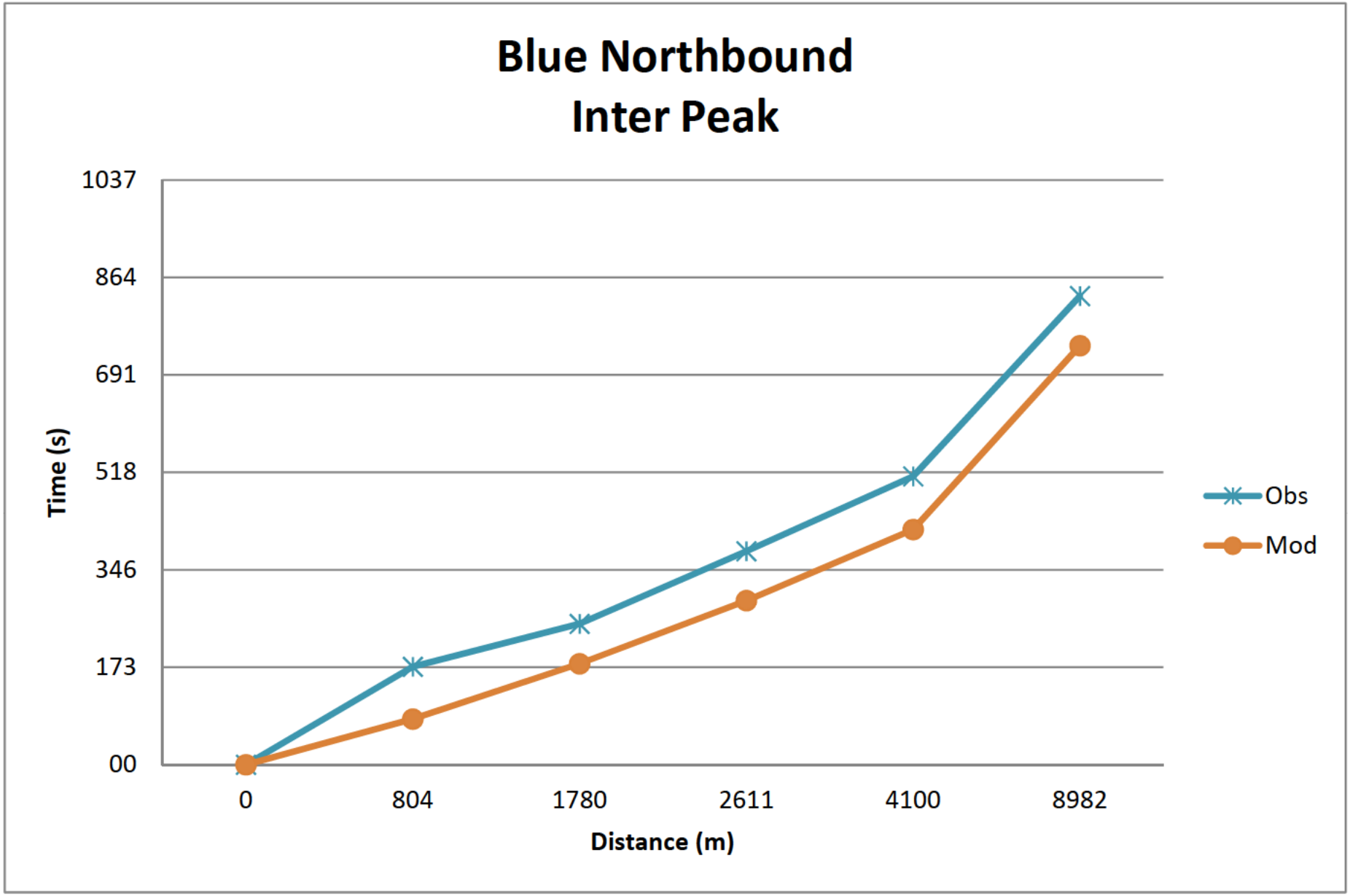
Appendix G – Link Flow Validation

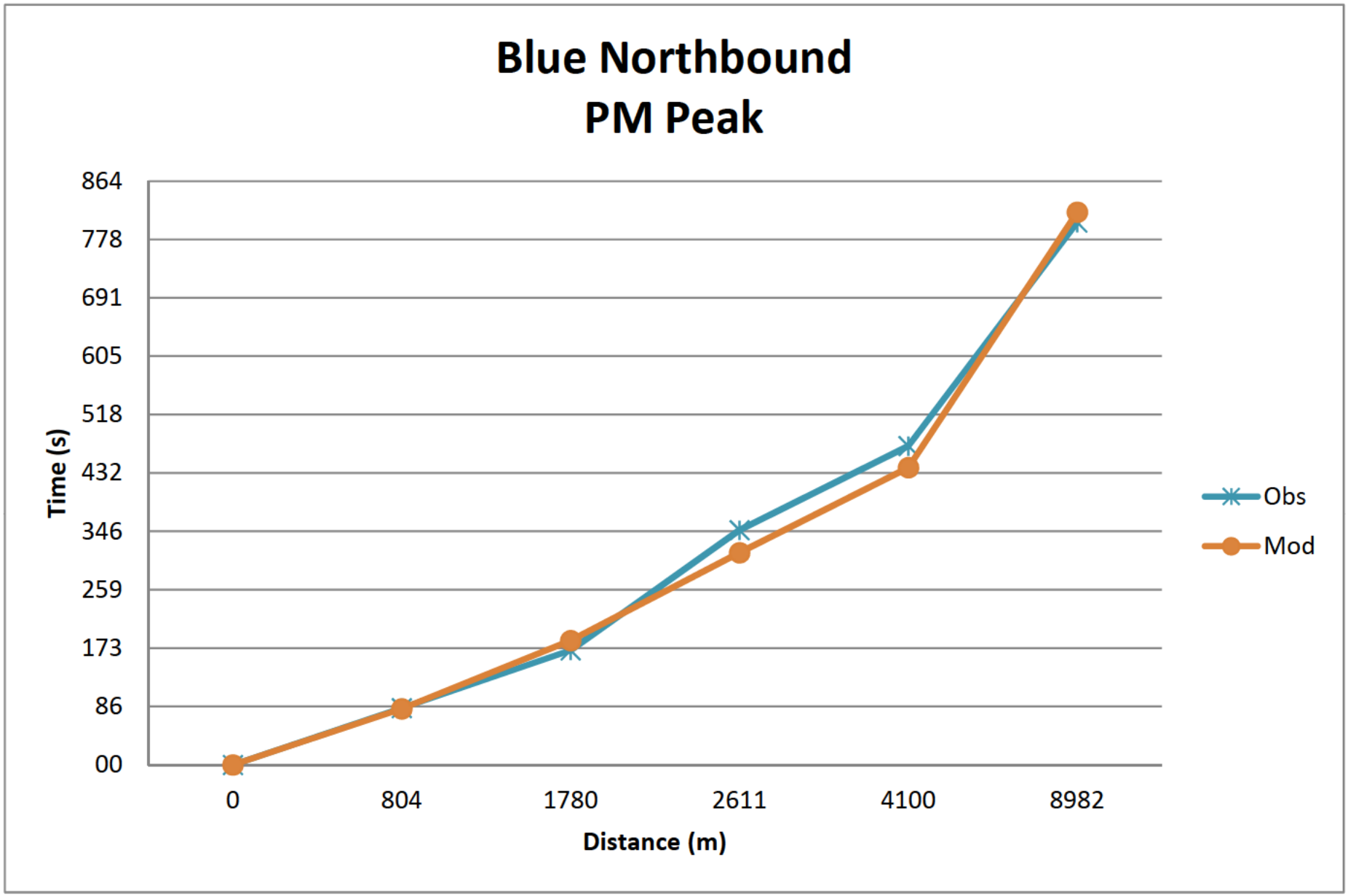
All flows in **Veh** unless otherwise stated
All modelled flows are **Actuals**

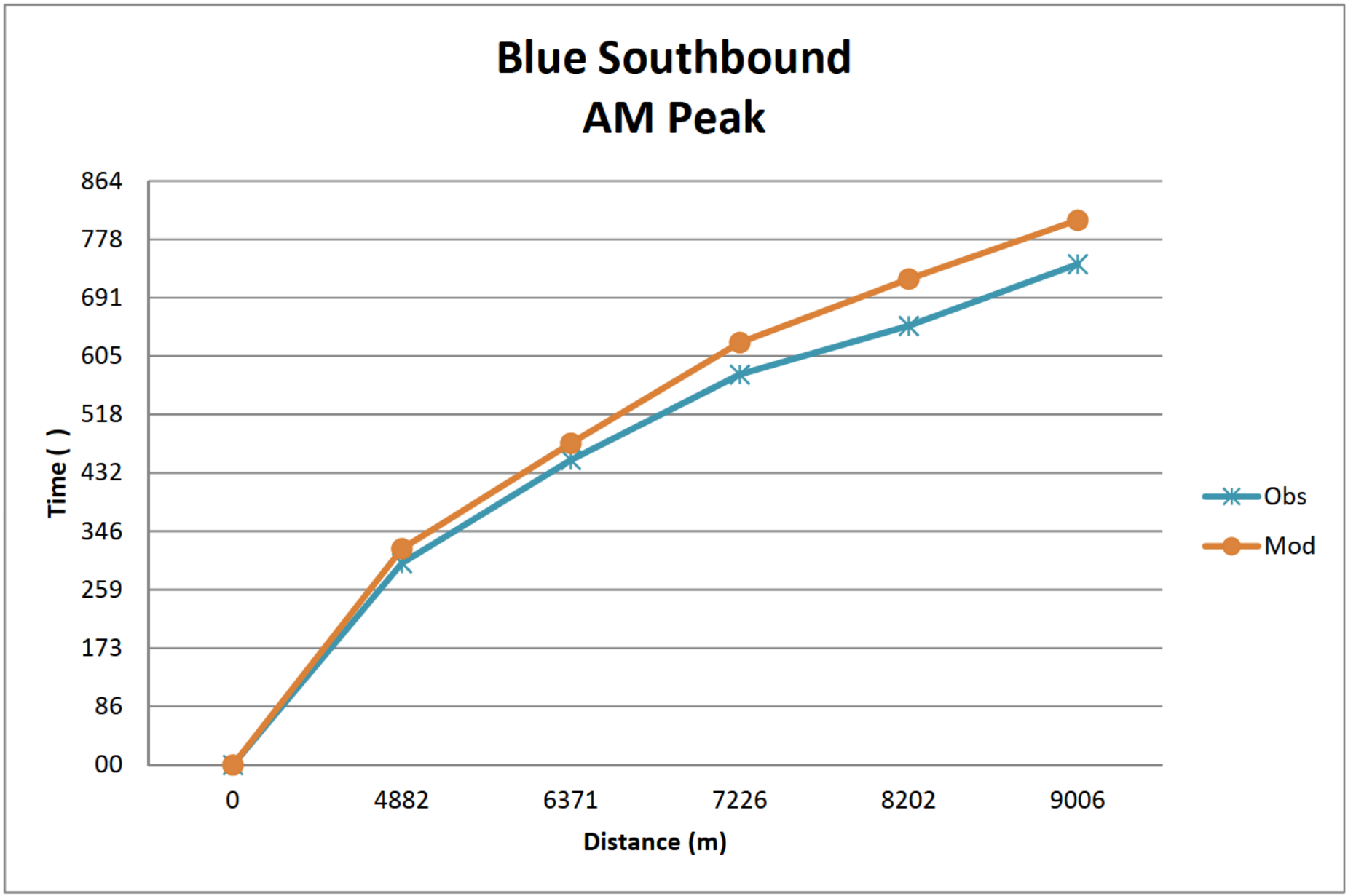
| | | | | AM Peak | | | |

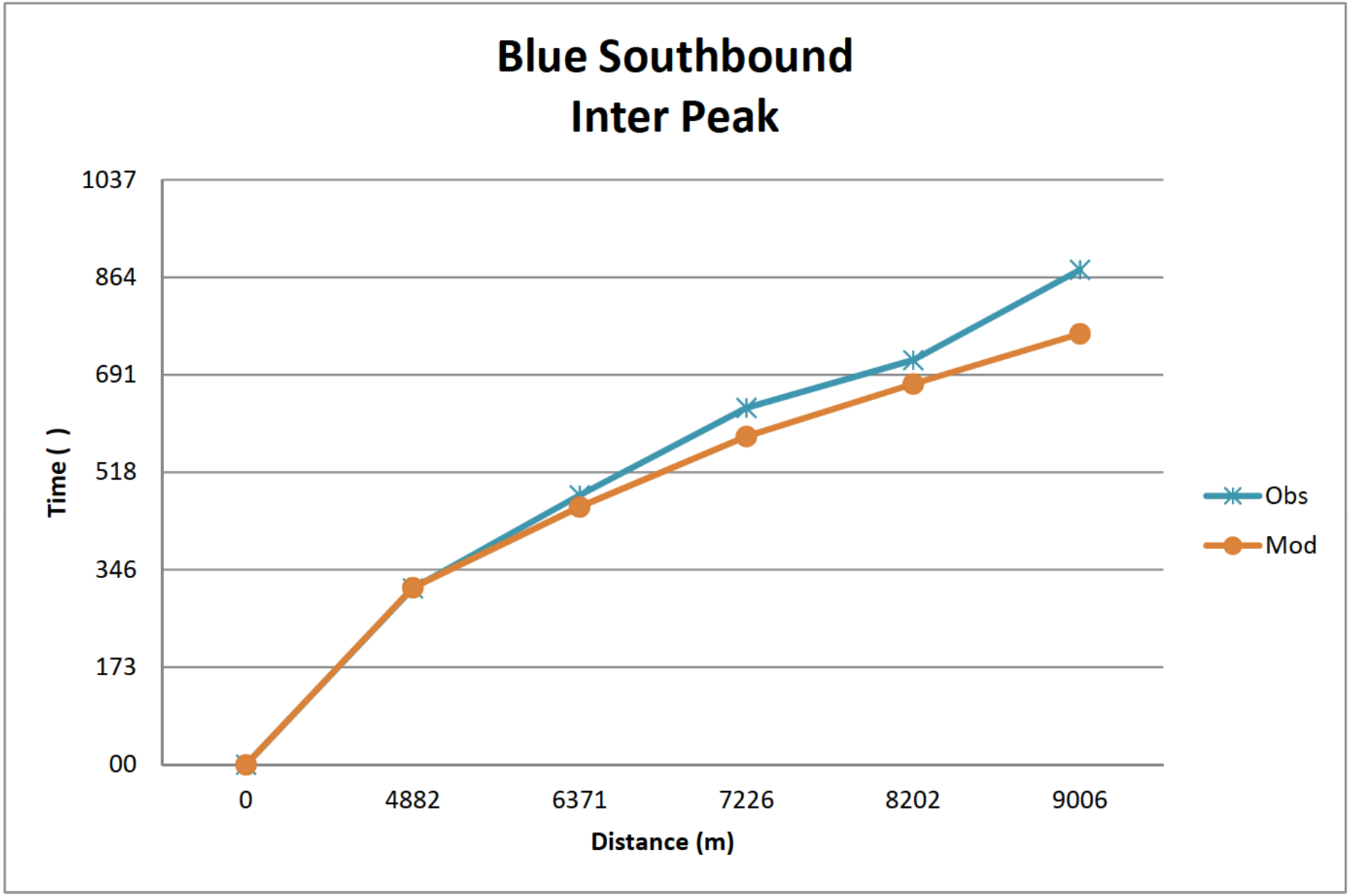
Appendix H – Journey Time Validation

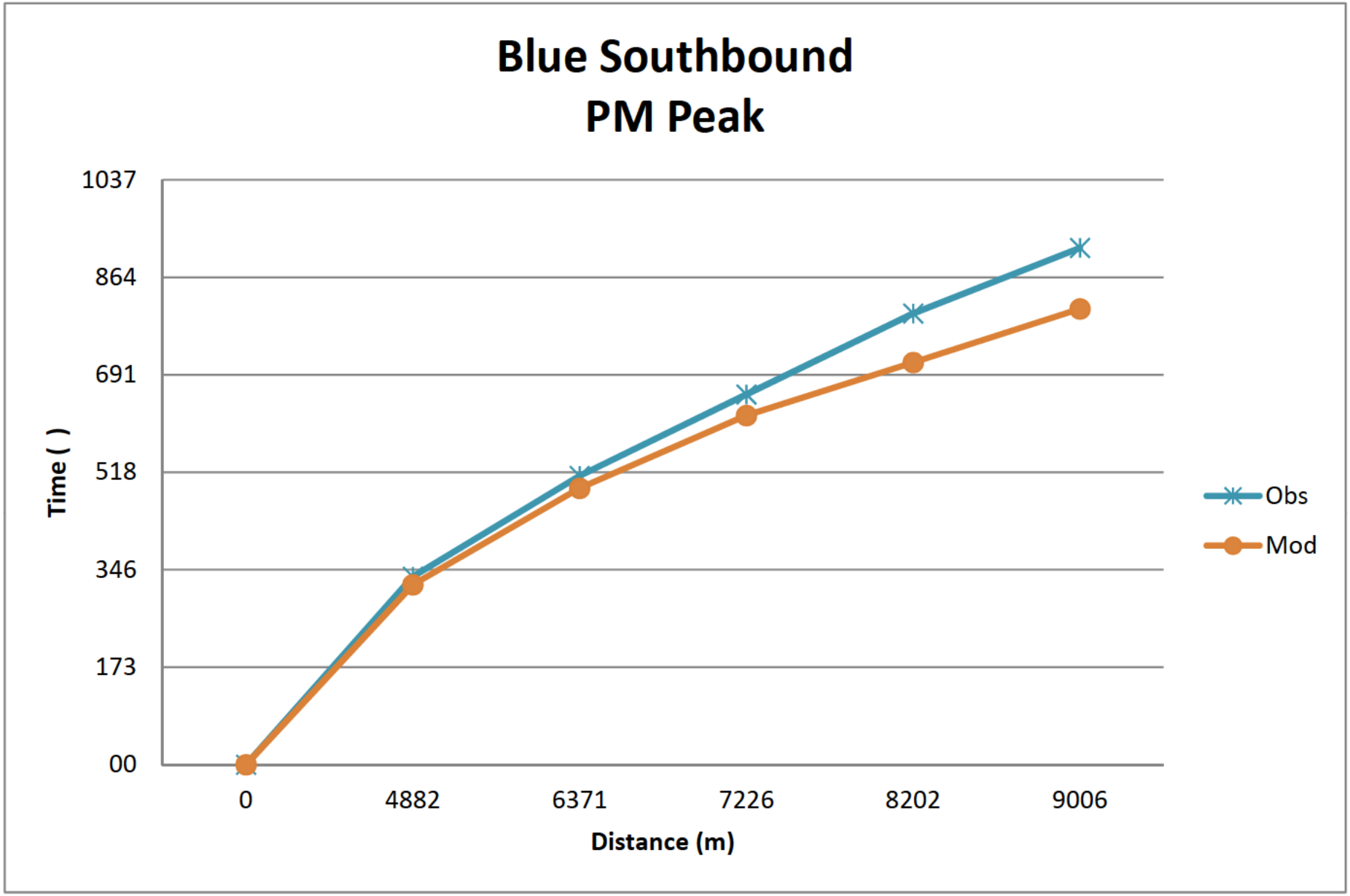

Blue Northbound
AM Peak
Time (s)
864
778
691
605
518
432
346
259
173
86
00
0
804
1780
2611
4100
8982
Distance (m)
Obs
Mod

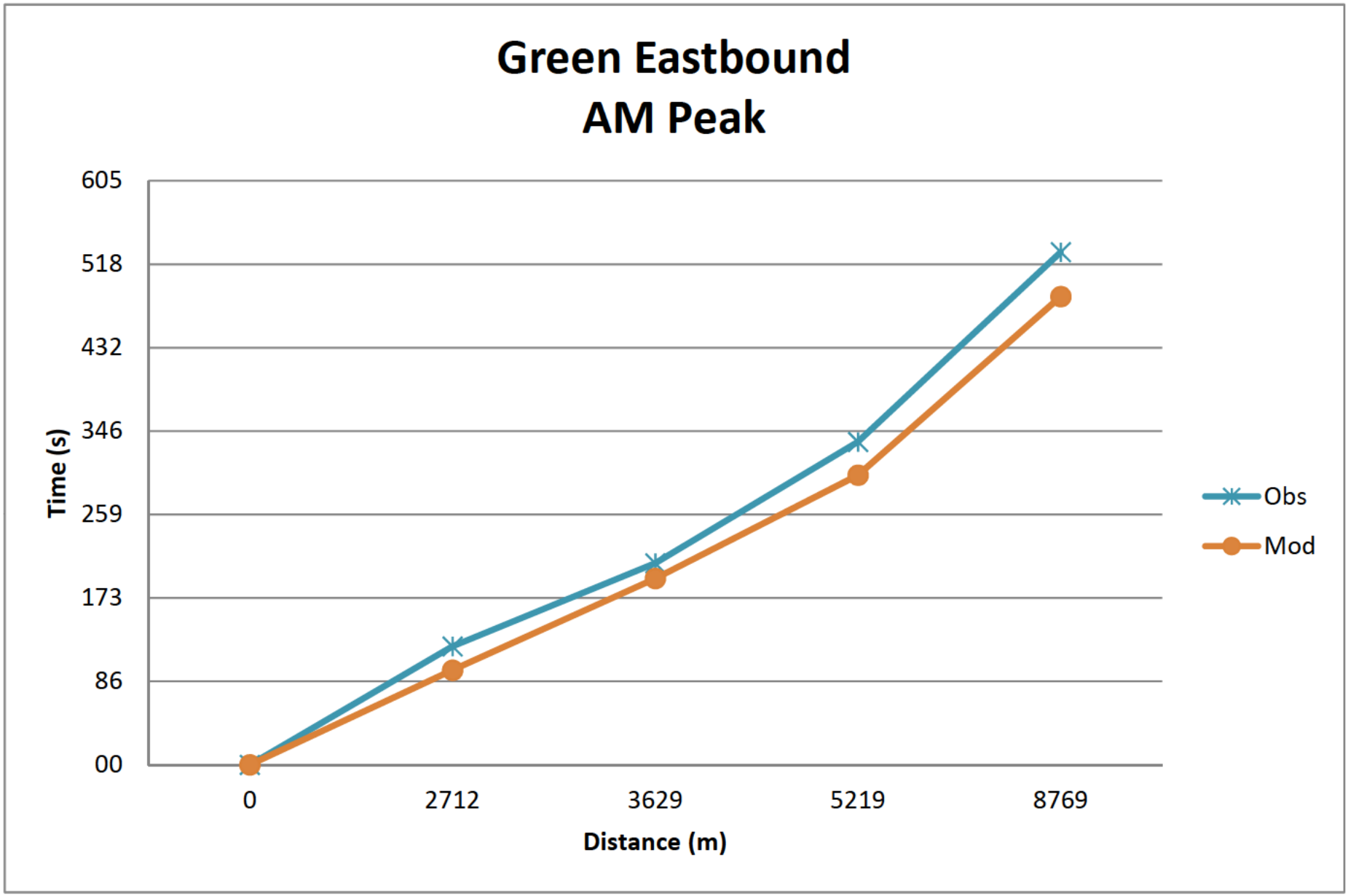

Blue Northbound
Inter Peak
1037
864
691
518
346
173
00
Time (s)
0
804
1780
2611
4100
8982
Distance (m)
Obs
Mod

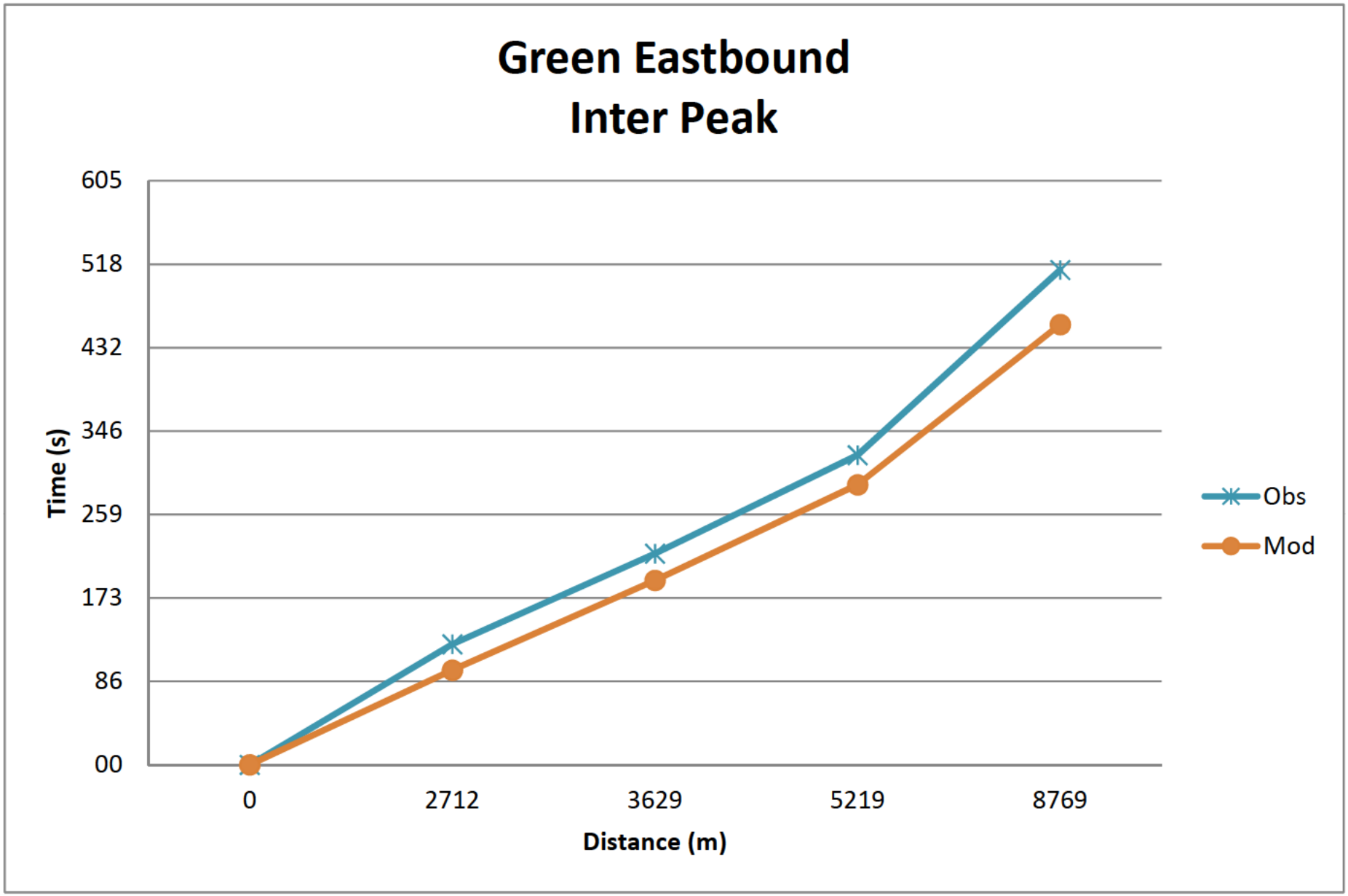

Blue Northbound
PM Peak
Time (s)
864
778
691
605
518
432
346
259
173
86
00
0
804
1780
2611
4100
8982
Distance (m)
Obs
Mod

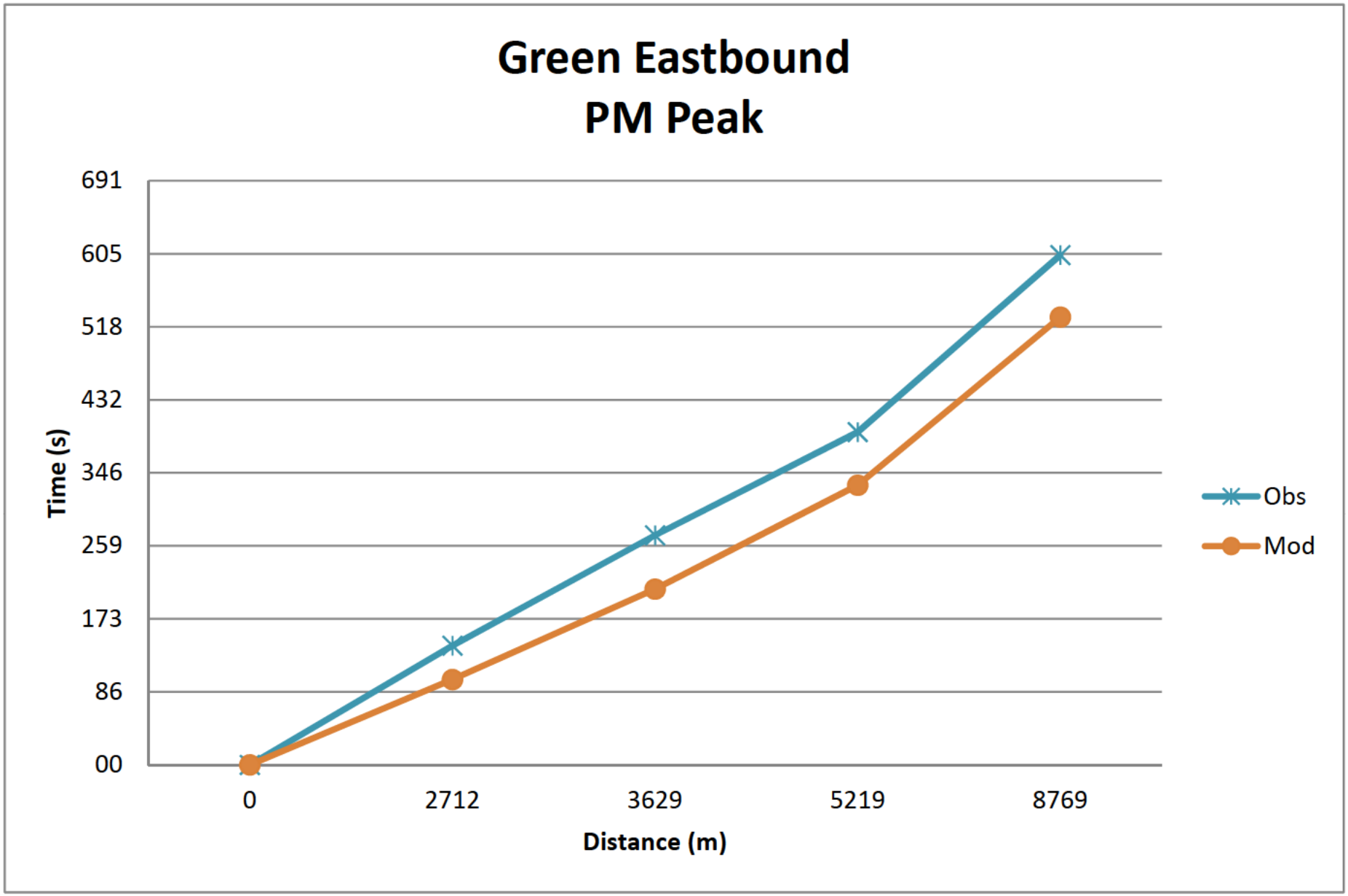

Blue Southbound
AM Peak
Time ( )
864
778
691
605
518
432
346
259
173
86
00
0
4882
6371
7226
8202
9006
Distance (m)
Obs
Mod

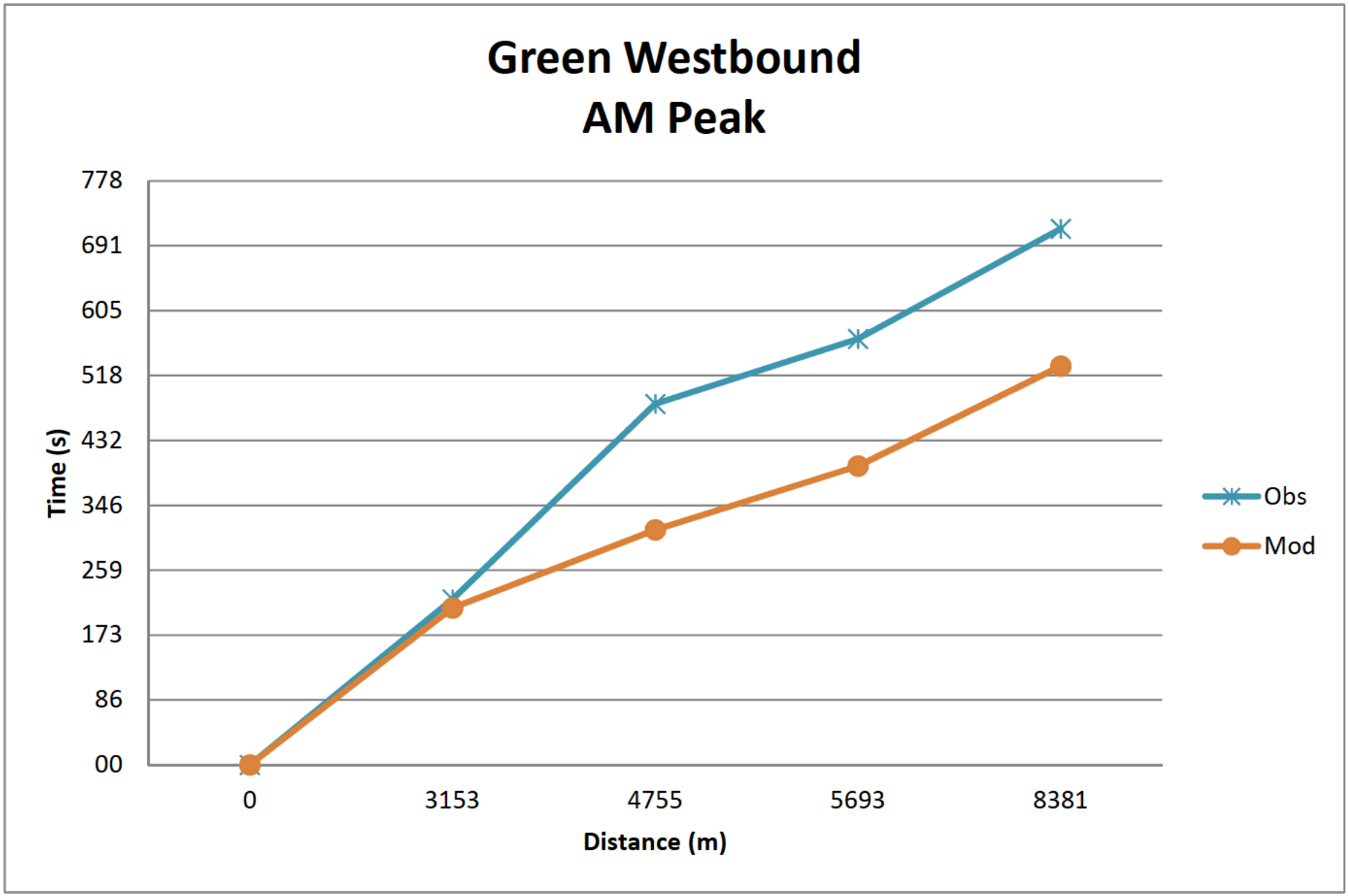

Blue Southbound
Inter Peak
1037
864
691
518
346
173
00
Time ( )
0
4882
6371
7226
8202
9006
Distance (m)
Obs
Mod

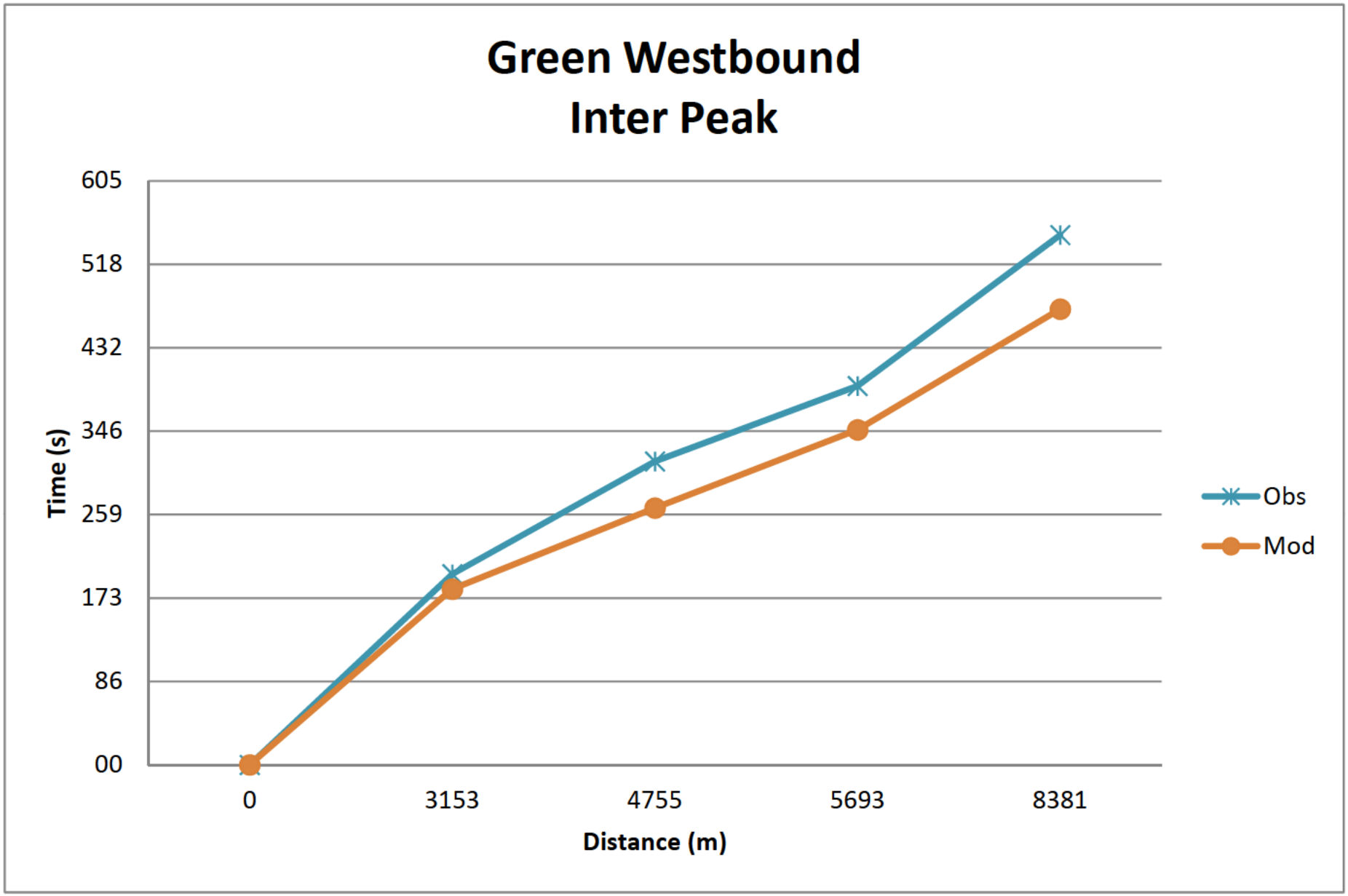

Blue Southbound
PM Peak
1037
864
691
518
346
173
00
Time ( )
0
4882
6371
7226
8202
9006
Distance (m)
Obs
Mod

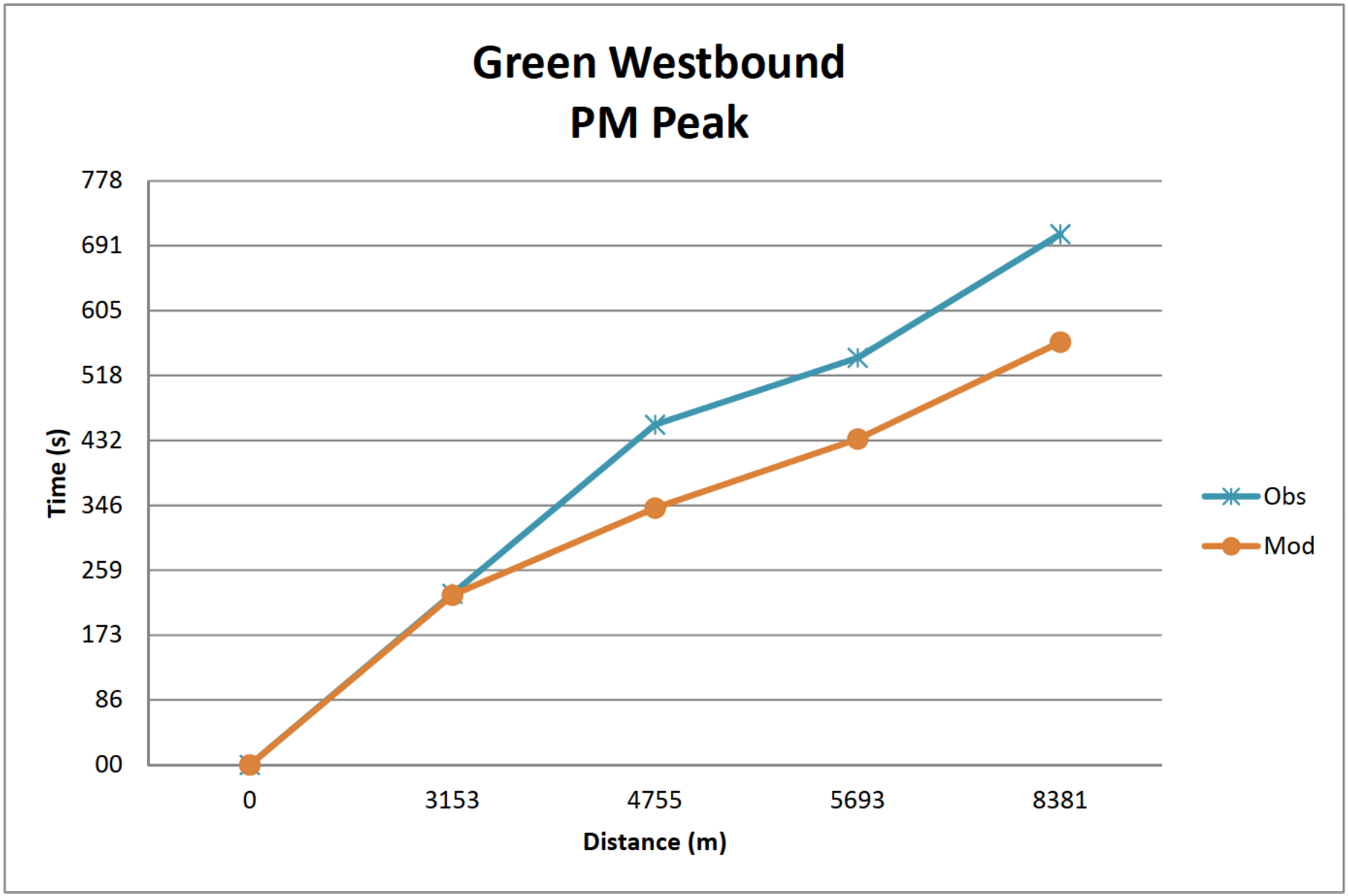

Green Eastbound
AM Peak
605
518
432
346
259
173
86
00
Time (s)
0
2712
3629
5219
8769
Distance (m)
Obs
Mod


Green Eastbound
Inter Peak
605
518
432
346
259
173
86
00
Time (s)
0
2712
3629
5219
8769
Distance (m)
Obs
Mod


Green Eastbound
PM Peak
691
605
518
432
346
259
173
86
00
Time (s)
0
2712
3629
5219
8769
Distance (m)
Obs
Mod


Green Westbound
AM Peak
778
691
605
518
432
346
259
173
86
00
Time (s)
0
3153
4755
5693
8381
Distance (m)
Obs
Mod


Green Westbound
Inter Peak
605
518
432
346
259
173
86
00
Time (s)
0
3153
4755
5693
8381
Distance (m)
Obs
Mod

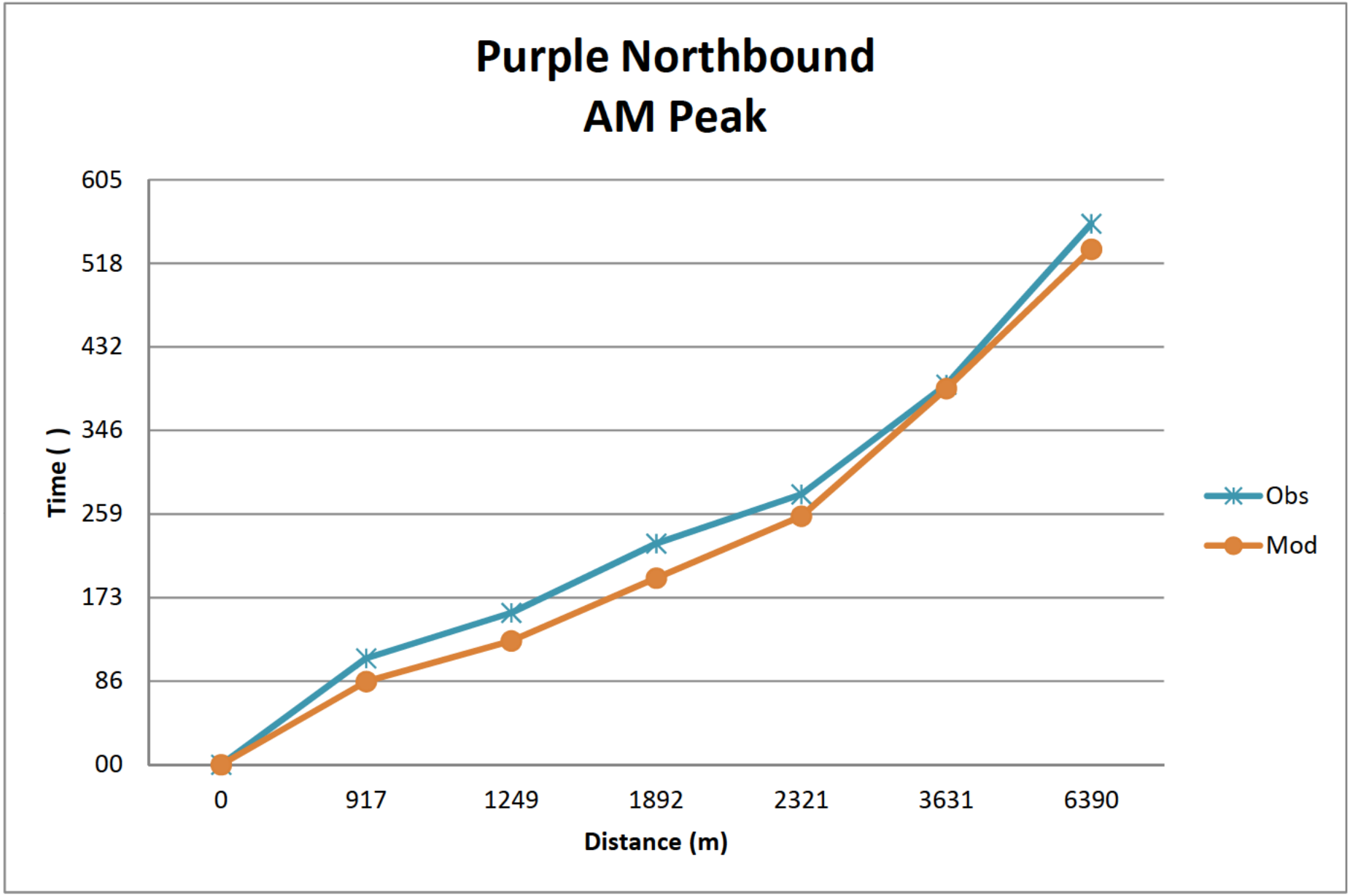

Green Westbound
PM Peak
778
691
605
518
432
346
259
173
86
00
Time (s)
0
3153
4755
5693
8381
Distance (m)
Obs
Mod

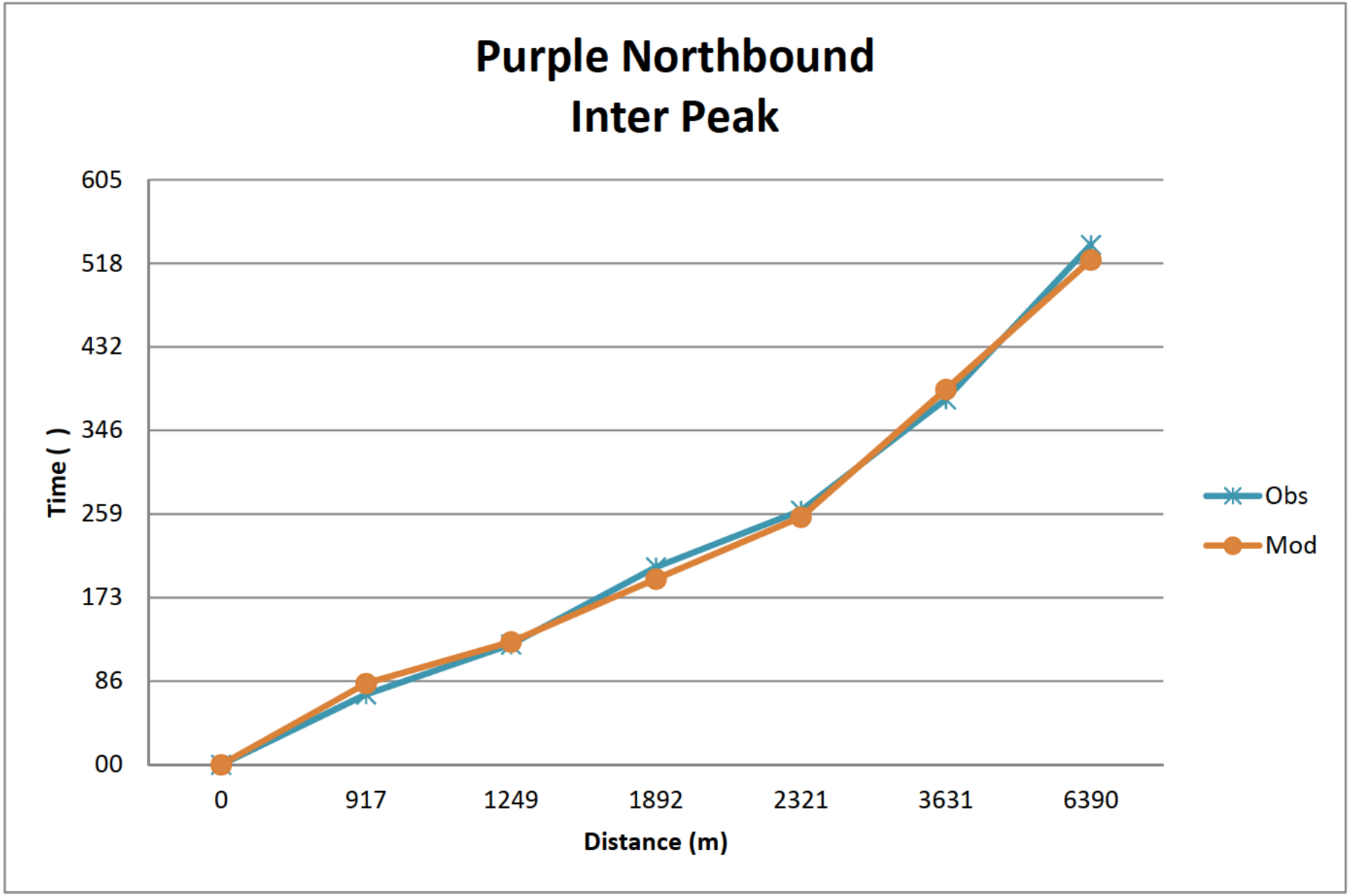
Journey Time Validation Summary

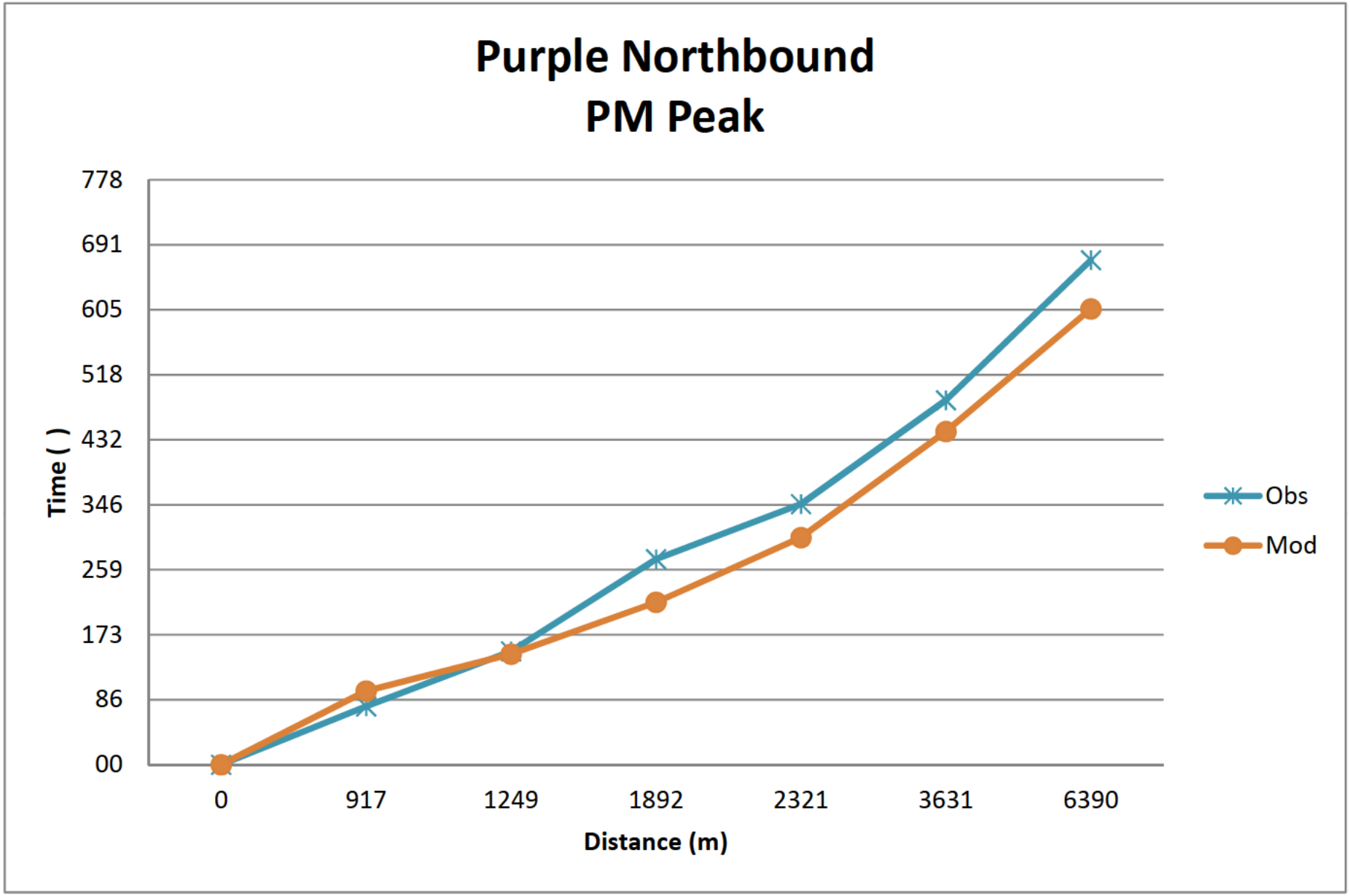
AM Peak		Average Time (s)						
Route		Observed	Modelled	AbsDiff	%Diff	Within 15%	Within 60s	Validate?
Blue	NB	723	760	37	5%	yes	yes	yes
	SB	741	806	65	9%	yes	no	yes
Green	EB	531	485	-46	-9%	yes	yes	yes
	WB	714	531	-183	-26%	no	no	no
Purple	NB	559	533	-26	-5%	yes	yes	yes
	SB	615	618	3	0%	yes	yes	yes
Yellow	CW	770	739	-31	-4%	yes	yes	yes
	Anti-CW	708	728	20	3%	yes	yes	yes
								88%

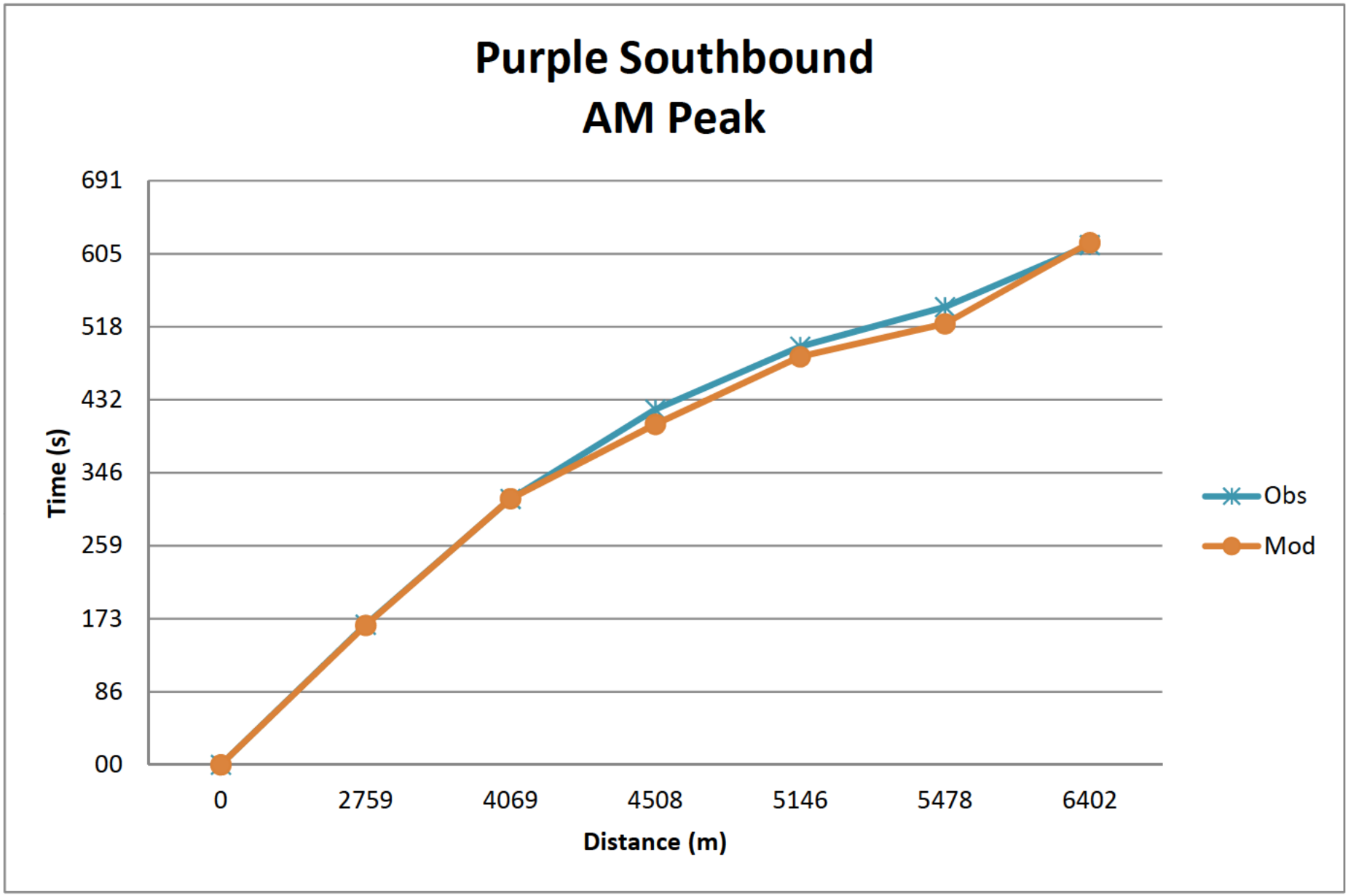
Inter Peak		Average Time (s)						
Route		Observed	Modelled	AbsDiff	%Diff	Within 15%	Within 60s	Validate?
Blue	NB	831	743	-88	-11%	yes	no	yes
	SB	877	764	-113	-13%	yes	no	yes
Green	EB	513	456	-57	-11%	yes	yes	yes
	WB	549	472	-77	-14%	yes	no	yes
Purple	NB	538	522	-16	-3%	yes	yes	yes
	SB	540	535	-5	-1%	yes	yes	yes
Yellow	CW	725	694	-31	-4%	yes	yes	yes
	Anti-CW	654	692	38	6%	yes	yes	yes
								100%

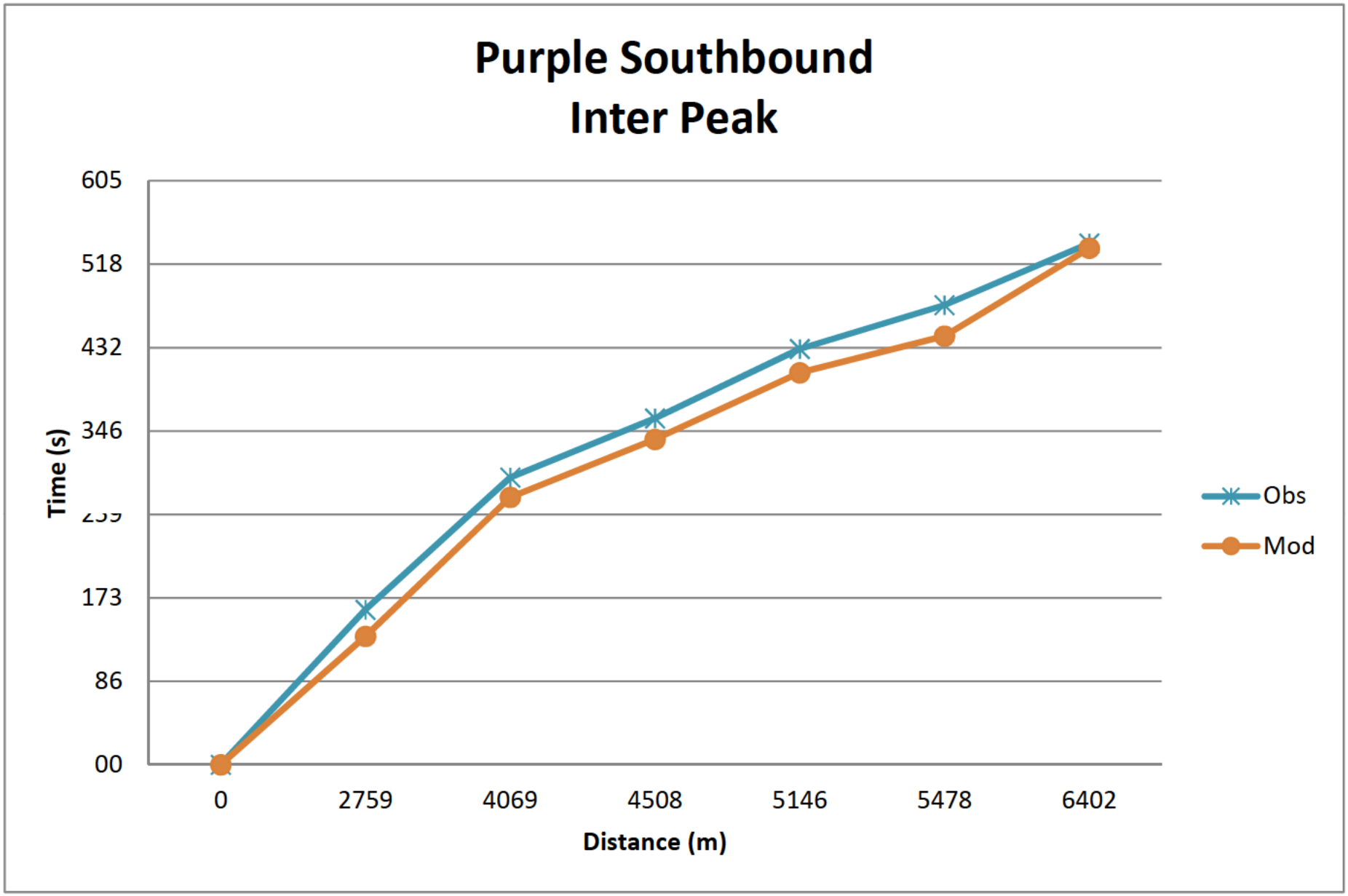
PM Peak		Average Time (s)						
Route		Observed	Modelled	AbsDiff	%Diff	Within 15%	Within 60s	Validate?
Blue	NB	803	818	15	2%	yes	yes	yes
	SB	916	808	-108	-12%	yes	no	yes
Green	EB	603	530	-73	-12%	yes	no	yes
	WB	707	563	-144	-20%	no	no	no
Purple	NB	671	606	-65	-10%	yes	no	yes
	SB	644	581	-63	-10%	yes	no	yes
Yellow	CW	763	810	47	6%	yes	yes	yes
	Anti-CW	681	771	90	13%	yes	no	yes
								88%

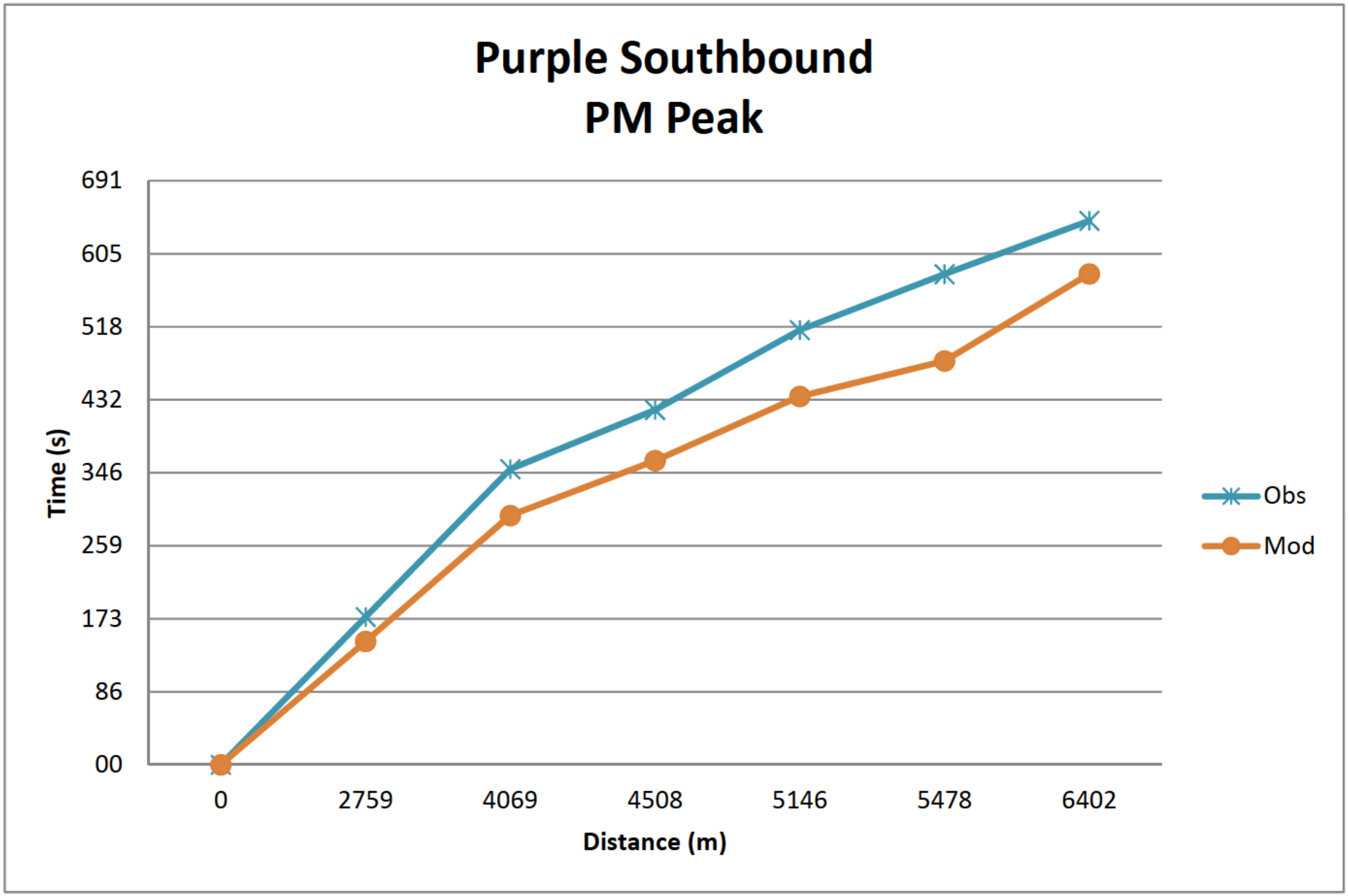

Purple Northbound
AM Peak
605
518
432
346
259
173
86
00
Time ( )
0
917
1249
1892
2321
3631
6390
Distance (m)
Obs
Mod

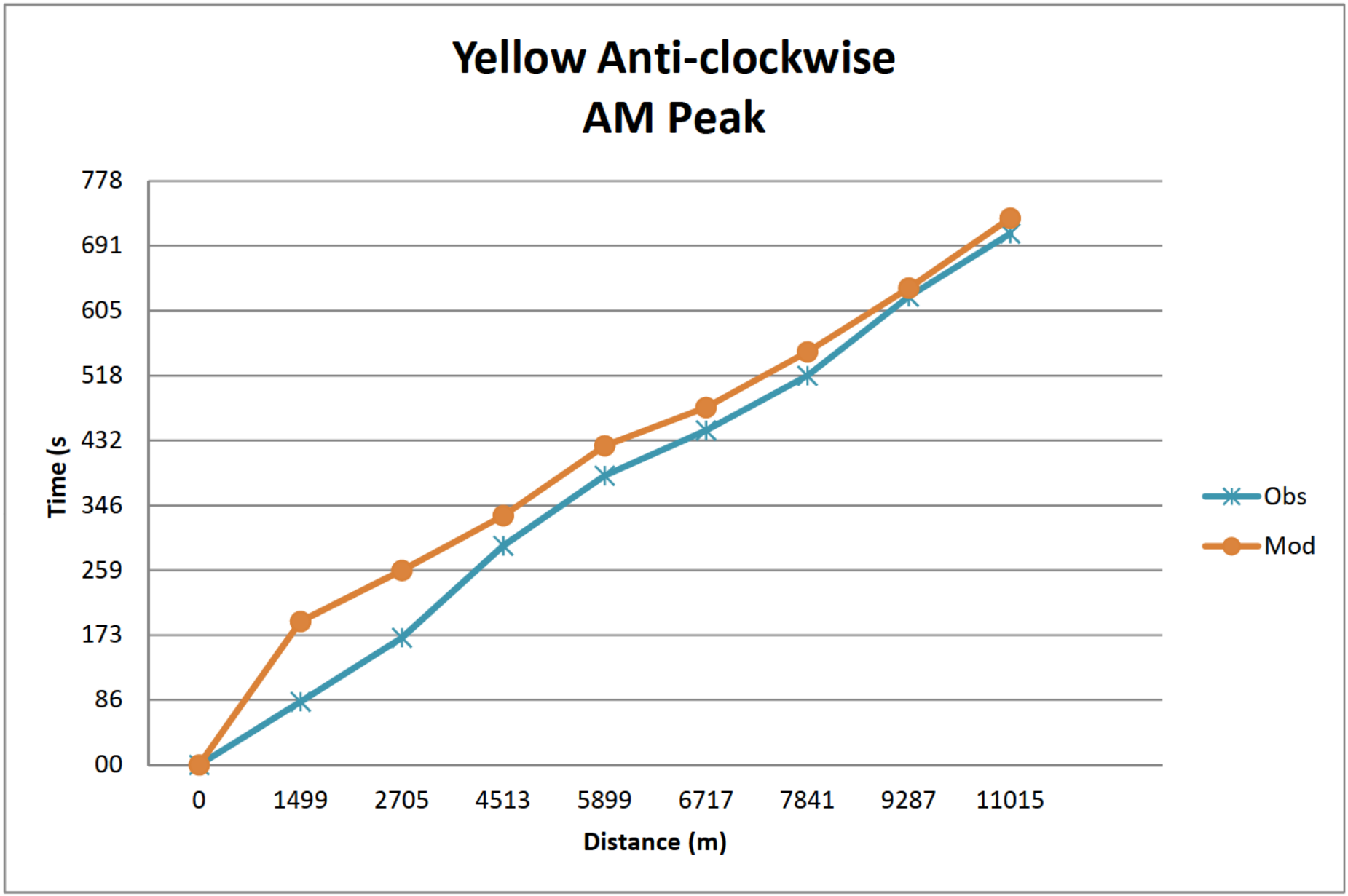

Purple Northbound
Inter Peak
605
518
432
346
259
173
86
00
Time ( )
0
917
1249
1892
2321
3631
6390
Distance (m)
Obs
Mod

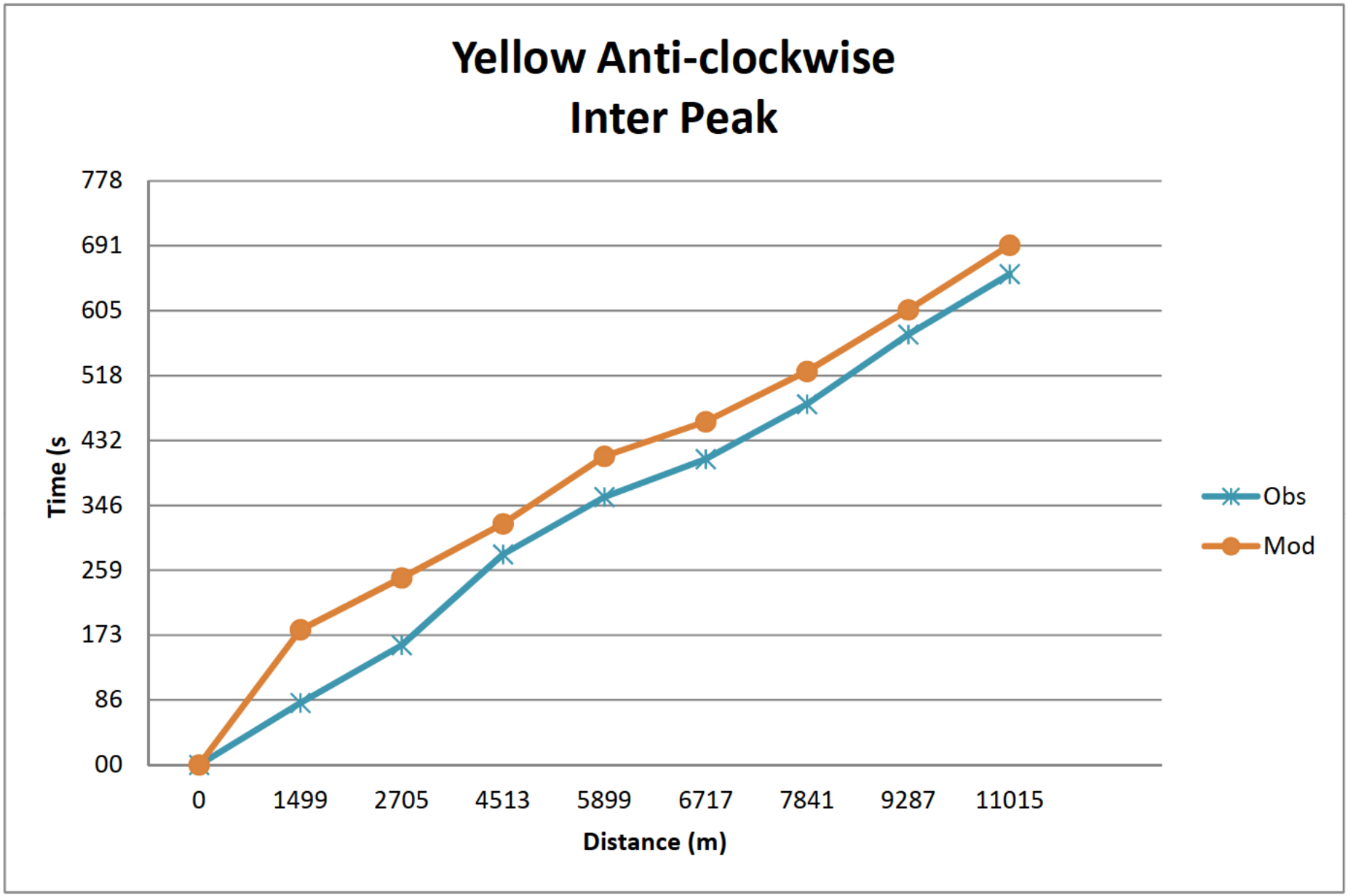

Purple Northbound
PM Peak
778
691
605
518
432
346
259
173
86
00
Time ( )
0
917
1249
1892
2321
3631
6390
Distance (m)
Obs
Mod

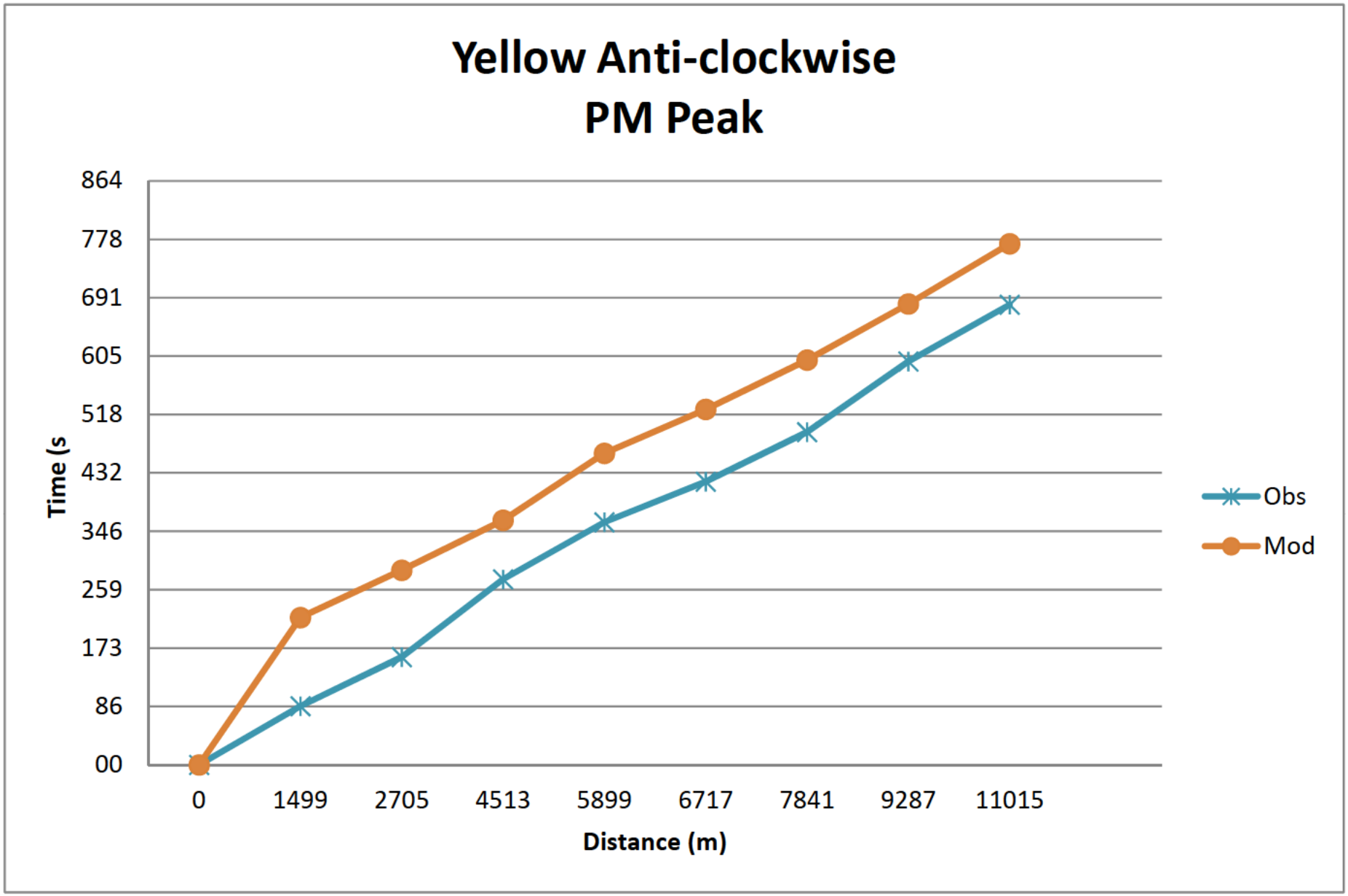

Purple Southbound
AM Peak
691
605
518
432
346
259
173
86
00
Time (s)
0
2759
4069
4508
5146
5478
6402
Distance (m)
Obs
Mod

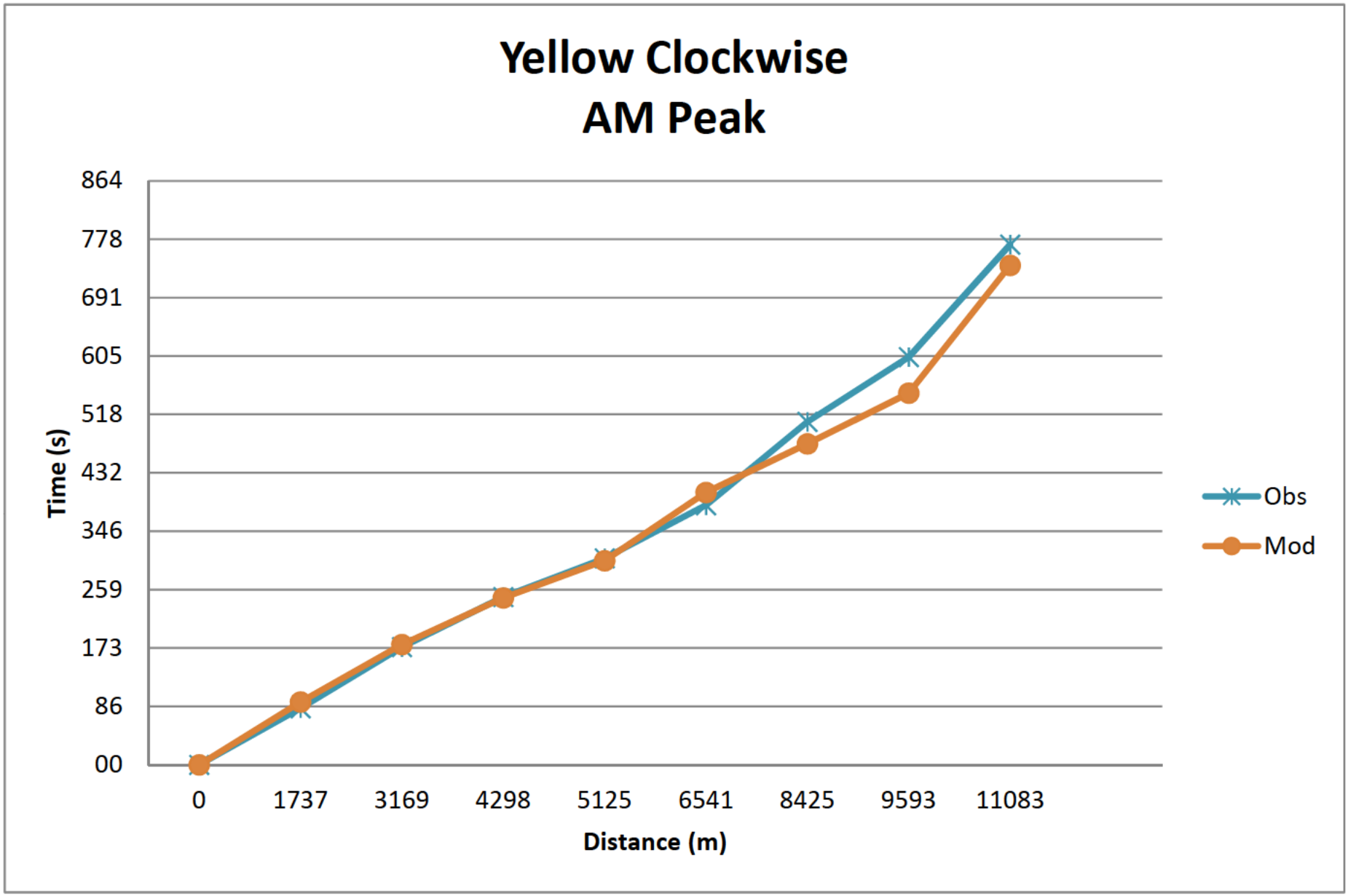

Purple Southbound
Inter Peak
605
518
432
346
259
173
86
00
Time (s)
0
2759
4069
4508
5146
5478
6402
Distance (m)
Obs
Mod

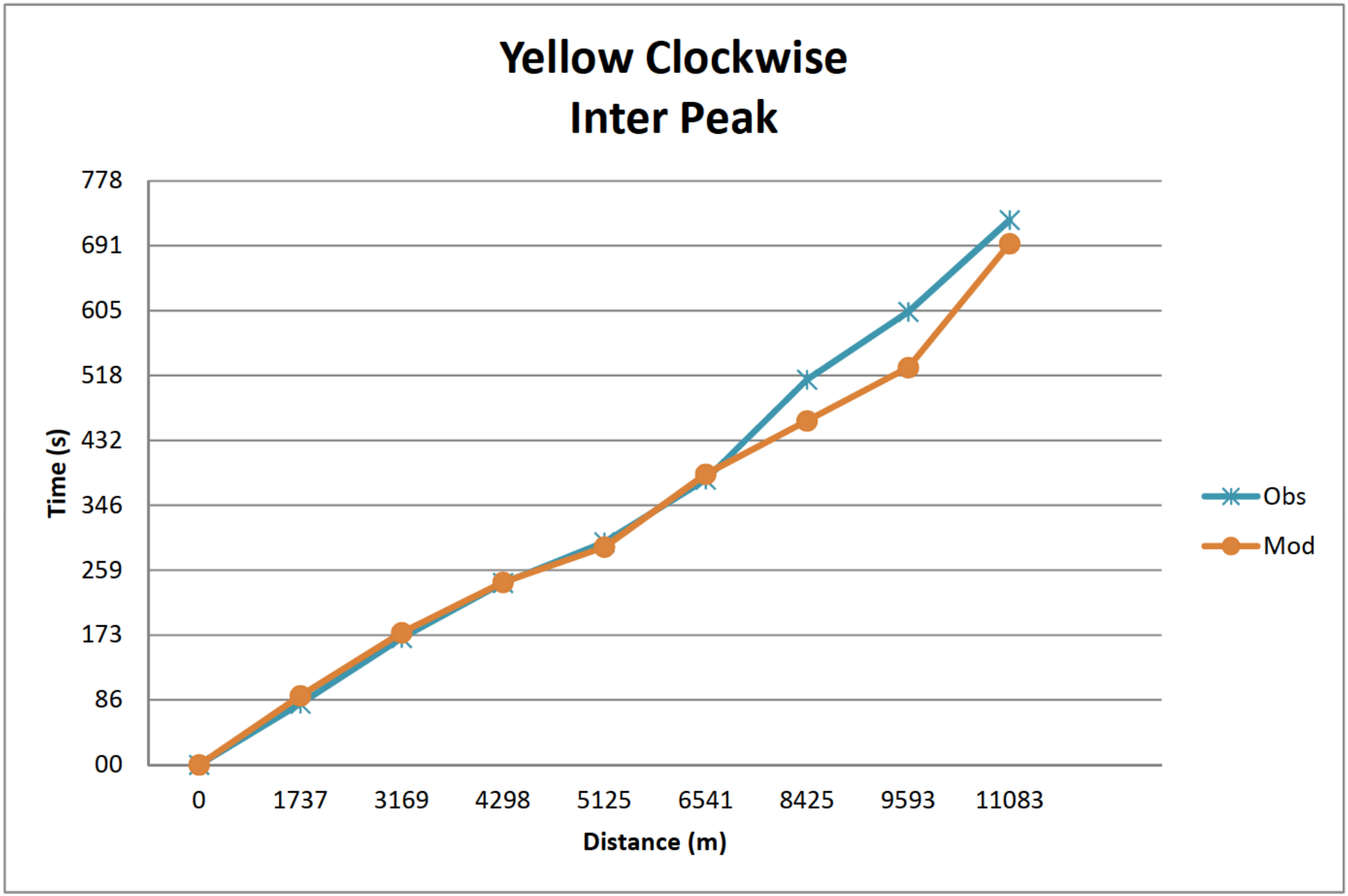

Purple Southbound
PM Peak
691
605
518
432
346
259
173
86
00
Time (s)
0
2759
4069
4508
5146
5478
6402
Distance (m)
Obs
Mod

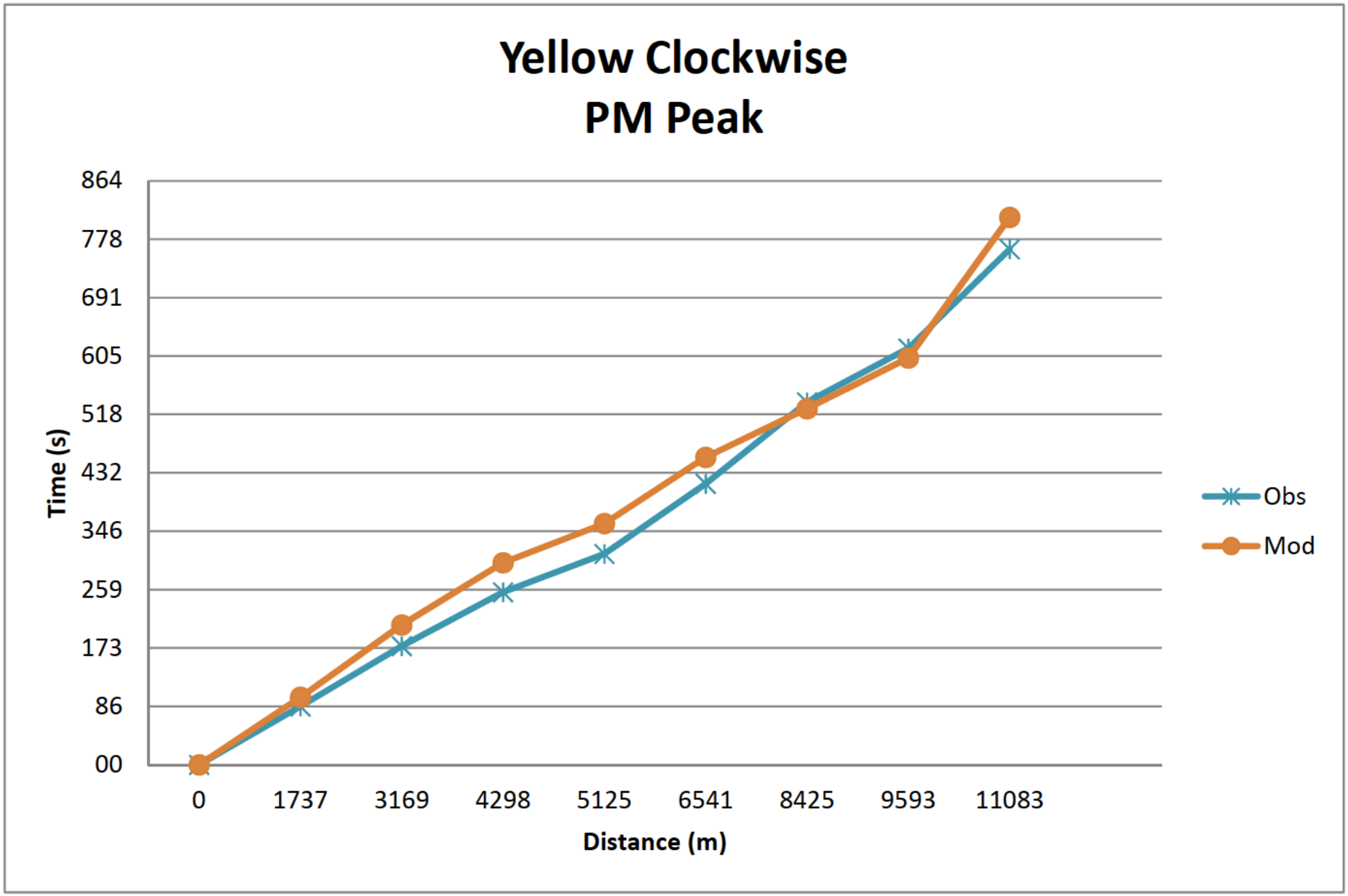

Yellow Anti-clockwise
AM Peak
778
691
605
518
432
346
259
173
86
00
Time (s
0
1499
2705
4513
5899
6717
7841
9287
11015
Distance (m)
Obs
Mod


Yellow Anti-clockwise
Inter Peak
778
691
605
518
432
346
259
173
86
00
Time (s
0
1499
2705
4513
5899
6717
7841
9287
11015
Distance (m)
Obs
Mod


Yellow Anti-clockwise
PM Peak
Time (s
864
778
691
605
518
432
346
259
173
86
00
0
1499
2705
4513
5899
6717
7841
9287
11015
Distance (m)
Obs
Mod


Yellow Clockwise
AM Peak
Time (s)
864
778
691
605
518
432
346
259
173
86
00
0
1737
3169
4298
5125
6541
8425
9593
11083
Distance (m)
Obs
Mod


Yellow Clockwise
Inter Peak
778
691
605
518
432
346
259
173
86
00
Time (s)
0
1737
3169
4298
5125
6541
8425
9593
11083
Distance (m)
Obs
Mod


Yellow Clockwise
PM Peak
Time (s)
864
778
691
605
518
432
346
259
173
86
00
0
1737
3169
4298
5125
6541
8425
9593
11083
Distance (m)
Obs
Mod

WYG Transport Planning

Oxfordshire County Council

Heyford Park Settlements LP

Bicester Transport Model

Heyford Park Model Update

Addendum to the Local Model Validation Report

WYG
Executive Park
Avalon Way
Anstey
Leicester
LE7 7GR

RT099211-5-001
Issue 3

August 2018
Copyright © WYG EPT Ltd 2018

REPORT CONTROL

Document:	Addendum to the Local Model Validation Report
Project:	Bicester Transport Model: Heyford Park Update
Client:	Oxfordshire County Council
Job Number:	A099211-5
File Origin:	N:\Projects\A099211-5 Upper Heyford Bicester\reports\RT099211-5-001 LMVR_Addendum_issue3.docx

Document Checking:

Primary Author	[redacted]	Initialled:	[redacted]
Contributor		Initialled:	
Review By		Initialled:	

Issue	Date	Status	Checked for Issue
1	03-07-2018	Draft	
2	10-07-2018	Draft	
3	07-08-2018	Final	[redacted]

Contents

1	INTRODUCTION	6
2	DATA SOURCES	8
3	TRAFFIC MODEL UPDATE	11
4	MODEL ASSIGNMENT	14
5	MODEL CALIBRATION AND VALIDATION	20
6	REALISM TESTING	31
7	SUMMARY AND CONCLUSION	34

Tables

Table 1 – ATC Locations 8

Table 2 – CTC Locations 9

Table 3 – VDM Internal Highway Assignment Convergence Statistics 15

Table 4 - Matrix Estimation: Matrix Totals 16

Table 5 – Significance of Matrix Estimation Changes Criteria 17

Table 6 – Matrix Estimation Trip Length Distribution Statistics 18

Table 7 – Matrix Estimation Sector to Sector Percentage Differences 18

Table 8 - Peak Period Convergence Statistics 21

Table 9 - Trip Matrix Validation 22

Table 10 – Flow Validation Criteria and Acceptability Guidelines 22

Table 11 – Turning Flow Calibration Results 23

Table 12 – Car Link Flow Calibration Results 24

Table 13 – Total Vehicle Link Flow Calibration Results 24

Table 14 – Car Link Flow Validation Results 25

Table 15 - Total Vehicle Link Flow Validation Results 25

Table 16 – Heyford Park Link Data Total Vehicle Validation Results 26

Table 17 – Turning Count Validation Results 26

Table 18 - Summary Journey Time Validation Results – AM Peak 27

Table 19 - Summary Journey Time Validation Results – Inter Peak 28

Table 20 - Summary Journey Time Validation Results – PM Peak 29

Table 21 – Car Fuel Cost Elasticities 32

Table 22 – Car Journey Time Elasticities 33

Figures

Figure 1 – Journey Time Routes

Figure 2 – Study Area

Figure 3 – Zone Boundary Plan

Figure 4 – Cordon and Screenline Location

Appendices

Appendix A – Transport Survey Data Locations

Appendix B – Matrix Estimation Analysis

Appendix C – Cordon and Screenline Data

Appendix D – Turn Count Calibration

Appendix E – Link Count Calibration

Appendix F – Link Flow Validation

Appendix G – Turning Count Validation

Appendix H – Journey Time Validation

Appendix I – Select Link Analysis

1 INTRODUCTION

1.1 BACKGROUND

1.1.1 Bicester is a historic market town located within Cherwell District, Oxfordshire located close to the strategic road network where the M40 meets the A41 and A34 and with good rail links to Oxford, London and beyond.

1.1.2 The Cherwell Local Plan identifies Bicester and Banbury as key locations for future growth and as such, there will be a significant increase in housing and employment in Bicester throughout the Local Plan period. The impact of the proposed developments on the highway infrastructure was evaluated in order to develop suitable mitigation measures as part of the Local Plan process.

1.1.3 The Bicester Transport model has been updated to a Variable Demand model and validated for a 2016 base year. It complies with modelling guidance and protocols outlined in the Design Manual for Roads and Bridges (DMRB) and with the Department for Transport (DfT) WebTAG guidance on modelling. Details of model validation are given in the Local Model Validation Report (RT099211-001 LMVR_Issue2 March 2017).

1.1.4 Future year forecasts of traffic conditions have been produced for 2021, 2026 and 2031 in line with the Cherwell Local Plan forecasts. This includes testing of proposed highways and development schemes in order to assess their comparative viability and to aid economic assessment. Details of the forecasting process are given in the Future Year Forecasting Report (RT099211-002 FYFR_Issue2 April 2017).

1.1.5 Following the initial model validation and forecasting work, it was found that evaluation of the impact of the proposed Heyford Park development traffic flows as part of the Middleton Stoney Study was required. Although the Bicester Transport Model covers Upper Heyford and the surrounding area it is on the periphery of the modelled network and as such, modelling was to a lower level of detail than included for Bicester itself.

1.1.6 In order to determine whether the model represented vehicle trips with sufficient accuracy in the area, additional count data has been supplied. Comparison was then made between the observed and modelled flows. This concluded that the model did not represent the area of interest in enough detail and as such, did not reproduce flows with enough accuracy on which to base the Middleton Stone Study. Therefore, model update is required to provide a more suitable base for option testing within the Upper Heyford/Middleton Stoney area.

1.1.7 This addendum report details the update process to the 2016 Base model and the level of validation achieved. It does not reproduce the model building information provided in the LMVR. For full details of the model set up, please refer to the LMVR.

2 Data Sources

2.1.1 Traffic survey data was collected in 2016 to validate the Bicester Transport Model. Details of this data is given in the LMVR.

2.1.2 Additional data has been provided for:

- Link Counts;
- Turning Movements; and
- Journey time data.

2.1.3 The section outlines the additional data received. Locations of the Surveys are given in **Appendix A**. Due to the volume of data, survey data as received has not been included but may be available on request.

2.2 AUTOMATIC TRAFFIC COUNTS

2.2.1 Automatic Traffic Counts (ATC) were carried out at the locations given in **Table 1**.

Site No:	Site Title	Date:
009	B430 North of Weston on the Green	01/01/2017-01/01/2018
032	A4095 West of B430	01/01/2017-01/01/2018
051	B4030 West of Middleton Stoney	01/01/2017-01/01/2018
141	B4030 West of A4095	01/01/2017-01/01/2018
142	A4095 East of B430	01/01/2017-01/01/2018
170	B430 South of B4030	01/01/2017-01/01/2018
206	B4030 Lower Heyford	01/01/2017-01/01/2018
207	A4095 Gibralter	01/01/2017-01/01/2018
218	B430 South of M40 Ardley	01/01/2017-01/01/2018
348	Bicester, Bucknell Road West of Lords Lane	01/01/2017-01/01/2018
349	A4095 North of Chesterton	01/01/2017-01/01/2018
S1	Camp Road	31/10/2016-10/11/2016
S2	B430 Ardley Road	01/11/2016-20/11/2016
S3	A4260 Banbury Road	31/10/2016-10/11/2016
S4	Ardley Road	31/10/2016-10/11/2016

Table 1 – ATC Locations

2.2.2 No data was available for S2 B430 Ardley Road the period 3rd to 10th November.

2.2.3 Weekday average data for the AM and PM peak periods were initially used. However, on full interrogation of the data it was determined that the Friday flows for the peak periods

(particularly the AM peak) were inconsistent with the Monday to Thursday data. As such, where available, average Monday to Thursday data has been used.

2.2.4 Data collected in 2017 has been factored to 2016 using Department for Transport National Transport Model growth factors for the South East region.

2.3 CLASSIFIED TURNING COUNTS

2.3.1 Classified Turning Counts were carried out for AM and PM periods at 21 locations. The surveys were carried out for the dates given in **Table 2** below:

Site No:	Site Title	Date:
1	Chilgrove Drive / Minor Road / Camp Road	25/06/2013
2 (a, b, c)	M40 Junction 10/A43/Services/ B430 Ardley Roundabout	03/11/2016
3	A43/ B4100	03/11/2016
4a	B430/ Northampton Rd Mini Roundabout	03/11/2016
4b	B430/ Oxford Road T-Junction	03/11/2016
5	Ardley Road/Camp Road	24/06/2014
6	B430 Oxford Rd/Ardley Rd/B4030 Heyford Rd Junction	03/11/2016
7	A 4095/ B430 Oxford Road	03/11/2016
8	A4095/ Middleton Stoney Rd Roundabout	03/11/2016
9	Lower Heyford Road/ Unnamed Road	03/11/2016
10	Camp Road / Kirtlington Road	25/06/2013
11	Somerton Road / Camp Road	25/06/2013
12	Lower Heyford Road/Port Way	24/06/2014
13	Station Rd/ Freehold St/ B4030 Crossroads	03/11/2016
14	A4260/ North Ashdon Rd/ Somerton Rd Crossroad	03/11/2016
15	A4260/ B4030 Junction	03/11/2016
16	A4260 Banbury Road	03/11/2016
17	A4260/ Church Hill/ Banbury Road	19/01/2017
18	A4260 Banbury Road	03/11/2016
19	Port Way/ A4095 Junction	03/11/2016
20	A4095 / Bletchingdon Road Junction	03/11/2016
21	B4027/ A4095 Junction	03/11/2016

Table 2 – CTC Locations

2.3.2 Counts carried out outside of 2016 have been factored to 2016 using Department for Transport National Transport Model growth factors by vehicle class and road type for the South East region.

2.4 JOURNEY TIME DATA

2.4.1 Journey time information for the Heyford Park area was supplied in shape file format from the Teletrac Navman (formally Trafficmaster) database. Data was supplied in seconds for each link for an average 2016 term time weekday for the AM, Inter and PM peak periods.

2.4.2 The data has been aggregated in GIS to provide the journey time routes shown on **Figure 1**. These routes will be used in model validation as discussed in **Section 5.9**

3 Traffic Model Update

3.1 INTRODUCTION

3.1.1 WebTAG guidance requires that analysis of a transport scheme is proportionate to the scheme being tested. Due to the volume of growth planned for Bicester and the likely size/monetary value of any schemes required to mitigate the associate transport impact, full Variable Demand Modelling would be required at the future year forecasting stage. In order to achieve this, linked demand, public transport and highway assignment models have been created as part of the Bicester Transport Model in order to satisfy current guidance.

3.2 STUDY AREA

3.2.1 The model study area has been retained as shown in **Figure 2**. This shows that the modelled highway network in the study area extends from the M40/A422 to the north, A41/A4157 to the east, A418 to the south and A44 to the west. The area also includes M40 Junctions 9 and 10, the M40, A34, A41 and A43 trunk routes and all significant local roads, for example the A4095 from London Oxford Airport through to Bicester and local roads through Middleton Stoney and Ambrosden.

3.2.2 Train lines and stations, and bus routes and stops are modelled in the study area and beyond. These represent the competing routes using other modes of transport.

3.3 SOFTWARE

3.3.1 The highway model has been updated to use the most recent version of SATWIN 11 available (Version 11.4.06D).

3.3.2 The PTV VISUM (Version 15.00-11) suite of modelling programs has been retained as only limited update to the PT model are required for this study.

3.3.3 Both suites of software are DfT approved programs for carrying out transport modelling.

3.4 ZONING SYSTEM

3.4.1 The zoning system for the Heyford Park area has been updated to reflect the 2016 level of development. The Zoning system for this area is shown on **Figure 3**.

3.5 MODEL STRUCTURE

3.5.1 The model constitutes four main parts:

i) The Public Transport (PT) Network;

ii) The Variable Demand Module (VDM);

iii) Fixed Trips Matrices; and

iv) The Highway Network.

3.5.2 The following sections detail the updates carried out for each element.

3.6 PUBLIC TRANSPORT NETWORK

3.6.1 The Public Transport (PT) network has been reviewed and updated for the revised Heyford Park zoning system. All other data was confirmed as correct for the 2016 base year.

3.6.2 Updated skim matrices of 'perceived journey time' have been produced for use in the VDM model.

3.7 VARIABLE DEMAND MODEL

3.7.1 The structural data that feeds the demand model have been updated to reflect the refined Heyford Park zoning and level of development for the 2016 base year.

3.8 FIXED TRIP MATRICES

3.8.1 Three user classes are included in the modelling as fixed trip matrices. These are cars where both trip ends are outside of the internal model area i.e. externals and Light Goods Vehicles (LGVs) and Heavy Goods Vehicles (HGVs) for both External and Internal movements.

3.8.2 Examples of external trips are longer distance trunk road trips travelling on the M40. These trip ends are not generated by the variable demand model and as such, are not directly affected by changes in the provision of say, the number of houses in Bicester although they are able to reroute within the highway assignment model. These external trips are further split into two groups, the Strategic Road Network (SRN) trips that use the M40, A34 and A43 and non-SRN trips which use the local road network.

3.8.3 The survey check of the existing model indicated a significant underestimation of through trips on the A4260. This is likely as a significant number of these trips would be external trips i.e. with both origin and destination outside of the internal modelled area centred on Bicester. Whereas other external trips have been identified using the RSI data or forecast using the M40/A34/A43 permanent counter site data, these flows could not be identified previously

from any of the data sources at the time of modelling. As such, additional trips have been included in the fixed trip matrices to represent the A4260 through movements.

3.8.4 It should be noted that the matrices have not been adjusted to represent less strategic external to external trips at the extents of the network. As such, turning movements near to the limit of the coding area are likely to be under represented in the model e.g. movements at count site 18 are likely to be low in the model as not all the external to external trips will be included in the matrices. It was considered that acknowledging this under representation for movements which will not detrimentally impact the Heyford Park assessment is more reasonable than artificially carrying out manual adjustments to the matrices where limited or no observed data for the origin/destination of the trips is available.

3.9 HIGHWAY NETWORK

3.9.1 The existing 2016 Saturn highway network has been reviewed and updated to convert the buffer modelling in the west of the model to full simulation coding. This has been carried out using the standard coding methodology adopted for the rest of the Bicester highway network and using aerial mapping information to provide details of the links and junctions. The revised simulation coding area is shown on **Figure 2**.

3.9.2 Initial model highway assignments were carried out using the existing matrices. Logic/error checking of routes and initial calibration was then carried out prior to full model assignment.

4 Model Assignment

4.1.1 The model assignment procedures consist of staged iterative loops. Initially, the public transport time skims are fed to the VDM. This then uses the input structural data and time/distance skims from the highway network to produce initial estimates of the demand matrices by user class (UC).

4.1.2 The initial estimated user class 1-3 matrices are 'stacked' with the fixed trip highway matrices (UC4-6) and then assigned within the Saturn Highway model.

4.1.3 Assignment within the highway model uses Origin-Based Assignment (OBA) (Bar Gera 2002). Full details are given in the LMVR.

4.1.4 How close to the equilibrium assignment the model reaches is defined in terms of convergence.

4.1.5 WebTAG defines two set of convergence measures: Proximity to the assignment objective (i.e. how close is it to equilibrium?) and Stability of the model outcomes between consecutive iterations. The following criteria are set:

Proximity measures:

- Delta (δ) < 0.1%; and
- %GAP (if relevant) < 0.1%.

Stability measures:

- RAAD in flows < 0.1%; and
- %Links with Flows changing by less than 1% > 98% ("P1"); and
- %Links with Costs changing by less than 1% > 98% ("P2").

4.1.6 It is recommended that, in addition to satisfying the convergence measures described above, assignment model iterations should continue until at least four successive values of 'P1' or 'P2' in excess of 98% have been obtained.

4.1.7 The converged assignments are then skimmed for time and distance and the skims fed back into the VDM iterative process. The VDM model iterations continue until convergence is reached at this outer level.

4.1.8 The convergence statistics for the last of the highway assignments is given in **Table 3** below. Please note that the SATURN suite of programs does not output P2.

Model	Assignment-Simulation Loops	Iterations	Proximity		Stability	
			δ (%)	GAP (%)	% Flows (P)	RAAD
AM	8	5	0.0009	0.00081	99.53	0.013
Inter	5	3	0.0001	0.00003	99.98	0.000
PM	8	3	0.0012	0.0011	99.80	0.004
Off	5	3	0.0001	0.00011	99.80	0.004

Table 3 – VDM Internal Highway Assignment Convergence Statistics

4.1.9 WebTAG Unit M2 Section 6.3 recommends a %GAP value of less than 0.1% with more problematic systems nearer to 0.2% for the Variable Demand Model convergence. The %Gap for the converged VDM is 0.0740% which is well within the criteria.

4.1.10 Therefore, convergence for both the internal (Highway Assignment) and outer (VDM) loops satisfies the WebTAG criteria. The results from the VDM process were passed to the matrix estimation process in order to calibrate the matrices.

4.2 MATRIX ESTIMATION

4.2.1 As model calibration could not be achieved directly using the synthetic based matrices matrix manipulation has been carried out using a matrix estimation process in order to satisfy the calibration and, later, validation criteria.

4.2.2 Matrix estimation is the adjustment of prior trip matrices so that, when assigned, the resulting flows accord more closely with counts used as constraints in the process. The methodology is discussed in more detail in the LMVR.

4.2.3 The prior and resultant matrix totals post matrix estimation (ME2) are given in **Table 4** below. The figures identified as Prior matrices represent the synthetic matrices produced as part of the VDM process.

AM	**Prior**	**Post ME2**	**Diff**	**% Diff**
Car	21908	21580	-328	-1.5%
LGV	2775	2728	-46	-1.7%
HGV	3274	3275	-0	-0.0%
IP	**Prior**	**Post ME2**	**Diff**	**% Diff**
Car	15800	15780	-20	-0.1%
LGV	1938	2014	76	3.9%
HGV	3729	3689	-40	-1.1%
PM	**Prior**	**Post ME2**	**Diff**	**% Diff**
Car	25169	25435	266	1.1%
LGV	2464	2512	48	2.0%
HGV	2358	2265	-93	-4.0%

Table 4 - Matrix Estimation: Matrix Totals

4.2.4 WebTAG requires that the changes brought about by matrix estimation should be carefully monitored by the following means:

- scatter plots of matrix zonal cell values, prior to and post matrix estimation, with regression statistics (slopes, intercepts and R^2 values);
- scatter plots of zonal trip ends, prior to and post matrix estimation, with regression statistics (slopes, intercepts and R^2 values);
- trip length distributions, prior to and post matrix estimation, with means and standard deviations; and

- sector to sector level matrices, prior to and post matrix estimation, with absolute and percentage changes.

4.2.5 The changes brought about by matrix estimation should not be significant. The criteria by which the significance of the changes brought about by matrix estimation may be judged are given in **Table 5** below.

Measure	**Significance Criteria**
Matrix zonal cell values	Slope within 0.98 and 1.02 Intercept near zero R^2 in excess of 0.95
Matrix zonal trip ends	Slope within 0.99 and 1.01 Intercept near zero R^2 in excess of 0.98
Trip length distributions	Means within 5% Standard deviations within 5%
Sector to sector level matrices	Differences within 5%

Table 5 – Significance of Matrix Estimation Changes Criteria

4.2.6 The matrix estimation statistics for matrix zonal cell values and trip ends by vehicle class are given in **Appendix B**.

4.2.7 The statistics indicate that the matrix estimation does not in general meet the criteria for slope, intercept or R^2 for any vehicle class or peak period.

4.2.8 The trip length distributions statics are given in **Table 4** below:

	AM			IP			PM		
Car	**Prior**	**Post**	**% Change**	**Prior**	**Post**	**% Change**	**Prior**	**Post**	**% Change**
Mean	33.2	33.7	1.5%	33.2	32.9	-0.9%	33.3	32.0	-4.0%
Standard Deviation	39.6	40.4	1.9%	44.1	44.4	0.6%	39.5	39.5	-0.2%
LGV	**Prior**	**Post**	**% Change**	**Prior**	**Post**	**% Change**	**Prior**	**Post**	**% Change**
Mean	52.5	48.9	-7.0%	54.2	49.1	-9.3%	51.2	47.5	-7.3%
Standard Deviation	49.0	44.7	-8.8%	50.2	47.8	-5.0%	46.1	44.2	-4.3%
HGV	**Prior**	**Post**	**% Change**	**Prior**	**Post**	**% Change**	**Prior**	**Post**	**% Change**
Mean	67.7	65.0	-3.8%	53.7	56.3	4.8%	57.0	57.8	1.3%
Standard Deviation	73.6	72.5	-1.4%	51.4	55.9	8.9%	61.1	60.7	-0.7%

Table 6 – Matrix Estimation Trip Length Distribution Statistics

4.2.9 As can be seen from **Table 6** above, the trip distribution criteria are not met in some cases with the LGV user class showing the greatest differences. The statistics are met for the Car user class in all peak periods.

4.2.10 The sector to sector percentage difference statics are given in **Table 7** below:

		AM			IP			PM		
From	**To**	**Car**	**LGV**	**HGV**	**Car**	**LGV**	**HGV**	**Car**	**LGV**	**HGV**
Internal	Internal	0%	27%	6%	7%	75%	15%	14%	40%	9%
Internal	External	30%	-9%	18%	1%	26%	1%	-2%	19%	-4%
External	Internal	-9%	18%	-15%	-7%	5%	12%	6%	-19%	36%
External	External	-7%	-7%	-0%	-3%	-7%	-3%	-8%	1%	-6%

Table 7 – Matrix Estimation Sector to Sector Percentage Differences

4.2.11 Again, **Table 7** above indicates that the sector to sector criterion is not met in most cases.

4.2.12 Scatter plots and trip length distribution plots are given in **Appendix B**.

4.2.13 The statistics discussed above are not unexpected due to the nature of the synthetic model and are consistent with previous Bicester Transport Model work. This uses trip length distributions from the 2011 census data in the matrix building process that are unlikely to fully reflect the mixed nature of the local conditions and in particular, potentially underestimates the frequency of shorter distance trips by private vehicle modes and the need to estimate the internal to internal LGV and HGV movements where limited observed data was available. The

reduction in external-internal trips and corresponding increase in internal-internal trips uses the observed classified vehicle data at the RSI sites which effectively form a cordon around Bicester. The use of this observed data and the replication of the trips through the cordon sites is therefore important to ensure that the model is accurately replicating the correct sector to sector movements.

4.2.14 It is widely accepted that the strict WebTAG thresholds for matrix estimation are intrinsically hard to achieve with an absolute model such as this one. However, the absolute form of the model design is required to forecast the very high levels of growth planned for Bicester. The ME2 statistics are a trade-off and so are considered acceptable in this case.

4.2.15 Therefore, although the matrix estimation process does not meet all the various criteria, it is considered that the post estimation matrices are fit for purpose provided the cordon calibration discussed later in this report meets WebTAG criteria.

4.2.16 These resultant matrices were then assigned to the highways networks as discussed in the next section.

5 Model Calibration and Validation

5.1 INTRODUCTION

5.1.1 Model calibration and validation is the method of comparing the modelled network with the observed conditions in order to form an opinion of how well the one represents the other. DfT WebTAG guidance (Tag Unit M3.1: Highways Assignment Modelling) sets out criteria against which models are compared which can be used as acceptability guidelines. Calibration involves the adjustment of the transport model to match observed data whereas data used for validation purposes are independent of those used for calibration.

5.1.2 The criteria are aggregated into five sections namely:

- Assignment Convergence
- Trip Matrix Validation
- Assignment Calibration
- Link Flow Validation
- Journey Time Validation

Each of these is addressed below.

5.2 ASSIGNMENT CONVERGENCE

5.2.1 The model was 'run' with the appropriate matrix and network data files for each time period. The number of assignment loops, which assess all potential O/D paths, simulation loops, which assess each O/D path and calculates speeds and delays, and the number of assignment-simulation loops, which combines the first two processes, can all be greater than 1 before an acceptable equilibrium state is achieved. The following paragraphs provide an analysis of relevant convergence criteria.

5.2.2 As discussed previously, WebTAG sets out the assignment convergence criteria required to ensure a stable model. **Table 8** below presents the convergence statistics from the three peak period models.

Model	Assignment-Simulation Loops	Iterations	Proximity		Stability	
			δ (%)	GAP (%)	% Flows (P)	RAAD
AM	8	5	0.0037	0.0036	98.9	0.02
Inter	5	3	0.0001	0.0000	100.0	0.00
PM	12	5	0.0011	0.0012	99.4	0.02

Table 8 - Peak Period Convergence Statistics

5.2.3 The convergence statistics presented above indicate that all three models converge well within accepted limits.

5.3 TRIP MATRIX VALIDATION

5.3.1 Trip matrix validation is assessed by comparing the percentage differences between modelled flows and counts at screenline level. The criterion and acceptability guideline for screenline flows is that all or nearly all screenlines should show differences between modelled and observed flows of less than 5%.

5.3.2 Trip Matrix calibration and validation were assessed here using a cordon around Bicester for calibration and a north/south screenline for validation. The Cordon and Screenline locations are shown on **Figure 4**.

5.3.3 The cordon consists of the road side interview sites using the classified turning count link totals. Please note that this does not form a 'water tight' cordon but does cover all of the significant links.

5.3.4 The screenline uses the ATC counts which were not classified. The screenline runs northeast-northwest along the railway line capturing the main north-south movements. Note that the Banbury Road site has been excluded from this assessment as investigation of this count indicated it was not consistent with the surrounding counts which indicated a problem with this location. As such, the screenline is not continuous but is still considered a good indicator for trip matrix validation.

5.3.5 **Table 9** gives the % difference for modelled and observed data with further details given in **Appendix C**.

Cordon	Inbound	Outbound
AM	-1.8%	-6.7%
IP	-0.9%	-3.8%
PM	-6.2%	-5.5%
Screenline	**Northbound**	**Southbound**
AM	-4.6%	-0.7%
IP	-8.4%	-1.4%
PM	-3.6%	-8.0%

Table 9 - Trip Matrix Validation

5.3.6 As can be seen from **Table 9** above, the cordon comparison is within 5% for the AM and Inter peak inbound and for the Interpeak outbound. The AM outbound and PM peak in both directions are outside of the criteria and indicates slightly lower vehicles travelling into/through Bicester in these cases.

5.3.7 The screenline comparison compares well but with two of the six over the 5% criteria. Both of these are approximately 8% lower than the observed movements and indicates that the matrix is likely to be lower than the observed for north-south movements within Bicester.

5.4 LINK FLOW AND TURNING MOVEMENT CRITERIA

5.4.1 The acceptability guidelines for calibration and validation are set out in DfT WebTAG Unit M3.1 and are summarised in **Table 10** below:

Criteria	Description of Criteria	Acceptability Guideline
1	Individual flows within 100 veh/h of counts for flows less than 700 veh/h	>85% of cases
	Individual flows within 15% of counts for flows from 700 to 2,700 veh/h	>85% of cases
	Individual flows within 400 veh/h of counts for flows more than 2700 veh/h	>85% of cases
2	GEH < 5 for individual flows	>85% of cases

Table 10 – Flow Validation Criteria and Acceptability Guidelines

5.4.2 The following notes are referenced to the above table in WebTAG:

- the above criteria should be applied to both link flows and turning movements;
- the acceptability guideline should be applied to link flows but may be difficult to achieve for turning movements;

- the comparisons should be presented for cars and all vehicles but not for light and other goods vehicles unless sufficiently accurate link counts have been obtained;
- the comparisons should be presented separately for each modelled period; and
- it is recommended that comparisons using both measures are reported in the model validation report.

5.4.3 The GEH (Geoffrey E. Havers) error statistic has been used to compare the observed and modelled flows. It is defined as:

$$\sqrt{\left[\frac{(Y - X)^2}{0.5(Y + X)}\right]}$$

where X = observed flow
Y = modelled flow

5.5 TURNING COUNT CALIBRATION

5.5.1 As discussed previously, where available, observed turning movements were included in the matrix estimation data set in order to produce the most accurate matrices possible with the available data. The assigned modelled flows have then been compared against the turning movement data set for calibration. The turning movement calibration results are presented in detail in **Appendix D** and summarised in **Table 11** below:

Turn Calibration	Count	Cars		Total Vehicles			
		< 5 GEH	% < 5.0 GEH	Count	< 5 GEH	% < 5.0 GEH	Meets Criteria?
AM Peak	423	385	91%	423	384	91%	Yes
Inter Peak	262	260	99%	262	255	97%	Yes
PM Peak	423	383	91%	423	380	90%	Yes

Table 11 – Turning Flow Calibration Results

5.5.2 Please note that additional turning counts were available and included in the data set for the AM and PM peak period compared to the Inter peak period.

5.5.3 As can be seen from **Table 11**, all counts achieve a high level of calibration for all three peak periods. Overall the results demonstrate very good model turning movement calibration for all three time periods.

5.6 LINK FLOW CALIBRATION

5.6.1 In order to assess the link flow calibration, the turning movements from the calibration data set were summed to provide approach links at each junction. This was carried out as a small difference in each turn from a particular link might not be outside the 5 GEH level but the sum of the differences for all possible turning movements from a link might place the link as a whole outside of the criteria. Further, a number of link flows were used in the calibration process that were not used in the matrix estimation process by turn, for example, the link flows on the strategic road network. The model has been calibrated against 172 total vehicle counts in the AM and PM peak periods and 166 counts in the Inter peak based on the availability of survey data.

5.6.2 The link flow calibration results are presented in detail in **Appendix E** and summarised in **Tables 12 and 13** below for Cars and Total Vehicles respectively:

	Car			
Link Calibration	**Count**	**< 5 GEH**	**% < 5.0 GEH**	**GEH Criteria?**
AM Peak	158	154	97%	Yes
Inter Peak	152	151	99%	Yes
PM Peak	158	137	87%	Yes

Table 12 – Car Link Flow Calibration Results

	Total Vehicle						
Link Calibration	**Count**	**< 5 GEH**	**% < 5.0 GEH**	**Meets GEH Criteria?**	**Link Flow No.**	**Link Flow %**	**Link Flow Criteria?**
AM Peak	172	164	95%	Yes	170	99%	Yes
Inter Peak	166	163	98%	Yes	165	99%	Yes
PM Peak	172	147	85%	Yes	150	87%	Yes

Table 13 – Total Vehicle Link Flow Calibration Results

5.6.3 As can be seen from the above tables, the model calibrates well for link flows in all three peak periods.

5.7 HIGHWAY LINK FLOW VALIDATION

5.7.1 The purpose of validation is to ensure that modelled flows are compatible with observed independent transport survey data, that is, data that have not been used in the matrix building or calibration processes.

5.7.2 The model validation process has been carried out with reference to DfT WebTAG Unit M3.1 guidelines for links. Each of the three modelled time periods have been validated against independent data using the validation criteria as set out in **Table 10**. The model has been validated against 96 total vehicle counts in the AM and PM peak periods and 90 counts in the Inter peak based on the availability of survey data. This includes all of the additional link flow counts provided as part of the Heyford Park model update. These have also been assessed for the Car vehicle type in accordance with WebTAG guidance where possible. Detailed validation data for each site is presented in **Appendix F**.

5.7.3 The results are summarised in **Tables 14** and **15** below:

	Car			
Link Validation	**Count**	**< 5 GEH**	**% < 5.0 GEH**	**GEH Criteria?**
AM Peak	27	22	81%	No
Inter Peak	27	21	78%	No
PM Peak	27	21	78%	No

Table 14 – Car Link Flow Validation Results

	Total Vehicles							
Link Validation	**Count**	**< 5 GEH**	**% < 5.0 GEH**	**Meets GEH Criteria?**	**Link Flow No.**	**Link Flow %**	**Link Flow Criteria?**	**Validates?**
AM Peak	96	82	85%	Yes	85	89%	Yes	Yes
Inter Peak	90	86	96%	Yes	88	98%	Yes	Yes
PM Peak	96	89	93%	Yes	91	95%	Yes	Yes

Table 15 - Total Vehicle Link Flow Validation Results

5.7.4 **Table 14** shows link flow validation based on cars only does not meet the validation criteria. This is likely affected by the low number of counts available with data disaggregated by vehicle type and that these counts were predominantly Automatic Traffic Counter sites which cannot always reliably differentiate between cars and light goods vehicles. As such, this is not

considered to indicate a poor level of validation as long as the total vehicle counts meet the criteria and other model calibration/validation is good.

5.7.5 It can be seen from **Table 15** above that the three peak period models validate within the GEH and Link flow criteria for total vehicles. Therefore, the model is considered to be validated for link flows.

5.7.6 The newly supplied Upper Heyford link counts have been considered in isolation. Validation results for this subset of the link counts is given for total vehicles in **Table 16** below:

		GEH			Link Flow			Validates:
	Count	No. < 5 GEH	% < 5.0 GEH	Meets GEH?	No. Within	%	Meets Link Flow?	
AM Peak	30	25	83%	No	28	93%	Yes	Yes
Inter Peak	30	27	90%	Yes	29	97%	Yes	Yes
PM Peak	30	27	90%	Yes	28	93%	Yes	Yes

Table 16 – Heyford Park Link Data Total Vehicle Validation Results

5.7.7 As can be seen in **Table 16**, all peaks validate well for this data. The AM peak is slightly under the 85% criteria for GEH but validate well overall with 93% over the link flow criteria.

5.8 TURN COUNT VALIDATION

5.8.1 Although the majority of turning counts supplied as part of the Heyford Park update have been used in calibration, a small number of junctions were not used in matrix estimation. The AM and PM peak flows have been compared to the modelled flows and the results are shown in **Table 17** below with further details in **Appendix G**:

		Car			Total Vehicle		
	Count	No. < 5 GEH	% < 5.0 GEH	Meets GEH?	No. < 5 GEH	% < 5.0 GEH	Meets GEH?
AM Peak	67	59	88%	Yes	57	85%	Yes
PM Peak	67	58	87%	Yes	56	84%	No

Table 17 – Turning Count Validation Results

5.8.2 As can be seen from **Table 17**, turn validation meets the WebTAG criteria in both peaks for Cars and Total vehicles in the AM peak. The PM peak is marginally below the 85% criteria.

5.9 JOURNEY TIME VALIDATION

5.9.1 Modelled journey times have been validated against surveyed journey times for the two-way routes shown in **Appendix H**.

5.9.2 In accordance with WebTAG criteria the modelled journey times have been compared to the average observed journey times and assessed against percentage difference criteria. The journey time validation results are summarised in **Tables 18 to 20** below with detailed results provided in **Appendix H**.

AM Peak		Average Time (s)						
Route		**Obs'd**	**Model**	**Diff**	**%Diff**	**Within 15%**	**Within 60s**	**Validate?**
Blue	NB	723	784	61	8%	yes	no	yes
	SB	741	823	82	11%	yes	no	yes
Green	EB	531	499	-32	-6%	yes	yes	yes
	WB	714	539	-175	-24%	no	no	no
Purple	NB	559	530	-29	-5%	yes	yes	yes
	SB	615	623	8	1%	yes	yes	yes
Yellow	CW	770	693	-77	-10%	yes	no	yes
	Anti-CW	708	718	10	1%	yes	yes	yes
A-F	SB	540	496	-44	-8%	yes	yes	yes
F-A	NB	541	495	-46	-9%	yes	yes	yes
C-R	EB	487	464	-23	-5%	yes	yes	yes
R-C	WB	485	488	3	1%	yes	yes	yes
F-R	EB	447	412	-35	-8%	yes	yes	yes
R-F	WB	452	420	-32	-7%	yes	yes	yes
S-G (M-way)	SB	783	705	-78	-10%	yes	no	yes
G-S (M-way)	NB	472	542	70	15%	yes	no	yes
S-G (Local)	SB	647	569	-78	-12%	yes	no	yes
G-S (Local)	NB	630	582	-48	-8%	yes	yes	yes
C-S	EB	591	559	-32	-5%	yes	yes	yes
S-C	WB	606	539	-67	-11%	yes	no	yes
								95%

Table 18 - Summary Journey Time Validation Results – AM Peak

Inter Peak		Average Time (s)						
Route		Obs'd	Model	Diff	%Diff	Within 15%	Within 60s	Validate?
Blue	NB	831	764	-67	-8%	yes	no	yes
	SB	877	782	-95	-11%	yes	no	yes
Green	EB	513	483	-30	-6%	yes	yes	yes
	WB	549	484	-65	-12%	yes	no	yes
Purple	NB	538	527	-11	-2%	yes	yes	yes
	SB	540	540	0	0%	yes	yes	yes
Yellow	CW	725	670	-55	-8%	yes	yes	yes
	Anti-CW	654	669	15	2%	yes	yes	yes
A-F	SB	534	493	-41	-8%	yes	yes	yes
F-A	NB	535	493	-42	-8%	yes	yes	yes
C-R	EB	463	461	-2	0%	yes	yes	yes
R-C	WB	461	456	-5	-1%	yes	yes	yes
F-R	EB	447	411	-36	-8%	yes	yes	yes
R-F	WB	447	408	-39	-9%	yes	yes	yes
S-G (M-way)	SB	529	465	-64	-12%	yes	no	yes
G-S (M-way)	NB	522	509	-13	-2%	yes	yes	yes
S-G (Local)	SB	627	531	-96	-15%	no	no	no
G-S (Local)	NB	618	577	-41	-7%	yes	yes	yes
C-S	EB	601	554	-47	-8%	yes	yes	yes
S-C	WB	611	525	-86	-14%	yes	no	yes
								95%

Table 19 - Summary Journey Time Validation Results – Inter Peak

PM Peak		Average Time (s)						
Route		Obs'd	Model	Diff	%Diff	Within 15%	Within 60s	Validate?
Blue	NB	803	865	62	8%	yes	no	yes
	SB	916	809	-107	-12%	yes	no	yes
Green	EB	603	516	-87	-14%	yes	no	yes
	WB	707	518	-189	-27%	no	no	no
Purple	NB	671	602	-69	-10%	yes	no	yes
	SB	644	569	-75	-12%	yes	no	yes
Yellow	CW	763	708	-55	-7%	yes	yes	yes
	Anti-CW	681	697	16	2%	yes	yes	yes
A-F	SB	523	495	-28	-5%	yes	yes	yes
F-A	NB	525	499	-26	-5%	yes	yes	yes
C-R	EB	482	463	-19	-4%	yes	yes	yes
R-C	WB	476	456	-20	-4%	yes	yes	yes
F-R	EB	458	420	-38	-8%	yes	yes	yes
R-F	WB	459	413	-46	-10%	yes	yes	yes
S-G (M-way)	SB	552	525	-27	-5%	yes	yes	yes
G-S (M-way)	NB	552	642	90	16%	no	no	no
S-G (Local)	SB	630	536	-94	-15%	yes	no	yes
G-S (Local)	NB	625	620	-5	-1%	yes	yes	yes
C-S	EB	608	577	-31	-5%	yes	yes	yes
S-C	WB	612	526	-86	-14%	yes	no	yes
								90%

Table 20 - Summary Journey Time Validation Results – PM Peak

5.9.3 **Tables 18 to 20** demonstrate that the models reproduce observed journey times accurately with more than 85% within 15% or 60 seconds of the observed total journey times for all three time periods as required by WebTAG.

5.9.4 The notable exceptions are the Green route westbound in the AM and PM peak period. However, as discussed in Section 2, journey time surveys for the yellow route were conducted on a different day to the rest of the surveys. The section of the green route that does not validate is also covered by the Yellow Route but show differing observed journey times over the two survey dates. It is not therefore possible to achieve validation for both the Green and Yellow routes in the north/east bound direction and as such it is not considered to indicate a substandard model. This may also have been affected by the presence of a temporary lane closure on one of the days associated with the proposed upgrade of the A41/Oxford Road junction although it has not been possible to confirm this supposition.

5.9.5 All three peak periods show greater than 85% of journey times within the DMRB criteria of 15% of observed journey times and therefore validation to journey times is considered excellent for all three peak periods.

5.10 HEYFORD PARK MODEL DISTRIBUTION

5.10.1 Select Link Analysis (SLA) has been carried out on the zones that represent the Heyford Park existing permission development. Plots showing the SLA paths are given in **Appendix I**.

5.11 MODEL VALIDATION SUMMARY

5.11.1 Overall it is considered that given the excellent model calibration results, good link flow and turn validation and excellent journey time validation, the 2016 model accurately reflects the 2016 base year conditions.

6 REALISM TESTING

6.1 BACKGROUND

6.1.1 It is important to ensure that a variable demand model behaves 'realistically' and responds correctly to known cost changes. The model demand responses are tested by changing the various components of travel costs and times and checking that the overall demand response is appropriate.

6.1.2 Section 6 of (WebTAG) Unit M2 Variable Demand Modelling (Jan 2014) details the required realism testing of transport models. The two realism tests required by the guidance are the Car Fuel Cost Elasticity Test and the Car Journey Time Elasticity Test. The formula to calculate elasticity is given below.

6.1.3 Demand elasticity is calculated using the following formula:

$$e = (\log T_1 - \log T_0) / (\log C_1 - \log C_0), \qquad (1)$$

where

e = Demand Elasticity,

T_0 = Total car-kilometres (or car trips) before the change,

C_0 = Car fuel cost (or journey time cost) before the change,

T_1 = Total car-kilometres (or car trips) after the change,

C_1 = Car fuel cost (or journey time cost) after the change,

log = The natural logarithm function.

6.1.4 Realism testing is designed to demonstrate that the VDM part of the model is behaving as expected. All realism tests check the elasticity of demand in response to a change in one of the controlling parameters.

6.1.5 The realism test for car fuel cost involves artificially increasing the cost of fuel by 10% and re-running the whole transport model to convergence. If a 4% reduction in car-kilometres compared to the original model run is evident, then the elasticity of demand in response to car fuel cost is (about) -0.2.

6.1.6 The realism test for car journey time involves artificially increasing the cost of car journey time by 10% and re-running the whole transport model for a single iteration. If a 5% reduction in car trips compared to the original model run is evident, then the elasticity of demand in response to car journey time cost is (about) -0.5.

6.1.7 Empirical studies suggest that in real life the car fuel cost elasticity is roughly -0.3. The WebTAG guidance requires that the overall model response yields a car fuel cost elasticity of between -0.35 and -0.25.

6.1.8 WebTAG guidance requires that the model responses yield a car journey time elasticity of between -2.0 and 0.

6.2 CAR FUEL COST REALISM TESTING

6.2.1 The calculated car fuel cost elasticities from the model are to be compared with observed fuel cost elasticities, which have been based on research. The observed elasticities are based on revealed preference surveys implying the model should be run to convergence. The realism test has been undertaken for the base year 2016.

6.2.2 The car fuel cost realism test requires that the fuel-only part of the cost in the demand model is increased by 10%. The model is then run to convergence. The resultant change in car-kms is then used to calculate the car fuel cost elasticity.

6.2.3 **Table 21** below sets out the car fuel-cost elasticities from the realism testing of the variable demand model.

	AM	IP	PM	Whole Model
Car Fuel Cost Elasticity	-0.339	-0.241	-0.338	-0.296

Table 21 – Car Fuel Cost Elasticities

6.2.4 The overall car fuel-cost elasticity should lie between -0.35 and -0.25. As can be seen from **Table 21** above, the Inter peak period lies slightly outside of the criteria. This means this peak is slightly less responsive to changes in fuel cost. Overall, the fuel cost elasticity criterion is met for the model as a whole. The model is considered to satisfy the WebTAG guidance for fuel cost elasticities.

6.3 CAR JOURNEY TIME REALISM TESTING

6.3.1 It is also a requirement to test the car journey time elasticities to ensure they are not too high. WebTAG guidance states that the car journey time demand elasticity should be between -2 and 0. It is important to note that this demand elasticity is tested with a single iteration of the variable demand model since the underpinning research is based on stated preference surveys.

6.3.2 A 10% increase was then applied to the time cost coefficient to represent a 10% increase in journey times across the network. The demand model was then run for one iteration and the change in car trips calculated. These yielded the car journey time elasticities as presented in the table below:

Peak	Demand Elasticity
AM	-0.1205
IP	-0.0678
PM	-0.1159

Table 22 – Car Journey Time Elasticities

6.3.3 WebTAG guidance indicates that journey time elasticities should lie in the range -2.0 to 0. As can be seen from **Table 22**, the journey time elasticity of each demand segment satisfies this requirement.

6.4 CONCLUSION

6.4.1 The demand response of the model to journey time was then investigated by running the model with an increased cost coefficient for time. The elasticities were well within the acceptable maximum as given in WebTAG.

6.4.2 The demand model has passed the required WebTAG realism tests and so is considered to have responses that are realistic. Therefore the model is fit to be used for forecasting future travel demand.

7 Summary and Conclusion

7.1 SUMMARY

7.1.1 This report has detailed the updating and validation of the Bicester Transport model to a 2016 base year.

7.1.2 The model constitutes four main parts:

i) The Public Transport (PT) Network;

ii) The Variable Demand Module (VDM);

iii) Fixed Trips Matrices; and

iv) The Highway Network.

7.1.3 The VDM produces synthetic matrices for assignment. The VDM model converges both for the internal highway assignment and outer loops within the recommended Department for Transport (DfT) WebTAG criteria.

7.1.4 As model calibration could not be achieved directly using the synthetic based matrices matrix manipulation has been carried out using a matrix estimation process in order to satisfy the calibration and, later, validation criteria. Monitoring of the Matrix Estimation Changes indicated that some of the indicators were outside of the strict WebTAG criteria. However this is deemed to be a consequence of the absolute form of the model design required to forecast the very high levels of growth planned for Bicester. It is widely accepted that the Matrix Estimation criteria are difficult to achieve for absolute form models and the results are therefore considered acceptable.

7.1.5 Highway assignments using the final matrices converged within WebTAG criteria.

7.1.6 Turning flow calibration and car link flow calibration results met WebTAG criteria.

7.1.7 Although link flow validation results were less that recommended for the Car user class in isolation this is accepted as likely affected by the low number of counts available with data disaggregated by vehicle type and that these counts were predominantly Automatic Traffic Counter sites which cannot always reliably differentiate between cars and light goods vehicles and does not indicate a poor level of validation.

7.1.8 Total vehicle link flow validation results were within WebTAG criteria.

7.1.9 Turn count validation results were within WebTAG criteria.

7.1.10 Modelled journey times validate well against independent observed data, meeting WebTAG criteria.

7.1.11 The realism testing has produced the appropriate demand response parameters required during the demand forecasting according to the WebTAG guidelines.

7.1.12 As a result of this base year model validation and realism testing it is considered that the Bicester transport model represents a robust basis for use in future year transport forecasting and for the purpose of operational, economic and environmental assessments.

Appendix A – Transport Survey Data Locations

Key:

- 1 Site Access Junctions
- 2a M40 Junction 10 Southbound Off-slip/A43 Roundabout
- 2b M40 Junction 10 Southbound On-slip/A43/Services
- 2c M40 Junction 10 Northbound slips/A43/B430 (Ardley) Roundabout
- 3 A43 / B4100 Roundabout
- 4a B430 / Northampton Road Mini-Roundabout
- 4b B430 / Oxford Road T-Junction
- 5 B430 / Unnamed Road Junction
- 6 B430 / B4030 (Middleton Stoney) Junction
- 7 A4095 / B430 Oxford Road Staggered Crossroads
- 8 A4095 / Middleton Stoney Road Roundabout
- 9 B4030 Lower Heyford Road/Unnamed Road T-Junction
- 10 Camp Road / Kirtlington Road Junction
- 11 Station Road / Camp Road Junction
- 12 B4030 / Portway Junction
- 13 Station Road / Freehold Street / B4030 Crossroads
- 14 A4260 / Somerton Road Crossroads
- 15 A4260 / B4030 (Hopcrofts Holt) Junction
- 16 A4260 / Unnamed Road Junction
- 17 A4260 Banbury Road Staggered Crossroads
- 18 A4260 / B4027 Junction
- 19 Port Way / A4095 Junction
- 20 A4095 / Bletchingdon Road Junction
- 21 B4027 / A4095 Junction

ATCs
1 Camp Road
2 B430 - Ardley Road
3 - A4260 Banbury Road
4 Ardley Road

pba peterbrett
Offices throughout the UK and Europe
www.peterbrett.com

Client
DORCHESTER GROUP

Contains Ordnance Survey data © Crown copyright and database right 2017.

HEYFORD PARK
TN001 - MODELLING SCOPING NOTE

GEOGRAPHIC SCOPE / JUNCTIONS TO BE ASSESSED

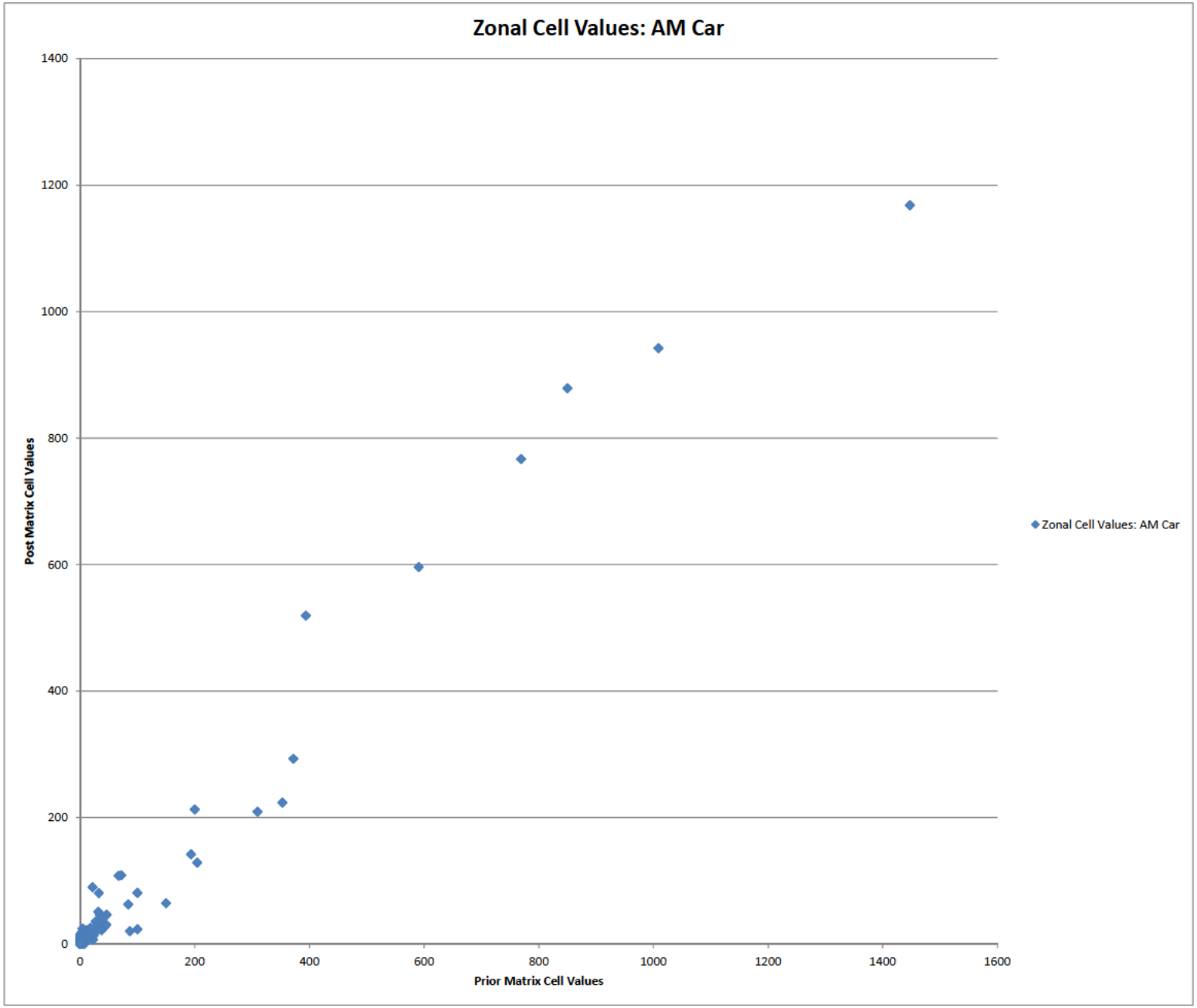
Mark	Revision	Drawn	Date	Chkd
A	Junction Descriptions Updated	JDS	12/01/18	PR

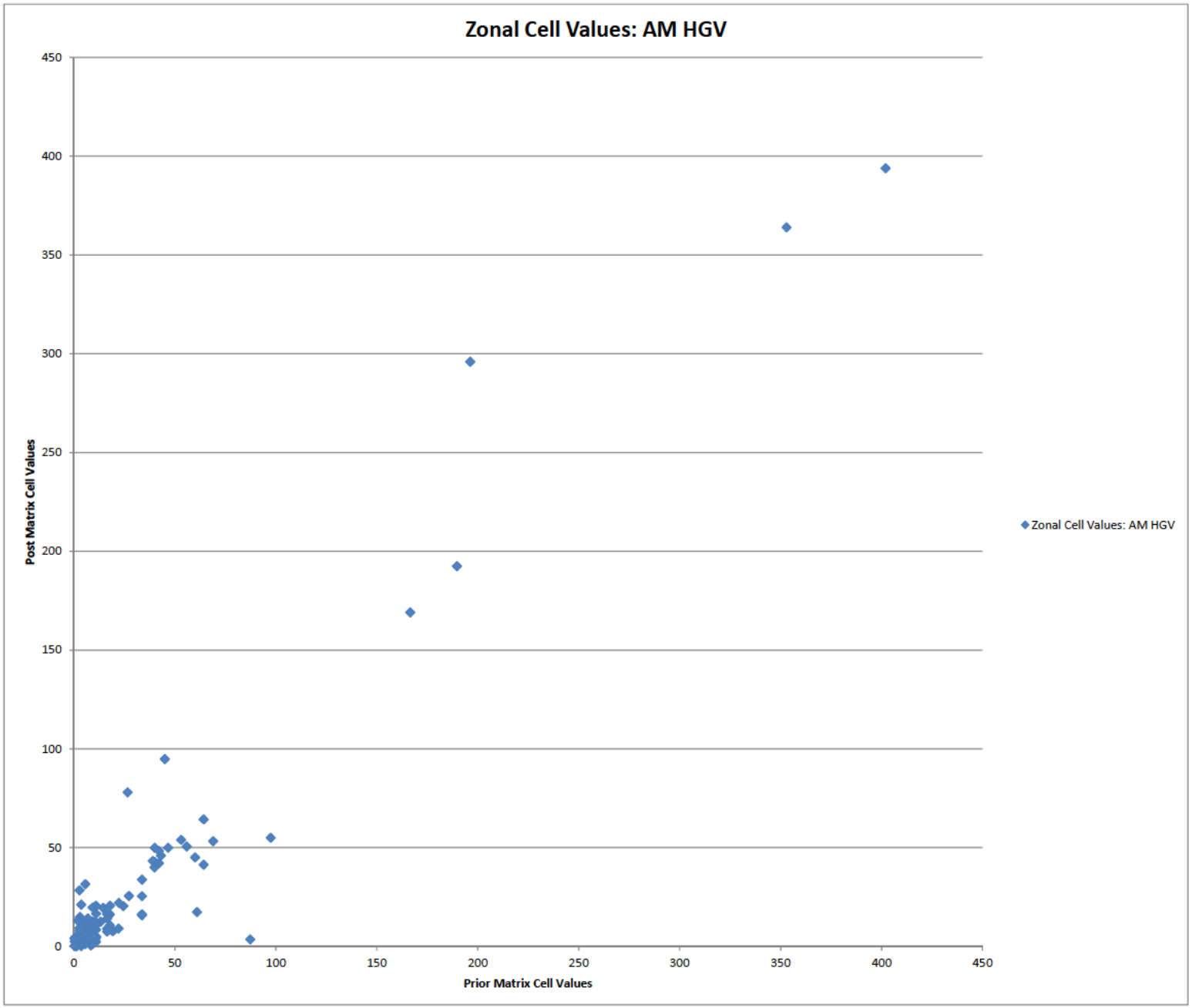
Date	23/01/2017
Scale	A3 - N.T.S
Drawn by	AE
Checked by	PR

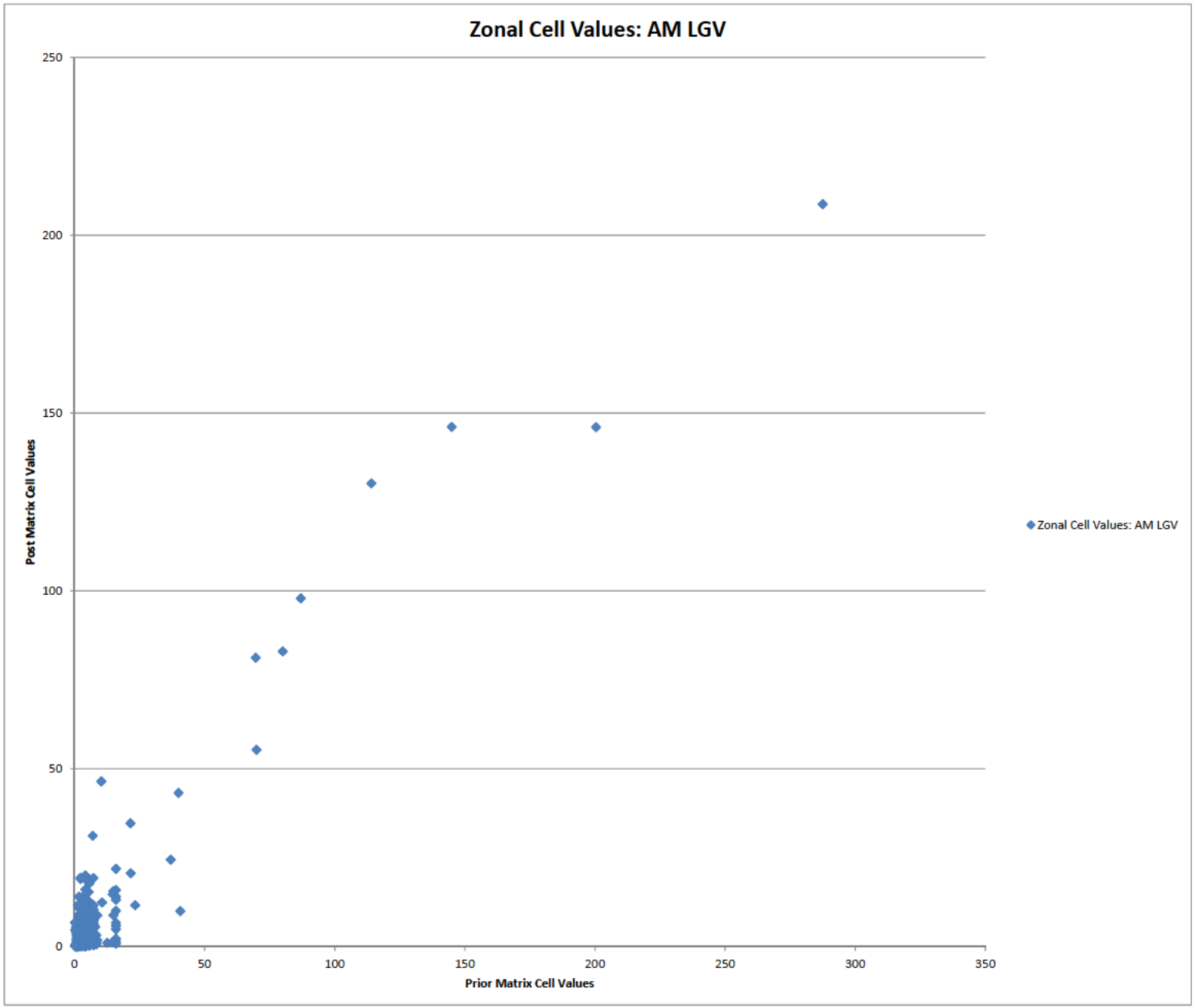
FIGURE TN001-4 A

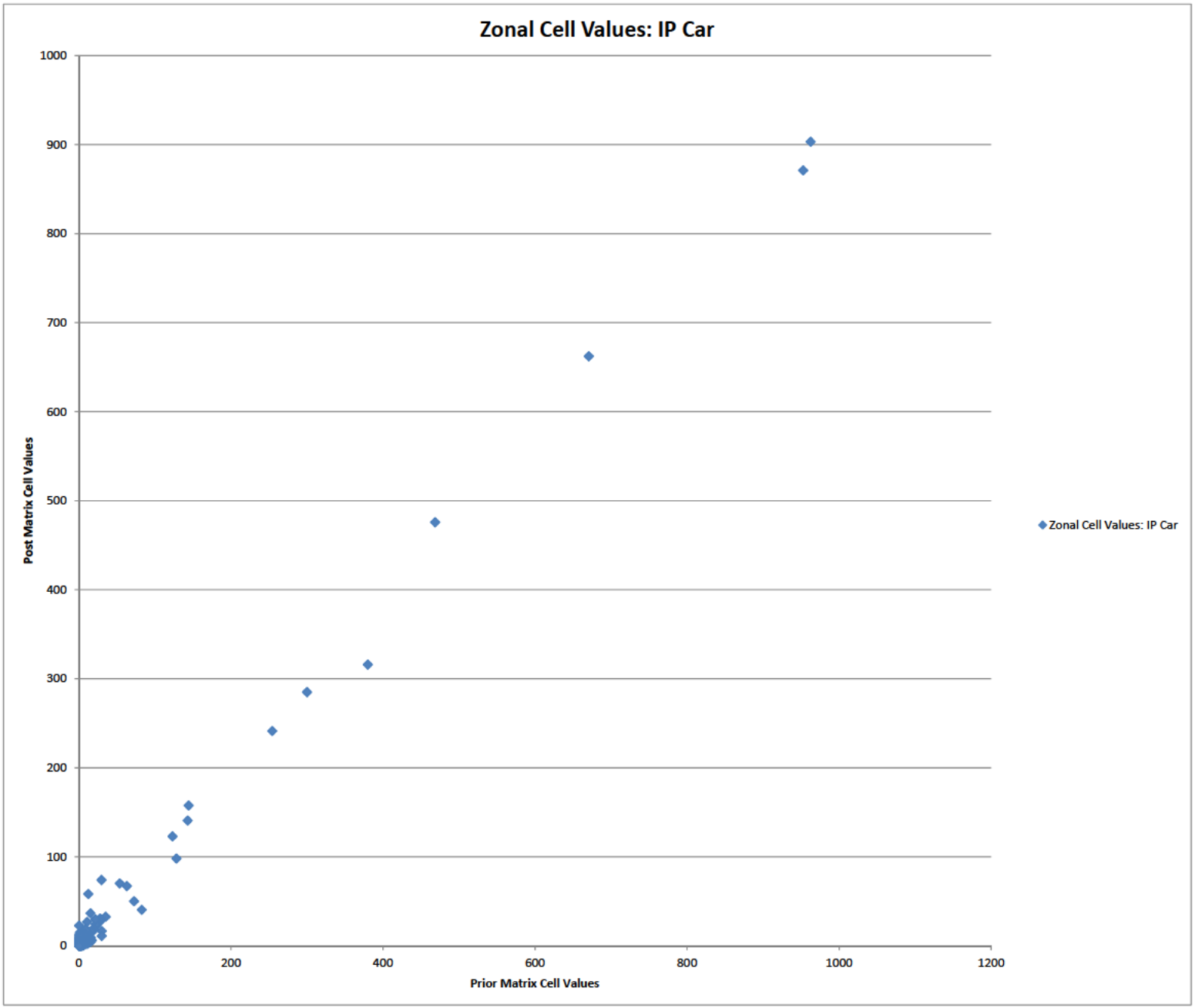
© Peter Brett Associates LLP

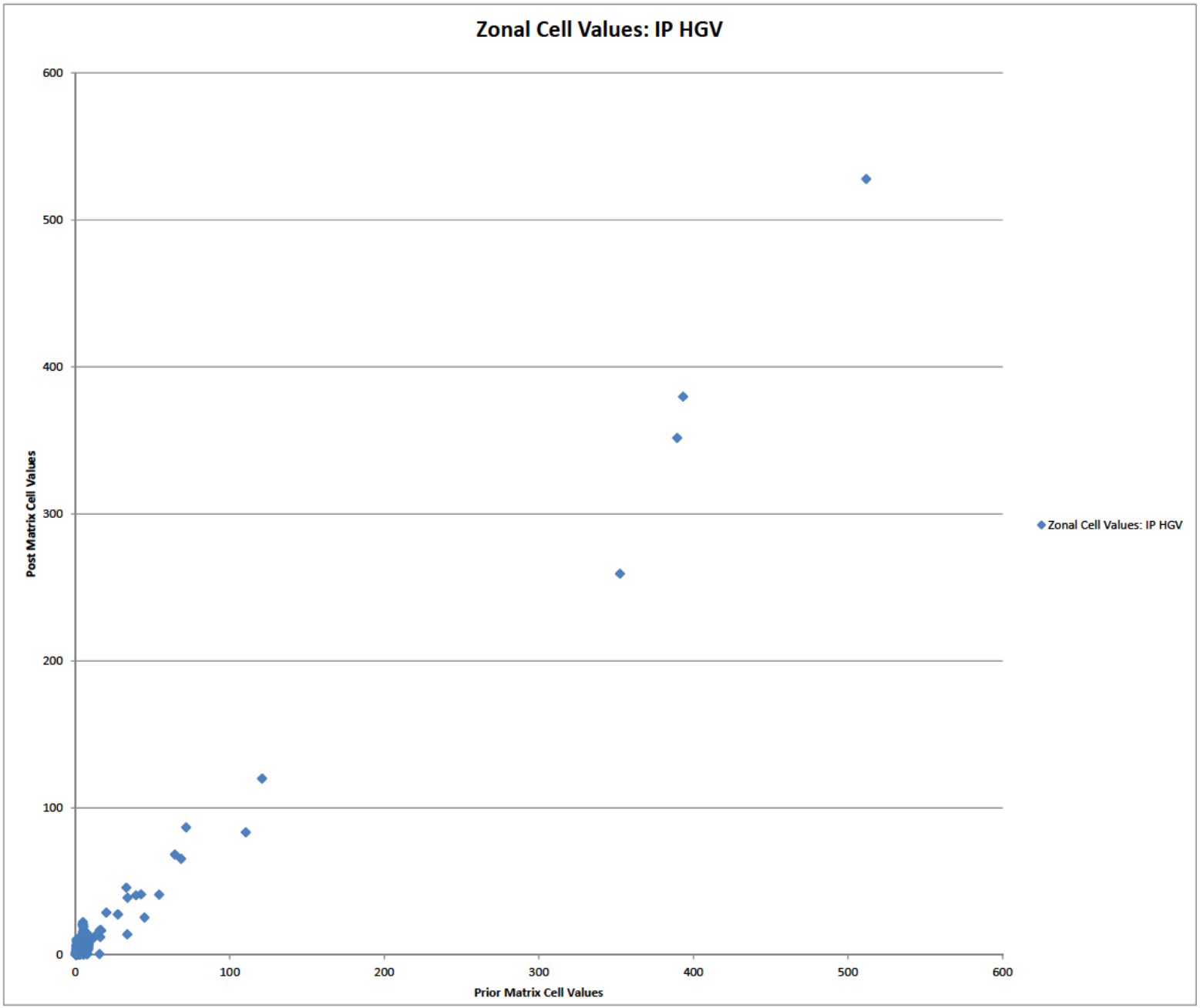
Appendix B – Matrix Estimation Analysis

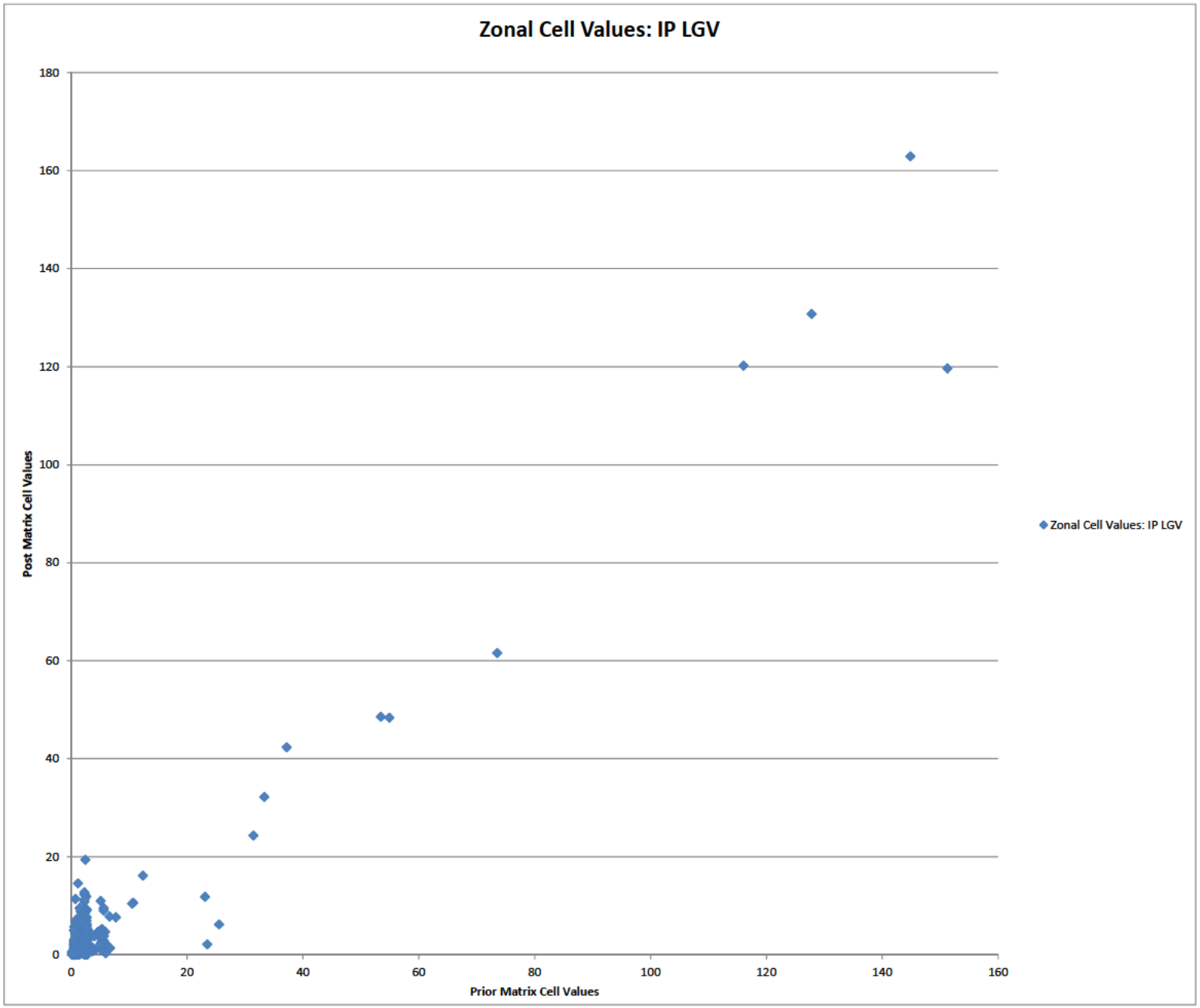

Zonal Cell Values: AM Car
1400
1200
1000
800
600
400
200
0
Post Matrix Cell Values
0
200
400
600
800
1000
1200
1400
1600
Prior Matrix Cell Values
Zonal Cell Values: AM Car

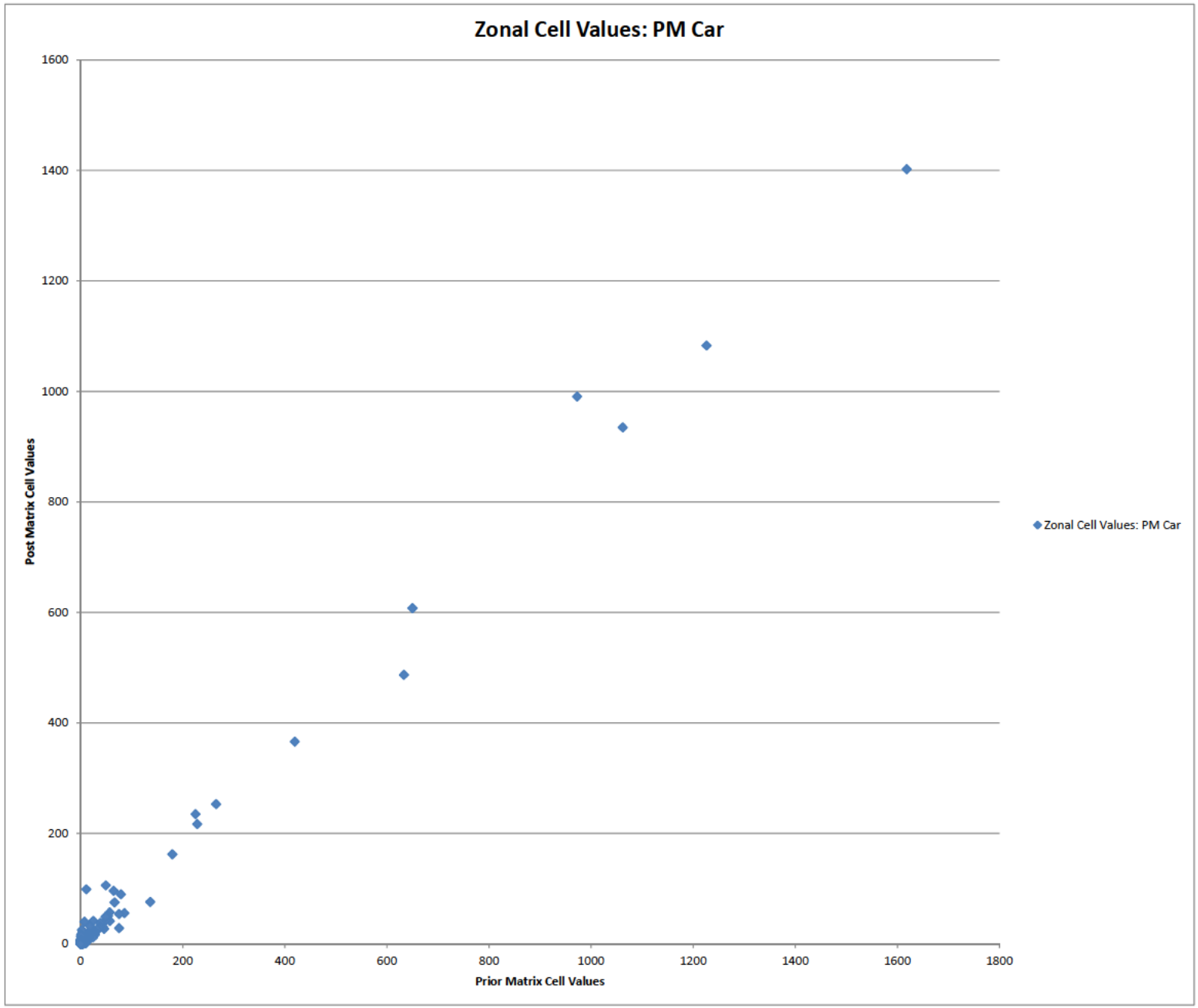

Zonal Cell Values: AM HGV
Post Matrix Cell Values
Prior Matrix Cell Values
0
50
100
150
200
250
300
350
400
450
Zonal Cell Values: AM HGV

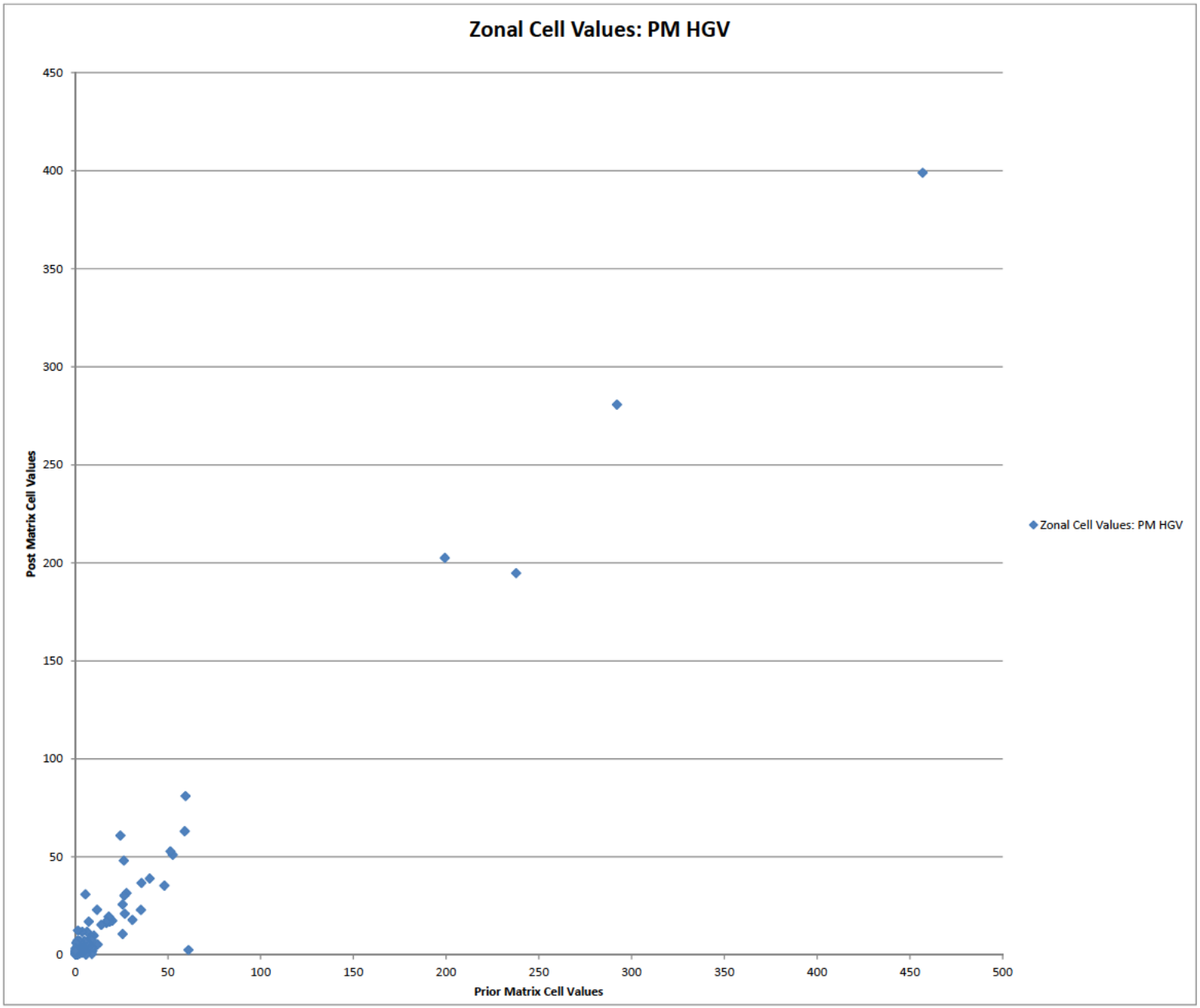

Zonal Cell Values: AM LGV
250
200
150
100
50
0
Post Matrix Cell Values
0
50
100
150
200
250
300
350
Prior Matrix Cell Values
Zonal Cell Values: AM LGV

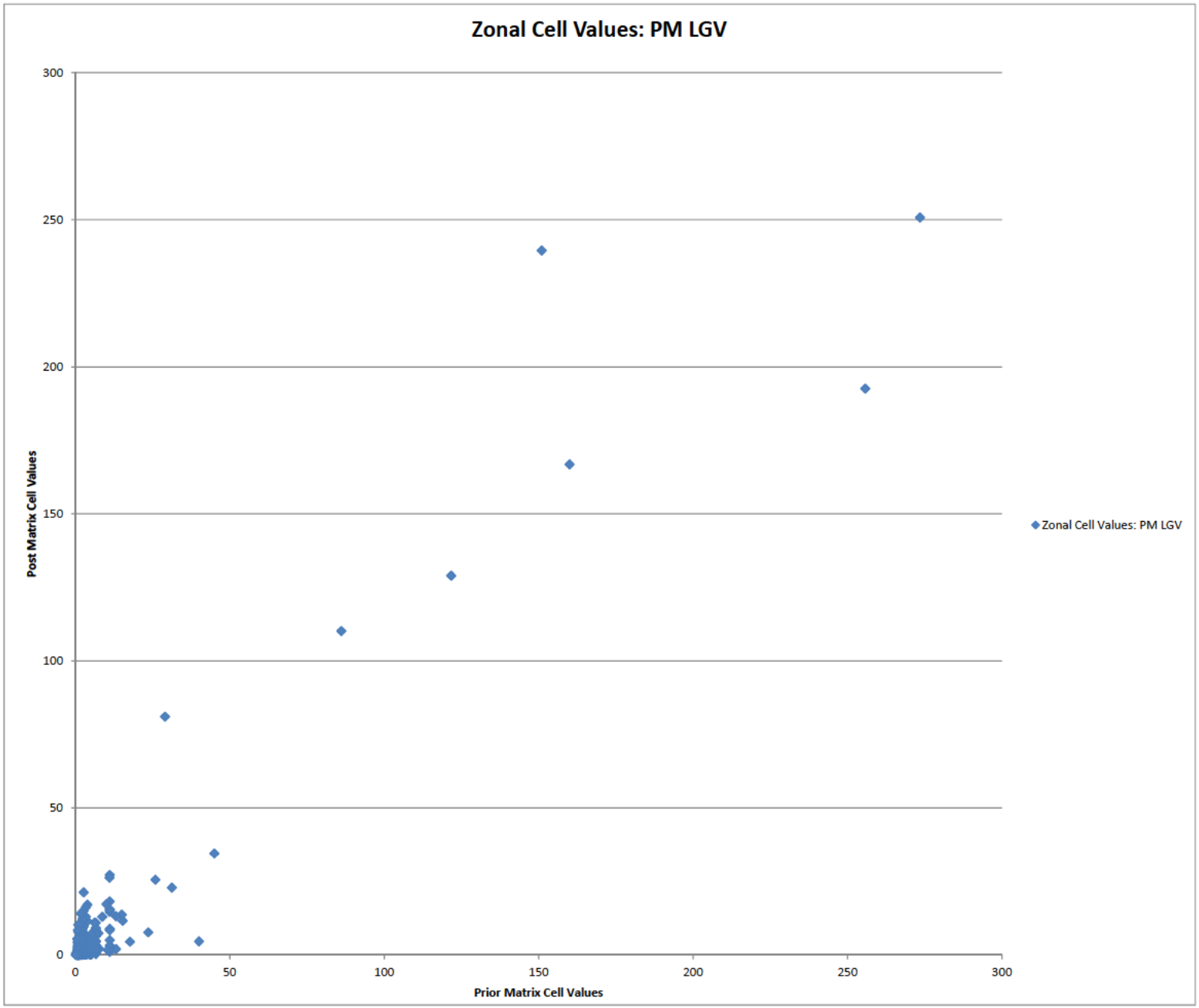

Zonal Cell Values: IP Car
Post Matrix Cell Values
Prior Matrix Cell Values
0
100
200
300
400
500
600
700
800
900
1000
0
200
400
600
800
1000
1200
Zonal Cell Values: IP Car

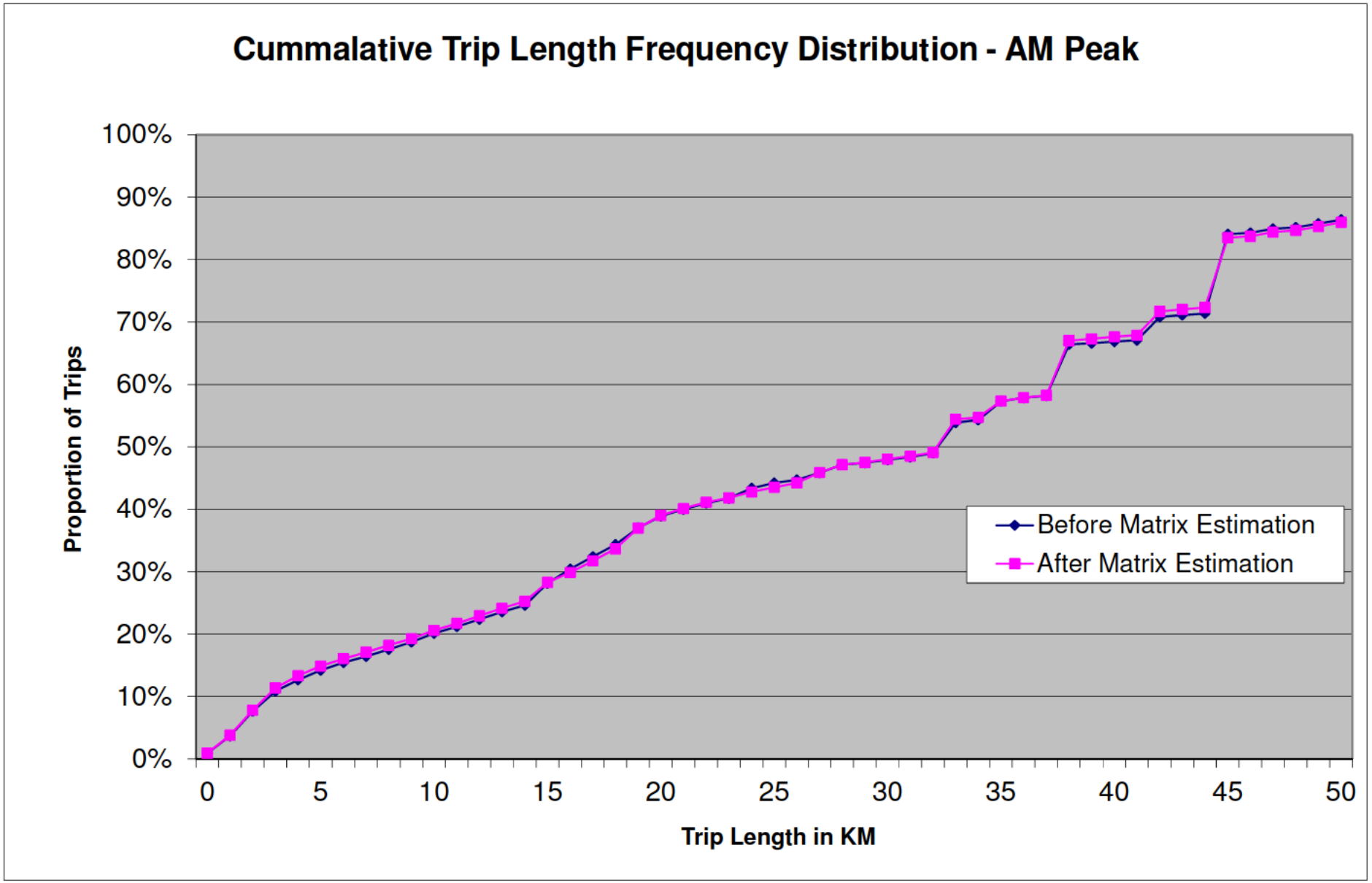

Zonal Cell Values: IP HGV
600
500
400
300
200
100
0
Post Matrix Cell Values
0
100
200
300
400
500
600
Prior Matrix Cell Values
Zonal Cell Values: IP HGV

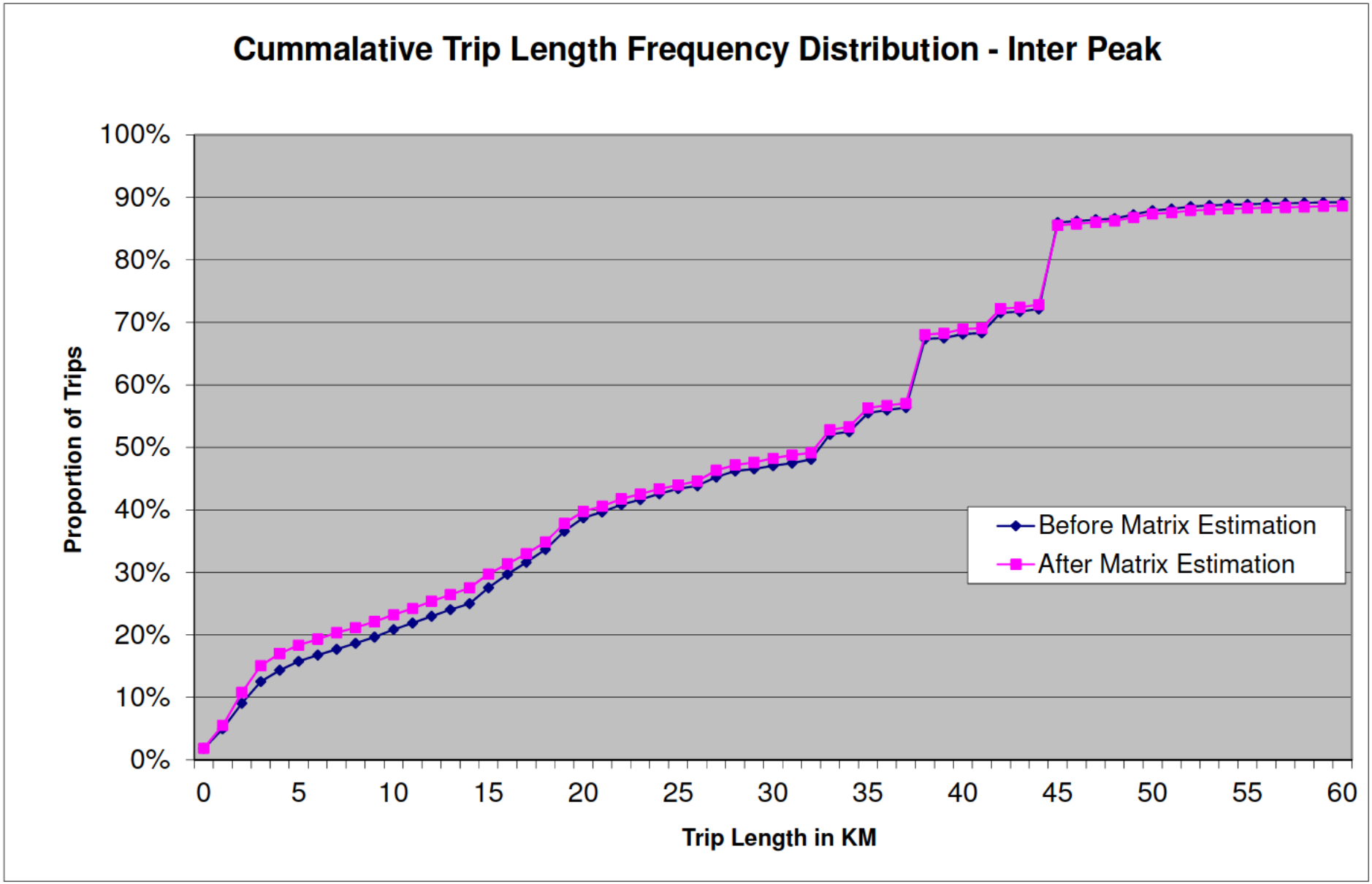

Zonal Cell Values: IP LGV
Post Matrix Cell Values
Prior Matrix Cell Values
0
20
40
60
80
100
120
140
160
180
Zonal Cell Values: IP LGV

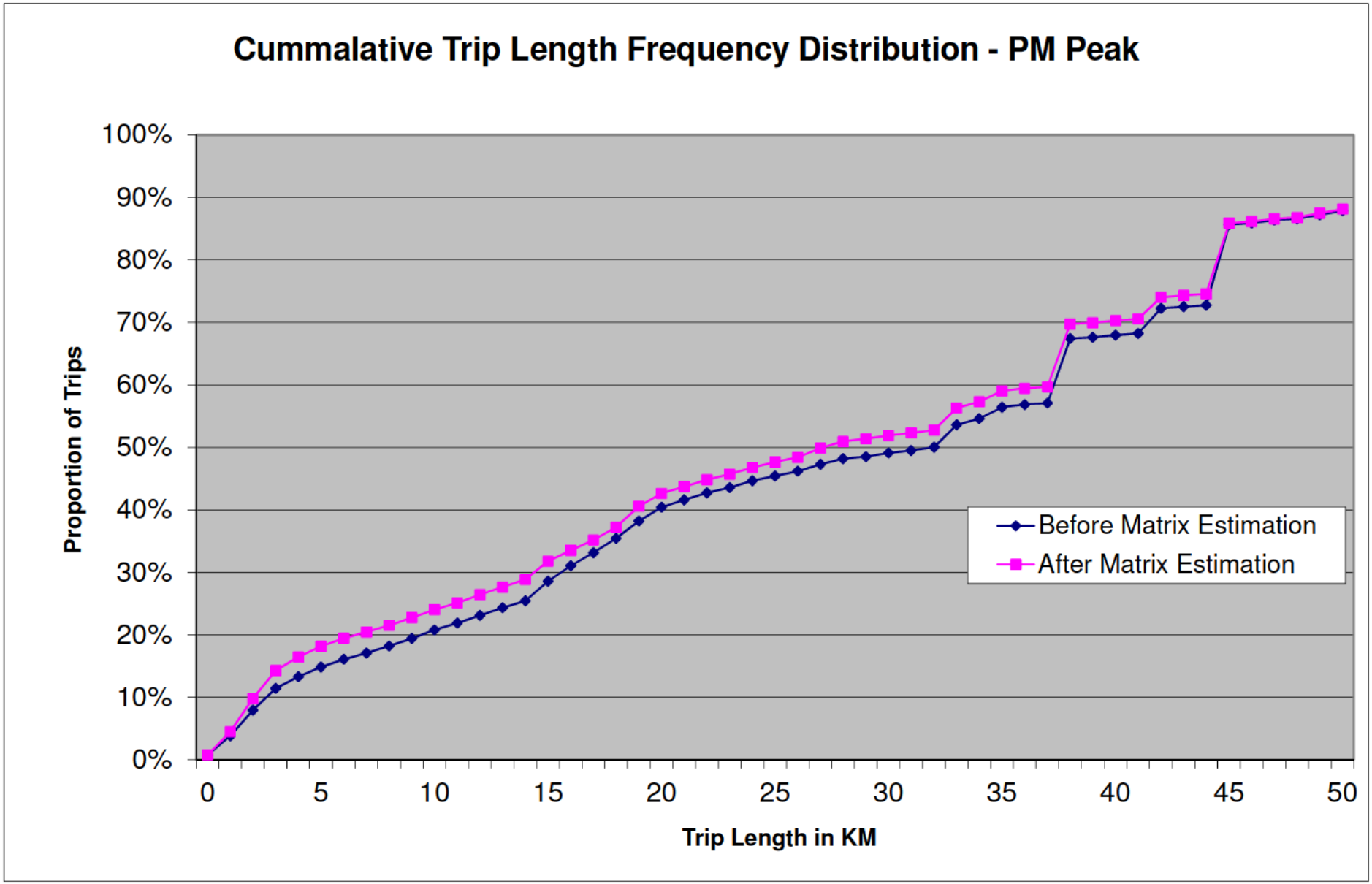

Zonal Cell Values: PM Car
Post Matrix Cell Values
Prior Matrix Cell Values
0
200
400
600
800
1000
1200
1400
1600
1800
Zonal Cell Values: PM Car


Zonal Cell Values: PM HGV
Post Matrix Cell Values
Prior Matrix Cell Values
0
50
100
150
200
250
300
350
400
450
500
Zonal Cell Values: PM HGV


Zonal Cell Values: PM LGV
300
250
200
150
100
50
0
Post Matrix Cell Values
0
50
100
150
200
250
300
Prior Matrix Cell Values
Zonal Cell Values: PM LGV


Cummalative Trip Length Frequency Distribution - AM Peak
Proportion of Trips
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0
5
10
15
20
25
30
35
40
45
50
Trip Length in KM
Before Matrix Estimation
After Matrix Estimation


Cummalative Trip Length Frequency Distribution - Inter Peak
Proportion of Trips
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0
5
10
15
20
25
30
35
40
45
50
55
60
Trip Length in KM
Before Matrix Estimation
After Matrix Estimation


Cummalative Trip Length Frequency Distribution - PM Peak
Proportion of Trips
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0
5
10
15
20
25
30
35
40
45
50
Trip Length in KM
Before Matrix Estimation
After Matrix Estimation

2016_AM_Car_PiJa.ME2

DfT WEBTAG Unit M3.1 Summary Stats (Table 5)

ZONE-TO-ZONE REGRESSION:

slope	0.9001	Fail
intercept	0.0154	Pass
r-squared	0.9726	Pass

ORIGIN TRIP END REGRESSION:

SLOPE	0.8507	Fail
INTERCEPT	7.3330	Fail
R-SQUARED	0.8788	Fail

DESTINATION TRIP END REGRESSION:

SLOPE	0.8853	Fail
INTERCEPT	5.5830	Fail
R-SQUARED	0.8787	Fail

2016_AM_LGV_PiJa.ME2

DfT WEBTAG Unit M3.1 Summary Stats (Table 5

ZONE-TO-ZONE REGRESSION:

slope	0.8302	Fail
intercept	0.0035	Pass
r-squared	0.9059	Fail

ORIGIN TRIP END REGRESSION:

SLOPE	0.8851	Fail
INTERCEPT	0.7826	Pass
R-SQUARED	0.9606	Fail

DESTINATION TRIP END REGRESSION:

SLOPE	0.8977	Fail
INTERCEPT	0.6821	Pass
R-SQUARED	0.9703	Fail

2016_AM_HGV_PiJa.ME2

DfT WEBTAG Unit M3.1 Summary Stats (T

ZONE-TO-ZONE REGRESSION:

slope	1.0124	Pass
intercept	-0.0003	Pass
r-squared	0.9374	Fail

ORIGIN TRIP END REGRESSION:

SLOPE	0.8052	Fail
INTERCEPT	0.4281	Pass
R-SQUARED	0.9044	Fail

DESTINATION TRIP END REGRESSION:

SLOPE	0.8504	Fail
INTERCEPT	0.2354	Pass
R-SQUARED	0.8452	Fail

2016_IP_Car_PiJa.ME2

DfT WEBTAG Unit M3.1 Summary Stats (Table 5)

ZONE-TO-ZONE REGRESSION:

slope	0.9396	Fail
intercept	0.0077	Pass
r-squared	0.9920	Pass

ORIGIN TRIP END REGRESSION:

SLOPE	0.9297	Fail
INTERCEPT	2.8008	Pass
R-SQUARED	0.8662	Fail

DESTINATION TRIP END REGRESSION:

SLOPE	0.7978	Fail
INTERCEPT	6.9172	Fail
R-SQUARED	0.8132	Fail

2016_IP_LGV_PiJa.ME2

DfT WEBTAG Unit M3.1 Summary Stats (Table 5

ZONE-TO-ZONE REGRESSION:

slope	0.9562	Fail
intercept	0.0013	Pass
r-squared	0.9394	Fail

ORIGIN TRIP END REGRESSION:

SLOPE	0.9148	Fail
INTERCEPT	0.6095	Pass
R-SQUARED	0.9776	Fail

DESTINATION TRIP END REGRESSION:

SLOPE	0.9586	Fail
INTERCEPT	0.4600	Pass
R-SQUARED	0.9591	Fail

2016_IP_HGV_PiJa.ME2

DfT WEBTAG Unit M3.1 Summary Stats (T

ZONE-TO-ZONE REGRESSION:

slope	0.9362	Fail
intercept	0.0016	Pass
r-squared	0.9791	Pass

ORIGIN TRIP END REGRESSION:

SLOPE	1.0505	Fail
INTERCEPT	0.1036	Pass
R-SQUARED	0.8922	Fail

DESTINATION TRIP END REGRESSION:

SLOPE	1.1090	Fail
INTERCEPT	-0.0288	Pass
R-SQUARED	0.9117	Fail

2016_PM_Car_PiJa.ME2

DfT WEBTAG Unit M3.1 Summary Stats (Table 5)

ZONE-TO-ZONE REGRESSION:

slope	0.8927	Fail
intercept	0.0245	Pass
r-squared	0.9905	Pass

ORIGIN TRIP END REGRESSION:

SLOPE	0.9690	Fail
INTERCEPT	4.2481	Pass
R-SQUARED	0.8675	Fail

DESTINATION TRIP END REGRESSION:

SLOPE	0.9690	Fail
INTERCEPT	4.2481	Pass
R-SQUARED	0.8675	Fail

2016_PM_LGV_PiJa.ME2

DfT WEBTAG Unit M3.1 Summary Stats (Table 5

ZONE-TO-ZONE REGRESSION:

slope	0.9702	Fail
intercept	0.0010	Pass
r-squared	0.9048	Fail

ORIGIN TRIP END REGRESSION:

SLOPE	1.0086	Pass
INTERCEPT	0.1298	Pass
R-SQUARED	0.9708	Fail

DESTINATION TRIP END REGRESSION:

SLOPE	1.0086	Pass
INTERCEPT	0.1298	Pass
R-SQUARED	0.9708	Fail

2016_PM_HGV_PiJa.ME2

DfT WEBTAG Unit M3.1 Summary Stats (T

ZONE-TO-ZONE REGRESSION:

slope	0.9008	Fail
intercept	0.0012	Pass
r-squared	0.9735	Pass

ORIGIN TRIP END REGRESSION:

SLOPE	0.9153	Fail
INTERCEPT	0.1543	Pass
R-SQUARED	0.8140	Fail

DESTINATION TRIP END REGRESSION:

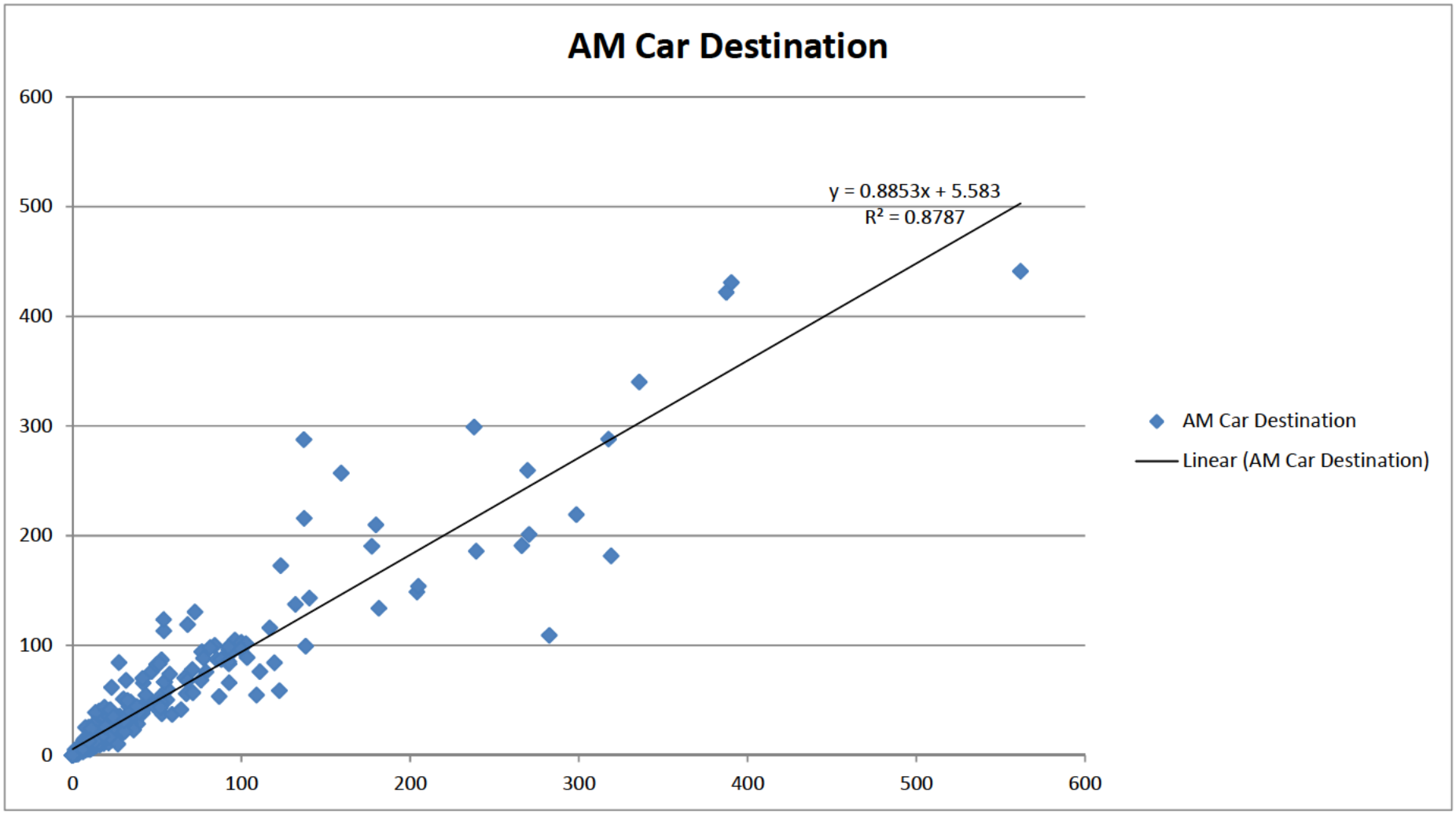
SLOPE	0.9153	Fail
INTERCEPT	0.1543	Pass
R-SQUARED	0.8140	Fail

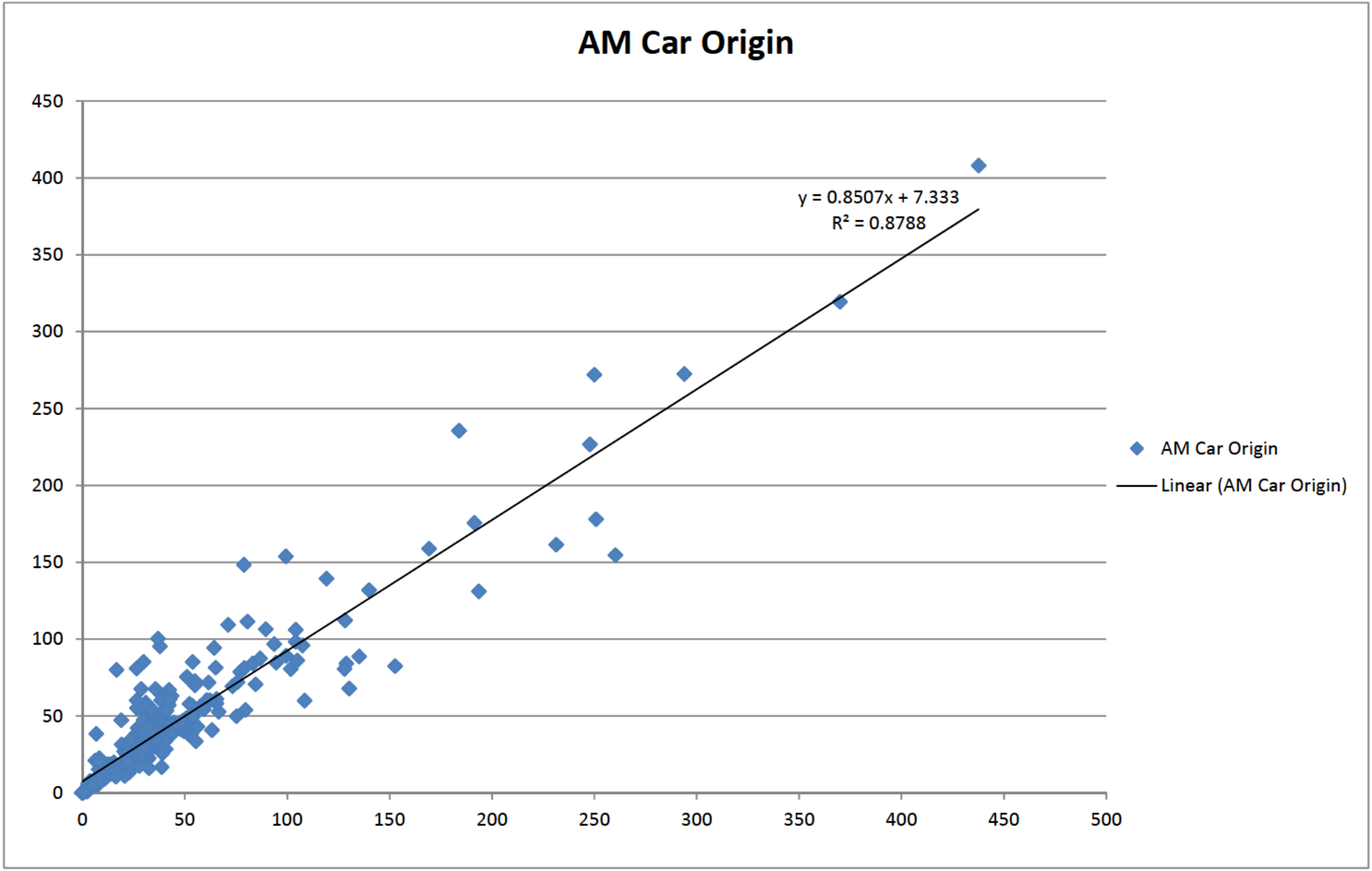
Measure	Significance Criteria			
	Slope lower	**Slope Upper**	**Intercept limit**	**R squared**
Matrix zonal cell values	0.9800	1.0200	5.0000	0.9500
Matrix zonal trip ends	0.9900	1.0100	5.0000	0.9800
	Means	**Std Dev**		
Trip length distributions	0.0500	0.0500		

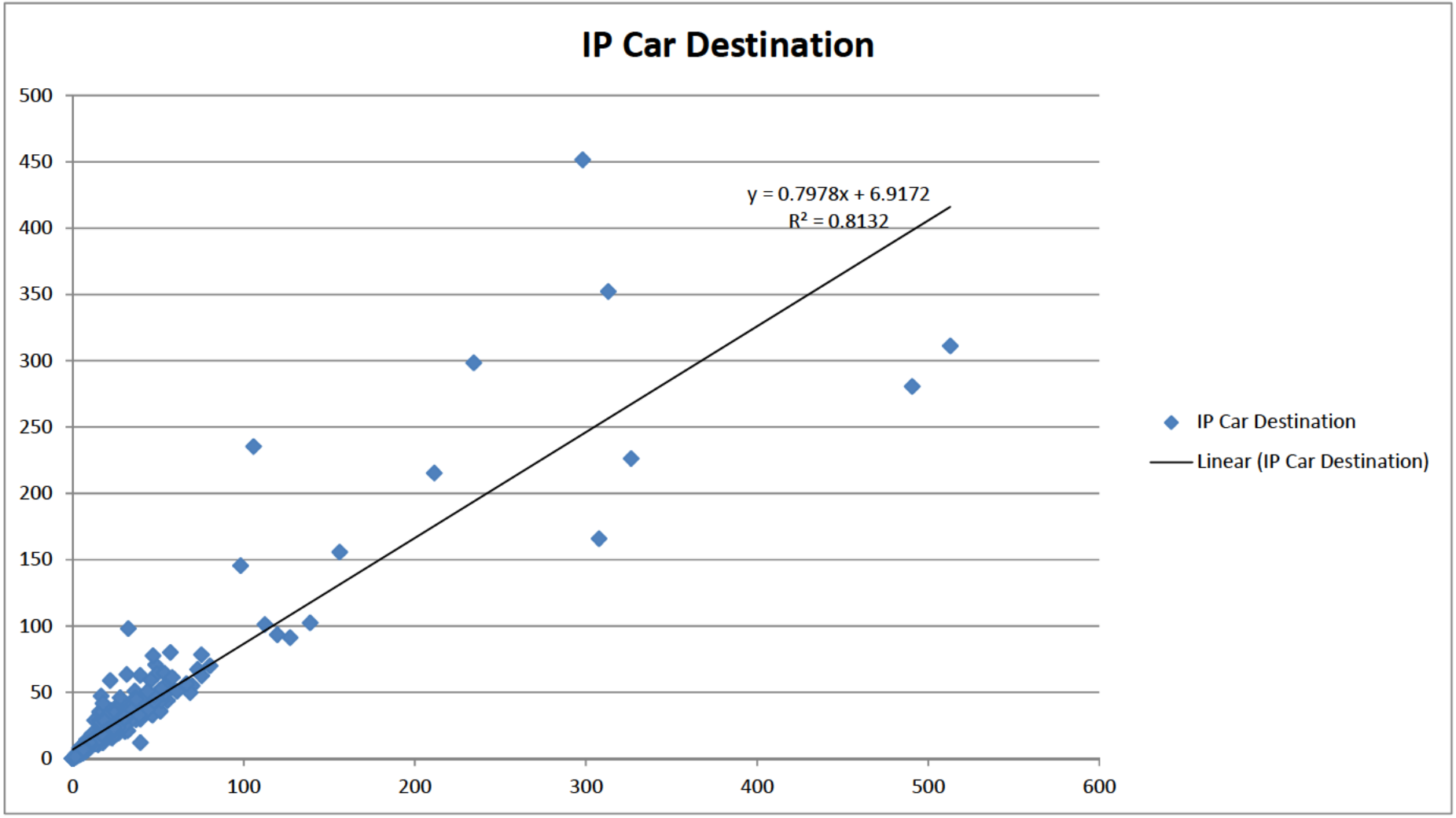
able 5]

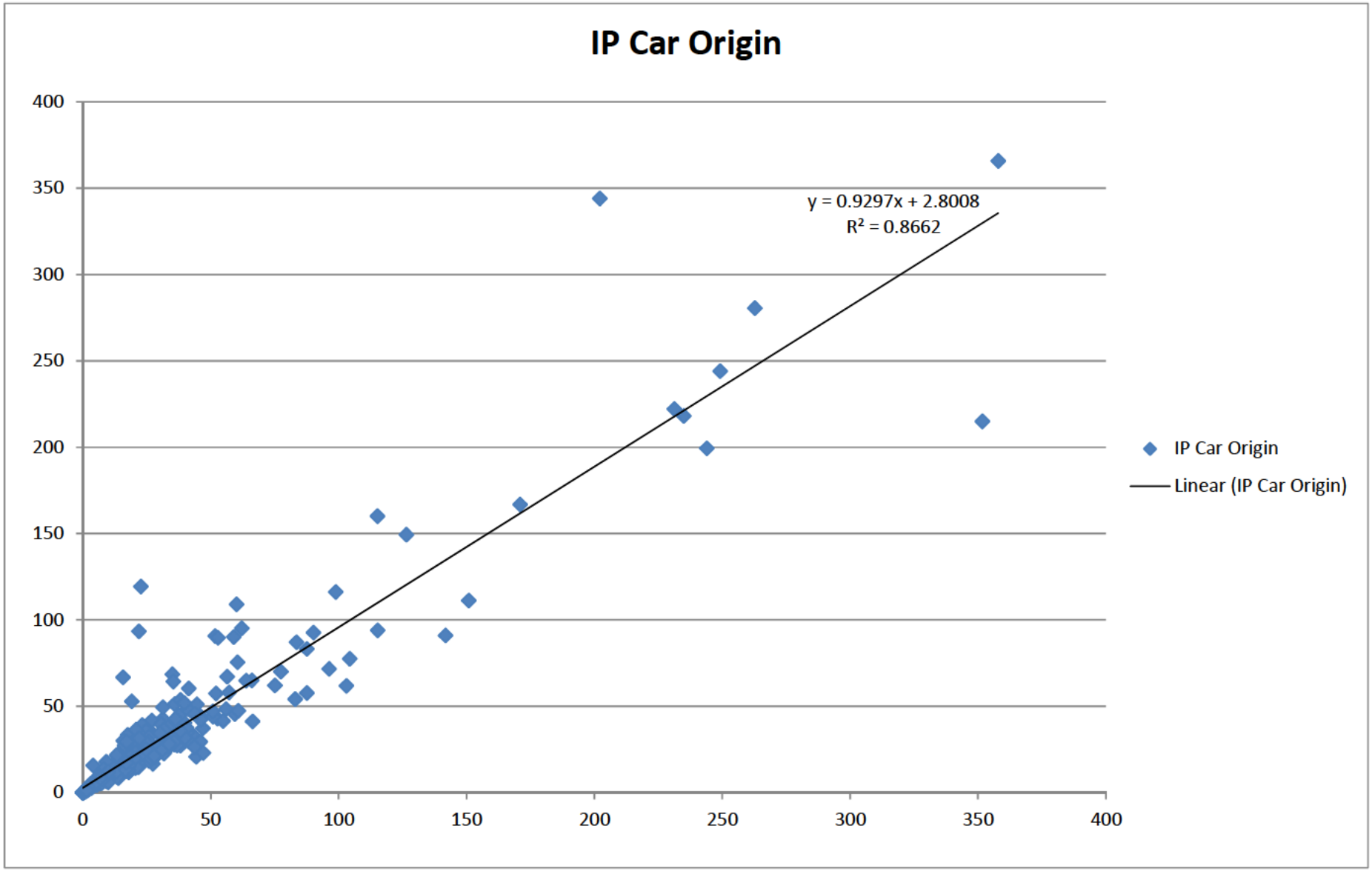
able 5]

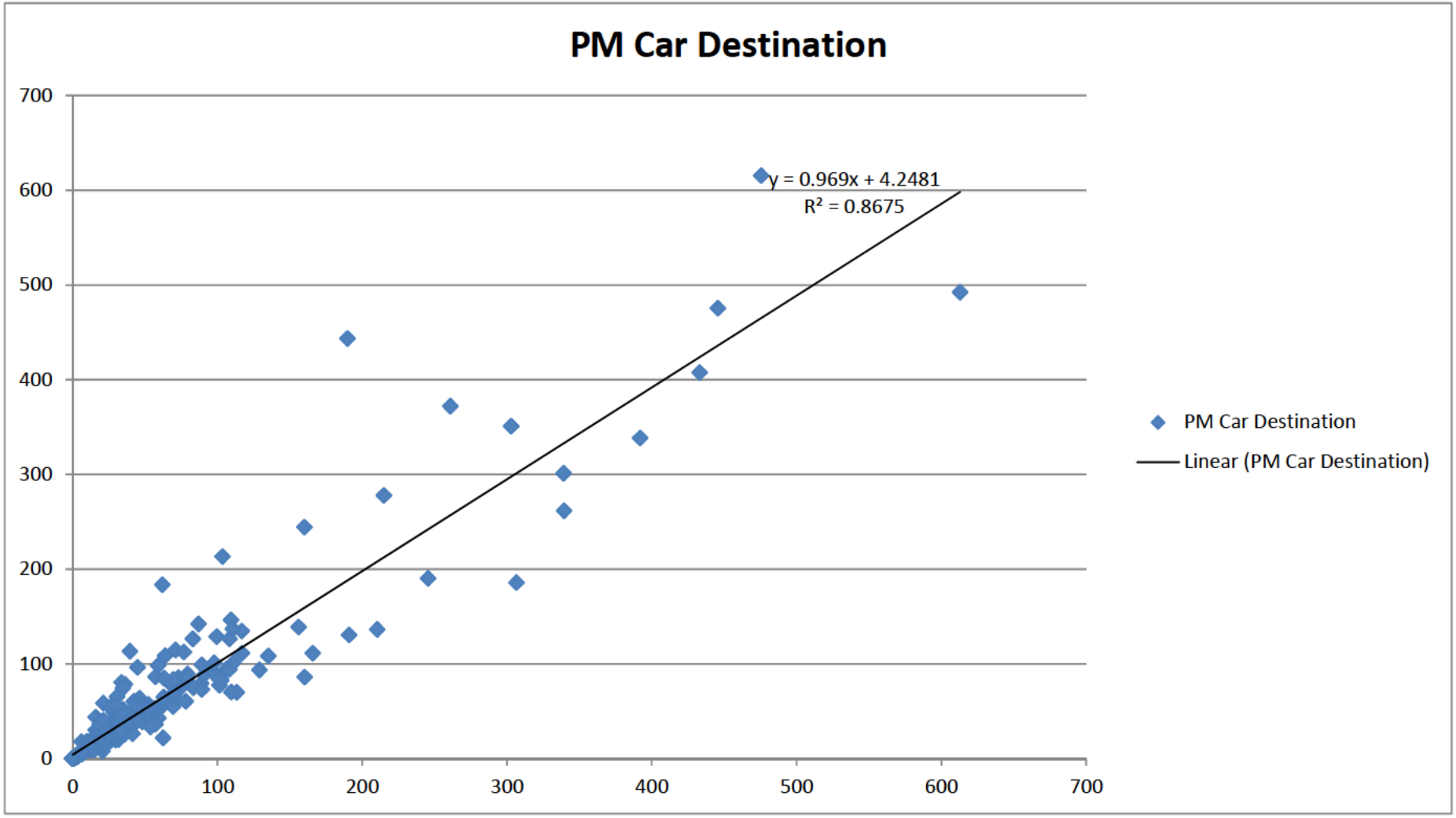
able 5]

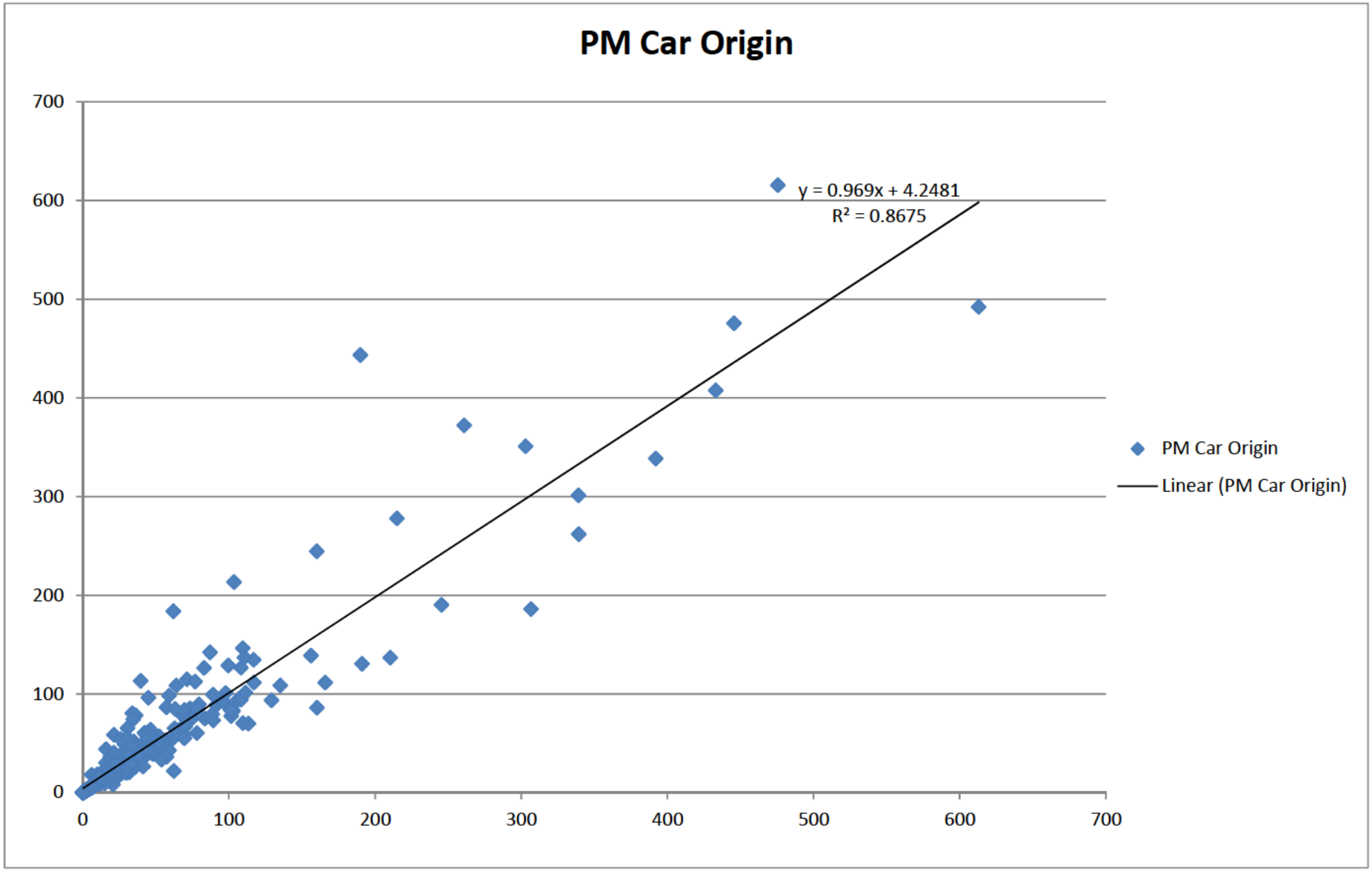

AM Car Destination
y = 0.8853x + 5.583
R² = 0.8787
600
500
400
300
200
100
0
0
100
200
300
400
500
600
AM Car Destination
Linear (AM Car Destination)

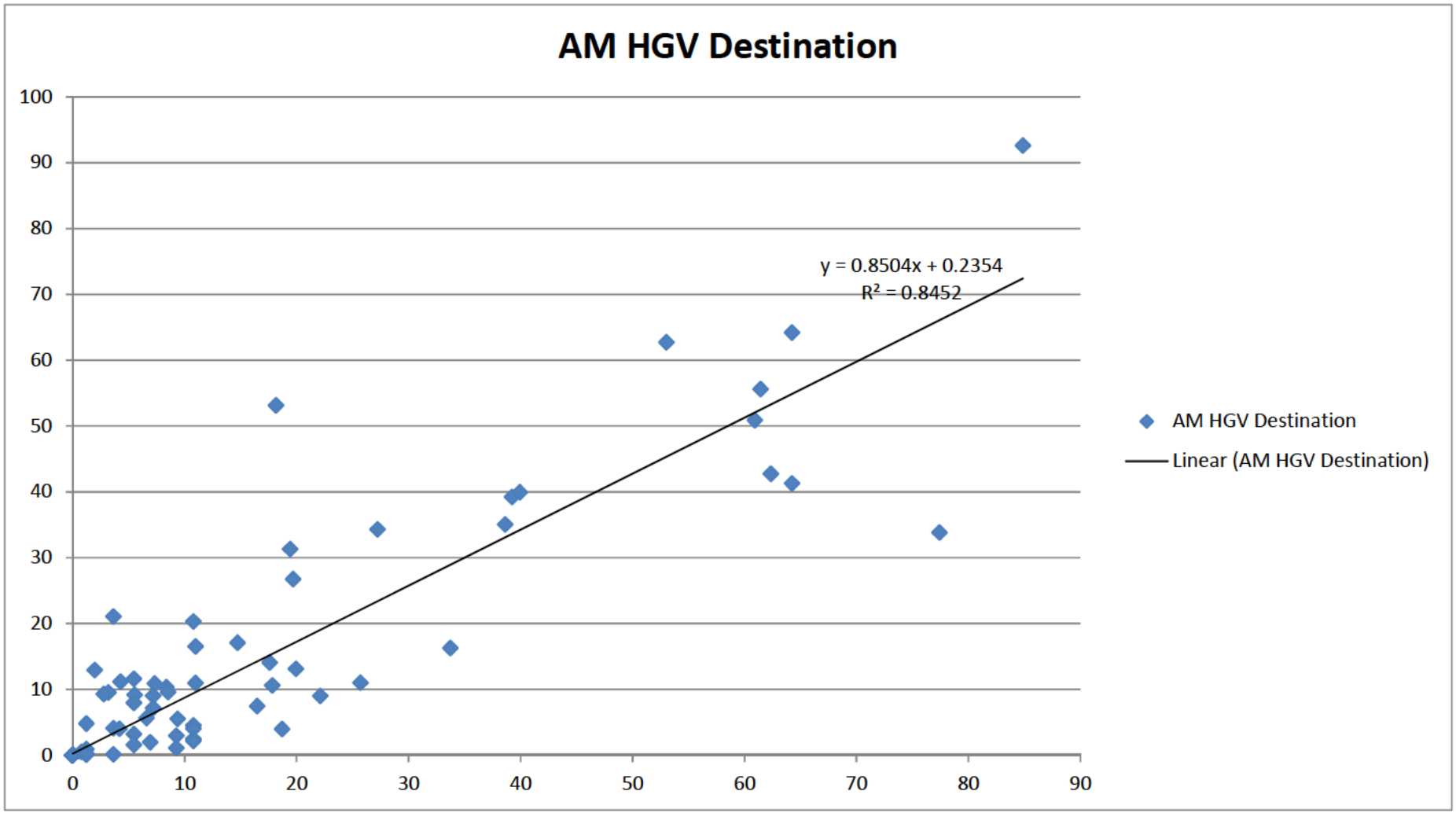

AM Car Origin
y = 0.8507x + 7.333
R² = 0.8788
AM Car Origin
Linear (AM Car Origin)
0
50
100
150
200
250
300
350
400
450
500

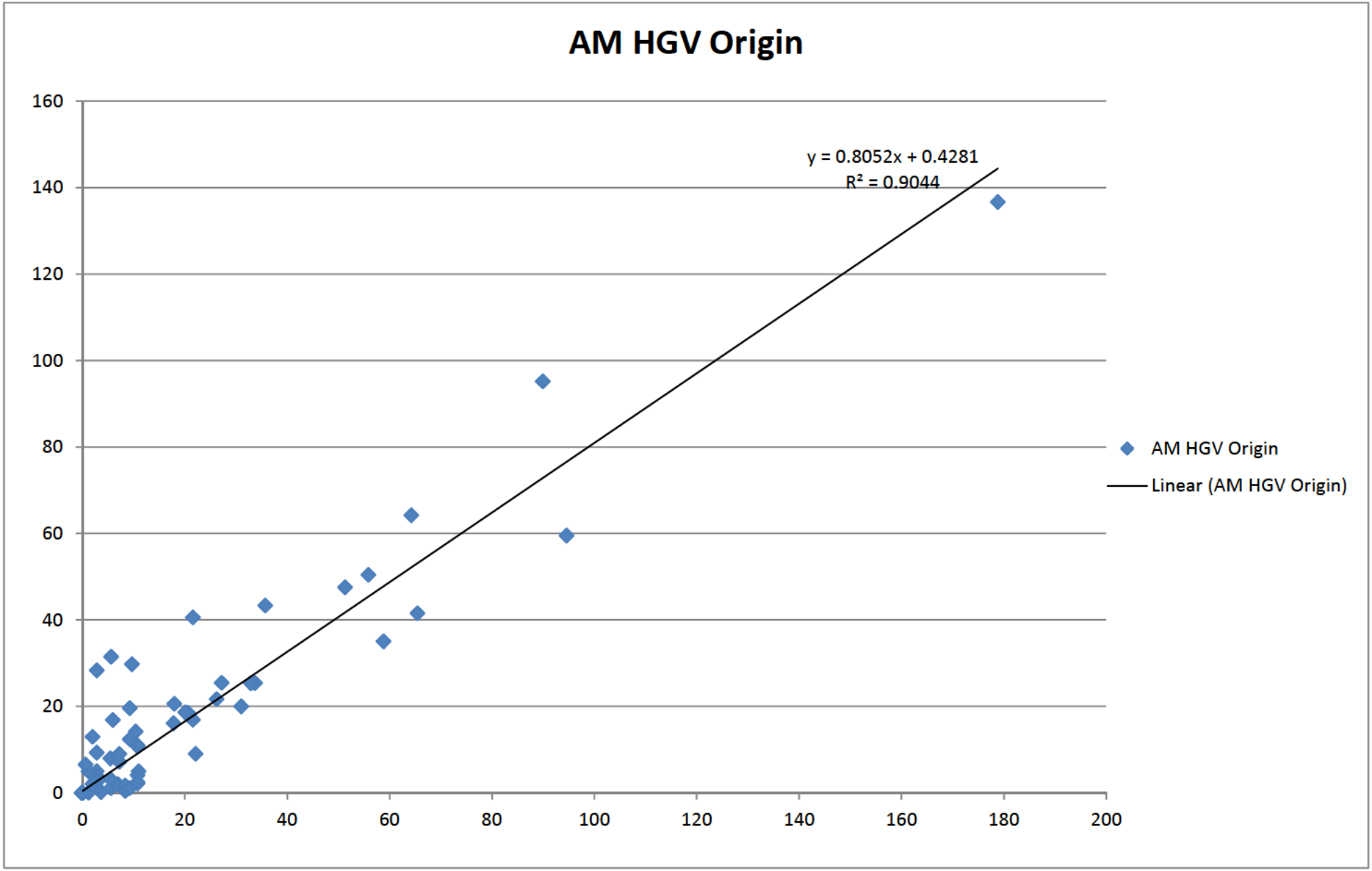

IP Car Destination
y = 0.7978x + 6.9172
R² = 0.8132
500
450
400
350
300
250
200
150
100
50
0
0
100
200
300
400
500
600
IP Car Destination
Linear (IP Car Destination)

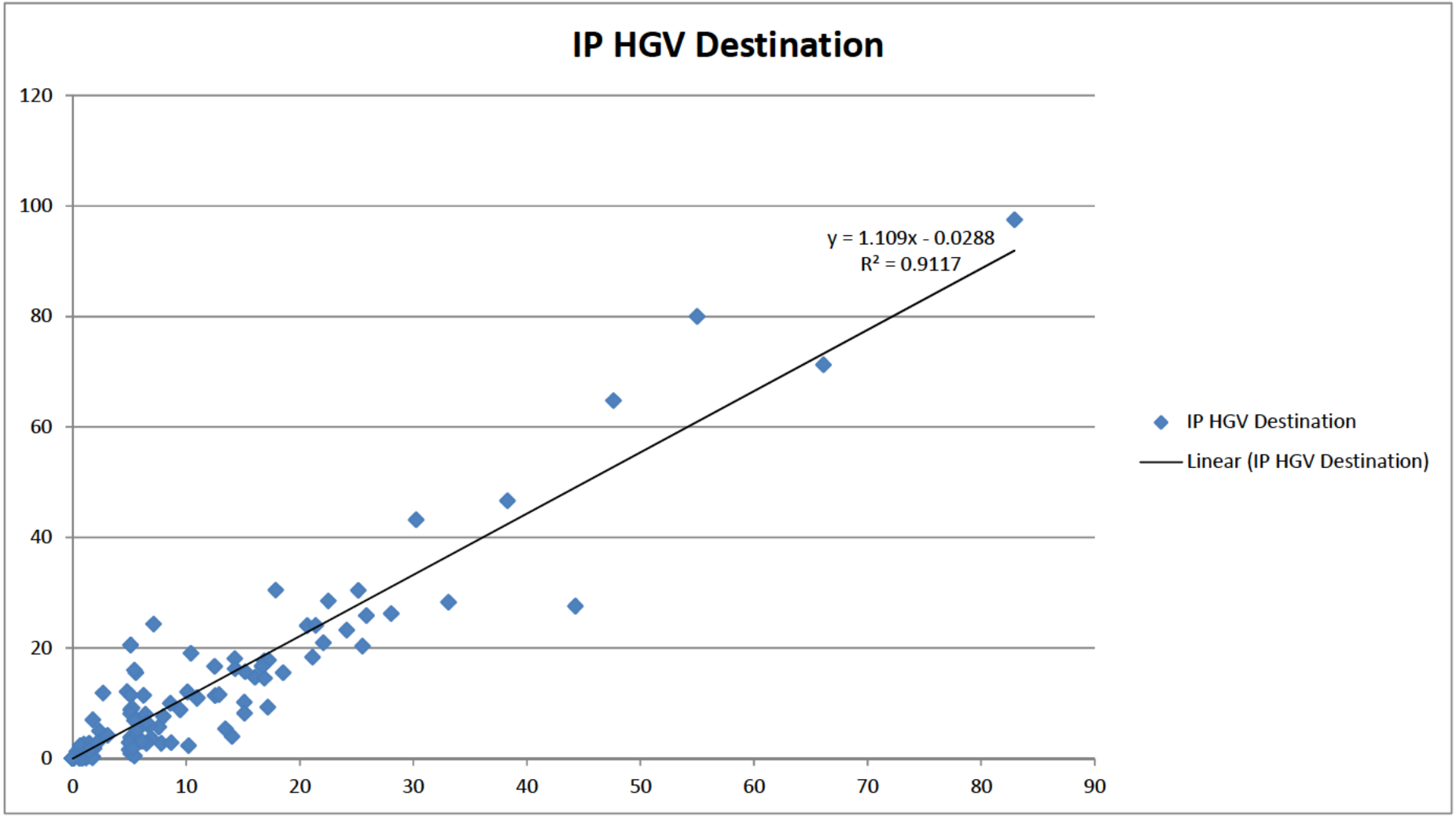

IP Car Origin
y = 0.9297x + 2.8008
R² = 0.8662
IP Car Origin
Linear (IP Car Origin)
0
50
100
150
200
250
300
350
400

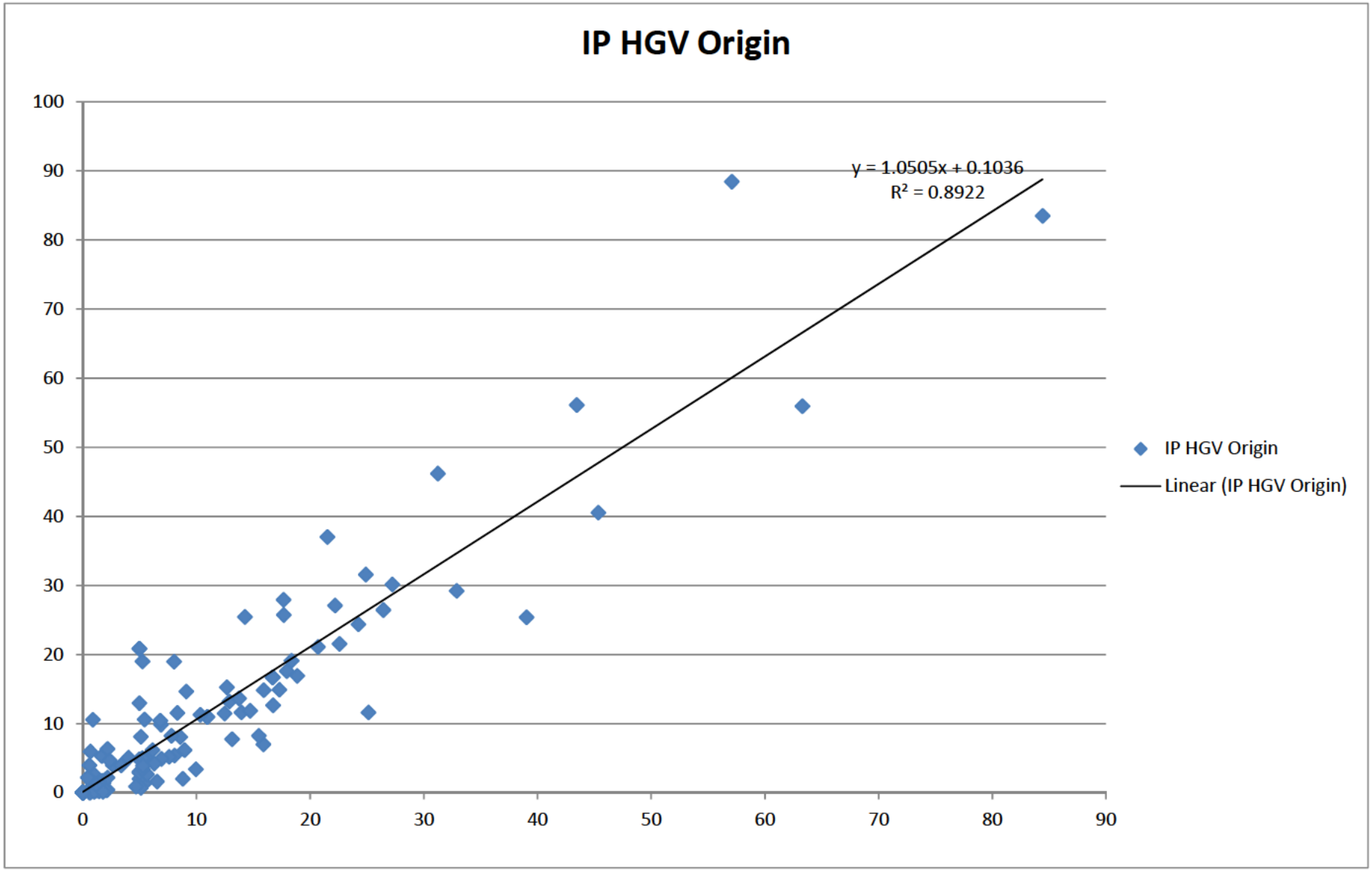

PM Car Destination
y = 0.969x + 4.2481
R² = 0.8675
0
100
200
300
400
500
600
700
PM Car Destination
Linear (PM Car Destination)

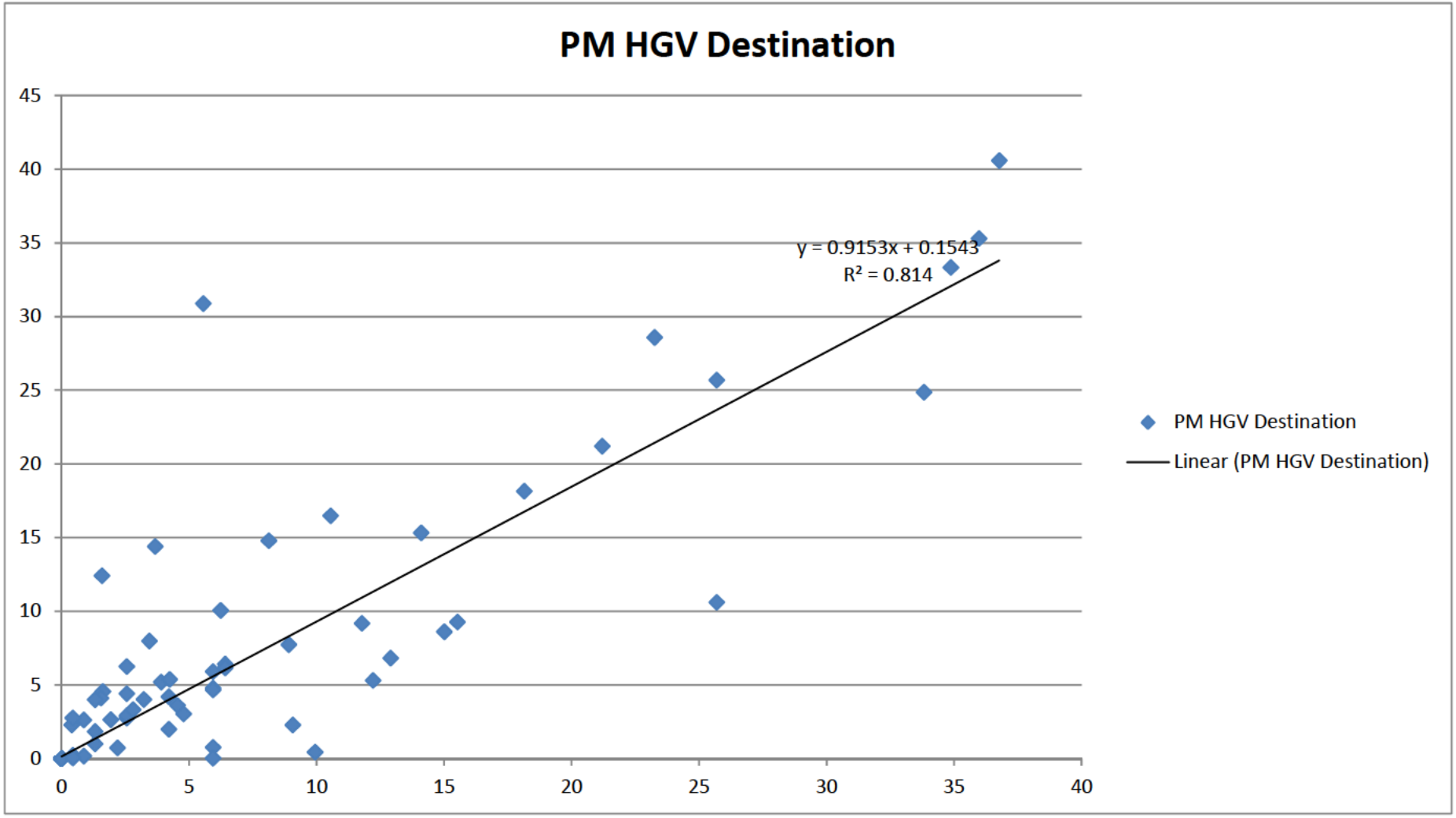

PM Car Origin
y = 0.969x + 4.2481
R² = 0.8675
0
100
200
300
400
500
600
700
PM Car Origin
Linear (PM Car Origin)

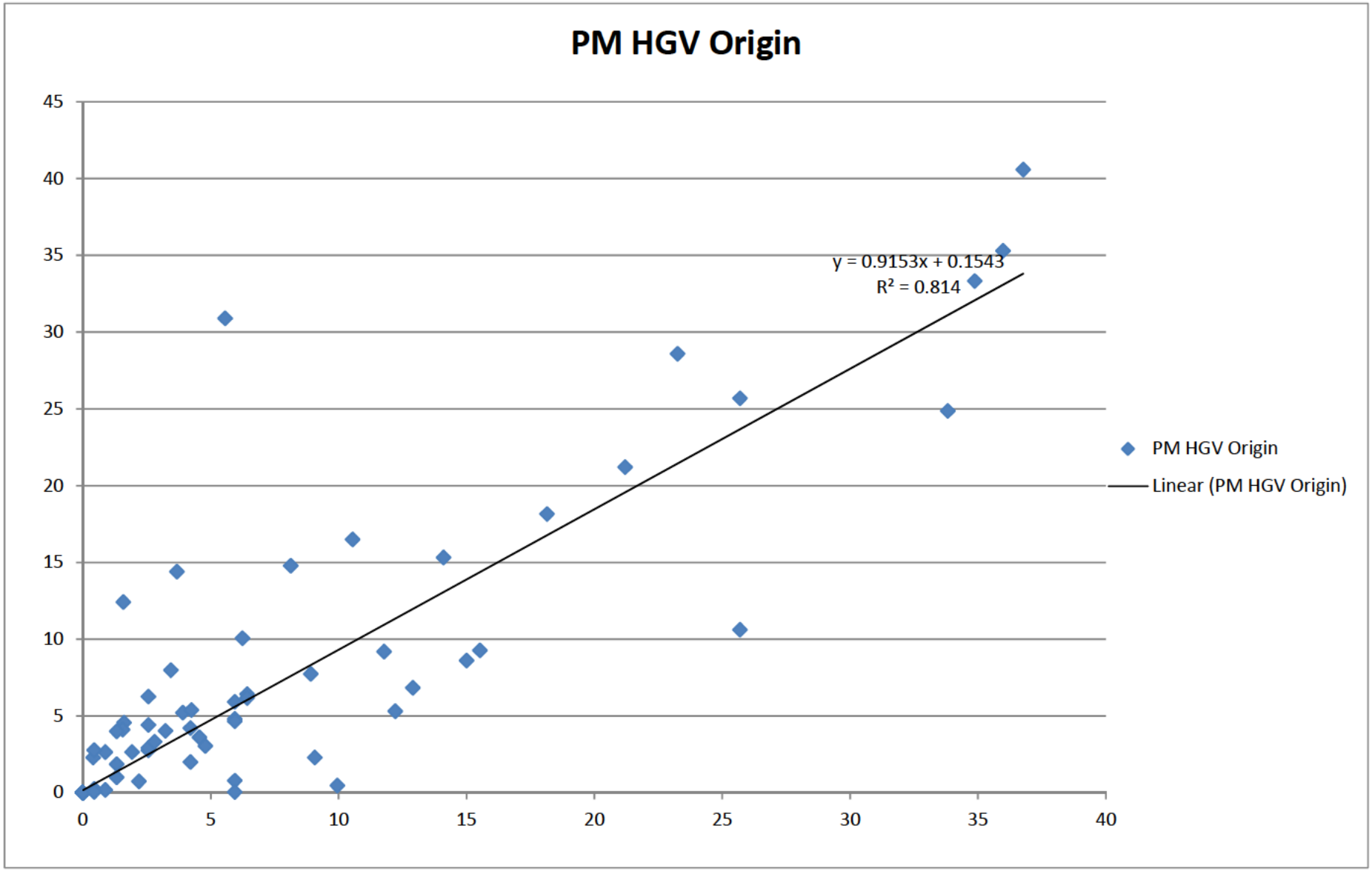

AM HGV Destination
y = 0.8504x + 0.2354
R² = 0.8452
AM HGV Destination
Linear (AM HGV Destination)
0
10
20
30
40
50
60
70
80
90
100

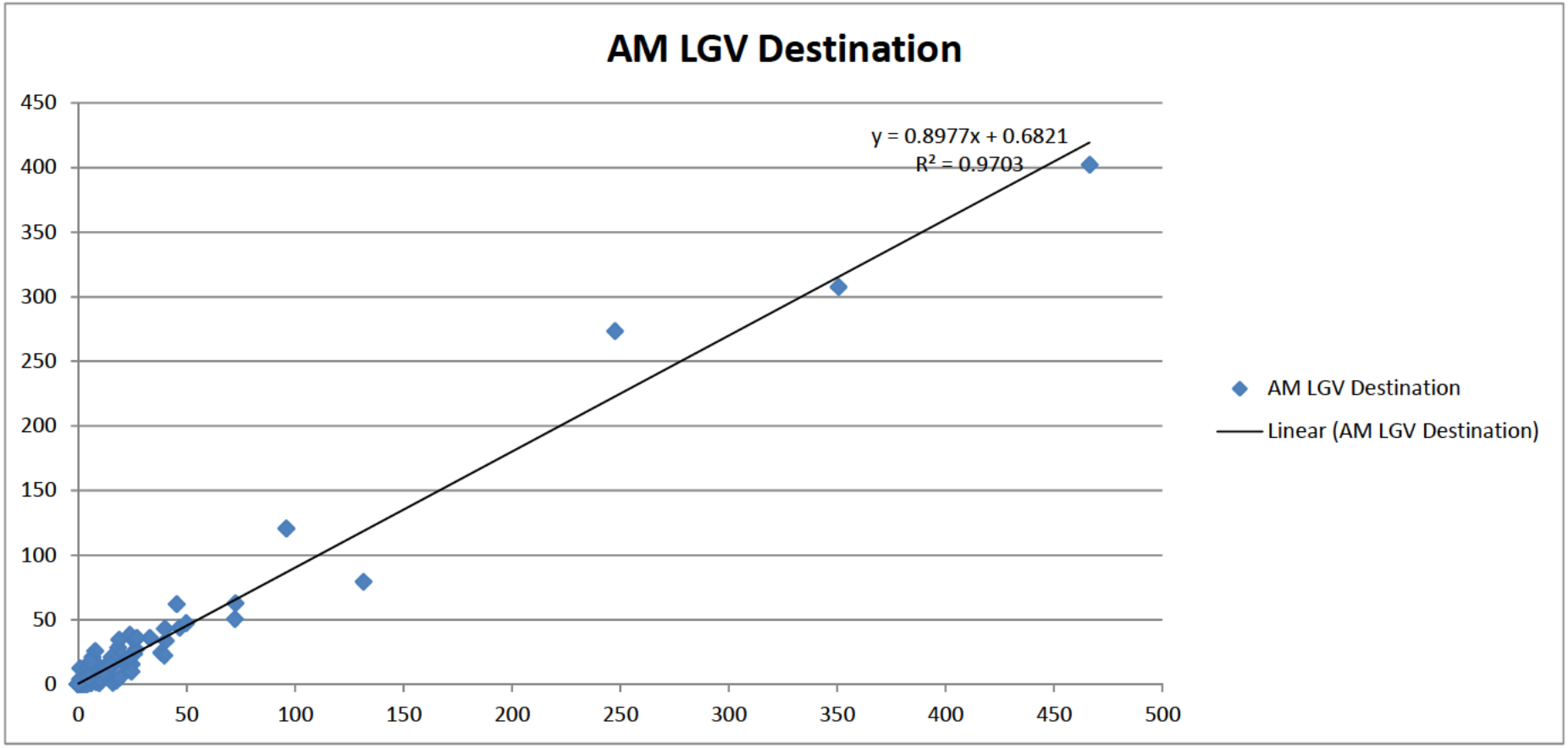

AM HGV Origin
y = 0.8052x + 0.4281
R² = 0.9044
160
140
120
100
80
60
40
20
0
0
20
40
60
80
100
120
140
160
180
200
AM HGV Origin
Linear (AM HGV Origin)

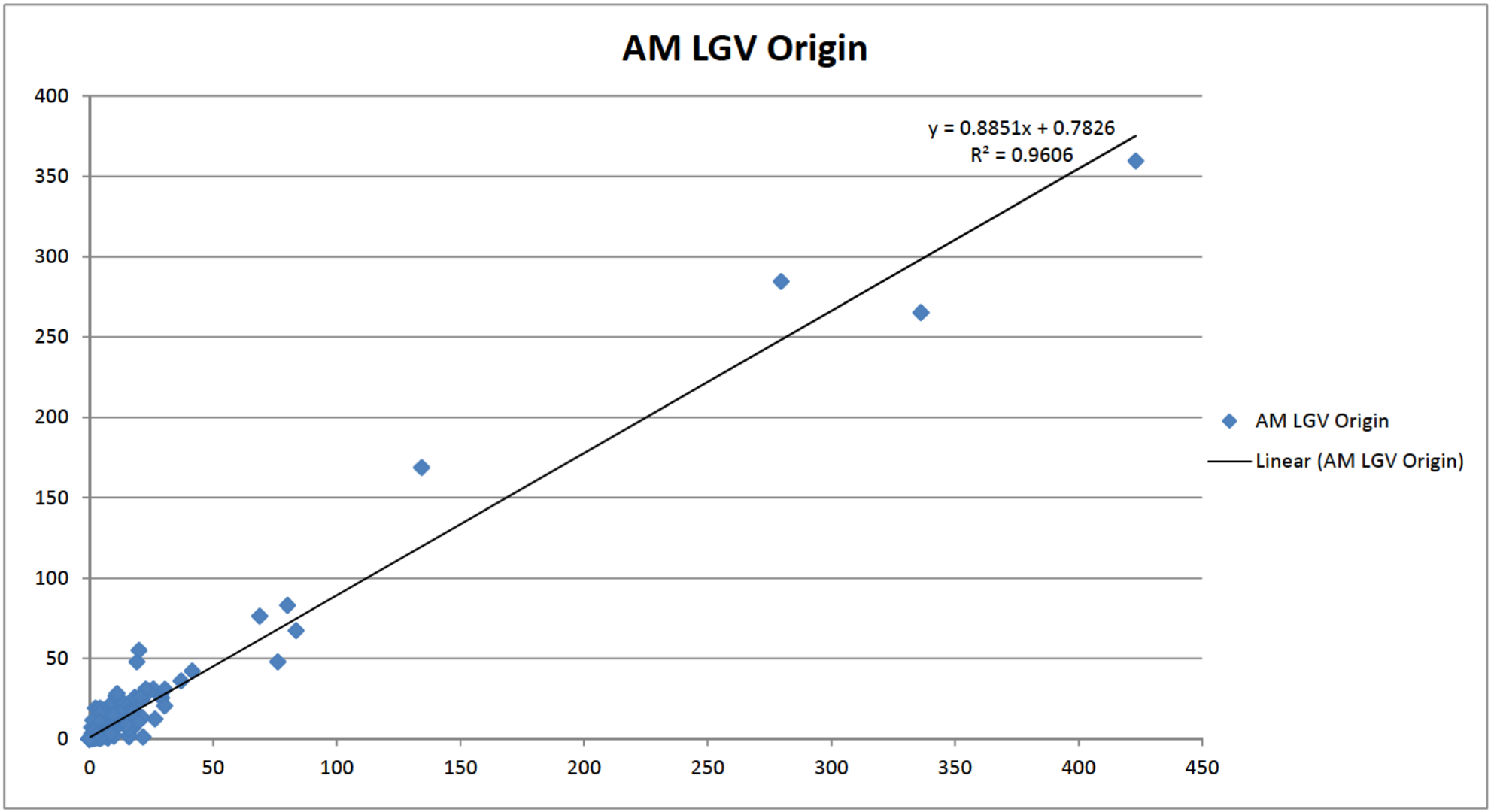

IP HGV Destination
120
100
80
60
40
20
0
0
10
20
30
40
50
60
70
80
90
y = 1.109x - 0.0288
R² = 0.9117
IP HGV Destination
Linear (IP HGV Destination)

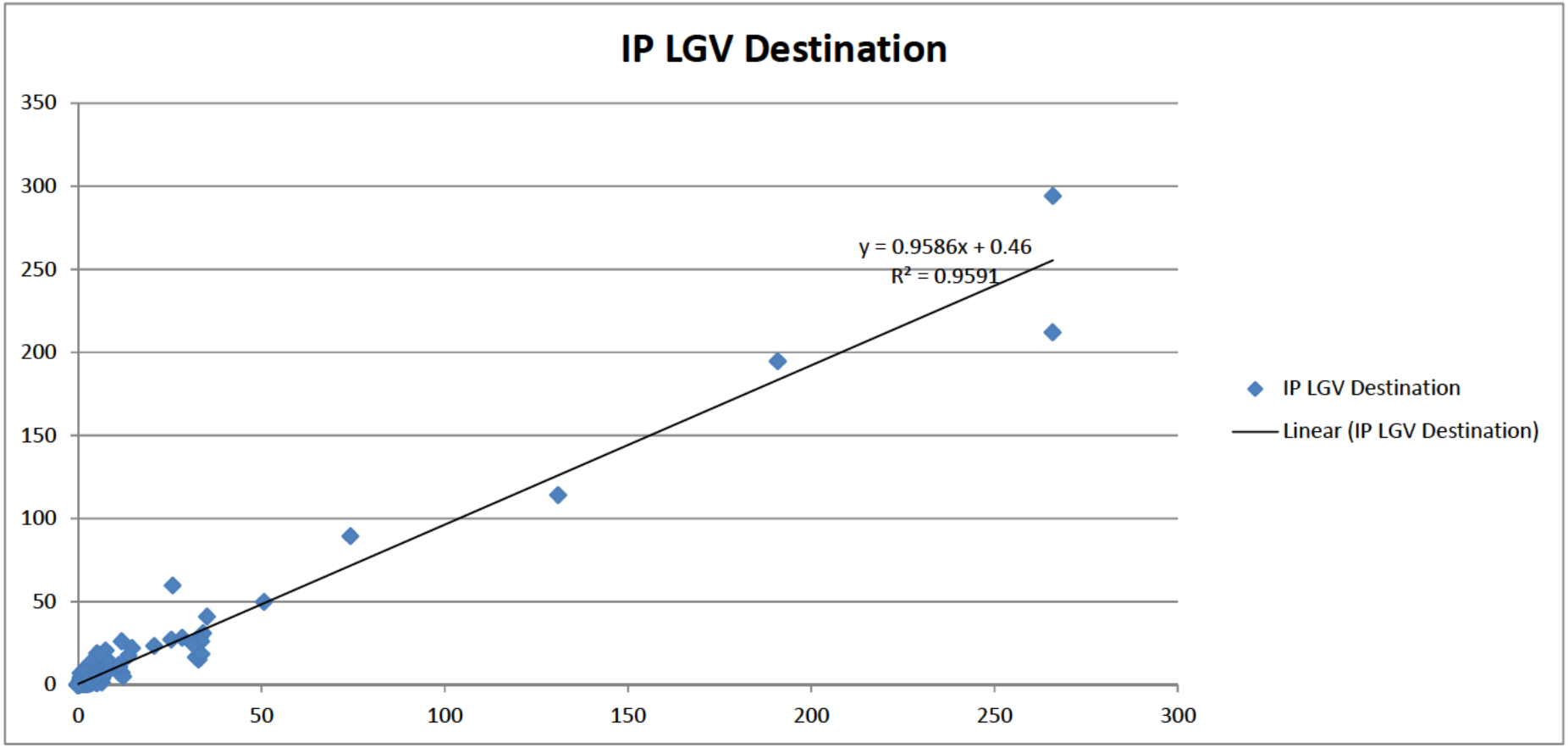

IP HGV Origin
y = 1.0505x + 0.1036
R² = 0.8922
100
90
80
70
60
50
40
30
20
10
0
0
10
20
30
40
50
60
70
80
90
IP HGV Origin
Linear (IP HGV Origin)

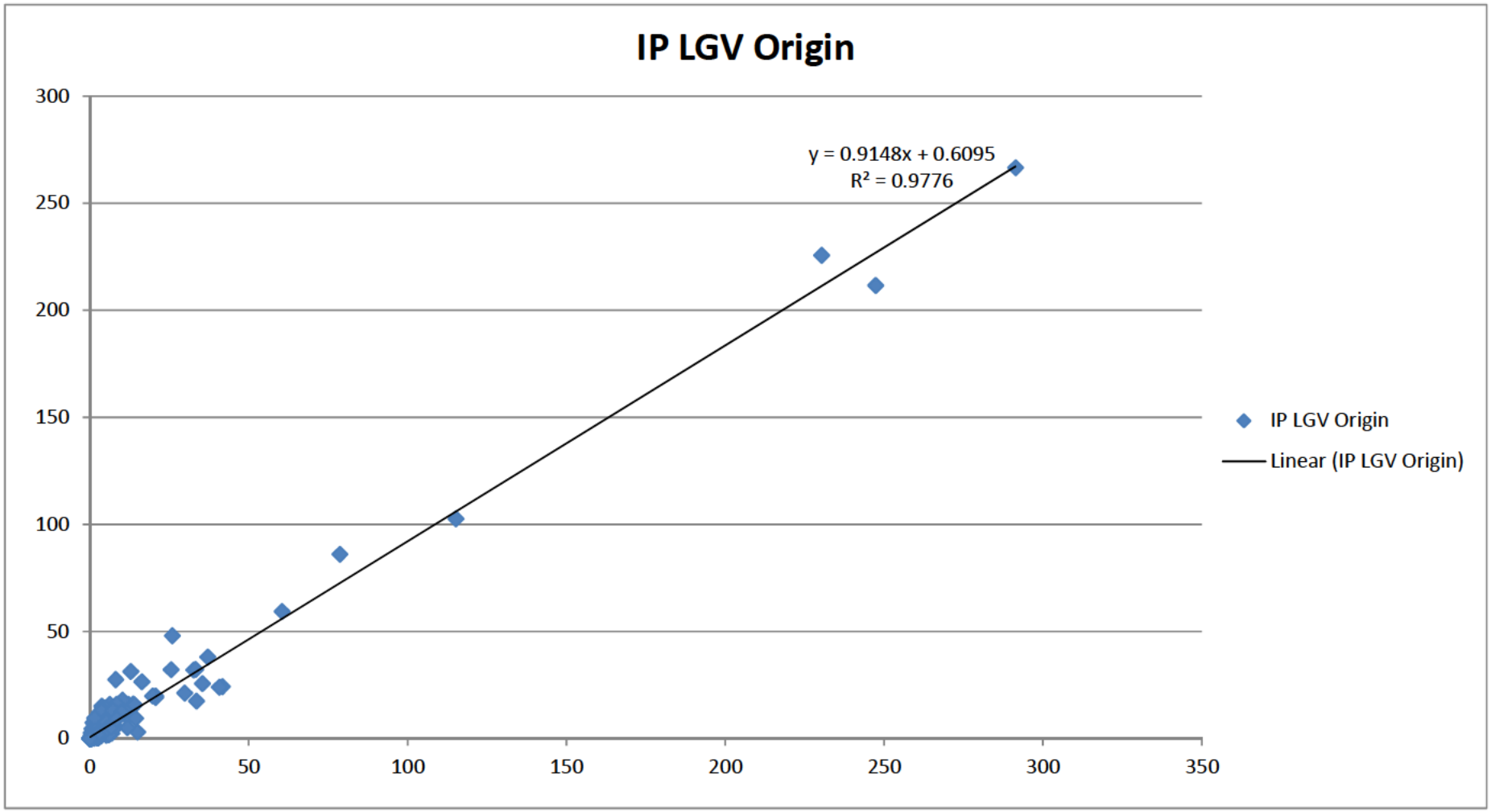

PM HGV Destination
y = 0.9153x + 0.1543
R² = 0.814
PM HGV Destination
Linear (PM HGV Destination)
0
5
10
15
20
25
30
35
40
45

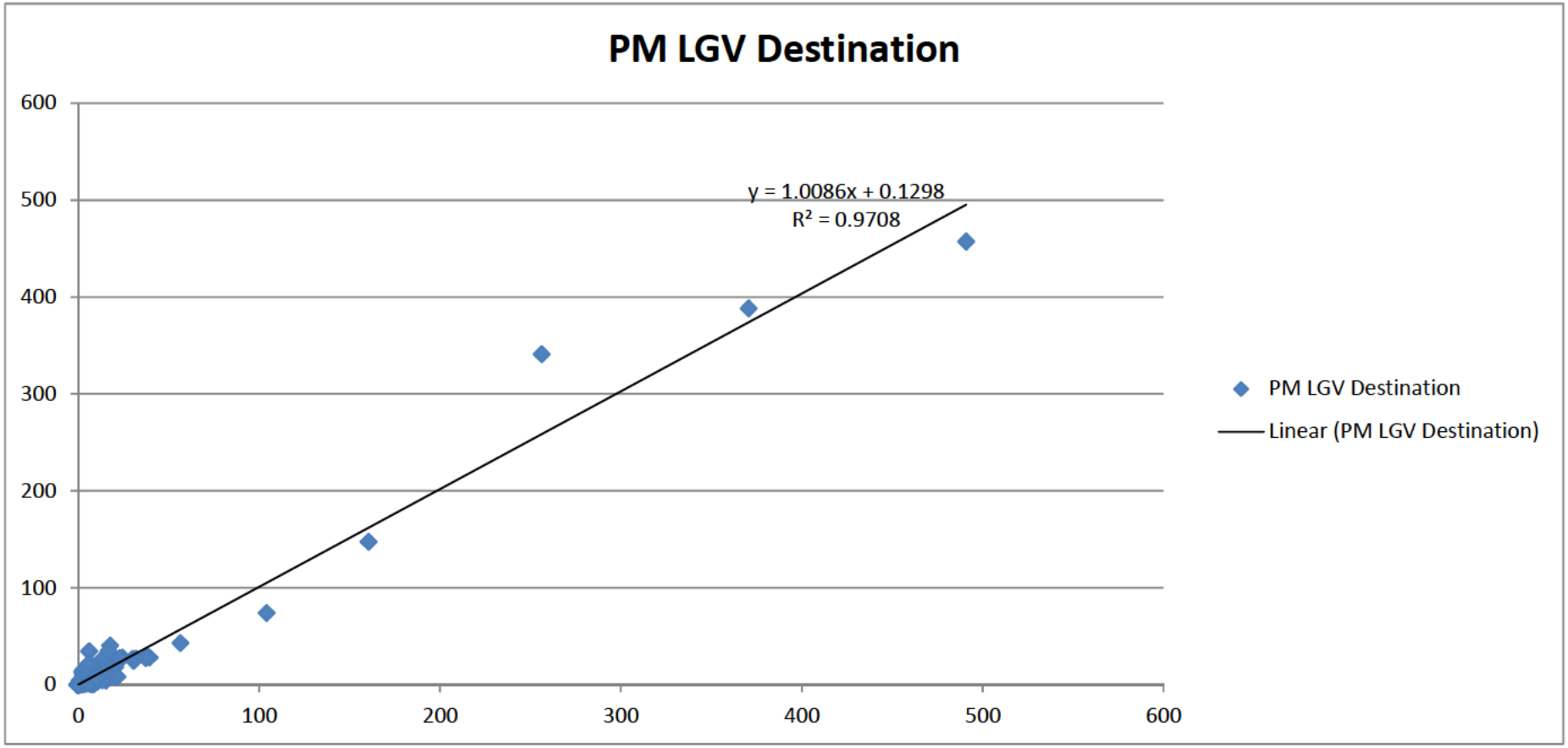

PM HGV Origin
y = 0.9153x + 0.1543
R² = 0.814
PM HGV Origin
Linear (PM HGV Origin)
0
5
10
15
20
25
30
35
40
45

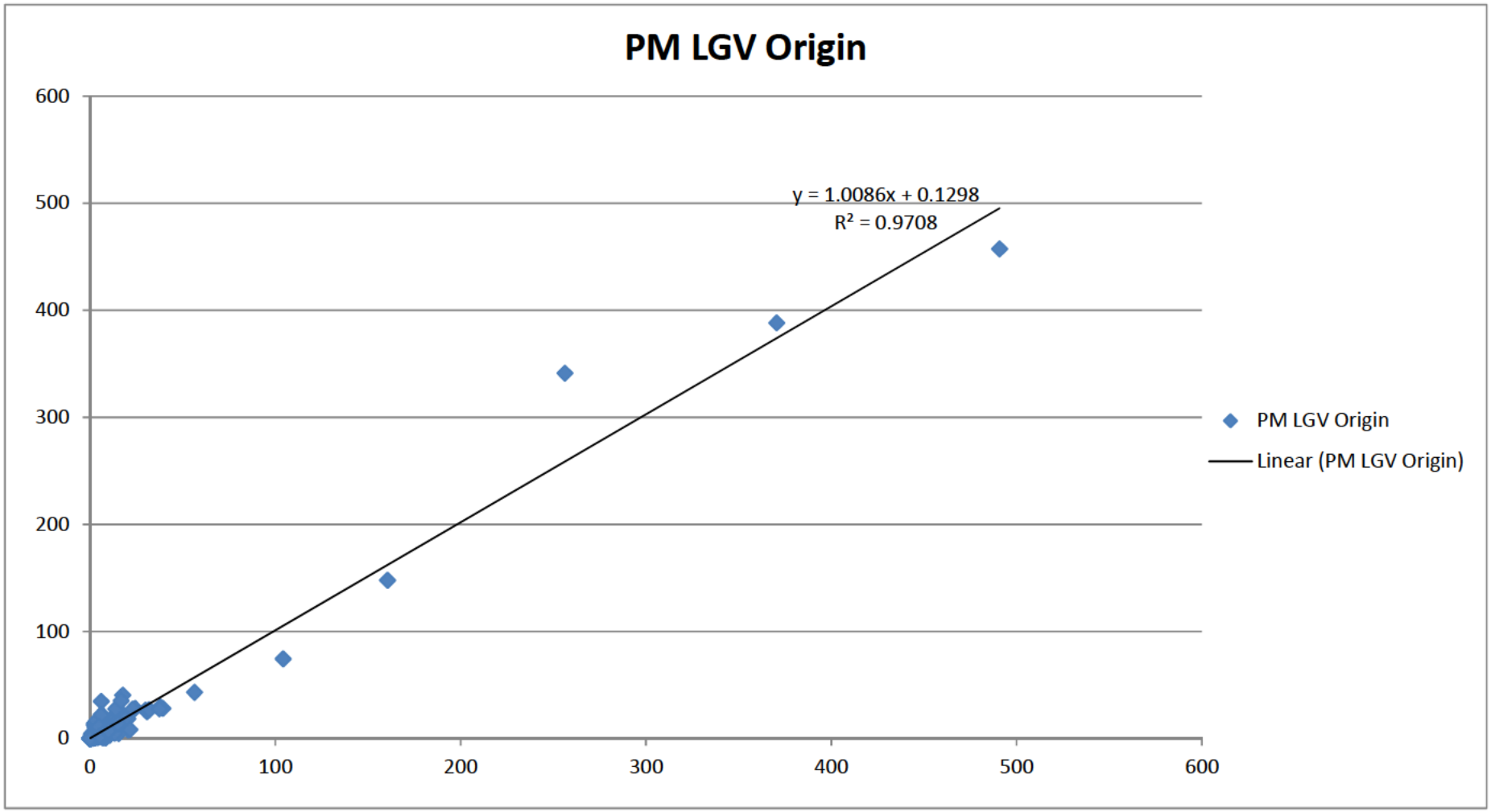

AM LGV Destination
y = 0.8977x + 0.6821
R² = 0.9703
450
400
350
300
250
200
150
100
50
0
0
50
100
150
200
250
300
350
400
450
500
AM LGV Destination
Linear (AM LGV Destination)


AM LGV Origin
y = 0.8851x + 0.7826
R² = 0.9606
400
350
300
250
200
150
100
50
0
0
50
100
150
200
250
300
350
400
450
AM LGV Origin
Linear (AM LGV Origin)

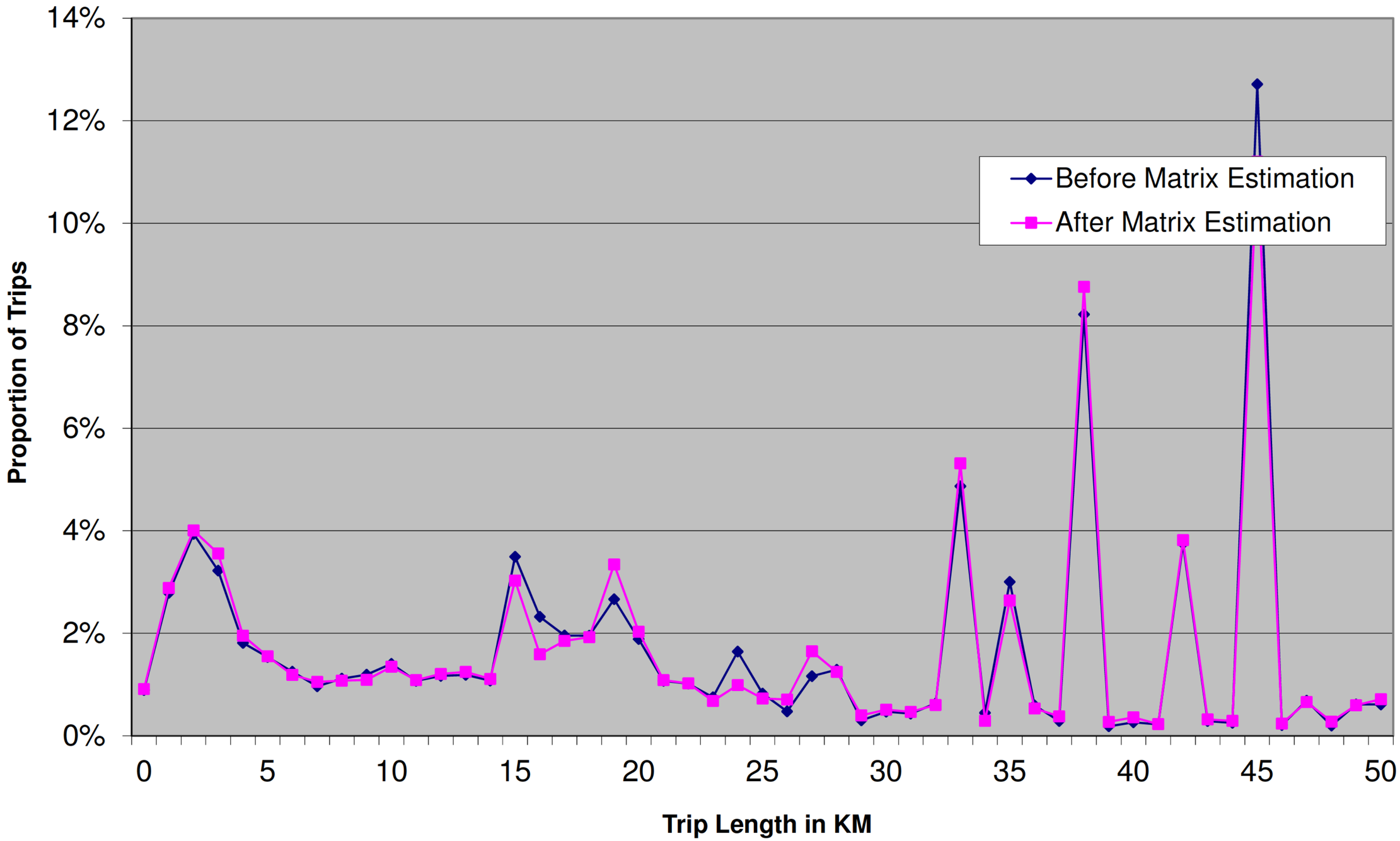

IP LGV Destination
350
300
250
200
150
100
50
0
0
50
100
150
200
250
300
y = 0.9586x + 0.46
R² = 0.9591
IP LGV Destination
Linear (IP LGV Destination)


IP LGV Origin
y = 0.9148x + 0.6095
R² = 0.9776
300
250
200
150
100
50
0
0
50
100
150
200
250
300
350
IP LGV Origin
Linear (IP LGV Origin)

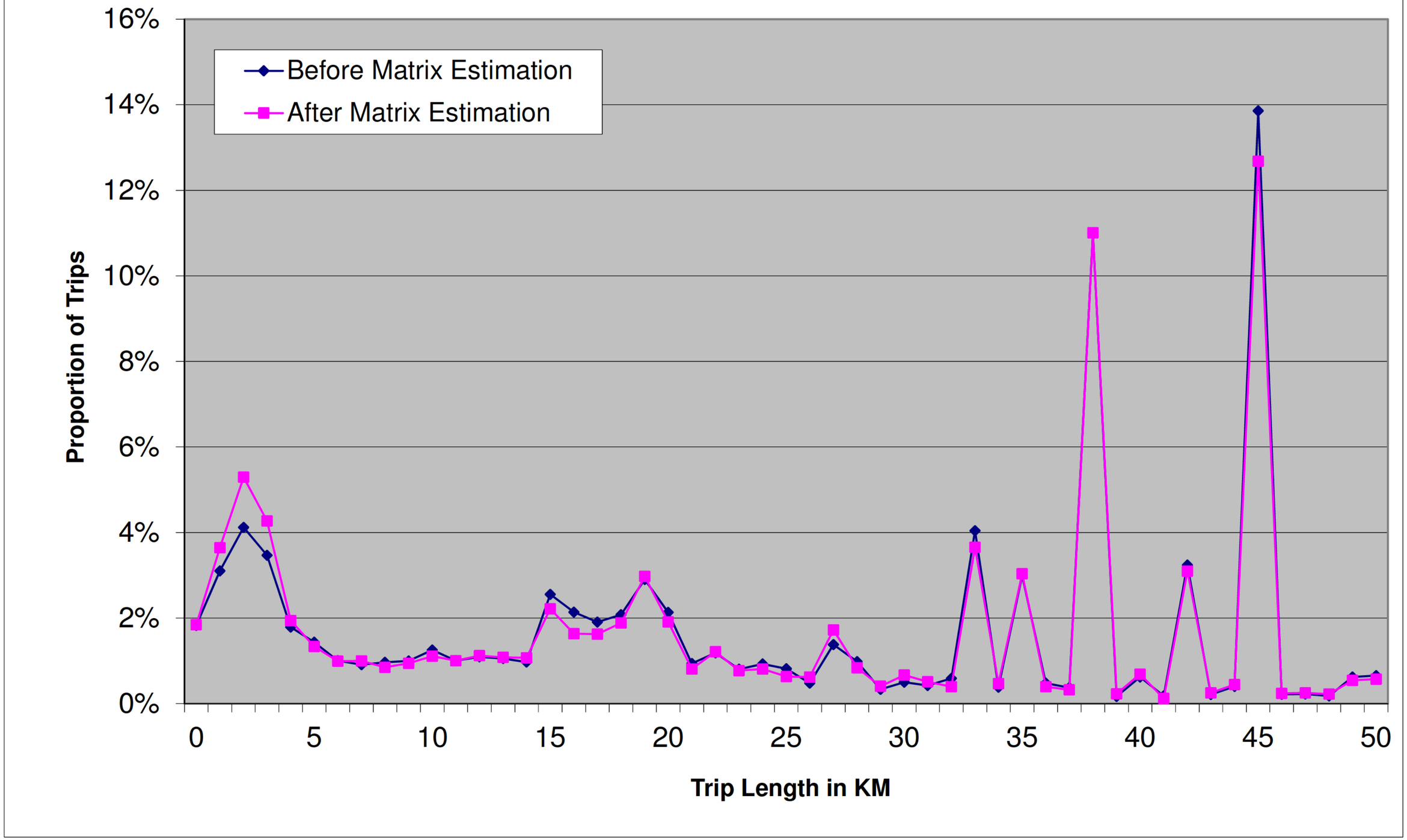

PM LGV Destination
600
500
400
300
200
100
0
0
100
200
300
400
500
600
y = 1.0086x + 0.1298
R² = 0.9708
PM LGV Destination
Linear (PM LGV Destination)


PM LGV Origin
y = 1.0086x + 0.1298
R² = 0.9708
600
500
400
300
200
100
0
0
100
200
300
400
500
600
PM LGV Origin
Linear (PM LGV Origin)

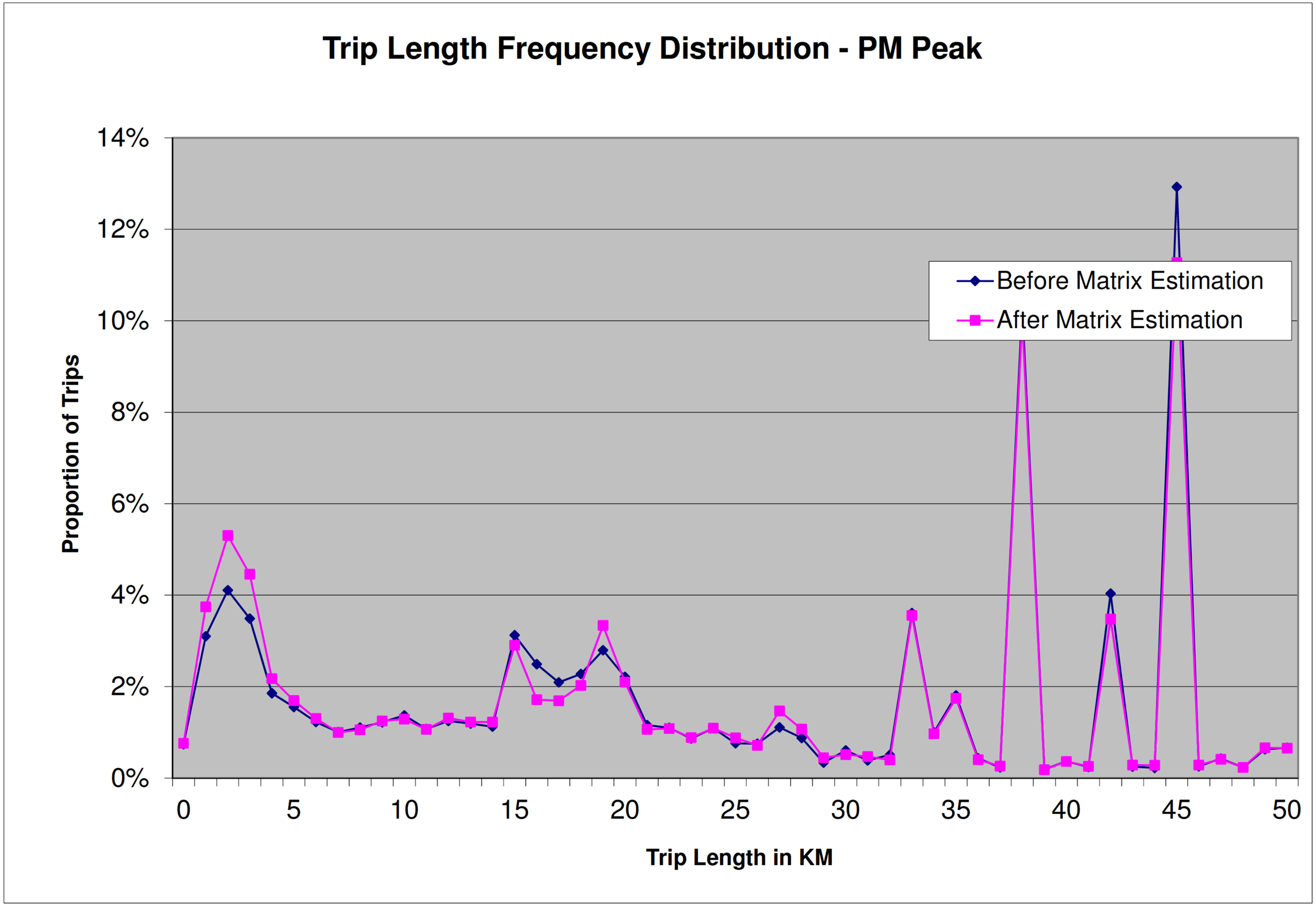
Trip Length Frequency Distribution - AM Peak



Trip Length Frequency Distribution - Inter Peak



Trip Length Frequency Distribution - PM Peak



Appendix C – Cordon and Screenline Data

Appendix C: Cordon Data

This is a roadside interview cordon using the CTC link totals. It is imperfect

Cordon1 - Inbound

Cordon around Bicester town

			AM Peak				Inter Peak				PM Peak			
			Observed	Modelled	% difference		Observed	Modelled	% difference		Observed	Modelled	% difference	
Site	type	direction	Total	Total	Total	GEH	Total	Total	Total	GEH	Total	Total	Total	GEH
JUNCTION DESCRIPTION: Banbury Rd/ A4095/ B	MCC	ARM A: B4100 (North)A Southbound	765	734	-4.0%		347	343	-1.1%		567	574	1.3%	
JUNCTION DESCRIPTION: Buckingham Rd/ A409	MCC	ARM A: A4421 (North)A Southbound	1033	1095	6.0%		443.25	453	2.2%		608	570	-6.2%	
JUNCTION DESCRIPTION: A4421/ Bicester Rd/ C	MCC	ARM B: Bicester Rd (East)B Westbound	339	329	-3.0%		190	231	21.6%		295	298	1.1%	
JUNCTION DESCRIPTION: London Rd/ A4421/ A	MCC	ARM C: A41 (South)C Northbound	887	834	-6.0%		689.5	634	-8.1%		1089	1001	-8.1%	
JUNCTION DESCRIPTION: London Rd/ A4421/ A	MCC	ARM D: Gravenhill Rd (West)D Eastbound	15	44	194.8%		38.5	21	-45.1%		39	70	79.5%	
JUNCTION DESCRIPTION: A41 N/ Unlabelled Rd	MCC	ARM C: A41 (South)C Northbound	1088	1015	-6.7%		1096	1065	-2.9%		1643	1467	-10.7%	
JUNCTION DESCRIPTION: Vendee Dr N/ Vendee	MCC	ARM C: A4095 (West)C Eastbound	220	202	-8.4%		181	188	3.6%		438	437	-0.2%	
JUNCTION DESCRIPTION: Howes Ln/ Middleton	MCC	ARM D: B4030 (West)D Eastbound	273	258	-5.7%		180	179	-0.5%		296	238	-19.6%	
JUNCTION DESCRIPTION: A4095/ Bucknell Rd S/	MCC	ARM C: Bucknell Rd (West)C Eastbound	118	144	22.2%		79	100	26.9%		120	123	2.1%	
		Total	4738	4654	-1.8%	1.22	3244	3214	-0.9%	0.53	5095	4778	-6.2%	4.51

This is a roadside interview cordon using the CTC link totals. It is imperfect

Cordon1 - Outbound

Cordon around Bicester town

			AM Peak				Inter Peak				PM Peak			
			Observed	Modelled	% difference		Observed	Modelled	% difference		Observed	Modelled	% difference	
Site	type	direction	Total	Total	Total	GEH	Total	Total	Total	GEH	Total	Total	Total	GEH
JUNCTION DESCRIPTION: Banbury Rd/ A4095/ B	MCC	ARM A: B4100 (North)A Northbound	467	438	-6.2%		329	301.80	-8.3%		623	563	-9.6%	
JUNCTION DESCRIPTION: Buckingham Rd/ A409	MCC	ARM A: A4421 (North)A Northbound	557	514	-7.7%		462.25	465.27	0.7%		972	964	-0.8%	
JUNCTION DESCRIPTION: A4421/ Bicester Rd/ C	MCC	ARM B: Bicester Rd (East)B Eastbound	273	289	5.8%		207	218.88	5.7%		347	359	3.6%	
JUNCTION DESCRIPTION: London Rd/ A4421/ A	MCC	ARM C: A41 (South)C Southbound	1118	1010	-9.7%		661.25	601.31	-9.1%		1026	940	-8.3%	
JUNCTION DESCRIPTION: London Rd/ A4421/ A	MCC	ARM D: Gravenhill Rd (West)D Westbound	27	27	-0.2%		28.25	26.75	-5.3%		8	33	312.6%	
JUNCTION DESCRIPTION: A41 N/ Unlabelled Rd	MCC	ARM C: A41 (South)C Southbound	1624	1514	-6.8%		1058	991.30	-6.3%		1313	1096	-16.5%	
JUNCTION DESCRIPTION: Vendee Dr N/ Vendee	MCC	ARM C: A4095 (West)C Westbound	441	406	-8.0%		151	147.44	-2.4%		250	242	-3.3%	
JUNCTION DESCRIPTION: Howes Ln/ Middleton	MCC	ARM D: B4030 (West)D Westbound	291	254	-12.8%		161	170.88	6.1%		239	276	15.3%	
JUNCTION DESCRIPTION: A4095/ Bucknell Rd S/	MCC	ARM C: Bucknell Rd (West)C Westbound	184	197	7.0%		92.0	105.2	14.4%		140	173	23.4%	
		Total	4982	4648	-6.7%	4.82	3150	3029	-3.8%	2.18	4918	4646	-5.5%	3.94

Appendix C: Screenline Data

This is a validation screenline using ATC's that only recorded total vehicles.

Screenline1 - Northbound NB

Screenline E-W along the railway line			AM Total Vehicles			IP Total Vehicles			PM Total Vehicles		
Site	type	direction	Observed	Modelled	% diff	Observed	Modelled	% diff	Observed	Modelled	% diff
Bucknell Rd/ Howes Lane	ATC	Northbound	482	474	-1.7%	399	360	-9.8%	898	865	-3.7%
Banbury Rd	ATC	Northbound	0	0	0.0%	0	0	0.0%	0	0	0.0%
Buckingham Rd	ATC	Northbound	436	399	-8.5%	440	367	-16.7%	613	530	-13.6%
Launton Road	ATC	Northbound	370	361	-2.2%	452	464	2.7%	557	638	14.5%
A4421 Gavray Drive	ATC	Northbound	624	589	-5.6%	382	341	-10.7%	604	543	-10.1%
Total			1912	1823	-4.6%	1672	1531	-8.4%	2672	2575	-3.6%

GEH		
AM	IP	PM
2.04	3.52	1.90

Screenline1 - Southbound SB

Screenline E-W along the railway line			AM Total Vehicles			IP Total Vehicles			PM Total Vehicles		
Site	type	direction	Observed	Modelled	% diff	Observed	Modelled	% diff	Observed	Modelled	% diff
Bucknell Rd/ Howes Lane	ATC	Southbound	864	905	4.8%	383	358	-6.4%	663	612	-7.7%
Banbury Rd	ATC	Southbound	0	0	0.0%	0	0	0.0%	0	0	0.0%
Buckingham Rd	ATC	Southbound	468	519	11.0%	411	364	-11.6%	491	530	8.0%
Launton Road	ATC	Southbound	387	319	-17.5%	421	505	20.2%	495	397	-19.7%
A4421 Gavray Drive	ATC	Southbound	608	566	-6.9%	388	352	-9.2%	609	537	-11.8%
Total			2325	2309	-0.7%	1603	1579	-1.4%	2257	2076	-8.0%

GEH		
AM	IP	PM
0.34	0.58	3.89

Appendix D – Turn Count Calibration

				AM Peak														Inter Peak														PM Peak													
				Observed				Modelled (Actual)				Car	LGV	HGVeh	Total Veh			Observed				Modelled (Actual)				Car	LGV	HGVeh	Total Veh			Observed				Modelled (Actual)				Car	LGV	HGVeh	Total Veh		
MCC	From	TO	Car	LGV	HGV	Total	Car	LGV	HGVeh	Total	GEH	GEH	GEH	Diff	% Diff	GEH	Car	LGV	HGV	Total	Car	LGV	HGV	Total	GEH	GEH	GEH	Diff	% Diff	GEH	Car	LGV	HGV	Total	Car	LGV	HGV	Total	GEH	GEH	GEH	Diff	% Diff	GEH
1 SITE 1	ARM A: B4100 (North)	ARM A: B4100 (North)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	1	1	0	1	0	0	0	0	1.22	1.00	0.00	-1	-100%	1.58	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
2 SITE 1	ARM A: B4100 (North)	ARM B: A4095 (East)	325	62	29	416	331	77	29	437	0.34	1.80	0.09	21	5%	1.00	129	23	26	177	118	23	26	167	0.97	0.08	0.06	-10	-6%	0.77	272	31	13	316	278	34	13	325	0.36	0.58	0.02	9	3%	0.52
3 SITE 1	ARM A: B4100 (North)	ARM C: B4100 (South)	191	28	8	227	176	28	0	204	1.11	0.02	4.00	-23	-10%	1.58	104	9	3	116	118	11	3	131	1.32	0.48	0.13	15	13%	1.37	127	13	0	140	122	18	0	140	0.42	1.25	0.00	0	0%	0.02
4 SITE 1	ARM A: B4100 (North)	ARM D: A4095 (West)	103	10	5	118	84	10	0	94	2.01	0.03	3.16	-24	-21%	2.37	43	6	3	52	43	2	0	45	0.04	2.07	2.45	-7	-13%	0.95	97	11	1	109	109	0	0	109	1.16	4.69	1.41	0	0%	0.03
5 SITE 1	ARM B: A4095 (East)	ARM A: B4100 (North)	230	42	24	296	214	42	25	281	1.10	0.02	0.21	-15	-5%	0.89	128	26	26	180	113	26	28	167	1.35	0.02	0.39	-13	-7%	0.98	356	37	4	397	318	37	4	360	2.05	0.01	0.13	-37	-9%	1.93
6 SITE 1	ARM B: A4095 (East)	ARM B: A4095 (East)	9	1	1	11	0	0	0	0	4.12	1.41	1.41	-11	-98%	4.58	5	2	0	7	0	0	0	0	3.10	1.87	0.71	-7	-98%	3.69	6	1	0	7	2	0	0	2	2.20	1.41	0.00	-5	-76%	2.55
7 SITE 1	ARM B: A4095 (East)	ARM C: B4100 (South)	89	4	1	94	83	0	0	83	0.65	2.83	1.41	-11	-12%	1.17	65	5	1	71	58	2	0	60	0.84	1.57	1.41	-10	-15%	1.29	115	8	1	124	80	0	0	80	3.56	4.00	1.41	-44	-36%	4.37
8 SITE 1	ARM B: A4095 (East)	ARM D: A4095 (West)	580	82	12	674	547	82	13	642	1.40	0.03	0.23	-32	-5%	1.25	224	34	13	270	196	34	12	242	1.92	0.04	0.11	-28	-10%	1.75	524	46	5	575	469	48	5	522	2.47	0.28	0.03	-53	-9%	2.27
9 SITE 1	ARM C: B4100 (South)	ARM A: B4100 (North)	81	15	1	97	81	15	0	95	0.05	0.06	1.41	-2	-2%	0.17	83	10	4	97	80	13	4	98	0.23	1.02	0.08	1	1%	0.13	156	11	0	167	140	11	0	151	1.32	0.09	0.00	-16	-10%	1.30
10 SITE 1	ARM C: B4100 (South)	ARM B: A4095 (East)	72	10	2	84	39	0	0	39	4.41	4.47	2.00	-45	-53%	5.72	66	4	1	71	67	3	0	69	0.10	0.78	1.41	-2	-2%	0.19	137	8	0	145	96	0	0	96	3.83	4.00	0.00	-49	-34%	4.49
11 SITE 1	ARM C: B4100 (South)	ARM C: B4100 (South)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	1	1	0	2	0	0	0	0	1.22	1.22	0.00	-2	-100%	1.73	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
12 SITE 1	ARM C: B4100 (South)	ARM D: A4095 (West)	63	7	0	70	59	0	0	59	0.53	3.74	0.00	-11	-16%	1.38	39	5	2	45	36	0	2	38	0.40	3.00	0.12	-7	-15%	1.05	84	6	0	90	68	0	0	68	1.79	3.46	0.00	-22	-24%	2.43
13 SITE 1	ARM D: A4095 (West)	ARM A: B4100 (North)	55	10	2	67	53	9	0	62	0.24	0.45	2.00	-5	-8%	0.64	37	6	3	46	37	0	0	37	0.09	3.54	2.35	-10	-21%	1.48	45	8	0	53	48	5	0	53	0.44	1.16	0.00	0	0%	0.01
14 SITE 1	ARM D: A4095 (West)	ARM B: A4095 (East)	366	37	6	409	324	31	8	363	2.29	1.00	0.70	-46	-11%	2.37	218	33	13	264	196	36	12	245	1.50	0.56	0.14	-19	-7%	1.18	576	65	10	651	522	66	8	596	2.29	0.13	0.71	-55	-8%	2.20
15 SITE 1	ARM D: A4095 (West)	ARM C: B4100 (South)	57	2	0	59	34	0	0	34	3.43	2.00	0.00	-25	-43%	3.69	41	3	2	45	39	0	2	41	0.26	2.45	0.14	-4	-10%	0.69	71	2	0	73	70	0	0	70	0.08	2.00	0.00	-3	-4%	0.31
16 SITE 1	ARM D: A4095 (West)	ARM D: A4095 (West)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	0	0	0	0	0	0	0	0	0.71	0.00	0.00	0	-100%	0.71	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
17 SITE 2	ARM A: A4421 (North)	ARM A: A4421 (North)	0	0	0	0	0	0	0	0	0.93	0.00	0.00	0	#DIV/0!	0.93	0	0	0	0	0	0	0	0	0.98	0.71	0.00	0	92%	0.38	0	0	0	0	1	0	0	1	1.33	0.00	0.00	1	#DIV/0!	1.33
18 SITE 2	ARM A: A4421 (North)	ARM B: Skimmingdish Ln (East)	353	44	28	425	349	44	27	420	0.24	0.03	0.11	-5	-1%	0.25	122	22	19	162	121	34	20	175	0.08	2.28	0.30	12	8%	0.96	149	13	13	175	160	14	4	177	0.86	0.14	3.01	2	1%	0.18
19 SITE 2	ARM A: A4421 (North)	ARM C: Buckingham Rd (South)	264	21	10	295	265	63	12	340	0.07	6.47	0.67	45	15%	2.54	160	17	3	179	141	31	3	176	1.47	2.93	0.33	-3	-2%	0.23	189	24	3	216	171	46	3	220	1.31	3.70	0.11	4	2%	0.28
20 SITE 2	ARM A: A4421 (North)	ARM D: A4095 (West)	257	38	9	304	283	38	13	334	1.60	0.00	1.15	30	10%	1.69	74	14	8	96	73	19	10	102	0.09	1.19	0.69	6	6%	0.62	189	19	1	209	150	21	1	172	3.02	0.44	0.12	-37	-18%	2.69
21 SITE 2	ARM B: Skimmingdish Ln (East)	ARM A: A4421 (North)	147	30	16	193	148	31	8	187	0.10	0.11	2.22	-6	-3%	0.43	120	24	21	164	119	38	23	179	0.04	2.39	0.47	15	9%	1.14	339	14	6	359	368	30	6	404	1.54	3.40	0.05	45	13%	2.30
22 SITE 2	ARM B: Skimmingdish Ln (East)	ARM B: Skimmingdish Ln (East)	2	0	0	2	0	0	0	0	2.00	0.00	0.00	-2	-100%	2.00	3	1	0	4	0	0	0	0	2.55	1.00	0.71	-4	-100%	2.83	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41
23 SITE 2	ARM B: Skimmingdish Ln (East)	ARM C: Buckingham Rd (South)	15	3	0	18	7	0	0	7	2.47	2.45	0.00	-11	-62%	3.17	20	3	1	24	12	0	0	12	2.05	2.35	1.58	-12	-50%	2.87	45	8	1	54	33	0	0	33	1.94	4.00	1.41	-21	-39%	3.21
24 SITE 2	ARM B: Skimmingdish Ln (East)	ARM D: A4095 (West)	316	68	27	411	292	70	25	386	1.39	0.20	0.38	-25	-6%	1.23	222	42	28	291	185	43	27	256	2.56	0.27	0.06	-35	-12%	2.12	605	65	5	675	583	54	5	642	0.90	1.40	0.02	-33	-5%	1.27
25 SITE 2	ARM C: Buckingham Rd (South)	ARM A: A4421 (North)	160	18	8	186	139	23	3	165	1.69	1.05	2.25	-21	-11%	1.60	161	25	6	192	151	33	6	190	0.77	1.48	0.04	-2	-1%	0.12	289	36	8	333	231	48	7	286	3.59	1.82	0.22	-47	-14%	2.66
26 SITE 2	ARM C: Buckingham Rd (South)	ARM B: Skimmingdish Ln (East)	74	9	2	85	64	9	0	73	1.16	0.00	2.00	-12	-14%	1.30	24	3	2	29	16	0	0	16	1.76	2.45	1.87	-13	-44%	2.66	24	4	0	28	21	0	0	21	0.72	2.83	0.00	-7	-26%	1.50
27 SITE 2	ARM C: Buckingham Rd (South)	ARM C: Buckingham Rd (South)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	0	0	0	0	0	0	0	0	0.71	0.00	0.00	0	-100%	0.71	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
28 SITE 2	ARM C: Buckingham Rd (South)	ARM D: A4095 (West)	162	17	2	181	146	0	0	146	1.28	5.83	2.00	-35	-19%	2.73	74	12	4	89	43	0	3	47	3.98	4.80	0.09	-42	-47%	5.12	174	15	4	193	119	0	1	120	4.58	5.48	1.54	-73	-38%	5.83
29 SITE 2	ARM D: A4095 (West)	ARM A: A4421 (North)	149	16	5	170	141	16	5	162	0.67	0.03	0.00	-8	-5%	0.63	74	15	9	97	73	14	8	96	0.10	0.14	0.04	-2	-2%	0.15	233	27	8	268	238	27	8	273	0.32	0.02	0.05	5	2%	0.30
30 SITE 2	ARM D: A4095 (West)	ARM B: Skimmingdish Ln (East)	500	81	30	611	467	74	31	571	1.52	0.77	0.11	-40	-6%	1.63	233	39	28	299	207	30	28	265	1.72	1.48	0.07	-35	-12%	2.05	381	48	17	446	375	53	13	441	0.29	0.64	1.02	-5	-1%	0.24
31 SITE 2	ARM D: A4095 (West)	ARM C: Buckingham Rd (South)	98	14	2	114	47	14	3	64	6.06	0.03	0.80	-50	-44%	5.34	62	8	3	73	51	0	3	54	1.46	4.00	0.14	-19	-26%	2.41	132	18	0	150	97	0	0	97	3.32	6.00	0.00	-53	-36%	4.82
32 SITE 2	ARM D: A4095 (West)	ARM D: A4095 (West)	0	0	0	0	0	0	0	0	0.45	0.00	0.00	0	#DIV/0!	0.45	1	0	0	1	0	0	0	0	0.53	0.00	0.00	0	-62%	0.53	0	0	0	0	0	0	0	0	0.76	0.00	0.00	0	#DIV/0!	0.76
33 SITE 3	ARM A: Skimmingdish Ln (North)	ARM A: Skimmingdish Ln (North)	3	0	0	3	0	0	0	0	2.45	0.00	0.00	-3	-100%	2.45	1	0	0	1	0	0	0	0	1.22	0.71	0.00	-1	-100%	1.41	3	0	0	3	0	0	0	0	2.45	0.00	0.00	-3	-100%	2.45
34 SITE 3	ARM A: Skimmingdish Ln (North)	ARM B: A4421 (South)	494	80	42	616	467	70	42	579	1.24	1.15	0.03	-37	-6%	1.53	193	29	33	254	193	29	32	253	0.03	0.09	0.11	-1	0%	0.03	360	35	17	412	339	38	7	384	1.14	0.50	2.85	-28	-7%	1.41
35 SITE 3	ARM A: Skimmingdish Ln (North)	ARM C: Launton Rd (West)	416	54	16	486	367	48	16	431	2.47	0.85	0.05	-55	-11%	2.56	176	35	16	226	148	35	16	199	2.15	0.03	0.02	-27	-12%	1.86	200	28	12	240	203	28	10	241	0.19	0.01	0.58	1	0%	0.05
36 SITE 3	ARM B: A4421 (South)	ARM A: Skimmingdish Ln (North)	328	44	23	395	295	44	13	353	1.85	0.03	2.29	-42	-11%	2.18	172	28	27	227	165	28	28	220	0.53	0.01	0.06	-7	-3%	0.44	495	47	6	548	480	47	6	533	0.70	0.02	0.06	-15	-3%	0.65
37 SITE 3	ARM B: A4421 (South)	ARM B: A4421 (South)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	1	0	0	1	0	0	0	0	1.00	0.00	0.00	-1	-100%	1.00	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41
38 SITE 3	ARM B: A4421 (South)	ARM C: Launton Rd (West)	349	49	13	411	325	49	8	382	1.30	0.00	1.62	-29	-7%	1.46	212	46	17	276	197	46	18	261	1.04	0.03	0.08	-15	-5%	0.90	281	35	3	319	258	35	0	293	1.42	0.00	2.45	-26	-8%	1.50
39 SITE 3	ARM C: Launton Rd (West)	ARM A: Skimmingdish Ln (North)	163	56	23	242	151	56	20	228	0.92	0.01	0.63	-14	-6%	0.95	187	40	22	250	152	53	22	227	2.71	1.83	0.01	-23	-9%	1.48	484	37	4	525	504	37	5	546	0.92	0.01	0.48	21	4%	0.92
40 SITE 3	ARM C: Launton Rd (West)	ARM B: A4421 (South)	227	49	21	297	212	49	0	261	1.01	0.00	6.48	-36	-12%	2.15	218	41	15	273	202	31	15	248	1.06	1.68	0.02	-25	-9%	1.58	352	31	7	390	337	31	4	373	0.78	0.01	1.27	-17	-4%	0.89
41 SITE 3	ARM C: Launton Rd (West)	ARM C: Launton Rd (West)	6	0	1	7	0	0	0	0	3.46	0.00	1.41	-7	-100%	3.74	3	1	0	4	0	0	0	0	2.35	1.22	0.71	-4	-100%	2.74	5	1	0	6	0	0	0	0	3.16	1.41	0.00	-6	-100%	3.46
42 SITE 4	ARM A: Charbridge Ln (North)	ARM A: Charbridge Ln (North)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	3	0	1	4	0	0	0	0	2.45	0.00	1.00	-4	-100%	2.65	2	0	0	2	0	0	0	0	2.00	0.00	0.00	-2	-100%	2.00
43 SITE 4	ARM A: Charbridge Ln (North)	ARM B: Wretchwick Wy (South)	467	80	54	601	444	80	22	546	1.08	0.02	5.21	-55	-9%	2.31	274	46	39	359	247	43	38	328	1.68	0.36	0.22	-31	-9%	1.67	462	40	27	529	440	41	7	487	1.05	0.08	4.85	-42	-8%	1.85
44 SITE 4	ARM A: Charbridge Ln (North)	ARM C: Gavray Dr (West)	21	3	1	25	20	0	0	20	0.18	2.45	1.41	-5	-19%	1.01	22	3	2	27	21	3	0	24	0.18	0.18	1.87	-3	-11%	0.57	53	5	0	58	49	0	0	49	0.51	3.16	0.00	-9	-15%	1.18
45 SITE 4	ARM B: Wretchwick Wy (South)	ARM A: Charbridge Ln (North)	464	48	36	548	453	57	13	523	0.51	1.22	4.70	-25	-5%	1.09	244	52	51	347	231	32	49	312	0.83	3.02	0.34	-35	-10%	1.92	495	46	18	559	441	46	7	494	2.50	0.00	3.25	-65	-12%	2.85
46 SITE 4	ARM B: Wretchwick Wy (South)	ARM B: Wretchwick Wy (South)	4	1	0	5	0	0	0	0	2.83	1.41	0.00	-5	-100%	3.16	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
47 SITE 4	ARM B: Wretchwick Wy (South)	ARM C: Gavray Dr (West)	17	1	0	18	8	0	0	8	2.56	1.41	0.00	-10	-56%	2.79	17	3	1	21	17	0	0	17	0.00	2.45	1.41	-4	-19%	0.92	43	2	0	45	26	0	0	26	2.88	2.00	0.00	-19	-42%	3.17
48 SITE 4	ARM C: Gavray Dr (West)	ARM A: Charbridge Ln (North)	76	3	0	79	67	0	0	67	1.13	2.45	0.00	-13	-16%	1.47	28	2	1	30	28	1	0	28	0.00	0.79	1.00	-1	-4%	0.25	43	5	0	48	49	0	0	49	0.92	3.16	0.00	1	3%	0.18
49 SITE 4	ARM C: Gavray Dr (West)	ARM B: Wretchwick Wy (South)	33	0	0	33	24	0	0	24	1.76	0.00	0.00	-9	-28%	1.76	11	4	0	15	11	0	0	11	0.00	2.65	0.71	-4	-25%	1.05	25	2	0	27	18	0	0	18	1.56	2.00	0.00	-9	-34%	1.94
50 SITE 4	ARM C: Gavray Dr (West)	ARM C: Gavray Dr (West)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	1	0	0	1	0	0	0	0	1.00	0.00	0.00	-1	-100%	1.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
51 SITE 5	ARM A: London Rd (North)	ARM A: London Rd (North)	3	1	0	4	0	0	0	0	2.45	1.41	0.00	-4	-100%	2.83	1	0	0	1	0	0	0	0	1.00	0.00	0.00	-1	-100%	1.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
52 SITE 5	ARM A: London Rd (North)	ARM B: A4421 (East)	35	4	2	41	34	0	0	34	0.13	2.83	2.00	-7	-17%	1.11	61	5	3	69	61	0	0	61	0.01	3.24	2.35	-8	-11%	0.98	129	8	4	141	142	0	4	146	1.09	4.00	0.04	5	3%	0.39
53 SITE 5	ARM A: London Rd (North)	ARM C: A41 (South)	125	24	3	152	124	24	0	148	0.07	0.01	2.45	-4	-2%	0.30	107	18	3	128	105	18	3	127	0.14	0.12	0.02	-1	-1%	0.08	202	19	2	223	204	19	1	224	0.15	0.00	1.24	1	0%	0.05
54 SITE 5	ARM A: London Rd (North)	ARM D: Gravenhill Rd (West)	2	0	0	2	2	0	0	2	0.01	0.00	0.00	0	1%	0.01	1	0	0	2	1	0	0	1	0.24	0.00	0.71	-1	-33%	0.45	1	0	1	2	2	0	0	2	0.92	0.00	1.41	0	8%	0.10
55 SITE 5	ARM A: London Rd (North)	ARM E: A41 (North)	79	19	3	101	74	19	4	97	0.60	0.00	0.73	-4	-4%	0.39	79	19	10	108	77	12	9	98	0.28	1.82	0.10	-10	-9%	0.98	141	21	1	163	160	22	7	189	1.53	0.18	3.02	26	16%	1.94
56 SITE 5	ARM B: A4421 (East)	ARM A: London Rd (North)	65	4	4	73	64	0	9	74	0.12	2.83	2.11	1	1%	0.06	29	4	2	34	31	0	0	31	0.33	2.65	1.73	-3	-10%	0.57	38	2	1	41	38	0	0	38	0.00	2.00	1.41	-3	-7%	0.47
57 SITE 5	ARM B: A4421 (East)	ARM B: A4421 (East)	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41	1	0	0	1	0	0	0	0	1.22	0.00	0.00	-1	-100%	1.22	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41
58 SITE 5	ARM B: A4421 (East)	ARM C: A41 (South)	334	53	17	404	328	53	9	390	0.32	0.00	2.10	-14	-3%	0.68	97	16	15	129	84	0	15	98	1.40	5.70	0.12	-30	-23%	2.82	157	24	7	188	144	21	7	172	1.04	0.66	0.00	-16	-8%	1.18
59 SITE 5	ARM B: A4421 (East)	ARM D: Gravenhill Rd (West)	3	0	1	4	7	7	3	17	1.67	3.72	1.45	13	316%	3.93	1	0	1	2	2	9	0	11	0.93	4.13	1.22	9	512%	3.59	0	0	0	0	14	0	0	14	5.38	0.00	0.00	14	#DIV/0!	5.38
60 SITE 5	ARM B: A4421 (East)	ARM E: A41 (North)	278	28	32	338	261	28	0	289	1.01	0.07	8.00	-49	-15%	2.77	160	27	22	209	156	27	22	205	0.34	0.04	0.04	-4	-2%	0.30	262	14	20	296	257	14	0	271	0.30	0.00	6.32	-25	-8%	1.47
61 SITE 5	ARM C: A41 (South)	ARM A: London Rd (North)	158	21	4	183	157	29	1	187	0.09	1.57	1.96	4	2%	0.26	101	15	7	123	94	19	6	118	0.75	0.93	0.38	-5	-4%	0.42	254	37	1	292	241	17	0	258	0.83	3.90	1.41	-34	-12%	2.06
62 SITE 5	ARM C: A41 (South)	ARM B: A4421 (East)	131	28	13	172	124	28	13	165	0.64	0.00	0.06	-7	-4%	0.57	82	17	12	111	76	0	12	88	0.62	5.83	0.12	-23	-21%	2.30	321	27	4	352	275	27	3	305	2.66	0.03	0.72	-47	-13%	2.60
63 SITE 5	ARM C: A41 (South)	ARM C: A41 (South)	19	1	3	23	0	0	0	0	6.16	1.41	2.45	-23	-100%	6.78	6	1	0	7	0	0	0	0	3.46	1.22	0.71	-7	-100%	3.74	11	1	0	12	0	0	0	0	4.69	1.41	0.00	-12	-100%	4.90
64 SITE 5	ARM C: A41 (South)	ARM D: Gravenhill Rd (West)	2	3	3	8	0	0	0	0	2.00	2.45	2.45	-8	-100%	4.00	3	3	5	10	0	0	0	0	2.24	2.55	3.00	-10	-100%	4.53	0	0	3	3	0	0	0	0	0.00	0.00	2.45	-3	-100%	2.45
65 SITE 5	ARM C: A41 (South)	ARM E: A41 (North)	383	59	44	486	380	59	44	483	0.17	0.03	0.00	-3	-1%	0.14	320	59	53	432	315	60	54	428	0.29	0.15	0.03	-4	-1%	0.18	340	49	26	415	349	73	16	438	0.46	3.11	2.16	23	6%	1.11
66 SITE 5	ARM D: Gravenhill Rd (West)	ARM A: London Rd (North)	2	0	0	2	2	0	0	2	0.02	0.00	0.00	0	-2%	0.02	3	0	0	4	3	0	0	3	0.14	0.00	0.71	-1	-14%	0.28	2	1	0	3	3	0	0	3	0.62	1.41	0.00	0	-1%	0.02
67 SITE 5	ARM D: Gravenhill Rd (West)	ARM B: A4421 (East)	0	0	0	0	21	0	0	21	6.50	0.00	0.00	21	#DIV/0!	6.50	3	1	1	5	3	2	0

				AM Peak																				Inter Peak																PM Peak															
				Observed				Modelled (Actual)				Car	LGV	HGVeh	Total Veh			Observed				Modelled (Actual)				Car	LGV	HGVeh	Total Veh			Observed				Modelled (Actual)				Car	LGV	HGVeh	Total Veh																
MCC	From	TO	Car	LGV	HGV	Total	Car	LGV	HGVeh	Total	GEH	GEH	GEH	Diff	% Diff	GEH	Car	LGV	HGV	Total	Car	LGV	HGV	Total	GEH	GEH	GEH	Diff	% Diff	GEH	Car	LGV	HGV	Total	Car	LGV	HGV	Total	GEH	GEH	GEH	Diff	% Diff	GEH																
182 SITE 13	ARM E: Field St (South)	ARM A: Banbury Rd (North)	136	21	3	160	127	11	0	138	0.77	2.47	2.45	-22	-14%	1.78	198	16	6	220	190	16	0	205	0.61	0.06	3.32	-14	-6%	0.97	322	20	0	342	266	12	0	278	3.26	2.12	0.00	-64	-19%	3.65														
183 SITE 13	ARM E: Field St (South)	ARM B: Buckingham Rd (North)	365	34	12	411	350	29	10	389	0.81	0.92	0.62	-22	-5%	1.12	345	48	10	403	303	38	10	351	2.33	1.51	0.07	-52	-13%	2.68	549	61	9	619	446	55	9	510	4.60	0.82	0.12	-109	-18%	4.59														
184 SITE 13	ARM E: Field St (South)	ARM E: Field St (South)	7	2	0	9	0	0	0	0	3.74	2.00	0.00	-9	-100%	4.24	12	0	0	12	0	0	0	0	4.80	0.71	0.71	-12	-100%	4.90	17	0	0	17	0	0	0	0	5.83	0.00	0.00	-17	-100%	5.83														
185 SITE 14	ARM A: Buckingham Rd (North)	ARM A: Buckingham Rd (North)	0	1	0	1	0	0	0	0	0.87	1.41	0.00	-1	-62%	0.75	1	0	0	1	0	0	0	0	0.65	0.00	0.00	0	-62%	0.65	0	0	0	0	0	0	0	0	0.85	0.00	0.00	0	#DIV/0!	0.85														
186 SITE 14	ARM A: Buckingham Rd (North)	ARM B: Churchill Rd (East)	152	13	2	167	134	13	5	152	1.50	0.01	1.52	-15	-9%	1.20	71	10	3	83	65	7	0	72	0.70	1.14	2.24	-12	-14%	1.31	118	19	0	137	97	17	0	114	2.03	0.45	0.00	-23	-17%	2.05														
187 SITE 14	ARM A: Buckingham Rd (North)	ARM C: Buckingham Rd (South)	318	33	10	361	330	57	23	410	0.67	3.56	3.23	49	14%	2.49	209	21	4	234	196	25	8	229	0.91	0.85	1.46	-5	-2%	0.35	237	25	4	266	230	26	5	262	0.43	0.22	0.47	-4	-2%	0.28														
188 SITE 14	ARM A: Buckingham Rd (North)	ARM D: Brashfield Rd (West)	8	1	0	9	6	0	0	6	0.68	1.41	0.00	-3	-31%	1.02	8	0	0	8	8	0	0	8	0.02	0.71	0.00	0	-4%	0.11	13	0	0	13	13	2	0	15	0.09	1.88	0.00	2	16%	0.56														
189 SITE 14	ARM B: Churchill Rd (East)	ARM A: Buckingham Rd (North)	93	15	1	109	70	8	0	78	2.59	2.10	1.41	-31	-29%	3.26	74	13	4	92	66	12	0	78	1.03	0.25	2.83	-13	-15%	1.47	208	16	2	226	170	12	0	181	2.78	1.21	2.00	-45	-20%	3.13														
190 SITE 14	ARM B: Churchill Rd (East)	ARM B: Churchill Rd (East)	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41	1	0	0	1	0	0	0	0	1.22	0.00	0.71	-1	-100%	1.41	2	0	0	2	0	0	0	0	2.00	0.00	0.00	-2	-100%	2.00														
191 SITE 14	ARM B: Churchill Rd (East)	ARM C: Buckingham Rd (South)	117	17	5	139	120	17	0	137	0.23	0.07	3.16	-2	-2%	0.18	120	13	3	136	118	9	3	129	0.19	1.32	0.18	-7	-5%	0.59	208	13	1	222	273	20	0	293	4.17	1.82	1.15	71	32%	4.44														
192 SITE 14	ARM B: Churchill Rd (East)	ARM D: Brashfield Rd (West)	34	3	2	39	37	10	0	47	0.50	2.78	2.00	8	21%	1.24	45	4	1	49	51	5	0	56	0.81	0.73	1.00	7	13%	0.91	101	6	1	108	129	5	0	134	2.63	0.32	1.41	26	25%	2.41														
193 SITE 14	ARM C: Buckingham Rd (South)	ARM A: Buckingham Rd (North)	202	19	9	230	194	19	18	230	0.60	0.11	2.42	0	0%	0.00	220	31	9	260	191	20	16	227	1.98	2.18	2.04	-32	-12%	2.07	401	45	8	454	331	43	15	389	3.67	0.30	2.17	-65	-14%	3.15														
194 SITE 14	ARM C: Buckingham Rd (South)	ARM B: Churchill Rd (East)	150	20	3	173	147	19	0	167	0.23	0.16	2.45	-6	-4%	0.50	123	21	4	148	115	21	5	142	0.71	0.11	0.69	-6	-4%	0.49	149	16	3	168	118	15	0	133	2.73	0.22	2.45	-35	-21%	2.88														
195 SITE 14	ARM C: Buckingham Rd (South)	ARM C: Buckingham Rd (South)	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41	2	0	0	2	0	0	0	0	1.73	0.00	0.00	-2	-100%	1.73	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00														
196 SITE 14	ARM C: Buckingham Rd (South)	ARM D: Brashfield Rd (West)	4	0	0	4	1	0	0	1	1.84	0.00	0.00	-3	-73%	1.84	10	1	0	11	4	0	0	4	2.40	1.41	0.00	-7	-66%	2.68	18	1	0	19	4	0	0	4	4.27	1.41	0.00	-15	-80%	4.47														
197 SITE 14	ARM D: Brashfield Rd (West)	ARM A: Buckingham Rd (North)	14	0	0	14	13	4	0	17	0.18	2.87	0.00	3	25%	0.87	7	0	0	7	7	0	0	7	0.18	0.71	0.00	-1	-10%	0.27	17	2	1	20	17	0	0	17	0.08	2.00	1.41	-3	-17%	0.78														
198 SITE 14	ARM D: Brashfield Rd (West)	ARM B: Churchill Rd (East)	64	8	1	73	83	5	0	88	2.18	1.16	1.41	15	20%	1.64	31	2	0	33	37	3	0	40	1.08	0.81	0.71	7	22%	1.21	47	2	1	50	65	4	0	69	2.45	1.12	1.41	19	39%	2.49														
199 SITE 14	ARM D: Brashfield Rd (West)	ARM C: Buckingham Rd (South)	19	1	0	20	0	0	0	0	6.02	1.41	0.00	-20	-99%	6.18	8	1	0	8	0	0	0	0	3.77	1.22	0.00	-8	-98%	3.96	19	1	0	20	0	0	0	0	6.04	1.41	0.00	-20	-99%	6.21														
200 SITE 14	ARM D: Brashfield Rd (West)	ARM D: Brashfield Rd (West)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00														
201 SITE 15	ARM A: Launton Rd (East)	ARM A: Launton Rd (East)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	2	0	0	2	0	0	0	0	2.00	0.00	0.00	-2	-100%	2.00														
202 SITE 15	ARM A: Launton Rd (East)	ARM B: London Rd (South)	114	36	8	158	112	36	8	156	0.18	0.01	0.07	-2	-1%	0.17	120	32	9	161	116	30	9	154	0.41	0.44	0.03	-7	-4%	0.56	234	28	3	265	245	5	3	253	0.72	5.62	0.11	-12	-5%	0.74														
203 SITE 15	ARM A: Launton Rd (East)	ARM C: Wessex Wy (West)	1	0	1	2	0	0	0	0	1.41	0.00	1.41	-2	-100%	2.00	2	0	0	2	0	5	0	5	2.00	3.31	0.00	3	174%	1.80	2	0	0	2	0	0	0	0	2.00	0.00	0.00	-2	-100%	2.00														
204 SITE 15	ARM A: Launton Rd (East)	ARM D: London Rd (North)	67	24	3	94	65	8	0	73	0.25	3.87	2.45	-21	-22%	2.26	136	17	5	158	120	17	0	137	1.43	0.00	3.16	-21	-13%	1.74	132	14	0	146	30	14	0	44	11.33	0.00	0.00	-102	-70%	10.46														
205 SITE 15	ARM B: London Rd (South)	ARM A: Launton Rd (East)	125	14	10	149	123	9	10	142	0.15	1.48	0.01	-7	-4%	0.55	101	29	9	139	99	41	9	149	0.17	1.97	0.03	10	7%	0.82	188	40	2	230	197	15	2	215	0.64	4.66	0.15	-15	-7%	1.03														
206 SITE 15	ARM B: London Rd (South)	ARM B: London Rd (South)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00														
207 SITE 15	ARM B: London Rd (South)	ARM C: Wessex Wy (West)	0	0	0	0	0	0	1	1	0.00	0.00	1.36	1	#DIV/0!	1.36	2	1	1	4	0	0	0	0	2.00	1.41	1.41	-4	-100%	2.83	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00														
208 SITE 15	ARM B: London Rd (South)	ARM D: London Rd (North)	138	15	3	156	139	15	0	154	0.07	0.02	2.45	-2	-1%	0.18	129	17	2	148	119	4	0	124	0.87	3.89	2.00	-24	-16%	2.09	258	21	0	279	192	0	0	192	4.41	6.45	0.00	-87	-31%	5.67														
209 SITE 15	ARM C: Wessex Wy (West)	ARM A: Launton Rd (East)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	2	0	0	2	0	10	0	10	2.00	4.42	0.00	8	390%	3.21	0	0	0	0	0	1	0	1	0.00	1.34	0.00	1	#DIV/0!	1.34														
210 SITE 15	ARM C: Wessex Wy (West)	ARM B: London Rd (South)	0	0	1	1	0	0	0	0	0.00	0.00	1.41	-1	-100%	1.41	4	0	0	4	0	0	0	0	2.83	0.00	0.00	-4	-100%	2.83	0	0	0	0	0	0	1	1	0.00	0.00	1.08	1	#DIV/0!	1.08														
211 SITE 15	ARM C: Wessex Wy (West)	ARM C: Wessex Wy (West)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00														
212 SITE 15	ARM C: Wessex Wy (West)	ARM D: London Rd (North)	2	0	0	2	0	0	0	0	2.00	0.00	0.00	-2	-100%	2.00	3	1	0	4	0	0	0	0	2.45	1.41	0.00	-4	-100%	2.83	8	0	0	8	0	0	0	0	4.00	0.00	0.00	-8	-100%	4.00														
213 SITE 15	ARM D: London Rd (North)	ARM A: Launton Rd (East)	176	40	6	222	177	45	0	222	0.11	0.71	3.46	0	0%	0.00	195	28	8	231	204	28	0	232	0.66	0.09	4.00	1	0%	0.05	218	33	3	254	254	32	0	287	2.36	0.13	2.45	33	13%	1.98														
214 SITE 15	ARM D: London Rd (North)	ARM B: London Rd (South)	135	19	1	155	133	11	0	144	0.20	2.00	1.41	-11	-7%	0.90	132	15	4	151	129	2	0	131	0.27	4.52	2.83	-20	-13%	1.70	213	18	2	233	208	18	0	226	0.34	0.02	2.00	-7	-3%	0.46														
215 SITE 15	ARM D: London Rd (North)	ARM C: Wessex Wy (West)	2	0	0	2	0	0	0	0	2.00	0.00	0.00	-2	-100%	2.00	3	0	0	3	0	0	0	0	2.45	0.00	0.00	-3	-100%	2.45	3	0	0	3	0	0	0	0	2.45	0.00	0.00	-3	-100%	2.45														
216 SITE 15	ARM D: London Rd (North)	ARM D: London Rd (North)	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41	3	1	0	4	0	0	0	0	2.45	1.41	0.00	-4	-100%	2.83	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41														
217 SITE 16	ARM A: A4421 (North)	ARM A: A4421 (North)	3	0	0	3	0	0	0	0	2.45	0.00	0.00	-3	-100%	2.45	2	1	0	3	0	0	0	0	2.00	1.41	0.00	-3	-100%	2.45	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41														
218 SITE 16	ARM A: A4421 (North)	ARM B: Bicester Rd (East)	200	39	6	245	203	52	6	261	0.21	1.93	0.05	16	7%	1.01	127	24	5	156	127	37	5	169	0.02	2.39	0.01	13	8%	1.02	264	28	2	294	266	40	4	310	0.10	2.12	1.23	16	5%	0.93														
219 SITE 16	ARM A: A4421 (North)	ARM C: Charbridge Ln (South)	515	87	57	659	487	72	36	594	1.26	1.69	3.13	-65	-10%	2.58	280	46	42	368	276	22	42	340	0.23	4.06	0.03	-28	-8%	1.48	454	43	23	520	434	36	7	477	0.97	1.10	4.13	-43	-8%	1.94														
220 SITE 16	ARM B: Bicester Rd (East)	ARM A: A4421 (North)	222	41	5	268	211	46	8	265	0.75	0.76	1.27	-3	-1%	0.17	117	25	6	148	116	58	6	180	0.06	5.10	0.05	32	22%	2.52	217	32	0	249	215	41	0	256	0.15	1.52	0.72	7	3%	0.46														
221 SITE 16	ARM B: Bicester Rd (East)	ARM B: Bicester Rd (East)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00														
222 SITE 16	ARM B: Bicester Rd (East)	ARM C: Charbridge Ln (South)	57	8	1	66	55	8	1	64	0.32	0.05	0.11	-2	-4%	0.31	31	6	1	38	30	18	2	51	0.11	3.46	1.06	13	34%	1.92	38	4	1	43	38	4	0	42	0.07	0.18	1.41	-1	-3%	0.17														
223 SITE 16	ARM C: Charbridge Ln (South)	ARM A: A4421 (North)	464	51	31	546	436	50	13	499	1.31	0.17	3.89	-47	-9%	2.07	266	50	39	355	253	21	39	313	0.78	4.90	0.00	-42	-12%	2.29	566	51	9	626	531	41	6	577	1.52	1.47	1.14	-49	-8%	1.98														
224 SITE 16	ARM C: Charbridge Ln (South)	ARM B: Bicester Rd (East)	18	7	0	25	21	7	0	28	0.60	0.02	0.00	3	11%	0.52	36	9	2	47	36	10	4	50	0.05	0.27	1.29	3	6%	0.41	45	5	1	51	43	5	1	49	0.29	0.00	0.12	-2	-4%	0.26														
225 SITE 16	ARM C: Charbridge Ln (South)	ARM C: Charbridge Ln (South)	2	0	0	2	0	0	0	0	2.00	0.00	0.00	-2	-100%	2.00	2	1	0	3	0	0	0	0	2.00	1.41	0.00	-3	-100%	2.45	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41														
226 SITE 17	ARM A: Shakespeare Dr (North)	ARM A: Shakespeare Dr (North)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00														
227 SITE 17	ARM A: Shakespeare Dr (North)	ARM B: Middleton Stoney Rd (East)	152	14	1	167	149	14	0	163	0.28	0.02	1.41	-4	-3%	0.34	77	7	1	85	79	7	0	86	0.27	0.00	1.41	1	2%	0.14	109	9	1	119	111	9	0	120	0.17	0.00	1.41	1	1%	0.07														
228 SITE 17	ARM A: Shakespeare Dr (North)	ARM C: B4100 (South)	28	7	0	35	27	3	0	30	0.24	1.88	0.00	-5	-15%	0.95	20	2	0	22	23	2	3	28	0.58	0.03	2.41	6	26%	1.13	25	2	0	27	27	2	3	32	0.35	0.35	2.58	5	17%	0.85														
229 SITE 17	ARM A: Shakespeare Dr (North)	ARM D: A4095 (West)	93	6	0	99	88	6	0	94	0.51	0.00	0.00	-5	-5%	0.49	26	3	1	30	20	3	1	24	1.28	0.19	0.11	-6	-21%	1.22	32	10	0	42	26	0	0	26	1.06	4.47	0.00	-16	-37%	2.69														
230 SITE 17	ARM B: Middleton Stoney Rd (East)	ARM A: Shakespeare Dr (North)	32	4	0	36	34	4	0	38	0.33	0.11	0.00	2	5%	0.28	67	6	2	75	69	3	0	71	0.23	1.65	2.00	-4	-5%	0.42	118	9	0	127	126	9	0	135	0.72	0.08	0.00	8	6%	0.67														
231 SITE 17	ARM B: Middleton Stoney Rd (East)	ARM B: Middleton Stoney Rd (East)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00														
232 SITE 17	ARM B: Middleton Stoney Rd (East)	ARM C: B4100 (South)	13	3	1	17	8	0	0	8	1.66	2.45	1.41	-9	-55%	2.66	27	2	1	30	17	0	0	17	2.19	2.00	1.41	-13	-44%	2.74	45	3	0	48	52	0	0	52	0.98	2.45	0.00	4	8%	0.54														
233 SITE 17	ARM B: Middleton Stoney Rd (East)	ARM D: A4095 (West)	106	18	6	130	101	18	10	129	0.47	0.00	1.45	-1	-1%	0.06	99	13	5	117	100	13	5	118	0.09	0.03	0.00	1	1%	0.07	157	11	4	172	174	14	2	190	1.31	0.88	1.41	18	10%	1.31														
234 SITE 17	ARM C: B4100 (South)	ARM A: Shakespeare Dr (North)	20	1	0	21	20	1	2	23	0.02	0.00	2.13	2	11%	0.50	19	2	0	21	19	2	2	23	0.03	0.00	1.75	2	8%	0.36	44	3	0	47	43	3	0	46	0.12	0.19	0.00	-1	-2%	0.17														
235 SITE 17	ARM C: B4100 (South)	ARM B: Middleton Stoney Rd (East)	51	5	1	57	51	0	0	51	0.02	3.16	1.41	-6	-10%	0.80	24	1	2	27	24	0	0	24	0.05	1.41	2.00	-3	-12%	0.65	22	0	1	23	21	0	0	21	0.21	0.00	1.41	-2	-9%	0.42														
236 SITE 17	ARM C: B4100 (South)	ARM C: B4100 (South)	0	0	1	1	0	0	0	0	0.00	0.00	1.41	-1	-100%	1.41	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00														
237 SITE 17	ARM C: B4100 (South)	ARM D: A4095 (West)	51	2	0	53	49	0	0	49	0.28	2.00	0.00	-4	-7%	0.55	11	4	1	16	15	0	0	15	1.01	2.83	1.41	-1	-9%	0.35	8	4	0	12	28	0	0	28	4.79	2.83	0.00	16	137%	3.65														
238 SITE 17	ARM D: A4095 (West)	ARM A: Shakespeare Dr (North)	25	4	3	32	26	0	0	26	0.12	2.83	2.45	-6	-20%	1.19	34	4	1	39	31	0	1	32	0.58	2.57	0.11	-7	-18%	1.17	122	10	2	134	107	10	0	117	1.38	0.01	2.00	-17	-13%	1.50														
239 SITE 17	ARM D: A4095 (West)	ARM B: Middleton Stoney Rd (East)	170	24	7	201	175	24	8	207	0.38	0.02	0.30	6	3%	0.40	124	18	7	149	123	24	6	153	0.13	1.27	0.34	4	2%	0.29	177	16	2	195	158	16	4	178	1.44	0.01	1.17	-17	-9%	1.22														
240 SITE 17	ARM D: A4095 (West)	ARM C: B4100 (South)	14	11	1	26	14	0	0	14	0.11	4.69	1.41	-12	-45%	2.57	10	2	1	13	10	0	0	10	0.11	2.00	1.41	-3	-26%	1.00	35	6	0	41	35	0	0	35	0.05	3.46	0.00	-6	-14%	0.92														
241 SITE 17	ARM D: A4095 (West)	ARM D: A4095 (West)	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00														
242 SITE 18	ARM A: Vendee Dr (North)	ARM B: Vendee Dr (South)	428	38	19	485	373	38	19	430	2.76	0.05	0.01	-55	-11%	2.57	122	16	18	156	87	7	18	112	3.39	2.76	0.04	-44	-28%	3.81	207	14	3	224	105	5	3	113	8.13	3.05	0.12	-111	-50%	8.57														
243 SITE 18	ARM A: Vendee Dr (North)	ARM C: A4095 (West)	338	44	3	385	337	45	0	382	0.04	0.11	2.38	-3	-1%	0.15	106	13	3	122	107	21	3	132	0.13	1.98	0.14	10	8%	0.87	187	18	2	207	185	22	0	207	0.17	0.96	2.00	0	0%	0.00														
244 SITE 18	ARM A: Vendee Dr (North)

	MCC	From	TO	AM Peak												Inter Peak												PM Peak											
				Observed				Modelled (Actual)				Car	LGV	HGVeh	Total Veh			Observed				Modelled (Actual)				Car	LGV	HGVeh	Total Veh			Observed				Modelled (Actual)				Car	LGV	HGVeh	Total Veh		
				Car	LGV	HGV	Total	Car	LGV	HGVeh	Total	GEH	GEH	GEH	Diff	% Diff	GEH	Car	LGV	HGV	Total	Car	LGV	HGV	Total	GEH	GEH	GEH	Diff	% Diff	GEH	Car	LGV	HGV	Total	Car	LGV	HGV	Total	GEH	GEH	GEH	Diff	% Diff	GEH
419	13	B4030 South	Station Road	68	5	2	75	46	0	0	46	2.91	3.16	2.00	-29	-39%	3.73																	75	7	7	89	59	0	0	59	2.01	3.74	3.74	-30	-34%	3.54
420	13	B4030 South	B4030 East	143	28	4	175	123	13	0	137	1.70	3.22	2.83	-38	-22%	3.06																	106	10	0	116	107	7	0	114	0.10	0.94	0.00	-2	-1%	0.16
421	13	B4030 South	Freehold Street	1	0	1	2	1	0	0	1	0.16	0.00	1.41	-1	-58%	0.96																	3	0	0	3	5	0	0	5	0.97	0.00	0.00	2	64%	0.97
422	13	Freehold Street	Station Road	8	2	0	10	8	0	0	8	0.00	2.00	0.00	-2	-20%	0.67																	6	0	0	6	5	0	0	5	0.52	0.00	0.00	-1	-20%	0.52
423	13	Freehold Street	B4030 East	12	2	0	14	12	2	0	14	0.08	0.00	0.00	0	2%	0.07																	1	0	0	1	2	0	0	2	0.49	0.45	0.00	1	66%	0.57
424	13	Freehold Street	B4030 South	4	1	0	5	2	0	0	2	1.13	1.41	0.00	-3	-59%	1.58																	0	0	0	0	2	0	0	2	1.91	0.00	0.00	2	#DIV/0!	1.91
425	14	A4260 Oxford Road North	Somerton Road	12	3	2	17	26	3	0	29	3.24	0.00	2.00	12	72%	2.53																	28	1	0	29	31	1	0	32	0.59	0.00	0.00	3	11%	0.58
426	14	A4260 Oxford Road North	A4260 Oxford Road South	632	83	29	744	763	83	25	871	4.96	0.00	0.76	127	17%	4.47																	314	22	7	343	292	22	0	314	1.29	0.00	3.74	-29	-9%	1.62
427	14	A4260 Oxford Road North	N Aston Road	37	5	1	43	0	0	0	0	8.60	3.16	1.41	-43	-100%	9.27																	38	3	0	41	13	0	0	13	4.94	2.45	0.00	-28	-68%	5.38
428	14	Somerton Road	A4260 Oxford Road North	21	5	2	28	19	1	0	20	0.52	2.16	2.00	-8	-29%	1.66																	42	4	0	46	42	0	0	42	0.06	2.52	0.00	-4	-9%	0.61
429	14	Somerton Road	A4260 Oxford Road South	19	5	0	24	18	5	0	23	0.28	0.00	0.00	-1	-5%	0.25																	8	0	0	8	19	0	0	19	2.91	0.00	0.00	11	133%	2.91
430	14	Somerton Road	N Aston Road	16	10	0	26	16	5	0	21	0.00	1.94	0.00	-5	-20%	1.09																	9	0	0	9	20	2	0	22	2.89	2.17	0.00	13	148%	3.37
431	14	A4260 Oxford Road South	A4260 Oxford Road North	269	43	20	332	262	52	28	342	0.41	1.29	1.54	10	3%	0.53																	658	26	6	690	645	33	9	687	0.51	1.28	1.21	-3	0%	0.11
432	14	A4260 Oxford Road South	Somerton Road	14	5	1	20	23	0	0	23	2.17	3.16	1.41	3	17%	0.72																	5	0	0	5	16	1	0	16	3.28	1.38	0.00	11	229%	3.50
433	14	A4260 Oxford Road South	N Aston Road	7	3	2	12	7	0	0	7	0.03	2.45	2.00	-5	-41%	1.59																	3	3	1	7	6	0	0	6	1.53	2.45	1.41	-1	-10%	0.27
434	14	N Aston Road	A4260 Oxford Road North	28	5	2	35	14	0	0	14	3.11	3.16	1.96	-21	-61%	4.29																	16	0	0	16	0	0	0	0	5.66	0.00	0.00	-16	-100%	5.66
435	14	N Aston Road	Somerton Road	12	1	0	13	29	2	0	30	3.71	0.49	0.00	17	133%	3.72																	12	0	0	12	12	3	0	15	0.01	2.60	0.00	3	29%	0.92
436	14	N Aston Road	A4260 Oxford Road South	33	2	0	35	39	0	0	39	0.96	2.00	0.00	4	11%	0.61																	10	0	0	10	10	3	0	10	0.03	0.00	0.00	0	1%	0.03
437	15	A4260 Oxford Road	B4030 East	39	9	2	50	31	0	0	31	1.29	4.24	2.00	-19	-37%	2.92																	29	1	2	32	30	5	0	35	0.22	2.18	2.00	3	9%	0.49
438	15	A4260 Oxford Road	A4260 Banbury Road	625	76	25	726	799	83	25	907	6.50	0.79	0.01	181	25%	6.32																	256	22	5	283	271	17	0	288	0.91	1.06	3.16	5	2%	0.30
439	15	A4260 Oxford Road	B4030 West	23	2	0	25	22	5	0	27	0.25	1.61	0.00	2	7%	0.36																	22	4	1	27	22	0	0	22	0.01	2.83	1.41	-5	-19%	1.02
440	15	B4030 East	A4260 Oxford Road	31	9	5	45	31	9	0	40	0.04	0.00	3.16	-5	-12%	0.81																	57	4	2	63	64	0	0	64	0.84	2.83	2.00	1	1%	0.07
441	15	B4030 East	A4260 Banbury Road	74	8	8	90	0	0	0	0	12.17	4.00	4.00	-90	-100%	13.42																	31	1	0	32	0	0	0	0	7.87	1.41	0.00	-32	-100%	8.00
442	15	B4030 East	B4030 West	84	20	5	109	85	8	0	92	0.08	3.33	3.16	-17	-15%	1.66																	85	6	1	92	72	5	0	77	1.45	0.61	1.41	-15	-17%	1.66
443	15	A4260 Banbury Road	A4260 Oxford Road	239	41	20	300	235	43	28	306	0.24	0.32	1.57	6	2%	0.34																	598	33	7	638	601	33	9	643	0.12	0.05	0.81	5	1%	0.19
444	15	A4260 Banbury Road	B4030 East	23	4	3	30	21	0	0	21	0.50	2.83	2.45	-9	-31%	1.85																	49	7	2	58	52	0	0	52	0.38	3.74	2.00	-6	-11%	0.85
445	15	A4260 Banbury Road	B4030 West	9	0	3	12	1	0	0	1	3.75	0.00	2.45	-11	-94%	4.47																	3	3	1	7	16	0	1	16	4.16	2.45	0.29	9	135%	2.76
446	15	B4030 West	A4260 Oxford Road	16	2	2	20	16	0	0	16	0.01	2.00	2.00	-4	-20%	0.96																	24	0	0	24	23	1	0	24	0.30	1.41	0.00	0	-2%	0.09
447	15	B4030 West	B4030 East	102	16	2	120	102	12	0	113	0.05	1.16	2.00	-7	-6%	0.63																	76	6	2	84	79	3	0	81	0.28	1.59	2.00	-3	-3%	0.31
448	15	B4030 West	A4260 Banbury Road	71	6	0	77	59	0	0	59	1.48	3.46	0.00	-18	-23%	2.17																	18	1	0	19	18	0	0	18	0.01	1.41	0.00	-1	-5%	0.23
449	16	A4260 North	Heyford Road	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00																	2	0	0	2	0	0	0	0	2.00	0.00	0.00	-2	-100%	2.00
450	16	A4260 North	A4260 South	782	83	20	885	747	72	22	841	1.28	1.22	0.39	-44	-5%	1.51																	303	8	3	314	289	17	0	306	0.82	2.62	2.45	-8	-3%	0.45
451	16	Heyford Road	A4260 North	0	1	1	2	0	0	0	0	0.00	1.41	1.41	-2	-100%	2.00																	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
452	16	Heyford Road	A4260 South	23	4	0	27	26	0	0	26	0.53	2.83	0.00	-1	-5%	0.27																	13	1	0	14	27	0	0	27	3.20	1.41	0.00	13	96%	2.94
453	16	A4260 South	A4260 North	266	43	11	320	257	43	28	327	0.58	0.01	3.79	7	2%	0.41																	736	22	4	762	668	33	10	711	2.56	2.05	2.28	-51	-7%	1.88
454	16	A4260 South	Heyford Road	7	1	0	8	1	0	0	1	3.06	1.41	0.00	-7	-89%	3.35																	21	0	0	21	0	0	0	0	6.48	0.00	0.00	-21	-100%	6.48
455	17	A4260 North	A4260 South	797	67	21	885	746	73	22	840	1.84	0.64	0.24	-45	-5%	1.52																	281	34	4	319	290	17	0	308	0.55	3.30	2.81	-11	-4%	0.64
456	17	A4260 North	Banbury Road	43	3	0	46	26	0	0	26	3.02	2.42	0.00	-21	-45%	3.45																	26	0	0	26	26	0	0	26	0.08	0.00	0.00	0	2%	0.08
457	17	A4260 South	A4260 North	244	54	17	316	234	43	28	305	0.67	1.63	2.30	-11	-3%	0.62																	601	63	6	670	615	33	10	658	0.57	4.42	1.44	-12	-2%	0.48
458	17	A4260 South	Banbury Road	6	3	2	11	0	0	0	0	3.44	2.42	1.99	-11	-100%	4.65																	3	3	3	9	0	0	0	0	2.43	2.42	2.44	-9	-100%	4.21
459	17	Banbury Road	A4260 North	22	1	1	24	23	0	0	23	0.38	1.39	1.41	0	-1%	0.04																	53	1	0	54	53	0	0	53	0.01	1.39	0.00	-1	-2%	0.12
460	17	Banbury Road	A4260 South	37	3	0	40	0	0	0	0	8.65	2.42	0.00	-40	-100%	8.99																	4	0	0	4	0	0	0	0	2.81	0.00	0.00	-4	-100%	2.81
461	18	A4260 North	B4027 East	142	5	5	152	64	0	0	64	7.71	3.16	3.16	-88	-58%	8.50																	27	1	2	30	23	0	0	23	0.76	1.41	2.00	-7	-23%	1.32
462	18	A4260 North	A4260 South	676	87	30	793	682	73	22	777	0.24	1.62	1.59	-16	-2%	0.58																	304	6	2	312	267	17	0	285	2.18	3.32	2.00	-27	-9%	1.59
464	18	B4027 East	A4260 North	20	2	2	24	8	0	0	8	3.20	2.00	2.00	-16	-67%	3.99																	57	4	0	61	17	0	1	18	6.48	2.83	1.24	-43	-70%	6.79
465	18	B4027 East	A4260 South	91	5	2	98	0	0	0	0	13.49	3.16	2.00	-98	-100%	14.00																	5	0	0	5	0	0	0	0	3.16	0.00	0.00	-5	-100%	3.16
466	18	B4027 East	B4027 West	75	26	3	104	84	29	5	118	1.03	0.52	1.07	14	13%	1.33																	57	4	0	61	109	8	0	118	5.75	1.72	0.00	57	93%	6.00
467	18	A4260 South	A4260 North	215	39	19	273	229	43	28	300	0.92	0.66	1.81	27	10%	1.57																	645	45	10	700	593	32	9	634	2.11	2.05	0.27	-66	-9%	2.56
468	18	A4260 South	B4027 East	43	5	2	50	0	0	0	0	9.27	3.16	2.00	-50	-100%	10.00																	39	4	0	43	0	0	0	0	8.83	2.83	0.00	-43	-100%	9.27
469	18	A4260 South	B4027 West	7	1	2	10	0	0	0	0	3.74	1.41	2.00	-10	-100%	4.47																	3	2	3	8	0	0	0	0	2.45	2.00	2.45	-8	-100%	4.00
473	19	Port Way	A4095 East	41	5	3	49	34	0	0	34	1.15	3.16	2.45	-15	-31%	2.33																	71	16	0	87	58	0	0	58	1.68	5.66	0.00	-29	-34%	3.46
474	19	Port Way	A4095 South	57	5	0	62	56	0	1	57	0.13	3.16	1.47	-5	-8%	0.63																	44	4	0	48	43	0	0	43	0.19	2.83	0.00	-5	-11%	0.78
475	19	A4095 East	Port Way	36	12	2	50	36	0	0	36	0.00	4.90	2.00	-14	-28%	2.13																	43	7	0	50	43	0	0	43	0.02	3.74	0.00	-7	-14%	1.05
476	19	A4095 East	A4095 South	116	32	7	155	150	32	9	191	2.91	0.07	0.67	36	23%	2.72																	117	21	4	142	124	21	2	147	0.66	0.09	1.00	5	4%	0.42
477	19	A4095 South	Port Way	46	10	2	58	48	0	0	48	0.31	4.47	2.00	-10	-17%	1.35																	86	4	1	91	83	0	0	83	0.32	2.83	1.41	-8	-9%	0.85
478	19	A4095 South	A4095 East	78	9	7	94	78	15	14	107	0.01	1.71	2.10	13	13%	1.26																	143	28	6	177	151	28	6	186	0.69	0.04	0.12	9	5%	0.63
479	20	A4095 Oxford Rd North	Bletchindon Road	180	16	1	197	40	0	1	41	13.39	5.66	0.10	-156	-79%	14.33																	49	4	0	53	41	0	0	41	1.15	2.83	0.00	-12	-22%	1.71
480	20	A4095 Oxford Rd North	A4095 Oxford Rd South	271	56	10	337	221	56	9	286	3.19	0.04	0.37	-51	-15%	2.92																	224	14	0	238	242	34	2	278	1.15	4.07	2.12	40	17%	2.48
481	20	Bletchindon Road	A4095 Oxford Rd North	36	4	0	40	23	0	0	23	2.42	2.83	0.00	-17	-43%	3.06																	90	4	1	95	37	0	0	37	6.66	2.83	1.41	-58	-61%	7.15
482	20	Bletchindon Road	A4095 Oxford Rd South	3	0	0	3	0	0	0	0	2.45	0.00	0.00	-3	-100%	2.45																	2	0	0	2	0	0	0	0	2.00	0.00	0.00	-2	-100%	2.00
483	20	A4095 Oxford Rd South	A4095 Oxford Rd North	227	32	14	273	133	15	14	161	7.04	3.54	0.08	-112	-41%	7.59																	433	18	2	453	281	28	6	315	8.07	2.02	2.10	-138	-31%	7.07
484	20	A4095 Oxford Rd South	Bletchindon Road	2	1	0	3	0	0	0	0	2.00	1.41	0.00	-3	-100%	2.45																	5	0	0	5	0	0	0	0	3.16	0.00	0.00	-5	-100%	3.16
485	21	A4095 Lince Ln	B4027 Station Road	2	1	0	3	0	0	0	0	2.00	1.41	0.00	-3	-100%	2.45																	4	2	0	6	0	0	0	0	2.83	2.00	0.00	-6	-100%	3.46
486	21	A4095 Lince Ln	A4095 Station Road	153	43	9	205	221	56	9	286	4.97	1.81	0.05	81	39%	5.14																	180	34	5	219	242	34	2	278	4.24	0.01	1.45	59	27%	3.73
487	21	B4027 Station Road	A4095 Lince Ln	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00																	2	2	0	4	0	0	0	0	2.00	2.00	0.00	-4	-100%	2.83
488	21	B4027 Station Road	A4095 Station Road	49	16	5	70	49	16	5	70	0.06	0.02	0.02	0	0%	0.03																	262	47	7	316	213	9	7	229	3.19	7.09	0.09	-87	-28%	5.27
489	21	A4095 Station Road	A4095 Lince Ln	136	23	14	173	133	15	14	161	0.30	1.87	0.08	-12	-7%	0.92																	289	66	15	370	281	28	6	315	0.50	5.60	2.68	-55	-15%	3.00
490	21	A4095 Station Road	B4027 Station Road	239	40	2	281	241	45	22	308	0.13	0.76	5.79	27	10%	1.58																	141	27	7	175	121	27	7	155	1.74	0.04	0.12	-20	-12%	1.59

Appendix E – Link Count Calibration

All flows in **Veh** unless otherwise stated
All modelled flows are **Actuals**

AM Peak

Link/Junction	Direction/Approach	Observed Car	Observed LGV	Observed HGV	Observed Total	Modelled (Actual) Car	Modelled (Actual) LGV	Modelled (Actual) HGV	Modelled (Actual) Veh Total	GEH	GEH	GEH	Diff	% Diff	GEH	Link Flow?
11 A41 - North of M40 Jn 9	ATC Northbound	832	82	65	984	762	157	98	1017	2.46	6.91	3.72	34	3%	1.1	Yes
12 A41 - North of M40 Jn 9	ATC Southbound	1207	120	66	1408	1102	219	121	1442	3.07	7.61	5.71	34	2%	0.9	Yes
13 B430 Weston on the Green	ATC Northbound	171	19	6	198	85	2	0	88	7.56	5.20	3.32	-110	-56%	9.2	No
14 B430 Weston on the Green	ATC Southbound	444	36	5	489	318	50	0	367	6.46	2.17	3.16	-121	-25%	5.9	No
51 JUNCTION DESCRIPTION: Banbury Rd/ A4095/ B4100	MCC ARM A: B4100 (North)A Northbound	366	67	27	467	348	65	25	438	0.98	0.19	0.38	-29	-6%	1.4	Yes
52 JUNCTION DESCRIPTION: Banbury Rd/ A4095/ B4100	MCC ARM A: B4100 (North)A Southbound	619	100	42	765	591	115	29	734	1.15	1.44	2.27	-31	-4%	1.1	Yes
53 JUNCTION DESCRIPTION: Banbury Rd/ A4095/ B4100	MCC ARM B: A4095 (East)B Eastbound	772	110	38	926	694	108	36	839	2.88	0.18	0.27	-87	-9%	2.9	Yes
54 JUNCTION DESCRIPTION: Banbury Rd/ A4095/ B4100	MCC ARM B: A4095 (East)B Westbound	908	129	38	1085	844	124	38	1006	2.17	0.41	0.02	-79	-7%	2.4	Yes
55 JUNCTION DESCRIPTION: Banbury Rd/ A4095/ B4100	MCC ARM C: B4100 (South)C Northbound	216	32	3	257	179	15	0	193	2.66	3.57	2.45	-64	-25%	4.2	Yes
56 JUNCTION DESCRIPTION: Banbury Rd/ A4095/ B4100	MCC ARM C: B4100 (South)C Southbound	337	34	9	381	293	28	0	321	2.49	1.09	4.24	-60	-16%	3.2	Yes
57 JUNCTION DESCRIPTION: Banbury Rd/ A4095/ B4100	MCC ARM D: A4095 (West)D Eastbound	478	49	8	536	411	40	8	458	3.20	1.38	0.05	-78	-15%	3.5	Yes
58 JUNCTION DESCRIPTION: Banbury Rd/ A4095/ B4100	MCC ARM D: A4095 (West)D Westbound	746	99	17	869	689	92	13	795	2.12	0.68	1.09	-74	-9%	2.6	Yes
59 JUNCTION DESCRIPTION: Buckingham Rd/ A4095/ A4421/ Skimmingdish Ln	MCC ARM A: A4421 (North)A Northbound	456	64	29	557	429	69	16	514	1.28	0.64	2.73	-43	-8%	1.8	Yes
60 JUNCTION DESCRIPTION: Buckingham Rd/ A4095/ A4421/ Skimmingdish Ln	MCC ARM A: A4421 (North)A Southbound	874	103	47	1033	898	145	52	1095	0.79	3.75	0.77	62	6%	1.9	Yes
61 JUNCTION DESCRIPTION: Buckingham Rd/ A4095/ A4421/ Skimmingdish Ln	MCC ARM B: Skimmingdish Ln (East)B Eastbound	929	134	60	1131	880	127	58	1065	1.64	0.61	0.26	-66	-6%	2.0	Yes
62 JUNCTION DESCRIPTION: Buckingham Rd/ A4095/ A4421/ Skimmingdish Ln	MCC ARM B: Skimmingdish Ln (East)B Westbound	480	101	43	630	447	100	33	580	1.54	0.07	1.57	-50	-8%	2.0	Yes
63 JUNCTION DESCRIPTION: Buckingham Rd/ A4095/ A4421/ Skimmingdish Ln	MCC ARM C: Buckingham Rd (South)C Northbound	396	44	12	458	350	32	3	384	2.39	1.99	3.39	-74	-16%	3.6	Yes
64 JUNCTION DESCRIPTION: Buckingham Rd/ A4095/ A4421/ Skimmingdish Ln	MCC ARM C: Buckingham Rd (South)C Southbound	377	38	12	433	318	77	16	411	3.14	5.12	0.96	-22	-5%	1.1	Yes
65 JUNCTION DESCRIPTION: Buckingham Rd/ A4095/ A4421/ Skimmingdish Ln	MCC ARM D: A4095 (West)D Eastbound	747	111	37	903	654	104	39	797	3.51	0.68	0.31	-106	-12%	3.6	Yes
66 JUNCTION DESCRIPTION: Buckingham Rd/ A4095/ A4421/ Skimmingdish Ln	MCC ARM D: A4095 (West)D Westbound	735	123	38	903	721	108	38	867	0.51	1.43	0.02	-36	-4%	1.2	Yes
67 JUNCTION DESCRIPTION: Skimmingdish Ln/ A4421/ Launton Rd	MCC ARM A: Skimmingdish Ln (North)A Northbound	494	100	46	645	447	100	33	580	2.18	0.02	2.01	-65	-10%	2.6	Yes
68 JUNCTION DESCRIPTION: Skimmingdish Ln/ A4421/ Launton Rd	MCC ARM A: Skimmingdish Ln (North)A Southbound	913	134	58	1112	834	118	58	1010	2.68	1.43	0.00	-102	-9%	3.1	Yes
69 JUNCTION DESCRIPTION: Skimmingdish Ln/ A4421/ Launton Rd	MCC ARM B: A4421 (South)B Northbound	677	93	36	814	647	96	21	764	1.16	0.29	2.80	-50	-6%	1.8	Yes
70 JUNCTION DESCRIPTION: Skimmingdish Ln/ A4421/ Launton Rd	MCC ARM B: A4421 (South)B Southbound	721	129	63	921	690	124	42	855	1.18	0.45	2.93	-66	-7%	2.2	Yes
71 JUNCTION DESCRIPTION: Skimmingdish Ln/ A4421/ Launton Rd	MCC ARM C: Launton Rd (West)C Eastbound	396	105	45	554	379	105	20	505	0.84	0.00	4.37	-49	-9%	2.1	Yes
72 JUNCTION DESCRIPTION: Skimmingdish Ln/ A4421/ Launton Rd	MCC ARM C: Launton Rd (West)C Westbound	771	103	30	914	714	97	24	835	2.11	0.60	1.16	-79	-9%	2.7	Yes
73 JUNCTION DESCRIPTION: Charbridge Ln/ Wretchwick Wy/ Gavray Dr	MCC ARM A: Charbridge Ln (North)A Northbound	540	51	36	630	520	57	13	589	0.88	0.80	4.70	-41	-6%	1.6	Yes
74 JUNCTION DESCRIPTION: Charbridge Ln/ Wretchwick Wy/ Gavray Dr	MCC ARM A: Charbridge Ln (North)A Southbound	488	83	55	631	464	80	22	566	1.09	0.36	5.33	-65	-10%	2.7	Yes
75 JUNCTION DESCRIPTION: Charbridge Ln/ Wretchwick Wy/ Gavray Dr	MCC ARM B: Wretchwick Wy (South)B Northbound	485	50	36	573	461	57	13	531	1.10	0.94	4.70	-42	-7%	1.8	Yes
76 JUNCTION DESCRIPTION: Charbridge Ln/ Wretchwick Wy/ Gavray Dr	MCC ARM B: Wretchwick Wy (South)B Southbound	504	81	54	647	468	80	22	569	1.65	0.13	5.21	-78	-12%	3.1	Yes
77 JUNCTION DESCRIPTION: Charbridge Ln/ Wretchwick Wy/ Gavray Dr	MCC ARM C: Gavray Dr (West)C Eastbound	109	3	0	116	90	0	0	90	1.89	2.45	0.00	-26	-22%	2.5	Yes
78 JUNCTION DESCRIPTION: Charbridge Ln/ Wretchwick Wy/ Gavray Dr	MCC ARM C: Gavray Dr (West)C Westbound	38	4	1	43	28	0	0	28	1.71	2.83	1.41	-15	-35%	2.5	Yes
79 JUNCTION DESCRIPTION: London Rd/ A4421/ A41 S/ Gravenhill Rd/ A41 N	MCC ARM A: London Rd (North)A Northbound	317	40	16	383	304	43	37	384	0.76	0.47	4.09	1	0%	0.0	Yes
80 JUNCTION DESCRIPTION: London Rd/ A4421/ A41 S/ Gravenhill Rd/ A41 N	MCC ARM A: London Rd (North)A Southbound	244	48	8	307	234	43	4	282	2.74	0.74	1.44	-25	-8%	1.5	Yes
81 JUNCTION DESCRIPTION: London Rd/ A4421/ A41 S/ Gravenhill Rd/ A41 N	MCC ARM B: A4421 (East)B Eastbound	321	52	36	411	341	48	13	402	1.12	0.54	4.70	-9	-2%	0.4	Yes
82 JUNCTION DESCRIPTION: London Rd/ A4421/ A41 S/ Gravenhill Rd/ A41 N	MCC ARM B: A4421 (East)B Westbound	681	85	54	830	660	88	22	770	0.80	0.27	5.21	-60	-7%	2.1	Yes
83 JUNCTION DESCRIPTION: London Rd/ A4421/ A41 S/ Gravenhill Rd/ A41 N	MCC ARM C: A41 (South)C Northbound	693	112	67	887	660	116	58	834	1.26	0.38	1.17	-53	-6%	1.8	Yes
84 JUNCTION DESCRIPTION: London Rd/ A4421/ A41 S/ Gravenhill Rd/ A41 N	MCC ARM C: A41 (South)C Southbound	855	164	85	1118	807	159	44	1010	1.68	0.37	5.15	-108	-10%	3.3	Yes
85 JUNCTION DESCRIPTION: London Rd/ A4421/ A41 S/ Gravenhill Rd/ A41 N	MCC ARM D: Gravenhill Rd (West)D Eastbound	6	6	3	15	27	0	18	45	5.37	3.46	4.54	29	181%	5.4	Yes
86 JUNCTION DESCRIPTION: London Rd/ A4421/ A41 S/ Gravenhill Rd/ A41 N	MCC ARM D: Gravenhill Rd (West)D Westbound	14	8	5	27	17	7	3	27	0.76	0.40	0.97	0	0%	0.0	Yes
87 JUNCTION DESCRIPTION: London Rd/ A4421/ A41 S/ Gravenhill Rd/ A41 N	MCC ARM E: A41 (North)E Northbound	741	107	80	941	718	106	66	890	0.83	0.12	1.65	-51	-5%	1.7	Yes
88 JUNCTION DESCRIPTION: London Rd/ A4421/ A41 S/ Gravenhill Rd/ A41 N	MCC ARM E: A41 (North)E Southbound	624	120	90	841	606	117	61	783	0.74	0.31	3.36	-58	-7%	2.0	Yes
89 JUNCTION DESCRIPTION: Oxford Rd N/ A41 E/ A41 S/ Unlabelled Rd	MCC ARM A: Oxford Rd (North)A Northbound	606	91	24	732	602	96	24	722	0.16	0.50	0.04	-10	-1%	0.4	Yes
90 JUNCTION DESCRIPTION: Oxford Rd N/ A41 E/ A41 S/ Unlabelled Rd	MCC ARM A: Oxford Rd (North)A Southbound	720	113	40	894	720	138	33	891	0.00	2.22	1.18	-3	0%	0.1	Yes
91 JUNCTION DESCRIPTION: Oxford Rd N/ A41 E/ A41 S/ Unlabelled Rd	MCC ARM B: A41 (East)B Eastbound	649	124	98	878	606	117	61	783	1.57	0.67	4.17	-95	-11%	3.3	Yes
92 JUNCTION DESCRIPTION: Oxford Rd N/ A41 E/ A41 S/ Unlabelled Rd	MCC ARM B: A41 (East)B Westbound	730	114	81	939	718	106	66	890	0.43	0.78	1.76	-49	-5%	1.6	Yes
93 JUNCTION DESCRIPTION: Oxford Rd N/ A41 E/ A41 S/ Unlabelled Rd	MCC ARM C: A41 (South)C Northbound	893	165	112	1181	897	168	94	1159	0.14	0.25	1.80	-22	-2%	0.6	Yes
94 JUNCTION DESCRIPTION: Oxford Rd N/ A41 E/ A41 S/ Unlabelled Rd	MCC ARM C: A41 (South)C Southbound	1087	175	111	1402	1126	201	113	1440	1.18	1.90	0.17	38	3%	1.0	Yes
95 JUNCTION DESCRIPTION: Oxford Rd N/ A41 E/ A41 S/ Unlabelled Rd	MCC ARM D: Unlabelled Rd (West)D Eastbound	60	37	18	121	60	24	14	99	0.02	2.27	0.96	-22	-18%	2.1	Yes
96 JUNCTION DESCRIPTION: Oxford Rd N/ A41 E/ A41 S/ Unlabelled Rd	MCC ARM D: Unlabelled Rd (West)D Westbound	61	39	18	123	61	23	9	93	0.04	2.89	2.45	-30	-24%	2.9	Yes
97 JUNCTION DESCRIPTION: A41 N/ Unlabelled Rd/ A41 S/ P&R/ Vendee Dr	MCC ARM A: A41 (North)A Northbound	862	163	104	1140	787	168	94	1048	2.61	0.38	1.05	-92	-8%	2.8	Yes
98 JUNCTION DESCRIPTION: A41 N/ Unlabelled Rd/ A41 S/ P&R/ Vendee Dr	MCC ARM A: A41 (North)A Southbound	956	158	108	1225	899	178	113	1189	1.88	1.51	0.46	-66	-5%	1.9	Yes
99 JUNCTION DESCRIPTION: A41 N/ Unlabelled Rd/ A41 S/ P&R/ Vendee Dr	MCC ARM B: Unlabelled Rd (East)B Eastbound	18	7	3	28	16	0	6	22	0.48	3.74	1.49	-6	-21%	1.1	Yes
100 JUNCTION DESCRIPTION: A41 N/ Unlabelled Rd/ A41 S/ P&R/ Vendee Dr	MCC ARM B: Unlabelled Rd (East)B Westbound	79	9	6	95	61	17	0	79	2.10	2.27	3.46	-16	-17%	1.8	Yes
101 JUNCTION DESCRIPTION: A41 N/ Unlabelled Rd/ A41 S/ P&R/ Vendee Dr	MCC ARM C: A41 (South)C Northbound	804	176	98	1078	760	157	98	1015	1.57	1.47	0.00	-73	-7%	2.3	Yes
102 JUNCTION DESCRIPTION: A41 N/ Unlabelled Rd/ A41 S/ P&R/ Vendee Dr	MCC ARM C: A41 (South)C Southbound	1271	189	121	1624	1175	219	121	1514	2.74	2.08	0.04	-110	-7%	2.8	Yes
103 JUNCTION DESCRIPTION: A41 N/ Unlabelled Rd/ A41 S/ P&R/ Vendee Dr	MCC ARM D: P&R (West)D Eastbound	12	0	0	22	8	0	0	8	1.15	0.00	0.00	-14	-62%	3.5	Yes
104 JUNCTION DESCRIPTION: A41 N/ Unlabelled Rd/ A41 S/ P&R/ Vendee Dr	MCC ARM D: P&R (West)D Westbound	57	1	0	68	50	0	0	50	1.02	1.41	0.00	-18	-27%	2.4	Yes
105 JUNCTION DESCRIPTION: A41 N/ Unlabelled Rd/ A41 S/ P&R/ Vendee Dr	MCC ARM E: Vendee Dr (North)E Northbound	159	36	11	208	152	7	10	168	0.59	6.38	0.39	-40	-19%	2.9	Yes
106 JUNCTION DESCRIPTION: A41 N/ Unlabelled Rd/ A41 S/ P&R/ Vendee Dr	MCC ARM E: Vendee Dr (North)E Southbound	516	53	27	608	452	41	19	512	2.93	1.73	1.68	-96	-16%	4.1	Yes
107 JUNCTION DESCRIPTION: Howes Ln/ Middleton Stoney Rd/ Vendee Dr/ B4030	MCC ARM A: Howes Ln (North)A Northbound	265	29	9	305	233	27	8	268	2.04	0.28	0.41	-37	-12%	2.2	Yes
108 JUNCTION DESCRIPTION: Howes Ln/ Middleton Stoney Rd/ Vendee Dr/ B4030	MCC ARM A: Howes Ln (North)A Southbound	713	88	8	820	642	91	16	748	2.74	0.27	2.21	-72	-9%	2.6	Yes
109 JUNCTION DESCRIPTION: Howes Ln/ Middleton Stoney Rd/ Vendee Dr/ B4030	MCC ARM B: Middleton Stoney Rd (East)B Eastbound	209	41	11	267	215	24	8	247	0.41	3.00	1.04	-20	-8%	1.3	Yes
110 JUNCTION DESCRIPTION: Howes Ln/ Middleton Stoney Rd/ Vendee Dr/ B4030	MCC ARM B: Middleton Stoney Rd (East)B Westbound	255	27	7	296	238	24	10	272	1.06	0.58	1.07	-24	-8%	1.4	Yes
111 JUNCTION DESCRIPTION: Howes Ln/ Middleton Stoney Rd/ Vendee Dr/ B4030	MCC ARM C: Vendee Dr (South)C Northbound	304	45	13	368	270	22	11	302	2.02	4.00	0.64	-66	-18%	3.6	Yes
112 JUNCTION DESCRIPTION: Howes Ln/ Middleton Stoney Rd/ Vendee Dr/ B4030	MCC ARM C: Vendee Dr (South)C Southbound	780	78	22	894	710	83	19	812	2.57	0.56	0.67	-82	-9%	2.8	Yes
113 JUNCTION DESCRIPTION: Howes Ln/ Middleton Stoney Rd/ Vendee Dr/ B4030	MCC ARM D: B4030 (West)D Eastbound	218	28	25	273	211	30	16	258	0.46	0.43	1.99	-15	-6%	0.9	Yes
114 JUNCTION DESCRIPTION: Howes Ln/ Middleton Stoney Rd/ Vendee Dr/ B4030	MCC ARM D: B4030 (West)D Westbound	236	40	11	291	203	32	18	254	2.20	1.28	1.83	-37	-13%	2.3	Yes
115 JUNCTION DESCRIPTION: Oxford Rd N/ A41 E/ A41 S/ Unlabelled Rd	MCC ARM A: Oxford Rd (North)A Northbound	412	49	9	472	368	44	8	420	2.23	0.77	0.40	-52	-11%	2.5	Yes
116 JUNCTION DESCRIPTION: A4095/ Bucknell Rd S/ Bucknell Rd W	MCC ARM A: A4095 (North)A Southbound	844	101	14	971	785	106	13	903	2.06	0.45	0.33	-68	-7%	2.2	Yes
117 JUNCTION DESCRIPTION: A4095/ Bucknell Rd S/ Bucknell Rd W	MCC ARM B: Bucknell Rd (South)B Northbound	442	59	8	512	404	62	8	474	1.85	0.37	0.06	-38	-7%	1.7	Yes
118 JUNCTION DESCRIPTION: A4095/ Bucknell Rd S/ Bucknell Rd W	MCC ARM B: Bucknell Rd (South)B Southbound	824	95	13	945	775	117	13	905	1.73	2.14	0.06	-40	-4%	1.3	Yes
119 JUNCTION DESCRIPTION: A4095/ Bucknell Rd S/ Bucknell Rd W	MCC ARM C: Bucknell Rd (West)C Eastbound	105	9	1	118	110	34	0	144	0.52	5.36	1.41	26	22%	2.3	Yes
120 JUNCTION DESCRIPTION: A4095/ Bucknell Rd S/ Bucknell Rd W	MCC ARM C: Bucknell Rd (West)C Westbound	155	25	1	184	156	40	0	197	0.11	2.70	1.41	13	7%	0.9	Yes
121 JUNCTION DESCRIPTION: Kings Ed/ Oxford Rd/ Middleton Stoney Rd	MCC ARM A: Kings Ed (North)A Northbound	547	81	16	655	540	83	12	635	0.21	0.21	1.04	-20	-3%	0.8	Yes
122 JUNCTION DESCRIPTION: Oxford Rd N/ Pingle Dr/ Oxford Rd S	MCC ARM A: Oxford Rd (North)A Southbound	829	111	36	1003	826	134	28	988	0.12	2.08	1.39	-15	-2%	0.5	Yes
123 JUNCTION DESCRIPTION: Oxford Rd N/ Pingle Dr/ Oxford Rd S	MCC ARM B: Pingle Dr (East)B Eastbound	235	22	19	281	236	22	19	278	0.06	0.04	0.09	-3	-1%	0.2	Yes
124 JUNCTION DESCRIPTION: Oxford Rd N/ Pingle Dr/ Oxford Rd S	MCC ARM B: Pingle Dr (East)B Westbound	63	18	14	96	68	13	12	93	0.61	1.22	0.53	-3	-3%	0.3	Yes
125 JUNCTION DESCRIPTION: Oxford Rd N/ Pingle Dr/ Oxford Rd S	MCC ARM C: Oxford Rd (South)C Northbound	601	89	25	726	602	96	24	722	0.05	0.71	0.16	-4	-1%	0.1	Yes
126 JUNCTION DESCRIPTION: Oxford Rd N/ Pingle Dr/ Oxford Rd S	MCC ARM C: Oxford Rd (South)C Southbound	711	115	40	889	720	138	33	891	0.34	2.04	1.18	2	0%	0.1	Yes
127 JUNCTION DESCRIPTION: Kings Ed/ Oxford Rd/ Middleton Stoney Rd	MCC ARM A: Kings Ed (North)A Northbound	652	79	17	761	647	82	17	747	0.18	0.38	0.07	-14	-2%	0.5	Yes
128 JUNCTION DESCRIPTION: Kings Ed/ Oxford Rd/ Middleton Stoney Rd	MCC ARM A: Kings Ed (North)A Southbound	636	86	31	773	629	112	28	769	0.26	2.57	0.60	-4	-1%	0.2	Yes
129 JUNCTION DESCRIPTION: Kings Ed/ Oxford Rd/ Middleton Stoney Rd	MCC ARM B: Oxford Rd (South)B Northbound	544	81	16	652	540	83	12	635	0.19	0.21	1.04	-17	-3%	0.7	Yes
130 JUNCTION DESCRIPTION: Kings Ed/ Oxford Rd/ Middleton Stoney Rd	MCC ARM B: Oxford Rd (South)B Southbound	826	111	36	998	826	134	28	988	0.01	2.08	1.39	-10	-1%	0.3	Yes
131 JUNCTION DESCRIPTION: Kings Ed/ Oxford Rd/ Middleton Stoney Rd	MCC ARM C: Middleton Stoney Rd (West)C Eastbound	442	52	12	516	442	53	8	503	0.00	0.11	1.31	-13	-3%	0.6	Yes
132 JUNCTION DESCRIPTION: Kings Ed/ Oxford Rd/ Middleton Stoney Rd	MCC ARM C: Middleton Stoney Rd (West)C Westbound	144	29	6	182	138	31	2	171	0.29	0.35	1.83	-11	-6%	0.9	Yes
133 JUNCTION DESCRIPTION: Field St/ St John's St/ Queens Av/ Bucknell Rd	MCC ARM A: Field St (North)A Northbound	503	57	15	593	477	40	10	527	1.18	2.45	1.43	-66	-11%	2.8	Yes
134 JUNCTION DESCRIPTION: Field St/ St John's St/ Queens Av/ Bucknell Rd	MCC ARM A: Field St (North)A Southbound	764	76	23	882	744	98	13	855	0.73	2.34	2.39	-27	-3%	0.9	Yes
135 JUNCTION DESCRIPTION: Field St/ St John's St/ Queens Av/ Bucknell Rd	MCC ARM B: St John's St (East)B Eastbound	318	36	5	381	335	37	9	381	0.92	0.24	1.29	0	0%	0.0	Yes
136 JUNCTION DESCRIPTION: Field St/ St John's St/ Queens Av/ Bucknell Rd	MCC ARM B: St John's St (East)B Westbound	374	60	12	471	370	43	24	436	0.23	2.44	2.77	-35	-7%	1.7	Yes
137 JUNCTION DESCRIPTION: Field St/ St John's St/ Queens Av/ Bucknell Rd	MCC ARM C: Queens Av (South)C Northbound	417	46	13	494	419	53	10	483	0.74	0.99	0.74	-11	-2%	0.5	Yes
138 JUNCTION DESCRIPTION: Field St/ St John's St/ Queens Av/ Bucknell Rd	MCC ARM C: Queens Av (South)C Southbound	777	96	29	925	714	116	28	857	2.31	1.91	0.23	-68	-7%	2.3	Yes
139 JUNCTION DESCRIPTION: Field St/ St John's St/ Queens Av/ Bucknell Rd	MCC ARM D: Bucknell Rd (West)D Eastbound	149	23	1	176	144	10	0	154	0.43	3.16	1.41	-22	-13%	1.7	Yes
140 JUNCTION DESCRIPTION: Field St/ St John's St/ Queens Av/ Bucknell Rd	MCC ARM D: Bucknell Rd (West)D Westbound	106	16	0	124	147	10	1	158	3.66	1.68	1.09	34	27%	2.8	Yes
141 JUNCTION DESCRIPTION: Banbury Rd/ Buckingham Rd/ Roman Wy/ North St/ Field St	MCC ARM A: Banbury Rd (North)A Northbound	142	21	3	171	128	11	0	139	1.21	2.47	2.45	-32	-19%	2.6	Yes
142 JUNCTION DESCRIPTION: Banbury Rd/ Buckingham Rd/ Roman Wy/ North St/ Field St	MCC ARM A: Banbury Rd (North)A Southbound	377	33	10	426	331	25	0	356	2.46	1.44	4.47	-70	-16%	3.5	Yes
143 JUNCTION DESCRIPTION: Banbury Rd/ Buckingham Rd/ Roman Wy/ North St/ Field St	MCC ARM B: Buckingham Rd (North)B Northbound	389	37	12	453	351	29	10	390	1.96	1.42	0.62	-63	-14%	2.1	Yes
144 JUNCTION DESCRIPTION: Banbury Rd/ Buckingham Rd/ Roman Wy/ North St/ Field St	MCC ARM B: Buckingham Rd (North)B Southbound	421	49	13	503	415	73	13	501	0.27	3.03	0.04	-2	0%	0.1	Yes
145 JUNCTION DESCRIPTION: Banbury Rd/ Buckingham Rd/ Roman Wy/ North St/ Field St	MCC ARM C: Roman Wy (East)C Eastbound	4	0	0	5	5	3	0	8	0.62	2.30	0.00	3	60%	1.2	Yes
146 JUNCTION DESCRIPTION: Banbury Rd/ Buckingham Rd/ Roman Wy/ North St/ Field St	MCC ARM C: Roman Wy (East)C Westbound	18	0	0	19	13	0	16	29	1.31	0.00	5.62	10	51%	2.0	Yes
147 JUNCTION DESCRIPTION: Banbury Rd/ Buckingham Rd/ Roman Wy/ North St/ Field St	MCC ARM D: North St (South)D Northbound	4	0	0	6	5	3	0	8	0.62	2.30	0.00	2	33%	0.8	Yes
148 JUNCTION DESCRIPTION: Banbury Rd/ Buckingham Rd/ Roman Wy/ North St/ Field St	MCC ARM D: North St (South)D Southbound	18	0	0	25	13	0	16	29	1.31	0.00	5.62	4	14%	0.7	Yes
149 JUNCTION DESCRIPTION: Banbury Rd/ Buckingham Rd/ Roman Wy/ North St/ Field St	MCC ARM E: Field St (South)E Northbound	508	57	15	598	477	40	10	527	1.40	2.45	1.43	-71	-12%	3.0	Yes
150 JUNCTION DESCRIPTION: Banbury Rd/ Buckingham Rd/ Roman Wy/ North St/ Field St	MCC ARM E: Field St (South)E Southbound	775	81	23	898	744	98	13	855	1.13	1.78	2.39	-43	-5%	1.5	Yes
151 JUNCTION DESCRIPTION: Buckingham Rd N/ Churchill Rd/ Buckingham Rd S/ Brashfield Rd	MCC ARM A: Buckingham Rd (North)A Northbound	309	35	10	364	277	31	10	317	1.87	0.78	0.01	-47	-13%	2.5	Yes
152 JUNCTION DESCRIPTION: Buckingham Rd N/ Churchill Rd/ Buckingham Rd S/ Brashfield Rd	MCC ARM A: Buckingham Rd (North)A Southbound	478	48	12	550	470	70	16	556	0.35	2.85	0.96	6	1%	0.2	Yes
153 JUNCTION DESCRIPTION: Buckingham Rd N/ Churchill Rd/ Buckingham Rd S/ Brashfield Rd	MCC ARM B: Churchill Rd (East)B Eastbound	367	41	6	427	364	37	3	404	0.16	0.58	1.60	-23	-5%	1.1	Yes
154 JUNCTION DESCRIPTION: Buckingham Rd N/ Churchill Rd/ Buckingham Rd S/ Brashfield Rd	MCC ARM B: Churchill Rd (East)B Westbound	245	35	8	299	226	35	0	261	1.23	0.05	4.00	-38	-13%	2.2	Yes
155 JUNCTION DESCRIPTION: Buckingham Rd N/ Churchill Rd/ Buckingham Rd S/ Brashfield Rd	MCC ARM C: Buckingham Rd (South)C Northbound	357	39	12	420	342	38	10	390	0.81	0.19	0.62	-30	-7%	1.5	Yes
156 JUNCTION DESCRIPTION: Buckingham Rd N/ Churchill Rd/ Buckingham Rd S/ Brashfield Rd	MCC ARM C: Buckingham Rd (South)C Southbound	455	51	15	539	449	74	13	536	0.26	2.93	0.57	-3	0%	0.1	Yes
157 JUNCTION DESCRIPTION: Buckingham Rd N/ Churchill Rd/ Buckingham Rd S/ Brashfield Rd	MCC ARM D: Brashfield Rd (West)D Eastbound	97	9	1	113	96	9	0	105	0.08	0.05	1.41	-8	-7%	0.7	Yes
158 JUNCTION DESCRIPTION: Buckingham Rd N/ Churchill Rd/ Buckingham Rd S/ Brashfield Rd	MCC ARM D: Brashfield Rd (West)D Westbound	46	4	2	52	44	10	0	54	0.27	2.30	2.00	2	4%	0.3	Yes
159 JUNCTION DESCRIPTION: Launton Rd/ London Rd S/ Wessex W

All flows in **Veh** unless otherwise stated
All modelled flows are **Actuals**

| | | | AM Peak | | |

Appendix F – Link Flow Validation

All flows in **Veh** unless otherwise stated
All modelled flows are **Actuals**

	Link/Junction		Direction/Approach	AM Peak Observed Car	Observed LGV	Observed HGV	Observed Total	Modelled (Actual) Car	Modelled (Actual) LGV	Modelled (Actual) HGVeh	Modelled (Actual) Total	Total Veh GEH	Total Veh GEH	Total Veh GEH	Diff	% Diff	Total Veh GEH	Link Flow?
1	B4100 - Road from Aynho	ATC	Northbound	519	25	8	554	348	65	25	438	8.22	5.98	4.26	-116	-21%	5.2	No
2	B4100 - Road from Aynho	ATC	Southbound	560	20	74	660	591	115	29	734	1.30	11.59	6.33	74	11%	2.8	Yes
3	Pingle Drive	ATC	Westbound	66	10	3	79	68	13	12	93	0.30	1.10	3.30	14	18%	1.5	Yes
4	Pingle Drive	ATC	Eastbound	259	17	4	285	236	22	19	278	1.43	1.30	4.70	-7	-3%	0.4	Yes
5	Kings End	ATC	Westbound	15	0	0	16	22	0	0	22	1.68	0.00	0.00	6	39%	1.4	Yes
6	Kings End	ATC	Eastbound	270	20	1	299	290	34	7	331	1.20	2.74	2.96	32	11%	1.8	Yes
7	Bucknell Rd/ Howes Lane	ATC	Southbound	828	15	13	864	775	117	13	905	1.87	12.64	0.08	41	5%	1.4	Yes
8	Bucknell Rd/ Howes Lane	ATC	Northbound	458	7	6	482	404	62	8	474	2.60	9.35	0.70	-8	-2%	0.4	Yes
9	Launton Road	ATC	Northbound	327	32	4	370	302	54	6	361	1.40	3.40	0.84	-8	-2%	0.4	Yes
10	Launton Road	ATC	Southbound	328	51	5	387	266	45	8	319	3.60	0.80	1.28	-68	-17%	3.6	Yes
15	A43- North of M40 Jn 10	ATC	Northbound	984	58	114	1160	1047	163	143	1353	1.98	10.08	2.63	193	17%	5.5	No
17	A41 - Road to Aylesbury	ATC	Eastbound	1017	79	30	1137	807	159	44	1010	6.97	7.36	2.26	-127	-11%	3.9	Yes
18	A41 - Road to Aylesbury	ATC	Westbound	844	69	27	945	660	116	58	834	6.70	4.95	4.81	-111	-12%	3.7	Yes
19	A41 - Southern Bypass	ATC	Eastbound	747	56	34	843	606	117	61	783	5.41	6.53	3.90	-59	-7%	2.1	Yes
20	A41 - Southern Bypass	ATC	Westbound	935	67	46	1054	718	106	66	890	7.53	4.18	2.66	-164	-16%	5.3	No
23	Churchill Rd	ATC	Eastbound	410	18	3	436	364	37	3	404	2.32	3.79	0.11	-32	-7%	1.5	Yes
24	Churchill Rd	ATC	Westbound	275	21	2	301	226	35	0	261	3.09	2.80	2.00	-39	-13%	2.3	Yes
25	A41 East of B4011	ATC	Eastbound	356	47	25	430	357	63	34	454	0.05	2.26	1.82	24	6%	1.2	Yes
26	A41 East of B4011	ATC	Westbound	525	58	21	608	420	68	53	541	4.80	1.28	5.33	-67	-11%	2.8	Yes
201	A34 NB West of M40	TRADS	Northbound			361	2612	2263	400	326	2989			1.91	377	14%	7.1	Yes
202	A34 NB West of M40	TRADS	Northbound			330	2596	2263	400	326	2989			0.21	393	15%	7.4	No
203	A34 SB West of M40	TRADS	Southbound			474	2450	1652	292	409	2352			3.10	-98	-4%	2.0	Yes
204	M40 South of J9 NB	TRADS	Northbound			172	2213	1716	318	190	2224			1.34	11	0%	0.2	Yes
205	M40 South of J9 NB	TRADS	Southbound			190	2231	1716	318	190	2224			0.01	-7	0%	0.2	Yes
206	M40 South of J9 SB	TRADS	Southbound			371	3643	2748	476	356	3581			0.74	-62	-2%	1.0	Yes
209	M40 J9 Through Jn NB	TRADS	Southbound			156	1838	1429	264	158	1851			0.21	14	1%	0.3	Yes
210	M40 J9 Through Jn SB	TRADS	Southbound			325	2918	2218	356	309	2883			0.86	-35	-1%	0.6	Yes
215	M40 J10 Through Jn NB	TRADS	Southbound			293	2479	1846	321	292	2460			0.05	-19	-1%	0.4	Yes
216	M40 J10 Through Jn SB	TRADS	Southbound			433	2766	2036	350	444	2830			0.52	65	2%	1.2	Yes
218	M40 J10 Through Jn SB	TRADS	Southbound			434	2761	2036	350	444	2830			0.51	69	3%	1.3	Yes
222	M40 NB North of J10 (Near Souldern)	TRADS	Northbound			334	2949	2156	380	344	2880			0.56	-69	-2%	1.3	Yes
224	M40 SB North of J10 (Near Aynho)	TRADS	Southbound			576	3352	2534	429	519	3482			2.44	130	4%	2.2	Yes
225	A43 Btw B4100 and A421 NB	TRADS	Northbound			162	1409	1082	146	135	1363			2.21	-46	-3%	1.2	Yes
226	A43 Btw B4100 and A421 SB	TRADS	Southbound			182	1633	1311	241	183	1734			0.05	101	6%	2.5	Yes
229	M40 SB Btw J10 and J9 (Near Middleton Stoney)	TRADS	Southbound			622	4252	2966	486	674	4126			2.02	-126	-3%	1.9	Yes
231	M40 NB Btw J9 and J10 (Near Middleton Stoney)	TRADS	Northbound			423	3596	2671	460	403	3533			0.99	-63	-2%	1.1	Yes
233	A41/B4011, Ambrosden	MCC	B4011 Northbound			5	211	161	20	5	186			0.00	-25	-12%	1.8	Yes
234	A41/B4011, Ambrosden	MCC	B4011 Southbound			5	393	288	52	9	349			1.62	-44	-11%	2.3	Yes
235	A41/B4011, Ambrosden	MCC	A41 North, Southbound			25	805	559	115	44	717			3.19	-88	-11%	3.2	Yes
236	A41/B4011, Ambrosden	MCC	A41 North, Northbound			25	762	495	87	58	640			5.09	-122	-16%	4.6	No
237	A41/B4011, Ambrosden	MCC	A41 South, Northbound			20	613	420	68	53	541			5.43	-72	-12%	3.0	Yes
238	A41/B4011, Ambrosden	MCC	A41 South, Southbound			20	474	357	63	34	454			2.76	-20	-4%	0.9	Yes
27	A4421 - Road to Buckingham	ATC	Northbound				541	434	69	16	520				-21	-4%	0.9	Yes
28	A4421 - Road to Buckingham	ATC	Southbound				919	874	143	52	1069				151	16%	4.8	No
29	Bicester Rd - Road to Blackthorn	ATC	Westbound				345	265	54	9	329				-16	-5%	0.9	Yes
30	Bicester Rd - Road to Blackthorn	ATC	Eastbound				267	224	59	6	289				22	8%	1.3	Yes
31	A41 - Road to Oxford	ATC	Northbound				842	760	157	98	1015				173	21%	5.7	No
32	A41 - Road to Oxford	ATC	Southbound				1229	1175	219	121	1514				285	23%	7.7	No
33	A4095 - Road to Chesterton	ATC	Northbound				217	182	16	3	202				-15	-7%	1.1	Yes
34	A4095 - Road to Chesterton	ATC	Southbound				442	361	45	0	406				-36	-8%	1.8	Yes
35	B4030 - Road to Middleton Stoney	ATC	Eastbound				275	211	30	16	258				-17	-6%	1.1	Yes
36	B4030 - Road to Middleton Stoney	ATC	Westbound				285	203	32	18	254				-31	-11%	1.9	Yes
37	Bucknell Rd - Road to Bucknell	ATC	Northbound				109	156	40	0	197				88	81%	7.1	Yes
38	Bucknell Rd - Road to Bucknell	ATC	Southbound				180	110	34	0	144				-36	-20%	2.8	Yes
39	St Johns St	ATC	Eastbound				378	335	37	9	381				3	1%	0.2	Yes
40	St Johns St	ATC	Westbound				491	370	43	24	436				-55	-11%	2.6	Yes
41	Buckingham Rd	ATC	Northbound				436	360	29	10	399				-37	-8%	1.8	Yes
42	Buckingham Rd	ATC	Southbound				468	433	73	13	519				51	11%	2.3	Yes
43	Skimmingdish Ln	ATC	Westbound				606	447	100	33	580				-25	-4%	1.0	Yes
44	Skimmingdish Ln	ATC	Eastbound				1073	880	127	58	1065				-8	-1%	0.2	Yes
45	A4421 Gavray Drive	ATC	Southbound				608	464	80	22	566				-42	-7%	1.7	Yes
46	A4421 Gavray Drive	ATC	Northbound				624	520	57	13	589				-35	-6%	1.4	Yes
47	B430 - South of M40 Junction 10	ATC	Southbound				551	543	92	9	644				93	17%	3.8	Yes
48	B430 - South of M40 Junction 10	ATC	Northbound				439	377	33	21	430				-9	-2%	0.4	Yes
49	Ploughley Rd	ATC	Westbound				304	222	39	0	261				-43	-14%	2.5	Yes
50	Ploughley Rd	ATC	Eastbound				429	270	44	0	315				-114	-27%	5.9	No
245	Camp Road	ATC	Eastbound	236	21	5	262	170	13	9	192	4.6	2.0	1.6	-70	-27%	4.7	Yes
246	Camp Road	ATC	Westbound	257	15	4	276	197	15	6	219	4.0	0.2	1.0	-57	-21%	3.6	Yes
247	B430 Ardley Rd	ATC	Northbound	176	12	5	192	158	3	20	182	1.3	3.2	4.4	-11	-5%	0.8	Yes
248	B430 Ardley Rd	ATC	Southbound	442	34	12	488	389	57	16	461	2.6	3.4	0.9	-27	-5%	1.2	Yes
249	A4260 Banbury Rd	ATC	Northbound	248	36	5	290	258	43	28	328	0.6	1.1	5.5	38	13%	2.2	Yes
250	A4260 Banbury Rd	ATC	Southbound	821	61	7	888	772	73	22	866	1.7	1.5	4.1	-22	-2%	0.7	Yes
251	Ardley Road	ATC	Eastbound	10	0	0	10	22	5	0	27	3.0	2.9	0.0	16	158%	3.8	Yes
252	Ardley Road	ATC	Westbound	6	0	0	6	10	6	0	16	1.2	3.3	0.0	9	148%	2.8	Yes
253	B430 NORTH OF WESTON ON THE GREEN	ATC	Northbound				174	85	0	0	85				-89	-51%	7.8	Yes
254	B430 NORTH OF WESTON ON THE GREEN	ATC	Southbound				661	351	53	3	407				-253	-38%	11.0	No
255	A4095 WEST OF B430	ATC	Eastbound				190	112	15	14	141				-49	-26%	3.8	Yes
256	A4095 WEST OF B430	ATC	Westbound				288	186	32	9	227				-61	-21%	3.8	Yes
257	B4030 WEST OF MIDDLETON STONEY	ATC	Eastbound				247	226	29	9	264				16	7%	1.0	Yes
258	B4030 WEST OF MIDDLETON STONEY	ATC	Westbound				233	201	18	6	226				-7	-3%	0.5	Yes
259	B4030 WEST OF A4095	ATC	Eastbound				262	211	30	16	258				-4	-2%	0.3	Yes
260	B4030 WEST OF A4095	ATC	Westbound				277	203	32	18	254				-23	-8%	1.4	Yes
261	A4095 EAST OF B430	ATC	Eastbound				114	46	7	3	55				-59	-52%	6.4	Yes
262	A4095 EAST OF B430	ATC	Westbound				187	106	27	0	132				-55	-29%	4.3	Yes
263	B430 SOUTH OF B4030	ATC	Northbound				188	131	9	11	151				-37	-20%	2.8	Yes
264	B430 SOUTH OF B4030	ATC	Southbound				537	439	57	12	508				-30	-6%	1.3	Yes
265	B4030 LOWER HEYFORD	ATC	Eastbound				249	170	13	0	184				-65	-26%	4.4	Yes
266	B4030 LOWER HEYFORD	ATC	Westbound				260	157	17	0	173				-87	-33%	5.9	Yes
267	A4095 GIBRALTER	ATC	Eastbound				507	374	60	36	469				-37	-7%	1.7	Yes
268	A4095 GIBRALTER	ATC	Westbound				619	269	72	14	355				-264	-43%	11.9	No
269	B430 SOUTH OF M40 ARDLEY	ATC	Northbound				402	377	33	21	430				29	7%	1.4	Yes
270	B430 SOUTH OF M40 ARDLEY	ATC	Southbound				621	543	92	9	644				23	4%	0.9	Yes
271	BICESTER, BUCKNELL ROAD WEST OF LORDS LANE	ATC	Northbound				166	156	40	0	197				30	18%	2.3	Yes
272	BICESTER, BUCKNELL ROAD WEST OF LORDS LANE	ATC	Southbound				117	110	34	0	144				27	23%	2.4	Yes
273	A4095 NORTH OF CHESTERTON	ATC	Northbound				205	182	16	3	202				-4	-2%	0.2	Yes
274	A4095 NORTH OF CHESTERTON	ATC	Southbound				374	361	45	0	406				32	8%	1.6	Yes
												81%	74%	90%			85%	89%

	Inter Peak Observed Car	Observed LGV	Observed HGV	Observed Total	Modelled (Actual) Car	Modelled (Actual) LGV	Modelled (Actual) HGV	Modelled (Actual) Total	Total Veh GEH	Total Veh GEH	Total Veh GEH	Diff	% Diff	Total Veh GEH	Link Flow?
1	333	35	11	381	230	40	32	302	6.14	0.69	4.66	-79	-21%	4.3	Yes
2	210	9	52	276	279	35	29	343	4.45	5.63	3.65	68	25%	3.8	Yes
3	381	17	4	403	344	19	6	369	1.94	0.47	1.33	-34	-8%	1.7	Yes
4	500	21	4	526	452	18	11	481	2.22	0.70	2.88	-45	-9%	2.0	Yes
5	22	1	0	24	18	4	0	22	0.71	1.90	0.00	-1	-5%	0.2	Yes
6	275	20	1	299	242	31	0	274	2.01	2.34	1.41	-25	-9%	1.5	Yes
7	362	11	4	383	302	44	12	358	3.28	6.30	2.89	-25	-6%	1.3	Yes
8	372	16	6	399	302	46	11	360	3.76	5.38	1.97	-39	-10%	2.0	Yes
9	411	34	3	452	367	83	14	464	2.22	6.46	3.87	12	3%	0.6	Yes
10	379	36	3	421	423	66	17	505	2.20	4.28	4.38	85	20%	3.9	Yes
15	931	94	149	1179	854	136	197	1188	2.55	3.91	3.72	9	1%	0.3	Yes
17	593	67	34	699	463	70	68	601	5.65	0.36	4.79	-98	-14%	3.8	Yes
18	636	85	30	755	485	78	71	634	6.38	0.70	5.79	-121	-16%	4.6	No
19	592	65	37	698	487	89	96	673	4.48	2.83	7.35	-24	-3%	0.9	Yes
20	700	74	41	820	553	102	89	744	5.85	3.02	6.02	-76	-9%	2.7	Yes
23	259	19	2	281	217	31	5	253	2.71	2.54	1.90	-28	-10%	1.7	Yes
24	284	19	1	307	234	26	3	263	3.08	1.48	1.25	-43	-14%	2.6	Yes
25	293	44	27	366	266	36	28	330	1.59	1.22	0.24	-36	-10%	1.9	Yes
26	318	51	21	394	299	43	33	374	1.10	1.24	2.36	-20	-5%	1.0	Yes
201			576	2302	1660	292	497	2449			3.39	148	6%	3.0	Yes
202			533	2299	1660	292	497	2449			1.60	151	7%	3.1	Yes
203			432	2344	1532	270	428	2230			0.19	-114	-5%	2.4	Yes
204			313	2283	1629	283	341	2253			1.56	-31	-1%	0.6	Yes
205			346	2302	1629	283	341	2253			0.27	-50	-2%	1.0	Yes
206			268	1953	1428	248	269	1945			0.12	-8	0%	0.2	Yes
209			301	1925	1354	232	299	1885			0.12	-40	-2%	0.9	Yes
210			241	1658	1212	205	240	1657			0.08	-2	0%	0.0	Yes
215			535	2565	1741	299	549	2588			0.58	23	1%	0.5	Yes
216			390	2187	1531	264	410	2204			1.01	18	1%	0.4	Yes
218			397	2186	1531	264	410	2204			0.62	18	1%	0.4	Yes
222			557	2893	1940	337	614	2891			2.33	-2	0%	0.0	Yes
224			531	2578	1779	306	478	2562			2.35	-15	-1%	0.3	Yes
225			247	1083	905	137	172	1214			5.14	131	12%	3.9	Yes
226			171	1031	826	133	169	1128			0.15	97	9%	2.9	Yes
229			551	3218	2180	383	598	3162			1.97	-57	-2%	1.0	Yes
231			744	3632	2455	423	732	3610			0.44	-22	-1%	0.4	Yes
233															
234															
235															
236															
237															
238															
27				438	330	84	37	450				13	3%	0.6	Yes
28				433	322	84	33	439				7	2%	0.3	Yes
29				197	147	76	9	231				35	18%	2.4	Yes
30				212	163	47	9	219				7	3%	0.5	Yes
31				1084	807	137	120	1065				-19	-2%	0.6	Yes
32				1106	738	139	114	991				-115	-10%	3.5	Yes
33				201	159	24	4	188				-13	-7%	1.0	Yes
34				157	123	21	3	147				-10	-6%	0.8	Yes
35				196	142	19	18	179				-17	-9%	1.2	Yes
36				184	144	16	11	171				-13	-7%	1.0	Yes
37				78	79	25	2	105				27	35%	2.8	Yes
38				93	78	19	3	100				8	8%	0.8	Yes
39				428	314	24	8	346				-82	-19%	4.2	Yes
40				703	568	38	12	618				-85	-12%	3.3	Yes
41				440	319	38	10	367				-73	-17%	3.7	Yes
42				411	326	32	6	364				-47	-12%	2.4	Yes
43				494	317	81	50	447				-46	-9%	2.1	Yes
44				473	344	64	47	456				-17	-4%	0.8	Yes
45				388	269	46	38	352				-36	-9%	1.9	Yes
46				382	259	33	49	341				-41	-11%	2.1	Yes
47				222	259	22	16	296				74	33%	4.6	Yes
48				314	268	34	13	315				2	0%	0.1	Yes
49				251	119	9	29	157				-93	-37%	6.5	Yes
50				236	135	14	28	178				-58	-25%	4.1	Yes
245	128	17	3	148	117	4	12	133	1.0	4.1	3.3	-15	-10%	1.3	Yes
246	117	18	2	137	103	13	16	132	1.4	1.1	4.6	-5	-4%	0.4	Yes
247	127	17	12	156	160	5	13	178	2.7	3.6	0.2	21	14%	1.7	Yes
248	107	14	8	129	188	3	8	200	6.7	3.7	0.0	70	54%	5.5	Yes
249	292	45	11	347	333	26	9	368	2.3	3.1	0.5	21	6%	1.1	Yes
250	250	27	10	287	396	34	11	441	8.1	1.3	0.1	154	54%	8.1	No
251	17	2	0	19	5	1	0	6	3.6	0.5	0.0	-12	-66%	3.5	Yes
252	17	3	0	20	9	2	0	11	2.4	0.2	0.0	-9	-44%	2.2	Yes
253				188	122	16	12	150				-37	-20%	2.9	Yes
254				146	163	0	1	164				18	12%	1.4	Yes
255				117	113	17	4	134				17	15%	1.6	Yes
256				105	107	18	3	128				23	22%	2.1	Yes
257				188	169	19	12	200				12	6%	0.8	Yes
258				181	149	15	9	173				-8	-4%	0.6	Yes
259				192	142	19	18	179				-13	-7%	1.0	Yes
260				179	144	16	11	171				-9	-5%	0.6	Yes
261				106	58	12	0	70				-36	-34%	3.9	Yes
262				81	65	15	0	80				-1	-1%	0.1	Yes
263				234	169	6	13	188				-46	-20%	3.1	Yes
264				170	220	3	4	227				57	34%	4.1	Yes
265				137	125	12	0	137				0	0%	0.0	Yes
266				134	136	6	0	141				7	5%	0.6	Yes
267				257	280	40	9	329				72	28%	4.2	Yes
268				265	219	30	8	256				-9	-3%	0.5	Yes
269				259	268	34	13	315				56	22%	3.3	Yes
270				213	259	22	16	296				83	39%	5.2	Yes
271				91	79	25	2	105				14	16%	1.4	Yes
272				79	78	19	3	100				21	27%	2.3	Yes
273				206	159	24	4	188				-19	-9%	1.3	Yes
274				147	123	21	3	147				1	0%	0.0	Yes
									78%	85%	91%			96%	98%

	PM Peak Observed Car	Observed LGV	Observed HGV	Observed Total	Modelled (Actual) Car	Modelled (Actual) LGV	Modelled (Actual) HGV	Modelled (Actual) Total	Car GEH	LGV GEH	HGV GEH	Diff	% Diff	Total Veh GEH	Link Flow?
1	669	25	4	700	506	53	4	563	6.70	4.53	0.12	-137	-20%	5.4	No
2	464	8	38	517	509	52	13	574	2.03	8.11	4.98	57	11%	2.4	Yes
3	519	16	4	542	444	11	2	456	3.42	1.43	0.88	-85	-16%	3.8	Yes
4	300	10	1	312	255	9	2	266	2.73	0.20	1.03	-46	-15%	2.7	Yes
5	26	1	0	29	47	0	1	48	3.45	0.86	1.50	19	68%	3.2	Yes
6	303	14	0	324	265	29	0	295	2.24	3.32	0.00	-29	-9%	1.6	Yes
7	645	8	7	663	546	62	5	612	4.05	9.20	0.66	-51	-8%	2.0	Yes
8	865	11	15	898	780	76	8	865	2.96	10.00	1.99	-33	-4%	1.1	Yes
9	515	32	4	557	587	48	2	638	3.07	2.55	0.98	81	14%	3.3	Yes
10	469	19	2	495	377	19	2	397	4.48	0.03	0.02	-98	-20%	4.6	Yes
15	1333	68	150	1563	1418	229	112	1759	2.31	13.21	3.31	197	13%	4.8	Yes
17	981	47	12	1049	818	92	30	940	5.42	5.45	3.97	-109	-10%	3.4	Yes
18	1027	52	13	1102	865	117	19	1001	5.27	7.16	1.45	-101	-9%	3.1	Yes
19	1010	39	14	1070	857	84	35	975	5.02	5.79	4.22	-94	-9%	2.9	Yes
20	921	30	21	978	805	109	41	954	3.96	9.56	3.52	-24	-2%	0.8	Yes
23	383	12	0	396	280	36	0	316	5.66	5.04	0.00	-80	-20%	4.2	Yes
24	521	18	3	547	572	37	0	609	2.16	3.65	2.29	62	11%	2.6	Yes
25	526	32	17	580	487	61	27	576	1.72	4.29	2.18	-4	-1%	0.2	Yes
26	409	28	9	452	443	55	13	510	1.67	4.25	1.09	59	13%	2.7	Yes
201			379	2948	2443	440	321	3204			3.11	256	9%	4.6	Yes
202			354	2941	2443	440	321	3204			1.81	263	9%	4.7	Yes
203			275	3088	2528	421	272	3220			0.17	132	4%	2.4	Yes
204			202	3546	2857	498	225	3580			1.57	34	1%	0.6	Yes
205			225	3571	2857	498	225	3580			0.01	10	0%	0.2	Yes
206			191	2518	1947	335	194	2476			0.18	-41	-2%	0.8	Yes
209			198	2777	2209	383	198	2790			0.02	13	0%	0.2	Yes
210			176	2126	1664	281	171	2116			0.36	-10	0%	0.2	Yes
215			357	3296	2447	430	352	3228			0.25	-67	-2%	1.2	Yes
216			275	2842	2201	376

Appendix G – Turning Count Validation

				AM Peak												PM Peak											
				Observed				Modelled (Actual)				Car	LGV	HGVeh	Total Veh	Observed				Modelled (Actual)				Car	LGV	HGVeh	Total Veh		
	MCC	From	TO	Car	LGV	HGV	Total	Car	LGV	HGVeh	Total	GEH	GEH	GEH	Diff	% Diff	GEH	Car	LGV	HGV	Total	Car	LGV	HGV	Total	GEH	GEH	GEH	Diff	% Diff	GEH
275	1e	Chilgrove Drive	Unclassified	1	0	0	1	0	0	0	0	1.44	0.00	0.00	-1	-100%	1.44	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
276	1e	Chilgrove Drive	Camp Road South	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
277	1e	Chilgrove Drive	Camp Road West	3	0	0	3	0	0	0	0	2.50	0.00	0.00	-3	-100%	2.50	1	0	0	1	0	0	0	0	1.44	0.00	0.00	-1	-100%	1.44
278	1e	Unclassified	Chilgrove Drive	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
279	1e	Unclassified	Camp Road South	9	1	0	10	9	0	0	9	0.04	1.45	0.00	-1	-11%	0.37	7	0	0	7	6	0	0	6	0.46	0.00	0.00	-1	-16%	0.46
280	1e	Unclassified	Camp Road West	97	20	1	118	100	11	0	111	0.38	2.33	1.43	-6	-5%	0.60	46	2	1	49	55	0	0	55	1.26	2.06	1.43	6	12%	0.80
281	1e	Camp Road South	Chilgrove Drive	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	1	0	0	1	0	0	0	0	1.44	0.00	0.00	-1	-100%	1.44
282	1e	Camp Road South	Unclassified	4	2	0	6	10	0	0	10	2.14	2.06	0.00	4	57%	1.25	5	1	0	6	21	0	0	21	4.38	1.45	0.00	15	237%	4.00
283	1e	Camp Road South	Camp Road West	88	6	1	96	97	5	6	108	0.91	0.77	2.73	12	13%	1.20	85	6	0	92	95	9	9	113	1.03	1.06	4.22	22	24%	2.14
284	1e	Camp Road West	Chilgrove Drive	2	0	0	2	0	0	0	0	2.04	0.00	0.00	-2	-100%	2.04	2	0	0	2	0	0	0	0	2.04	0.00	0.00	-2	-100%	2.04
285	1e	Camp Road West	Unclassified	50	0	3	53	52	0	0	52	0.26	0.00	2.47	-1	-2%	0.16	94	5	2	101	72	1	0	73	2.40	2.45	2.02	-28	-28%	3.02
286	1e	Camp Road West	Camp Road South	98	14	2	113	118	13	9	140	1.96	0.28	3.10	27	24%	2.38	117	2	1	121	113	6	3	122	0.46	1.95	1.42	1	1%	0.09
287	2a	A43 North	A43 South	1224	239	202	1665	1144	208	183	1535	2.33	2.09	1.38	-130	-8%	3.26	1066	112	110	1288	1046	176	91	1312	0.63	5.30	1.86	24	2%	0.68
288	2a	A43 South	A43 North	817	109	130	1056	845	129	121	1096	0.98	1.87	0.82	40	4%	1.20	1351	151	104	1606	1279	201	112	1592	1.99	3.76	0.79	-14	-1%	0.35
289	2a	M40 SB Off Slip	A43 North	148	41	20	209	200	34	22	256	3.93	1.20	0.47	47	22%	3.06	124	15	12	151	143	29	0	172	1.65	2.96	4.90	21	14%	1.65
290	2a	M40 SB Off Slip	A43 South	196	63	37	296	305	45	53	403	6.89	2.47	2.35	107	36%	5.71	224	25	34	283	247	48	47	342	1.47	3.86	2.00	59	21%	3.32
292	2b	A43 North	M40 SB On Slip	771	176	164	1111	807	105	172	1084	1.30	6.02	0.60	-27	-2%	0.82	755	42	76	873	808	143	83	1034	1.90	10.49	0.83	161	18%	5.23
293	2b	A43 North	A43 West	559	86	35	680	530	103	9	641	1.26	1.71	5.58	-39	-6%	1.52	398	43	18	459	304	46	7	358	5.00	0.47	3.01	-101	-22%	5.01
297	2b	A43 West	A43 North	781	107	119	1007	807	125	110	1041	0.94	1.63	0.89	34	3%	1.08	1263	146	88	1497	1222	195	101	1517	1.17	3.74	1.29	20	1%	0.52
299	2b	A43 West	M40 SB On Slip	33	3	7	43	14	0	0	14	3.83	2.45	3.74	-29	-67%	5.35	20	4	3	27	2	0	0	2	5.45	2.83	2.45	-25	-93%	6.58
300	2c	A43 East	M40 NB On Slip	202	30	30	262	92	29	43	164	9.11	0.12	2.20	-98	-37%	6.69	240	42	26	308	124	34	38	196	8.58	1.27	2.13	-112	-36%	7.02
301	2c	A43 East	B430	439	73	24	536	545	92	9	646	4.78	2.12	3.73	110	21%	4.54	248	18	5	271	286	25	3	315	2.34	1.51	0.80	44	16%	2.55
302	2c	M40 NB Off Slip	A43 East	781	103	125	1009	821	138	110	1069	1.40	3.22	1.35	60	6%	1.87	1083	144	125	1352	1112	178	134	1425	0.89	2.71	0.82	73	5%	1.96
303	2c	M40 NB Off Slip	B430	24	7	3	34	4	0	0	4	5.44	3.74	2.45	-30	-89%	6.96	21	5	2	28	8	0	0	8	3.37	3.16	2.00	-20	-71%	4.67
304	2c	B430	A43 East	175	27	24	226	158	3	12	174	1.28	6.03	2.92	-52	-23%	3.71	333	28	12	373	235	31	5	271	5.79	0.50	2.43	-102	-27%	5.68
305	2c	B430	M40 NB On Slip	212	15	4	231	218	29	9	257	0.43	3.04	1.93	26	11%	1.64	133	22	5	160	228	28	0	256	7.10	1.13	3.16	96	60%	6.66
367	8	A4095/ Howes Lane	A4095/ Howes Lane	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
368	8	A4095/ Howes Lane	Middleton Stoney Road East	13	1	1	15	1	0	0	1	4.37	1.41	1.41	-14	-91%	4.79	33	1	0	34	20	0	0	20	2.46	1.41	0.00	-14	-40%	2.62
369	8	A4095/ Howes Lane	Vendee Drive	486	89	11	586	553	74	13	640	2.95	1.71	0.52	54	9%	2.17	223	32	6	261	204	23	3	230	1.29	1.70	1.59	-31	-12%	1.99
370	8	A4095/ Howes Lane	Middleton Stoney Road West	51	8	0	59	87	17	3	107	4.35	2.55	2.36	48	81%	5.26	62	9	5	76	72	8	2	82	1.25	0.37	1.45	6	8%	0.72
371	8	Middleton Stoney Road East	A4095/ Howes Lane	13	1	0	14	9	0	0	9	1.19	1.41	0.00	-5	-35%	1.46	31	8	2	41	27	0	0	27	0.82	4.00	2.00	-14	-35%	2.48
372	8	Middleton Stoney Road East	Middleton Stoney Road East	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
373	8	Middleton Stoney Road East	Vendee Drive	123	21	3	147	139	9	0	148	1.41	3.08	2.45	1	1%	0.10	70	14	1	85	63	4	0	67	0.85	3.50	1.41	-18	-22%	2.11
374	8	Middleton Stoney Road East	Middleton Stoney Road West	65	21	5	91	90	15	10	115	2.85	1.42	1.86	24	27%	2.38	96	13	1	110	139	11	2	151	3.96	0.72	0.56	41	37%	3.59
375	8	Vendee Drive	A4095/ Howes Lane	100	16	3	119	176	15	5	196	6.47	0.27	1.06	77	65%	6.14	464	82	8	554	451	50	8	509	0.61	3.88	0.05	-45	-8%	1.94
376	8	Vendee Drive	Middleton Stoney Road East	45	10	0	55	68	7	1	75	3.01	1.17	1.11	20	36%	2.46	123	20	0	143	174	21	0	195	4.21	0.21	0.00	52	37%	4.02
377	8	Vendee Drive	Vendee Drive	0	1	0	1	0	0	0	0	0.00	1.41	0.00	-1	-100%	1.41	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41
378	8	Vendee Drive	Middleton Stoney Road West	1	1	0	2	26	0	5	31	6.83	0.85	3.17	29	1475%	7.21	1	0	2	3	39	1	2	42	8.47	1.52	0.20	39	1307%	8.25
379	8	Middleton Stoney Road West	A4095/ Howes Lane	24	3	3	30	48	13	3	63	3.97	3.43	0.20	33	110%	4.84	73	14	6	93	89	9	2	99	1.75	1.44	2.26	6	7%	0.66
380	8	Middleton Stoney Road West	Middleton Stoney Road East	97	13	3	113	146	17	7	171	4.45	1.10	1.86	58	51%	4.83	112	30	1	143	106	5	4	115	0.55	5.98	1.91	-28	-19%	2.44
381	8	Middleton Stoney Road West	Vendee Drive	27	12	2	41	17	0	6	24	2.02	4.62	2.05	-17	-41%	2.97	50	4	1	55	23	0	0	23	4.49	2.51	1.18	-32	-58%	5.06
382	8	Middleton Stoney Road West	Middleton Stoney Road West	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
383	9	Camp Road	B4030 South	127	15	7	149	118	13	9	140	0.81	0.62	0.86	-9	-6%	0.73	131	7	2	140	112	6	3	121	1.71	0.37	0.66	-19	-13%	1.64
384	9	Camp Road	B4030 West	21	6	2	29	9	0	0	9	3.00	3.46	2.00	-20	-68%	4.50	12	0	0	12	6	0	0	6	1.83	0.00	0.00	-6	-46%	1.83
385	9	B4030 South	Camp Road	94	9	6	109	97	5	6	108	0.29	1.71	0.09	-1	-1%	0.13	157	10	4	171	95	9	9	113	5.54	0.22	1.93	-58	-34%	4.87
386	9	B4030 South	B4030 West	152	25	7	184	105	14	0	118	4.19	2.59	3.74	-66	-36%	5.36	132	9	2	143	140	7	0	147	0.65	0.71	2.00	4	2%	0.30
387	9	B4030 West	Camp Road	16	2	1	19	10	0	0	10	1.66	2.00	1.41	-9	-47%	2.36	16	0	0	16	21	0	0	21	1.21	0.00	0.00	5	33%	1.21
388	9	B4030 West	B4030 South	139	20	3	162	107	16	0	123	2.84	1.01	2.45	-39	-24%	3.25	132	3	0	135	105	7	0	112	2.45	1.64	0.00	-23	-17%	2.08
401	12	Port Way North	B4030 East	3	0	0	3	0	0	0	0	2.35	0.00	0.00	-3	-96%	2.35	2	1	0	3	1	0	0	1	0.65	1.44	0.00	-2	-61%	1.28
402	12	Port Way North	Port Way South	11	1	0	12	5	0	1	6	2.06	1.44	1.49	-6	-48%	1.91	15	0	0	15	19	0	0	19	0.90	0.00	0.00	4	24%	0.90
403	12	Port Way North	B4030 West	3	0	0	3	0	0	0	0	2.48	0.00	0.00	-3	-100%	2.48	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00
404	12	B4030 East	Port Way North	2	0	0	2	1	0	0	1	1.24	0.00	0.00	-1	-70%	1.24	2	0	0	2	0	0	0	0	1.51	0.00	0.00	-2	-81%	1.51
405	12	B4030 East	Port Way South	0	0	0	0	0	0	0	0	0.00	0.00	0.00	0	0%	0.00	6	0	0	6	0	0	0	0	3.51	0.00	0.00	-6	-100%	3.51
406	12	B4030 East	B4030 West	115	30	13	158	107	12	0	118	0.80	4.07	5.14	-40	-25%	3.42	146	17	2	165	137	7	0	144	0.71	2.82	2.02	-20	-12%	1.62
407	12	Port Way South	Port Way North	12	0	0	12	14	0	0	14	0.37	0.00	0.00	1	11%	0.37	15	1	0	16	12	0	0	12	0.92	1.44	0.00	-4	-27%	1.18
408	12	Port Way South	B4030 East	4	0	0	4	0	0	0	0	2.87	0.00	0.00	-4	-100%	2.87	5	0	0	5	0	0	0	0	3.20	0.00	0.00	-5	-100%	3.20
409	12	Port Way South	B4030 West	9	1	1	11	13	9	0	22	1.01	3.53	1.43	10	90%	2.52	25	0	0	25	33	0	0	33	1.58	0.00	0.00	8	34%	1.58
410	12	B4030 West	Port Way North	1	0	0	1	0	0	0	0	1.43	0.00	0.00	-1	-100%	1.43	1	0	0	1	0	0	0	0	1.43	0.00	0.00	-1	-100%	1.43
411	12	B4030 West	B4030 East	134	18	5	156	102	16	0	118	2.90	0.54	3.19	-39	-25%	3.31	101	12	1	114	103	3	0	106	0.27	3.54	1.43	-8	-7%	0.76
412	12	B4030 West	Port Way South	27	6	1	34	61	0	0	61	5.17	3.54	1.43	27	79%	3.91	16	1	0	17	15	5	0	19	0.47	2.12	0.00	2	10%	0.40
463	18	A4260 North	B4027 West	1	1	0	2	0	0	0	0	1.41	1.41	0.00	-2	-100%	2.00	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41
470	18	B4027 West	A4260 North	1	0	1	2	0	0	0	0	1.41	0.00	1.41	-2	-100%	2.00	1	0	0	1	0	0	0	0	1.41	0.00	0.00	-1	-100%	1.41
471	18	B4027 West	B4027 East	162	17	2	181	140	18	0	158	1.76	0.13	2.00	-23	-13%	1.77	83	8	1	92	139	18	9	166	5.34	2.71	3.45	74	80%	6.48
472	18	B4027 West	A4260 South	24	5	0	29	0	0	0	0	6.93	3.16	0.00	-29	-100%	7.62	29	1	0	30	0	0	0	0	7.62	1.41	0.00	-30	-100%	7.75

Appendix H – Journey Time Validation

Journey Time Validation Summary

AM Peak		Average Time (s)						
Route		Observed	Modelled	AbsDiff	%Diff	Within 15%	Within 60s	Validate?
Blue	NB	723	784	61	8%	yes	no	yes
	SB	741	823	82	11%	yes	no	yes
Green	EB	531	499	-32	-6%	yes	yes	yes
	WB	714	539	-175	-24%	no	no	no
Purple	NB	559	530	-29	-5%	yes	yes	yes
	SB	615	623	8	1%	yes	yes	yes
Yellow	CW	770	693	-77	-10%	yes	no	yes
	Anti-CW	708	718	10	1%	yes	yes	yes
A-F	SB	540	496	-44	-8%	yes	yes	yes
F-A	NB	541	495	-46	-9%	yes	yes	yes
C-R	EB	487	464	-23	-5%	yes	yes	yes
R-C	WB	485	488	3	1%	yes	yes	yes
F-R	EB	447	412	-35	-8%	yes	yes	yes
R-F	WB	452	420	-32	-7%	yes	yes	yes
S-G (M-way)	SB	783	705	-78	-10%	yes	no	yes
G-S (M-way)	NB	472	542	70	15%	yes	no	yes
S-G (Local)	SB	647	569	-78	-12%	yes	no	yes
G-S (Local)	NB	630	582	-48	-8%	yes	yes	yes
C-S	EB	591	559	-32	-5%	yes	yes	yes
S-C	WB	606	539	-67	-11%	yes	no	yes
								95%

Inter Peak		Average Time (s)						
Route		Observed	Modelled	AbsDiff	%Diff	Within 15%	Within 60s	Validate?
Blue	NB	831	764	-67	-8%	yes	no	yes
	SB	877	782	-95	-11%	yes	no	yes
Green	EB	513	483	-30	-6%	yes	yes	yes
	WB	549	484	-65	-12%	yes	no	yes
Purple	NB	538	527	-11	-2%	yes	yes	yes
	SB	540	540	0	0%	yes	yes	yes
Yellow	CW	725	670	-55	-8%	yes	yes	yes
	Anti-CW	654	669	15	2%	yes	yes	yes
A-F	SB	534	493	-41	-8%	yes	yes	yes
F-A	NB	535	493	-42	-8%	yes	yes	yes
C-R	EB	463	461	-2	0%	yes	yes	yes
R-C	WB	461	456	-5	-1%	yes	yes	yes
F-R	EB	447	411	-36	-8%	yes	yes	yes
R-F	WB	447	408	-39	-9%	yes	yes	yes
S-G (M-way)	SB	529	465	-64	-12%	yes	no	yes
G-S (M-way)	NB	522	509	-13	-2%	yes	yes	yes
S-G (Local)	SB	627	531	-96	-15%	no	no	no
G-S (Local)	NB	618	577	-41	-7%	yes	yes	yes
C-S	EB	601	554	-47	-8%	yes	yes	yes
S-C	WB	611	525	-86	-14%	yes	no	yes
								95%

PM Peak		Average Time (s)						
Route		Observed	Modelled	AbsDiff	%Diff	Within 15%	Within 60s	Validate?
Blue	NB	803	865	62	8%	yes	no	yes
	SB	916	809	-107	-12%	yes	no	yes
Green	EB	603	516	-87	-14%	yes	no	yes
	WB	707	518	-189	-27%	no	no	no
Purple	NB	671	602	-69	-10%	yes	no	yes
	SB	644	569	-75	-12%	yes	no	yes
Yellow	CW	763	708	-55	-7%	yes	yes	yes
	Anti-CW	681	697	16	2%	yes	yes	yes
A-F	SB	523	495	-28	-5%	yes	yes	yes
F-A	NB	525	499	-26	-5%	yes	yes	yes
C-R	EB	482	463	-19	-4%	yes	yes	yes
R-C	WB	476	456	-20	-4%	yes	yes	yes
F-R	EB	458	420	-38	-8%	yes	yes	yes
R-F	WB	459	413	-46	-10%	yes	yes	yes
S-G (M-way)	SB	552	525	-27	-5%	yes	yes	yes
G-S (M-way)	NB	552	642	90	16%	no	no	no
S-G (Local)	SB	630	536	-94	-15%	yes	no	yes
G-S (Local)	NB	625	620	-5	-1%	yes	yes	yes
C-S	EB	608	577	-31	-5%	yes	yes	yes
S-C	WB	612	526	-86	-14%	yes	no	yes
								90%

Blue		AM		IP		PM	
Northbound	Distance	Obs	Mod	Obs	Mod	Obs	Mod
1 Launton Road / Skimmingdish Lane roundabout (A)	0	00	00	00	00	00	00
2 Under railway bridge Launton Road	804	83	84	174	81	84	83
3 Stop Line Launton Road/London Road Junction	1780	159	186	250	186	170	186
4 Left turn into Bucknell Road from Field Street	2611	281	308	378	313	347	398
5 Under railway bridge Bucknell Road/Howes Lane Junction	4100	404	446	511	451	472	536
6 Ardley Road /B430 Junction (B)	8982	723	784	831	764	803	865

Blue		AM		IP		PM	
Southbound	Distance	Obs	Mod	Obs	Mod	Obs	Mod
1 Ardley Road /B430 Junction (B)	0	00	00	00	00	00	00
2 Under railway bridge Bucknell Road/Howes Lane Junction	4882	299	320	313	305	333	308
3 Right turn into Field Street	6371	451	485	478	457	512	474
4 Left turn into Launton Road	7226	578	638	633	595	656	612
5 Under railway bridge Launton Road	8202	650	735	717	693	800	711
6 Launton Road / Skimmingdish Lane roundabout (A)	9006	741	823	877	782	916	809

Green		AM		IP		PM	
Eastbound	Distance	Obs	Mod	Obs	Mod	Obs	Mod
1 M40/A41 Roundabout (A)	0	00	00	00	00	00	00
2 Cross stopline Vendee Drive roundabout	2712	123	125	125	126	141	127
3 Cross stopline Esso roundabout towards Boundary Way	3629	209	216	219	216	272	226
4 Cross stopline London Road roundabout towards A41	5219	334	314	321	311	394	330
5 Under railway bridge at Marsh Gibbon turning (B)	8769	531	499	513	483	603	516

Green		AM		IP		PM	
Westbound	Distance	Obs	Mod	Obs	Mod	Obs	Mod
1 Under railway bridge at Marsh Gibbon turning (B)	0	00	00	00	00	00	00
2 Cross stopline London Road roundabout towards A41	3153	220	203	198	191	228	206
3 Cross stopline Esso roundabout towards Boundary Way	4755	481	295	314	274	453	298
4 Cross stopline Vendee Drive roundabout	5693	567	377	392	353	542	381
5 M40/A41 Roundabout (A)	8381	714	539	549	484	707	518

Purple		AM		IP		PM	
Northbound	Distance	Obs	Mod	Obs	Mod	Obs	Mod
1 Vendee Drive roundabout (A)	0	00	00	00	00	00	00
2 Cross stopline Esso roundabout towards Oxford Road	917	110	84	73	83	78	91
3 Cross stopline mini roundabouts with Middleton Stoney Road	1249	157	125	124	124	151	141
4 Cross stopline St John's Street roundabout	1892	229	193	204	193	273	216
5 Under railway bridge on Buckingham Road	2321	280	260	263	262	346	302
6 Cross stopline Skimmingdish Lane roundabout towards A4421	3631	393	399	378	398	485	451
7 Right turn into Stoke Lyne Road (B)	6390	559	530	538	527	671	602

Purple		AM		IP		PM	
Southbound	Distance	Obs	Mod	Obs	Mod	Obs	Mod
1 Left turn from Stoke Lyne Road (B)	0	00	00	00	00	00	00
2 Cross stopline Skimmingdish Lane roundabout towards Buckingham Road	2759	166	165	160	131	175	134
3 Under railway bridge on Buckingham Road	4069	315	321	297	278	350	286
4 Cross stopline St John's Street roundabout	4508	421	413	359	343	420	359
5 Cross stopline mini roundabouts with Middleton Stoney Road	5146	495	490	431	412	514	430
6 Cross stopline Esso roundabout towards A41	5478	542	532	476	452	581	477
7 Vendee Drive roundabout (A)	6402	615	623	540	540	644	569

Yellow		AM		IP		PM	
Clockwise	Distance	Obs	Mod	Obs	Mod	Obs	Mod
1 Vendee Drive roundabout (A)	0	00	00	00	00	00	00
2 Cross stopline towards Howes Lane from Middleton Stoney roundabout	1737	84	99	81	99	86	103
3 Under railway bridge Bucknell Road/Howes Lane Junction	3169	174	186	169	185	176	195
4 Cross stopline Banbury Road roundabout towards A4095	4298	248	270	242	268	255	287
5 Cross stopline A4421 roundabout towards Skimmingdish Lane	5125	306	329	296	322	312	348
6 Cross stopline Launton road roundabout towards Charbridge Lane	6541	384	440	380	429	416	456
7 Cross stopline roundabout with Gavray Drive	8425	507	521	513	509	536	537
8 Cross stopline roundabout with London Road towards A41	9593	603	601	603	586	616	616
9 Cross stopline Esso roundabout towards Oxford Road (B)	9593	770	693	725	670	763	708

Yellow		AM		IP		PM	
Anti-clockwise	Distance	Obs	Mod	Obs	Mod	Obs	Mod
1 Vendee Drive roundabout (B)	0	00	00	00	00	00	00
2 Cross stopline Esso roundabout towards Boundary Way	1499	00	00	00	00	00	00
3 Cross stopline London Road roundabout towards A4421	1499	84	95	83	92	87	102
4 Cross stopline roundabout with Gavray Drive	2705	169	171	159	168	160	179
5 Cross stopline Launton Road roundabout towards Skimmingdish Lane	4513	292	253	280	249	274	262
6 Cross stopline A4421 roundabout towards A4095	5899	385	356	357	349	359	364
7 Cross stopline Banbury Road roundabout	6717	445	417	407	403	419	425
8 Under railway bridge Bucknell Road/Howes Lane Junction	7841	518	522	480	485	492	511
9 Cross stopline Howes Lane towards Vendee Drive at Middleton Stoney Road roundabout (A)	9287	624	616	573	574	597	601
10 Vendee Drive roundabout	11015	708	718	654	669	681	697

A-F			AM		IP		PM	
SB		Distance	Obs	Mod	Obs	Mod	Obs	Mod
A	Water St/ Ardley Rd	00	00	00	00	00	00	00
B	Somerton Rd/ Camp Rd	877	183	145	187	145	182	145
C	B4030/ Station Rd	1891	261	210	265	210	258	210
D	B4030/ Port Way	2647	309	253	313	253	306	253
E	A4095 / Port Way	3713	518	466	513	463	502	464
F	A4095/ Akeman St	4911	540	496	534	493	523	495

F-A			AM		IP		PM	
NB		Distance	Obs	Mod	Obs	Mod	Obs	Mod
F	A4095/ Akeman St	00	00	00	00	00	00	00
E	A4095 / Port Way	1541	21	30	21	30	21	32
D	B4030/ Port Way	2627	233	241	223	240	218	244
C	B4030/ Station Rd	3376	281	281	270	280	267	285
B	Somerton Rd/ Camp Rd	5072	358	346	349	345	342	350
A	Water St/ Ardley Rd	5830	541	495	535	493	525	499

C-R			AM		IP		PM	
EB		Distance	Obs	Mod	Obs	Mod	Obs	Mod
C	B4030/ Station Rd	00	00	00	00	00	00	00
D	B4030/ Port Way	1650	48	40	48	39	48	40
J	B430/ B4030 Middleton Stoney Crossroads	2078	320	306	297	305	310	306
R	B4030/Howes Ln	2542	487	464	463	461	482	463

R-C			AM		IP		PM	
WB		Distance	Obs	Mod	Obs	Mod	Obs	Mod
R	B4030/Howes Ln	00	00	00	00	00	00	00
J	B430/ B4030 Middleton Stoney Crossroads	1613	165	227	165	196	165	194
D	B4030/ Port Way	2898	437	449	414	417	427	416
C	B4030/ Station Rd	3386	485	488	461	456	476	456

F-R			AM		IP		PM	
SB		Distance	Obs	Mod	Obs	Mod	Obs	Mod
F	A4095/ Akeman St	00	00	00	00	00	00	00
E	A4095 / Port Way	807	21	34	21	34	21	35
I	A4095/ B430	1278	200	210	197	209	204	213
P	A4095/ Unclassified	2597	335	321	335	320	333	325
Q	A4095/ Vendee Dr	3620	422	390	423	389	432	397
R	B4030/Howes Ln	4032	447	412	447	411	458	420

R-F			AM		IP		PM	
NB		Distance	Obs	Mod	Obs	Mod	Obs	Mod
R	B4030/Howes Ln	00	00	00	00	00	00	00
Q	A4095/ Vendee Dr	553	18	29	18	23	18	26
P	A4095/ Unclassified	1857	105	100	106	92	117	96
I	A4095/ B430	2325	240	219	244	209	247	213
E	A4095 / Port Way	3476	431	389	426	378	438	383
F	A4095/ Akeman St	3896	452	420	447	408	459	413

S-G (M-way)			AM		IP		PM	
SB		Distance	Obs	Mod	Obs	Mod	Obs	Mod
S	M40 J10 Cherwell Roundabout	00	00	00	00	00	00	00
O	M40 Jn9/ A41	4562	572	587	404	347	422	395
G	B4030/ B4030 Overbridge	5267	783	705	529	465	552	525

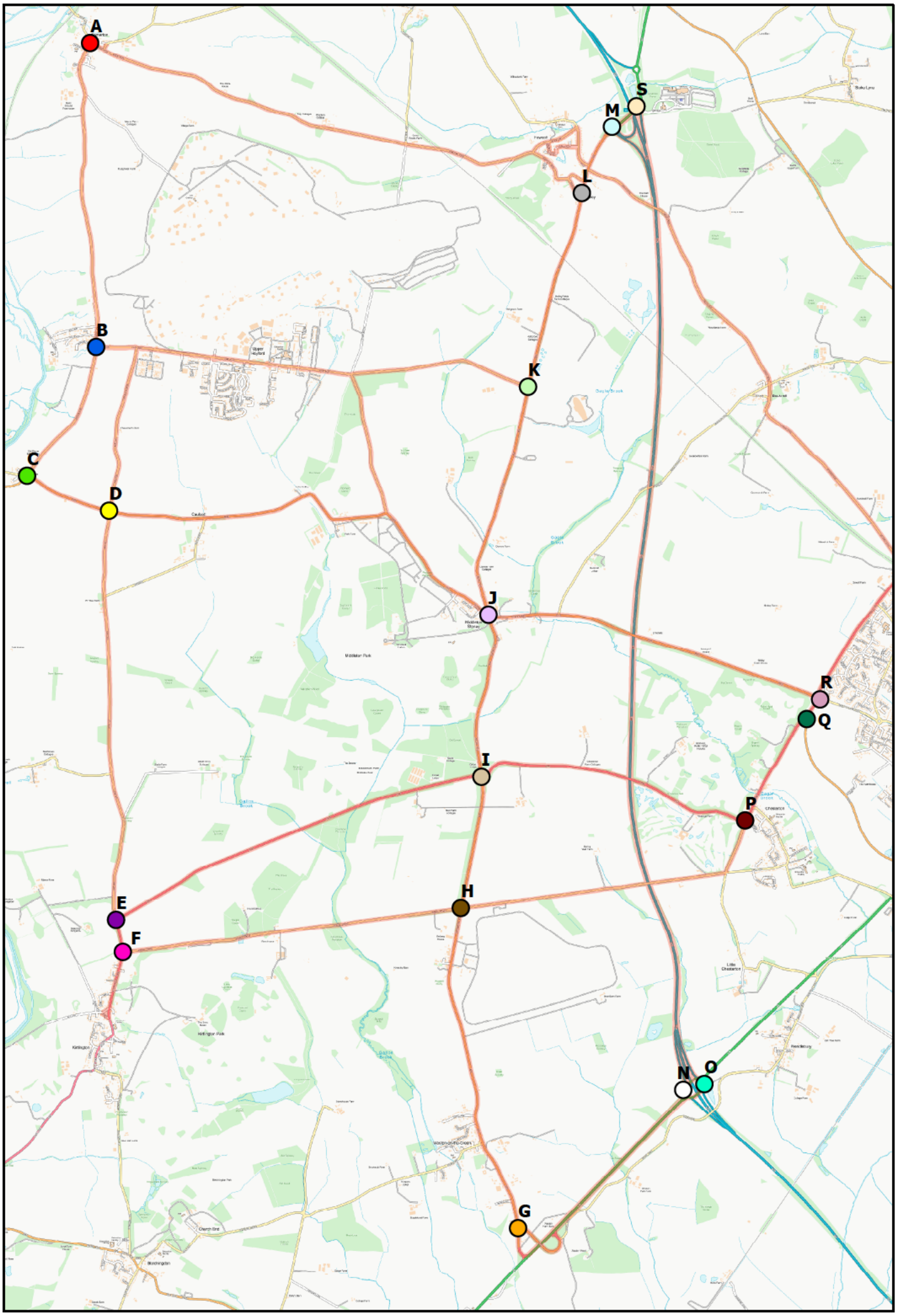
G-S (M-way)			AM		IP		PM	
NB		Distance	Obs	Mod	Obs	Mod	Obs	Mod
G	B4030/ B4030 Overbridge	00	00	00	00	00	00	00
N	M40 Jn9/ A34	1840	123	167	141	132	146	195
M	Ardley Roundabout	4575	449	482	496	451	525	581
S	M40 J10 Cherwell Roundabout	5117	472	542	522	509	552	642

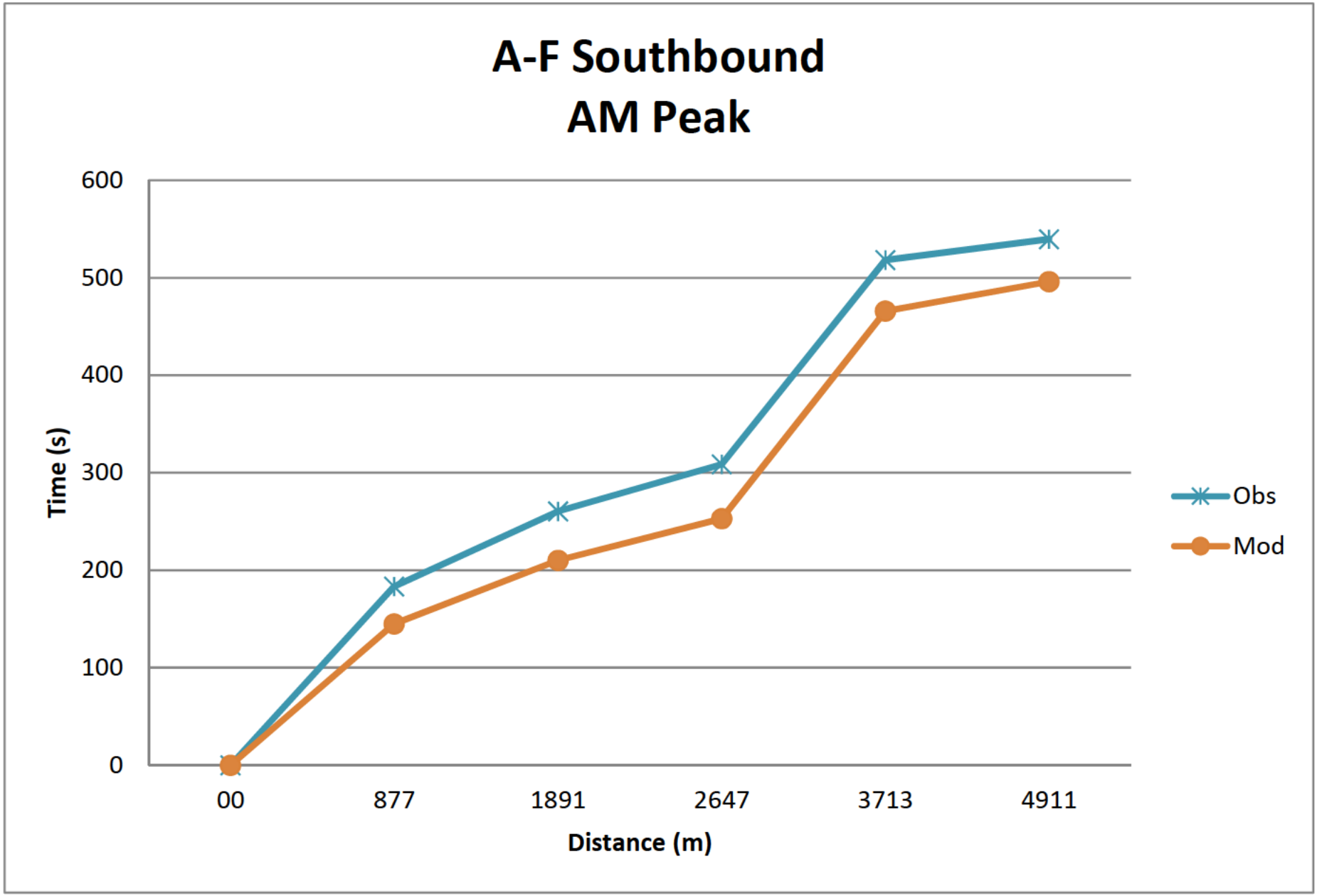
S-G (Local)			AM		IP		PM	
SB		Distance	Obs	Mod	Obs	Mod	Obs	Mod
S	M40 J10 Cherwell Roundabout	00	00	00	00	00	00	00
M	Ardley Roundabout	1500	37	21	36	18	37	18
L	B430/ Church Rd	3000	91	61	92	53	95	54
K	B430/ Unclassified	4194	178	144	183	132	186	132
J	B430/ B4030 Middleton Stoney Crossroads	4776	343	285	312	257	316	263
I	A4095/ B430	6091	424	366	400	334	407	339
H	B430/Green Lane	7406	476	421	456	387	464	392
G	B4030/ B4030 Overbridge	7975	647	569	627	531	630	536

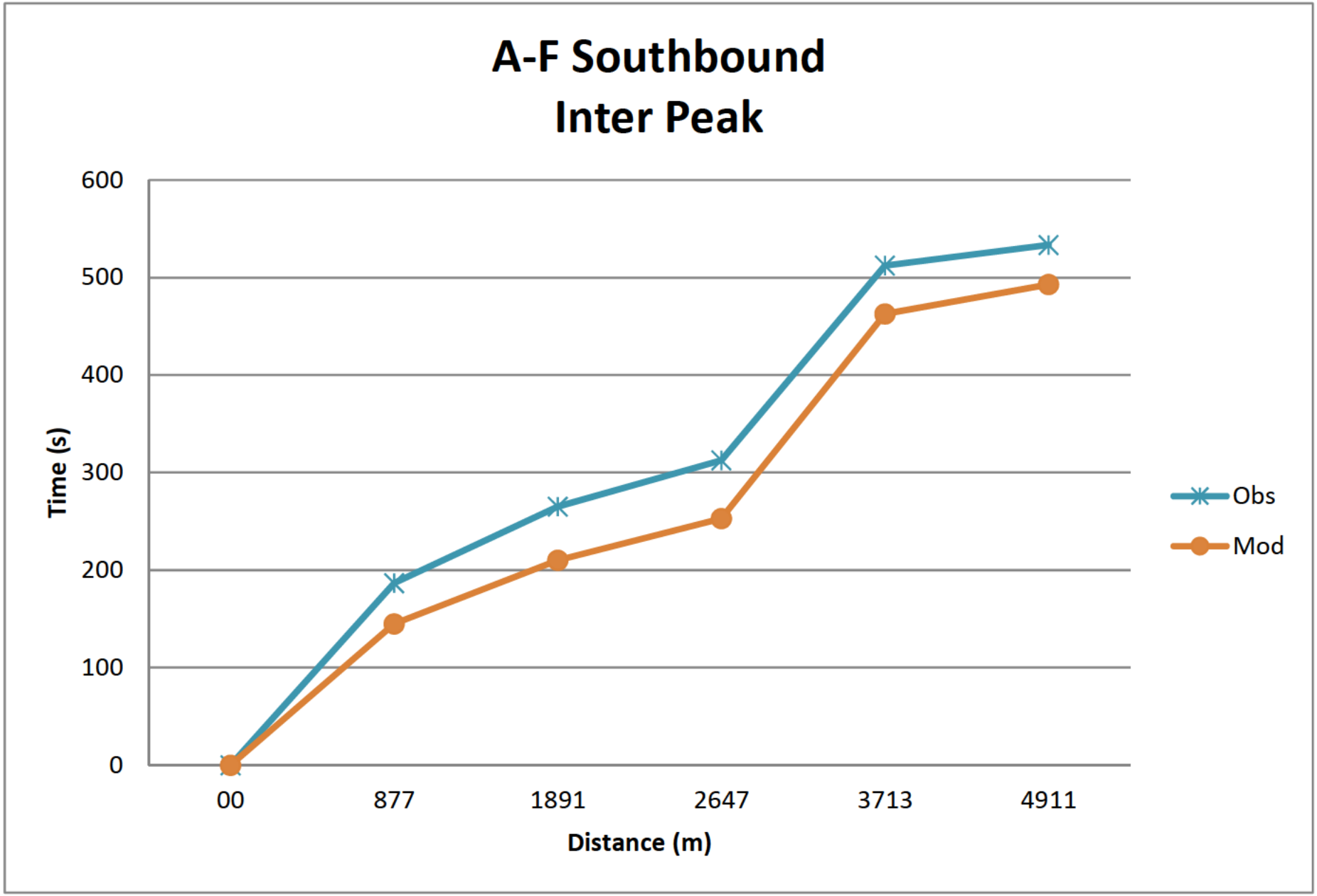
G-S (Local)			AM		IP		PM	
NB		Distance	Obs	Mod	Obs	Mod	Obs	Mod
G	B4030/ B4030 Overbridge	00	00	00	00	00	00	00
H	B430/Green Lane	1287	170	139	171	139	166	141
I	A4095/ B430	2602	223	192	227	193	223	195
J	B430/ B4030 Middleton Stoney Crossroads	4147	303	293	315	291	314	311
K	B430/ Unclassified	5462	469	395	445	393	444	415
L	B430/ Church Rd	6777	556	474	536	472	536	496
M	Ardley Roundabout	9512	607	522	592	518	597	559
S	M40 J10 Cherwell Roundabout	10094	630	582	618	577	625	620

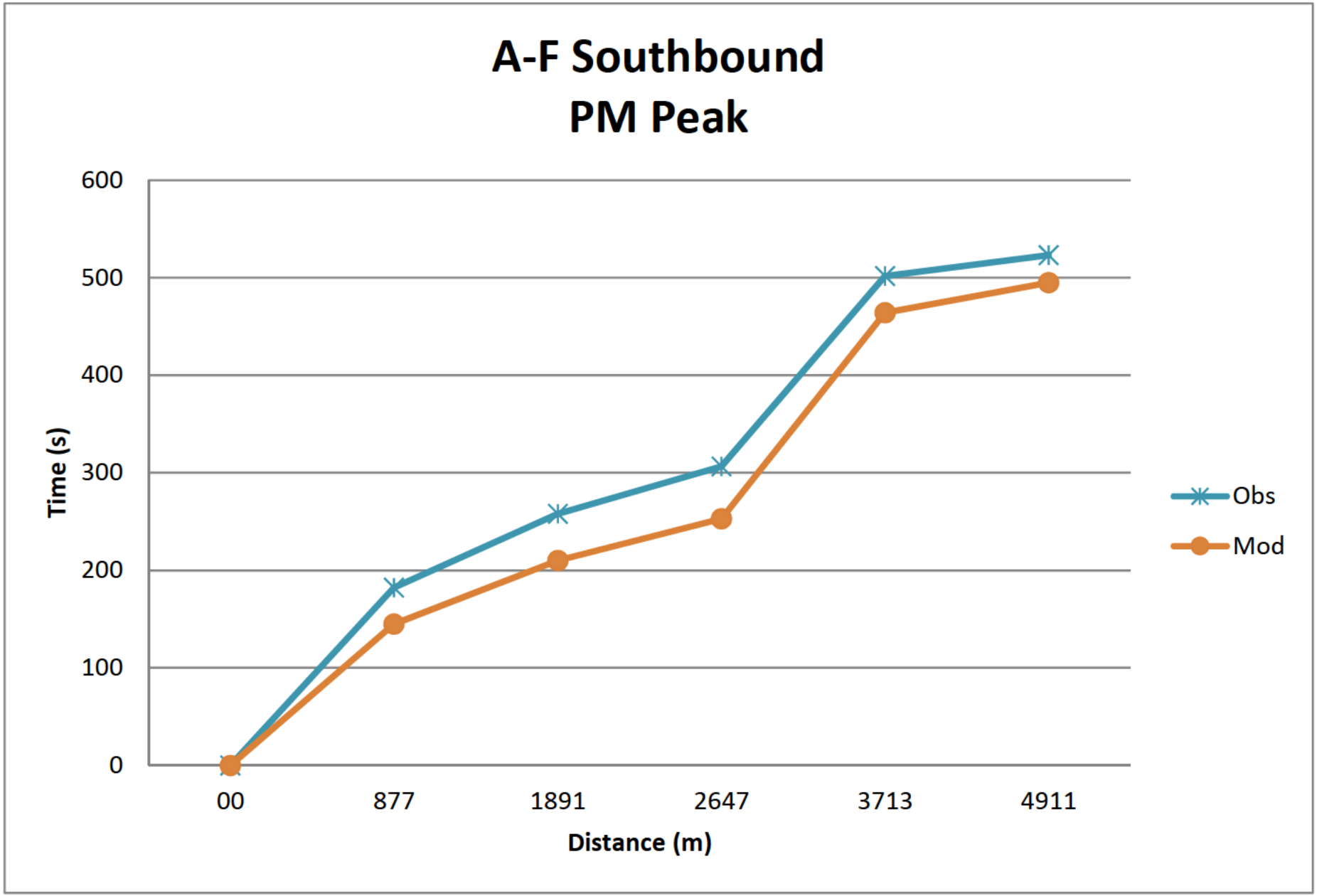
C-S			AM		IP		PM	
EB		Distance	Obs	Mod	Obs	Mod	Obs	Mod
C	B4030/ Station Rd	00	00	00	00	00	00	00
B	Somerton Rd/ Camp Rd	818	77	69	78	68	76	68
K	B430/ Unclassified	1885	429	372	428	370	428	372
L	B430/ Church Rd	3200	516	451	518	449	519	453
M	Ardley Roundabout	5935	568	499	575	496	581	516
S	M40 J10 Cherwell Roundabout	6494	591	559	601	554	608	577

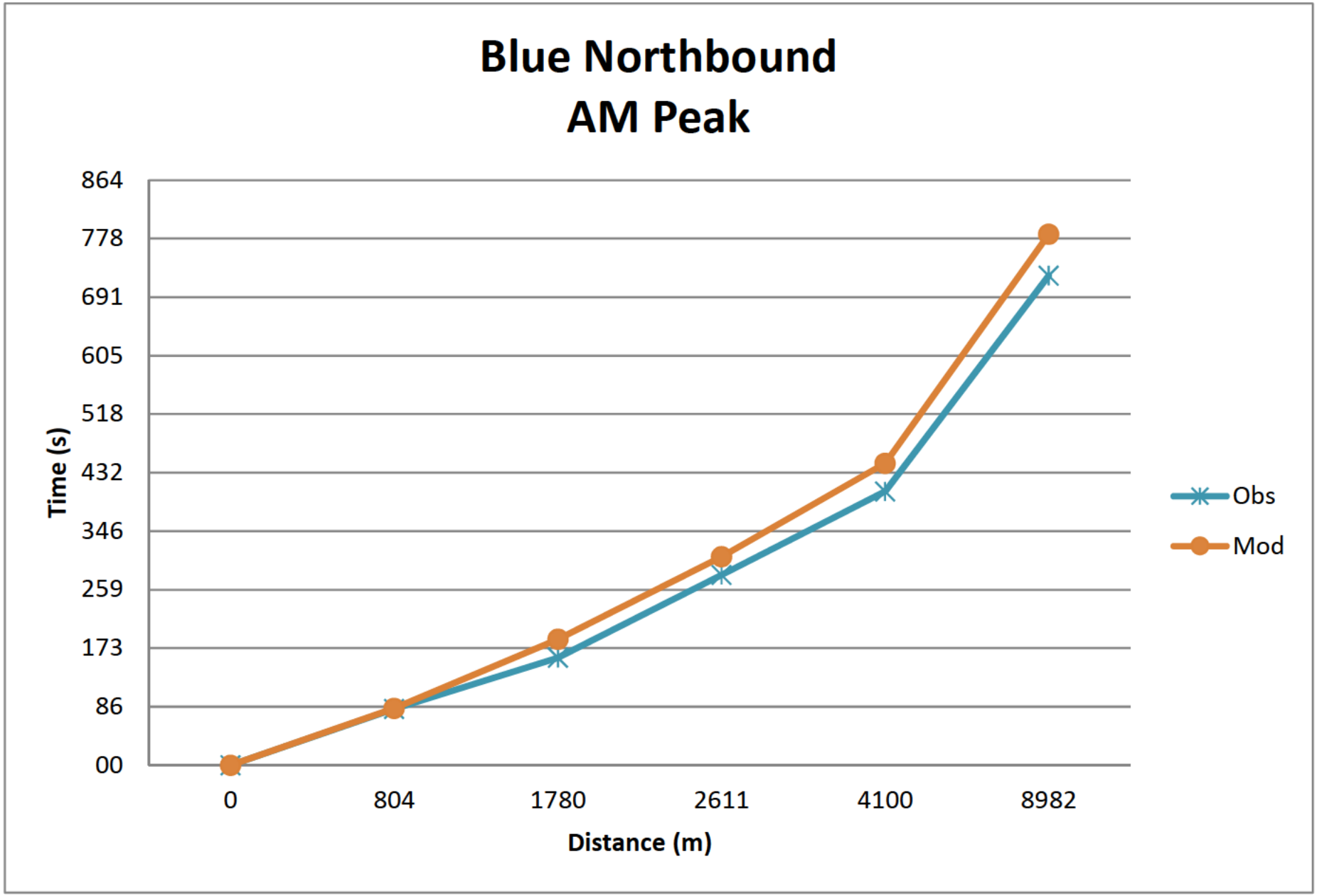
S-C			AM		IP		PM	
WB		Distance	Obs	Mod	Obs	Mod	Obs	Mod
S	M40 J10 Cherwell Roundabout	00	00	00	00	00	00	00
M	Ardley Roundabout	1500	37	21	36	18	37	18
L	B430/ Church Rd	3000	91	61	92	53	95	54
K	B430/ Unclassified	3575	178	148	183	136	186	136
B	Somerton Rd/ Camp Rd	4727	528	474	532	460	536	461
C	B4030/ Station Rd	5266	606	539	611	525	612	526

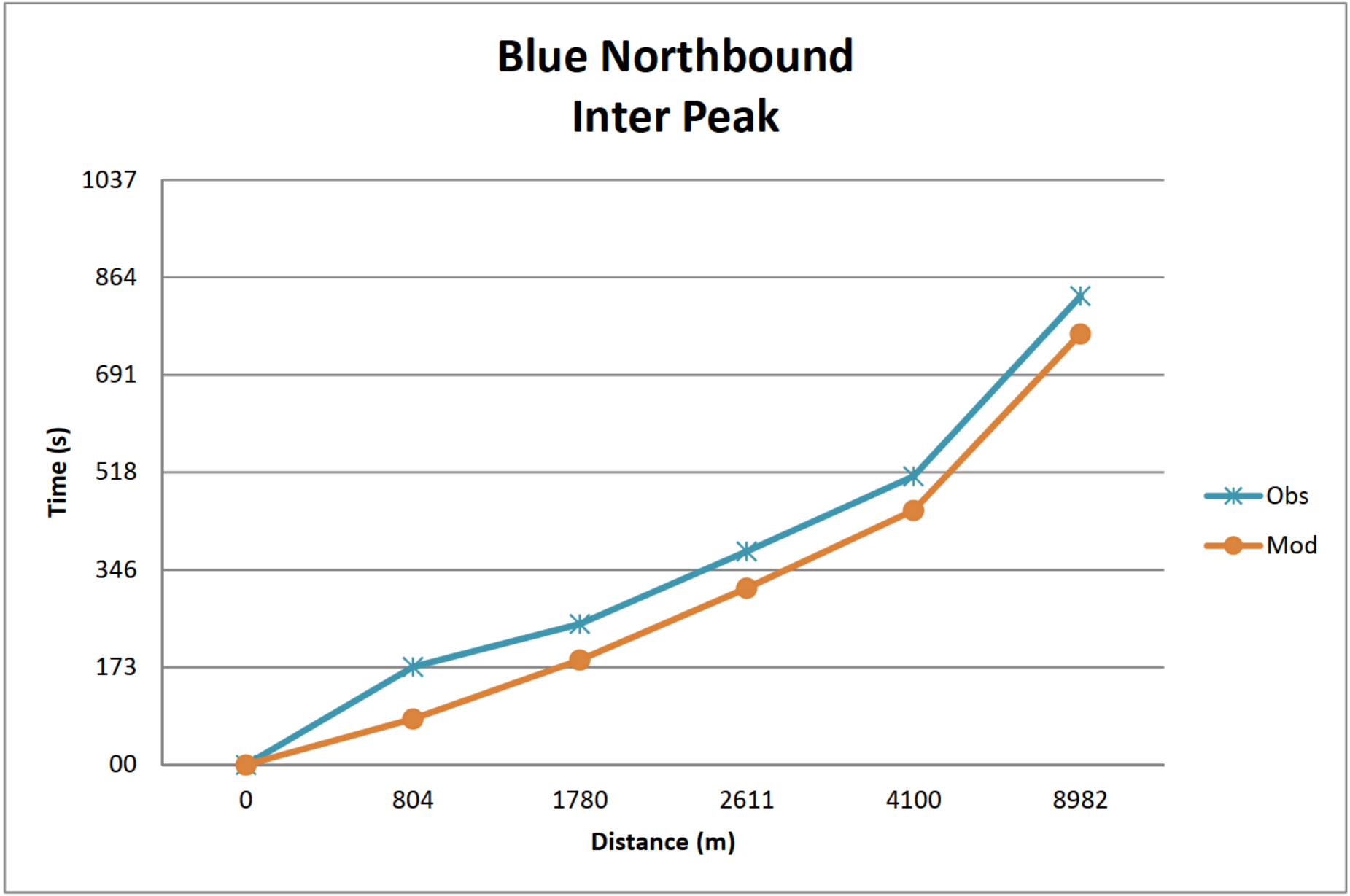

A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S

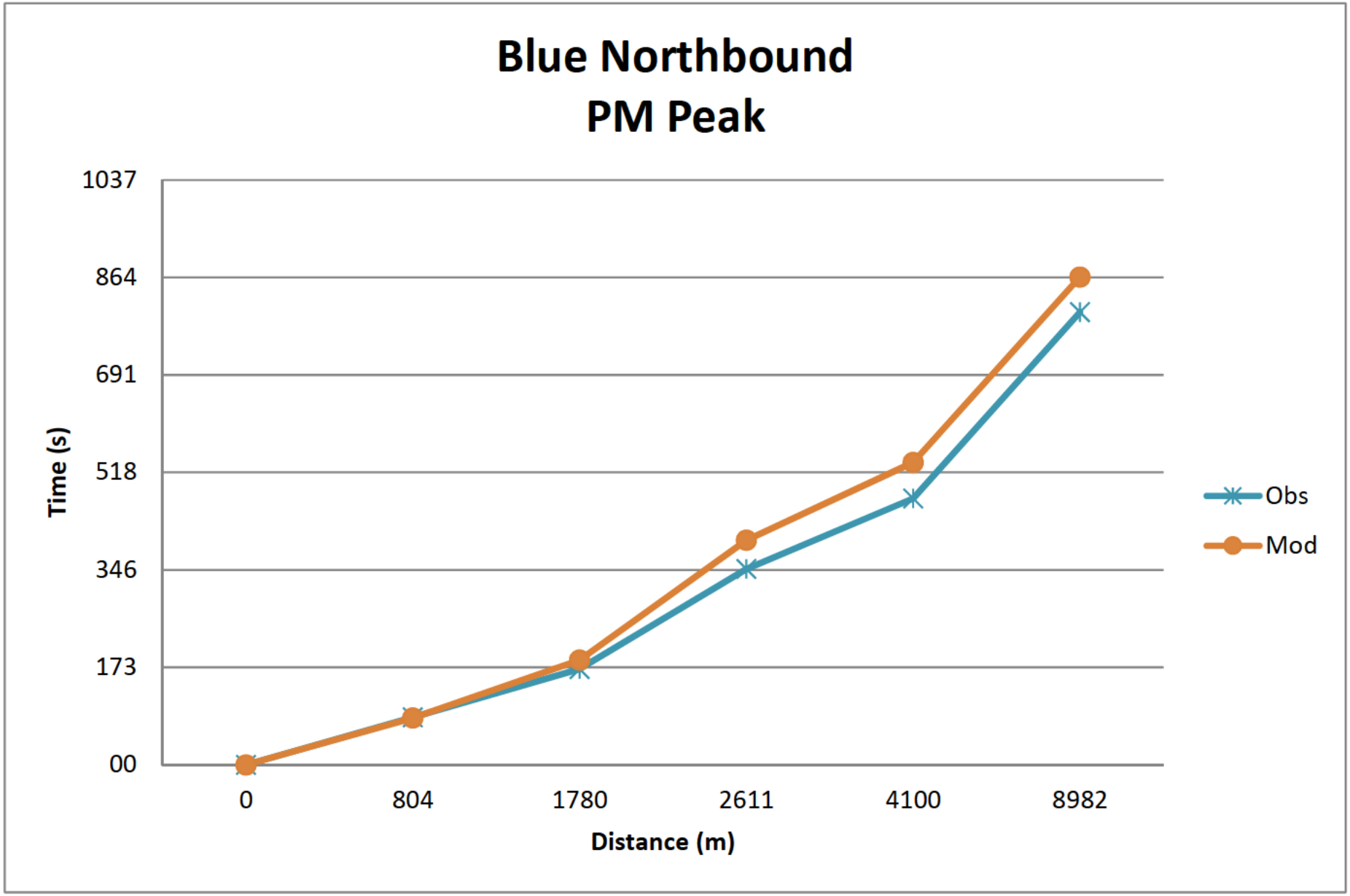

A-F Southbound
AM Peak
600
500
400
300
200
100
0
Time (s)
00
877
1891
2647
3713
4911
Distance (m)
Obs
Mod

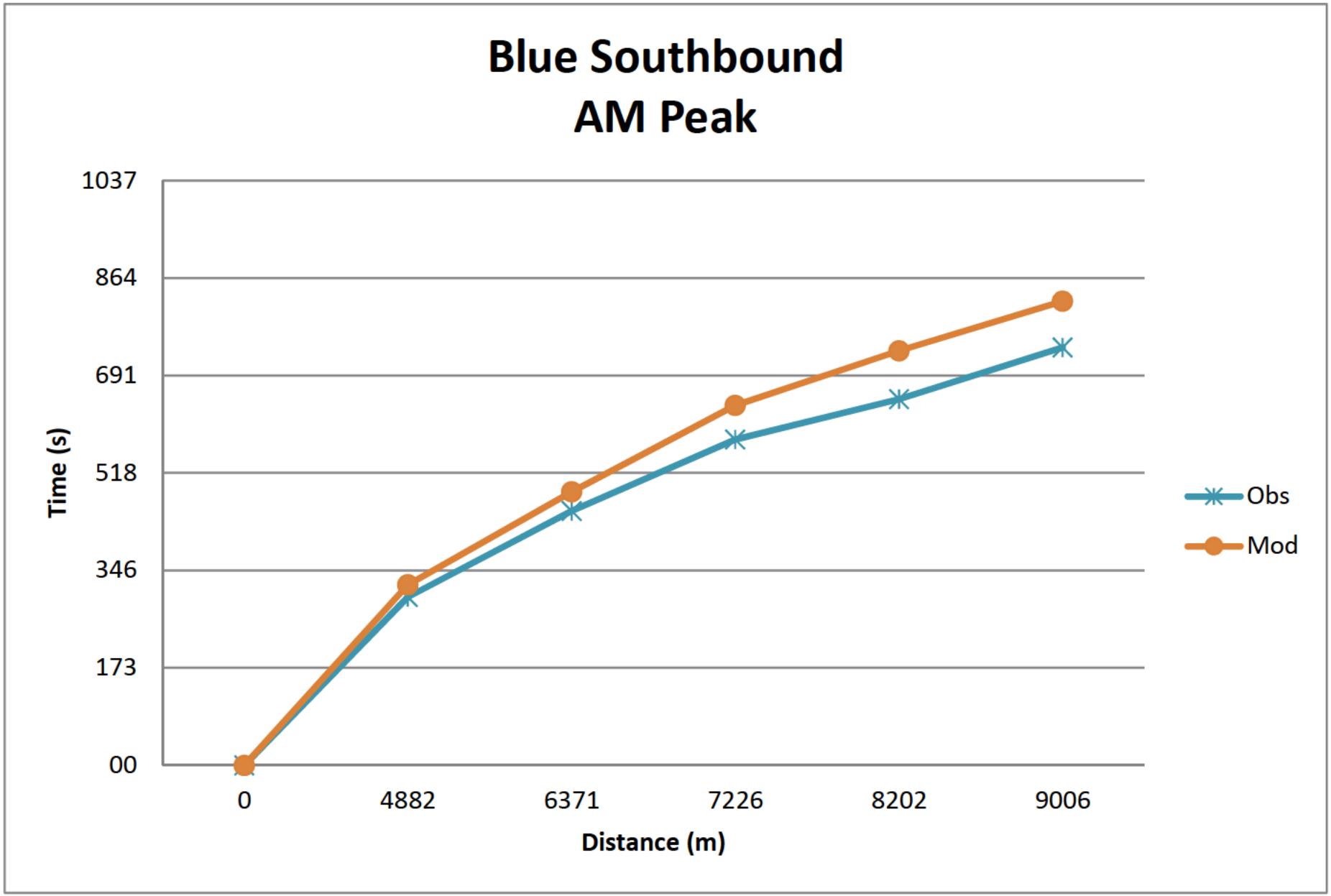

A-F Southbound
Inter Peak
600
500
400
300
200
100
0
Time (s)
00
877
1891
2647
3713
4911
Distance (m)
Obs
Mod

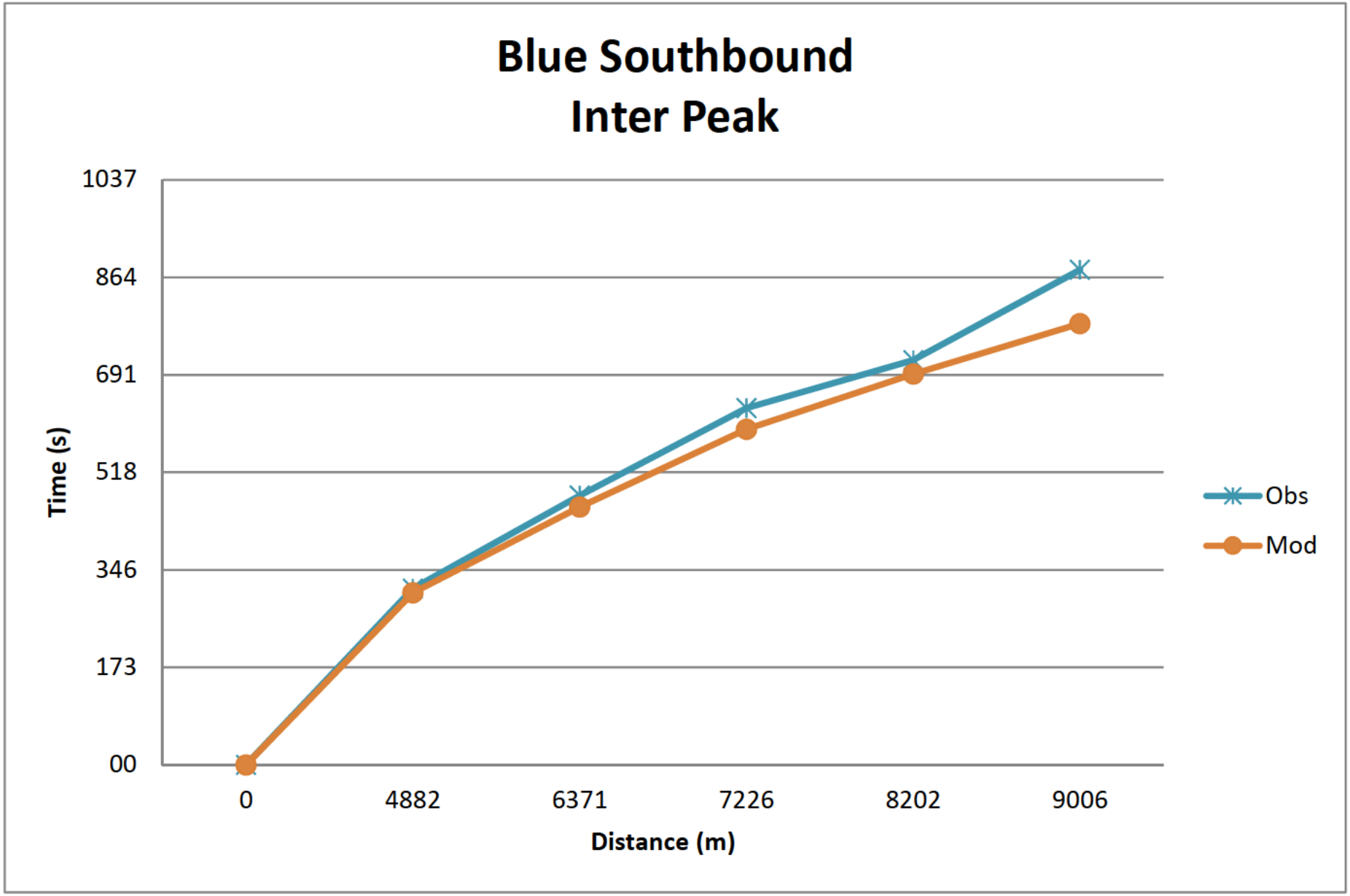

A-F Southbound
PM Peak
600
500
400
300
200
100
0
Time (s)
00
877
1891
2647
3713
4911
Distance (m)
Obs
Mod

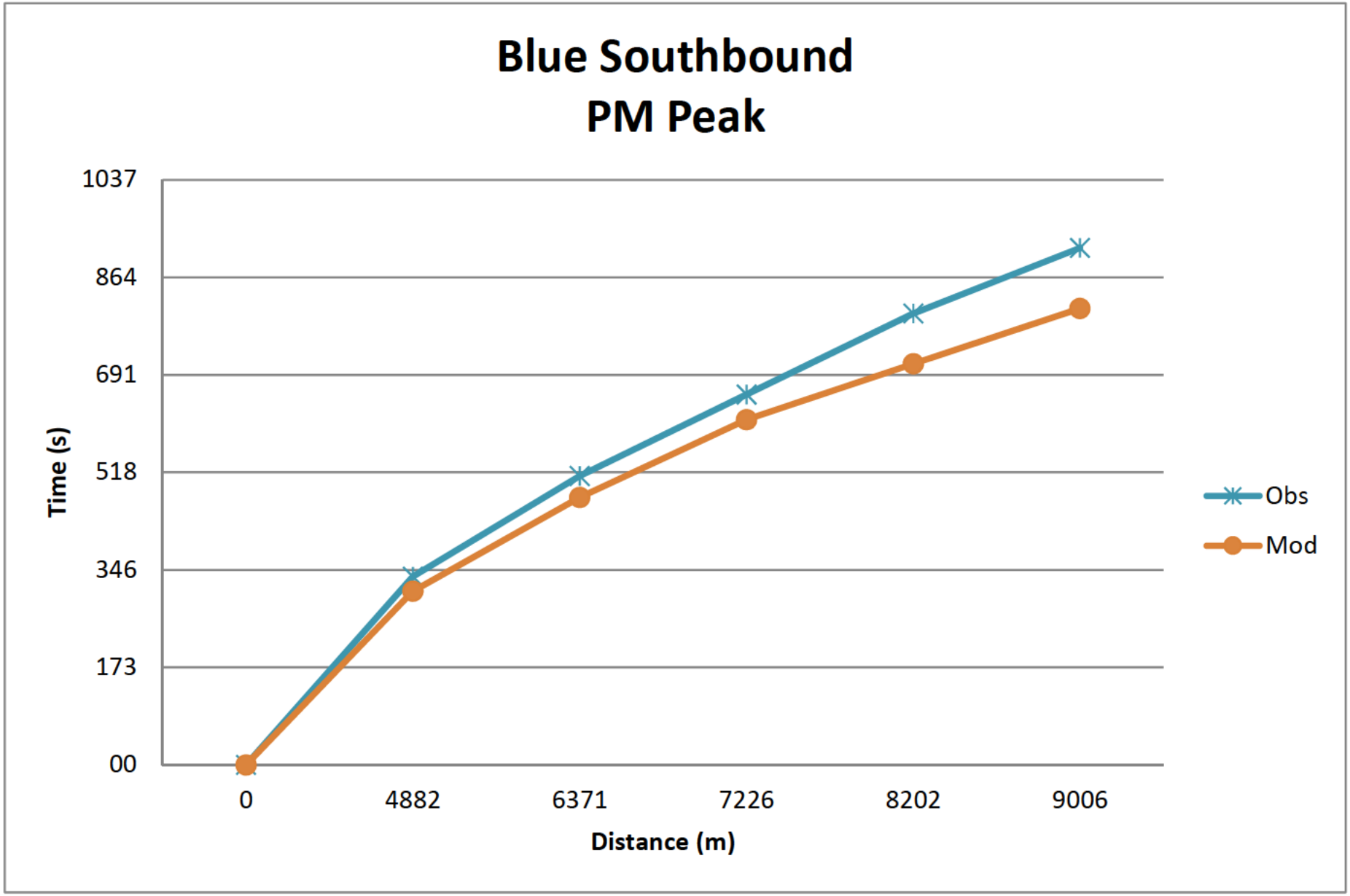

Blue Northbound
AM Peak
Time (s)
864
778
691
605
518
432
346
259
173
86
00
0
804
1780
2611
4100
8982
Distance (m)
Obs
Mod

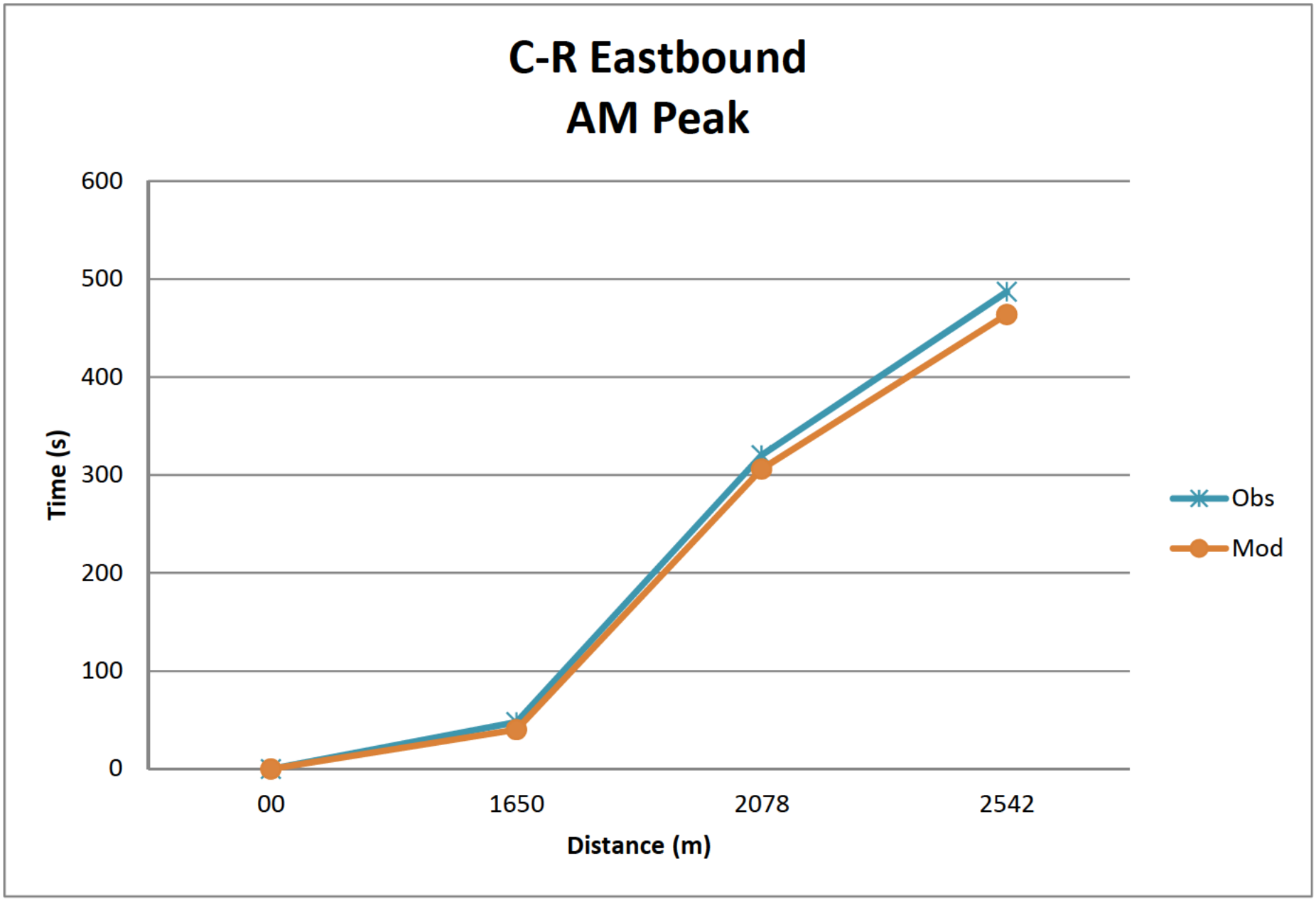

Blue Northbound
Inter Peak
1037
864
691
518
346
173
00
Time (s)
0
804
1780
2611
4100
8982
Distance (m)
Obs
Mod

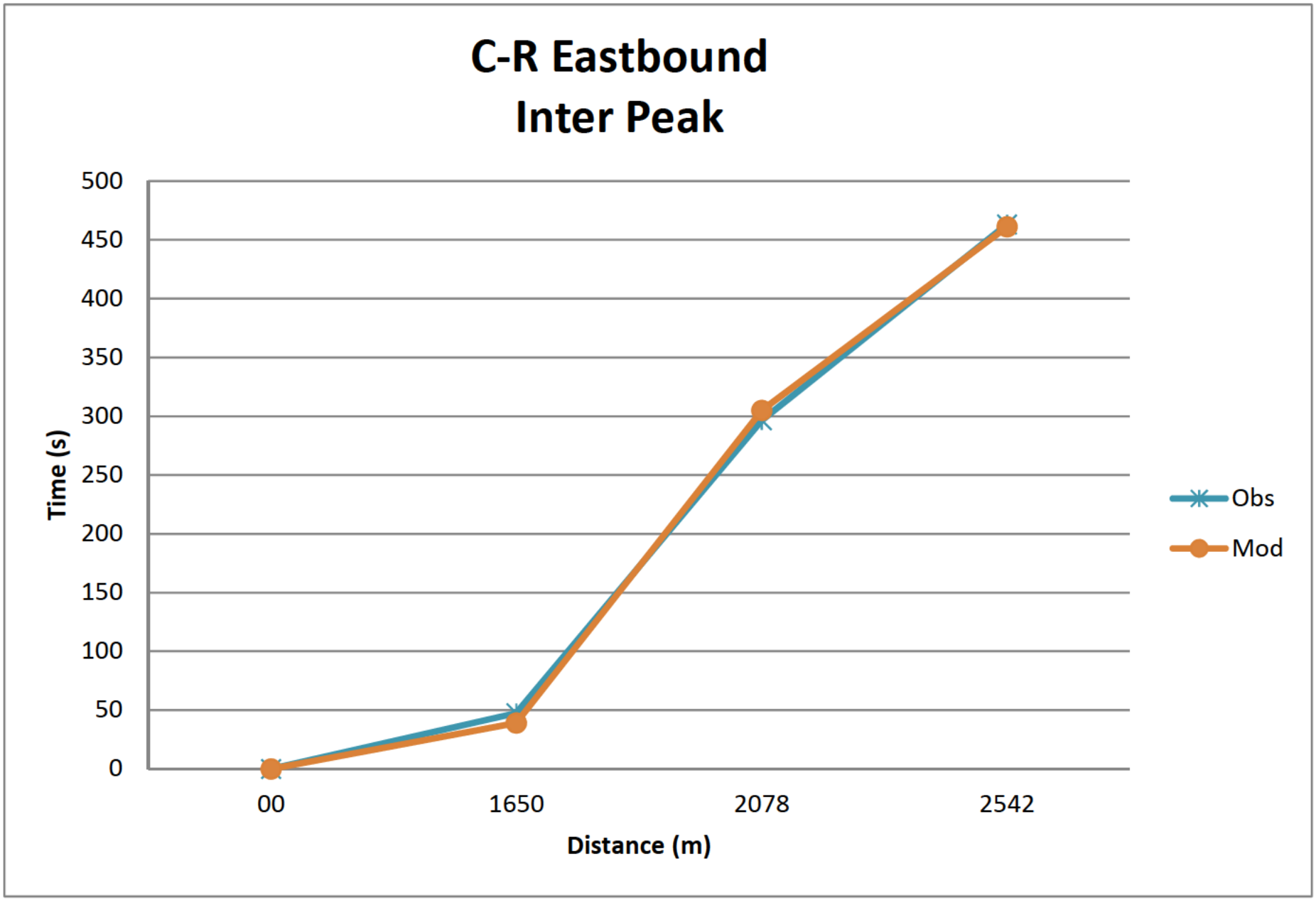

Blue Northbound
PM Peak
1037
864
691
518
346
173
00
Time (s)
0
804
1780
2611
4100
8982
Distance (m)
Obs
Mod

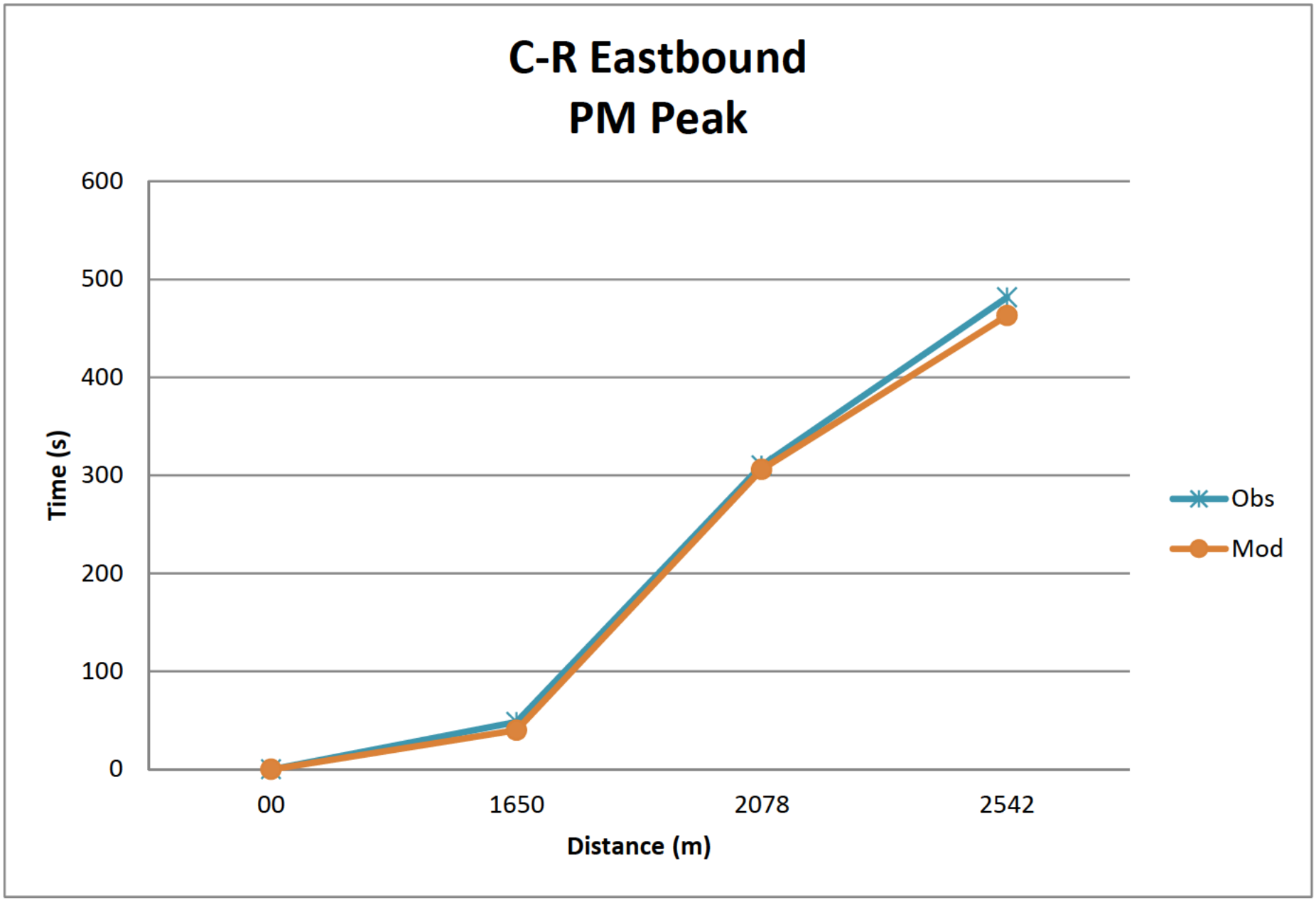

Blue Southbound
AM Peak
1037
864
691
518
346
173
00
Time (s)
0
4882
6371
7226
8202
9006
Distance (m)
Obs
Mod

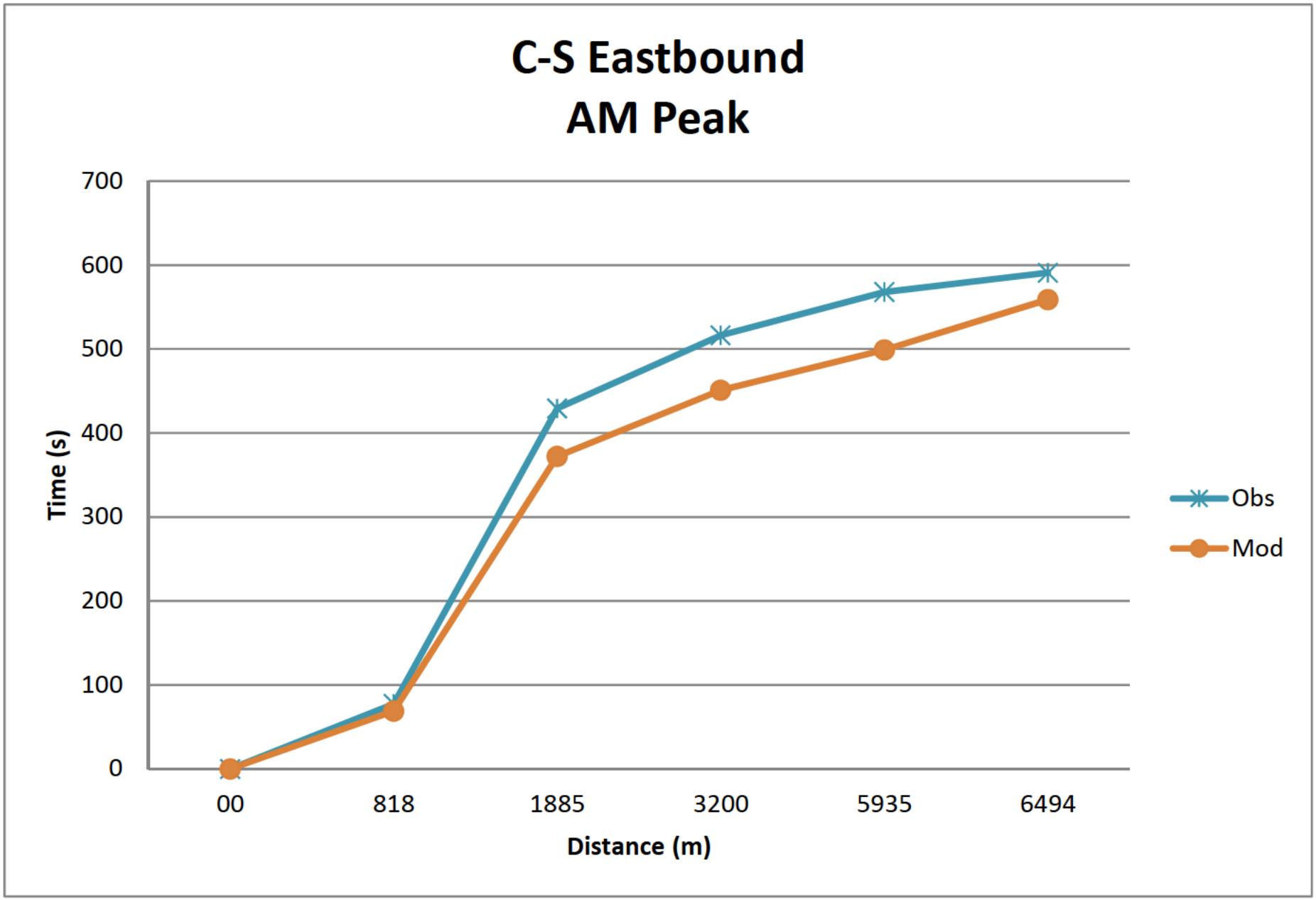

Blue Southbound
Inter Peak
1037
864
691
518
346
173
00
Time (s)
0
4882
6371
7226
8202
9006
Distance (m)
Obs
Mod

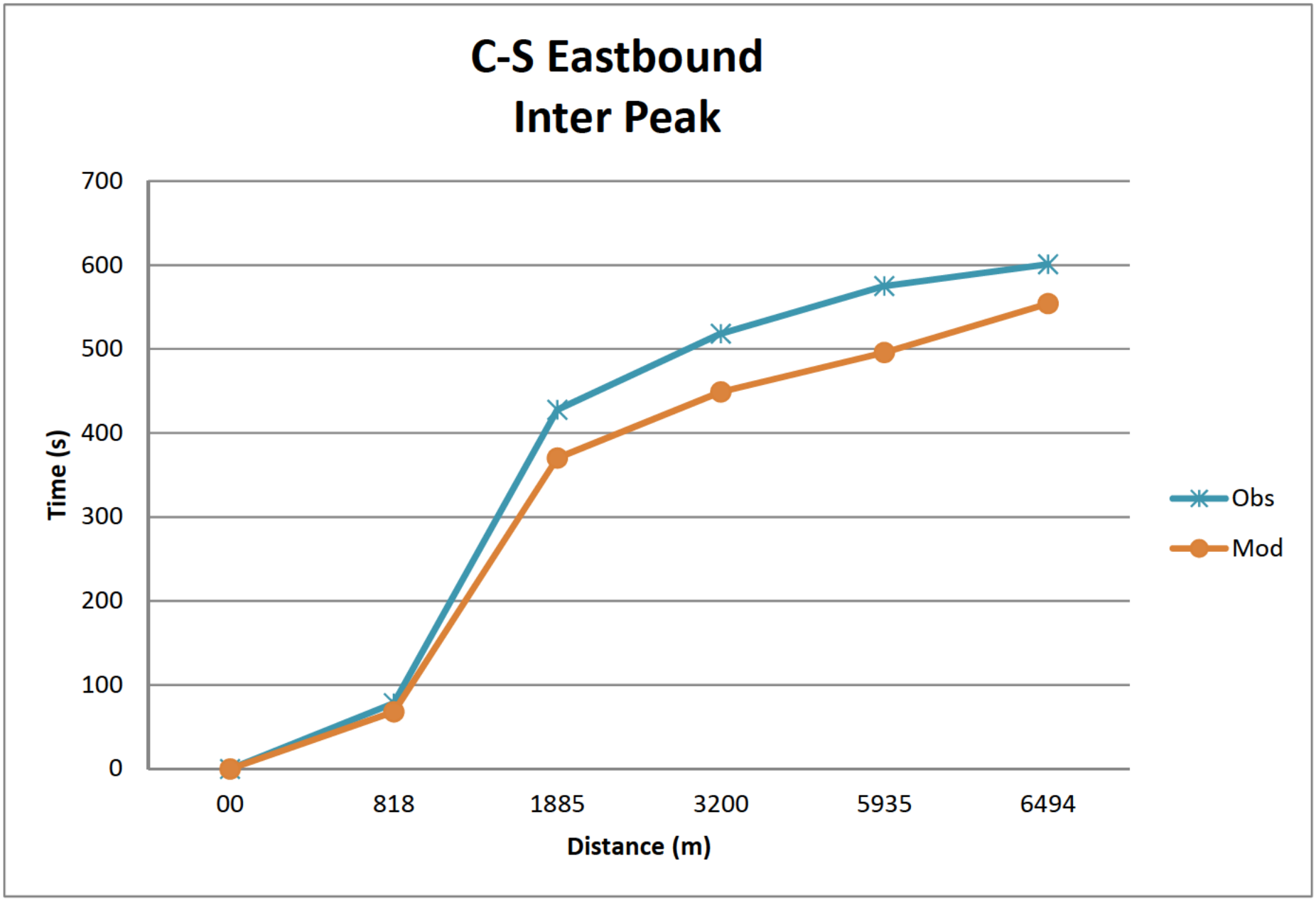

Blue Southbound
PM Peak
1037
864
691
518
346
173
00
Time (s)
0
4882
6371
7226
8202
9006
Distance (m)
Obs
Mod

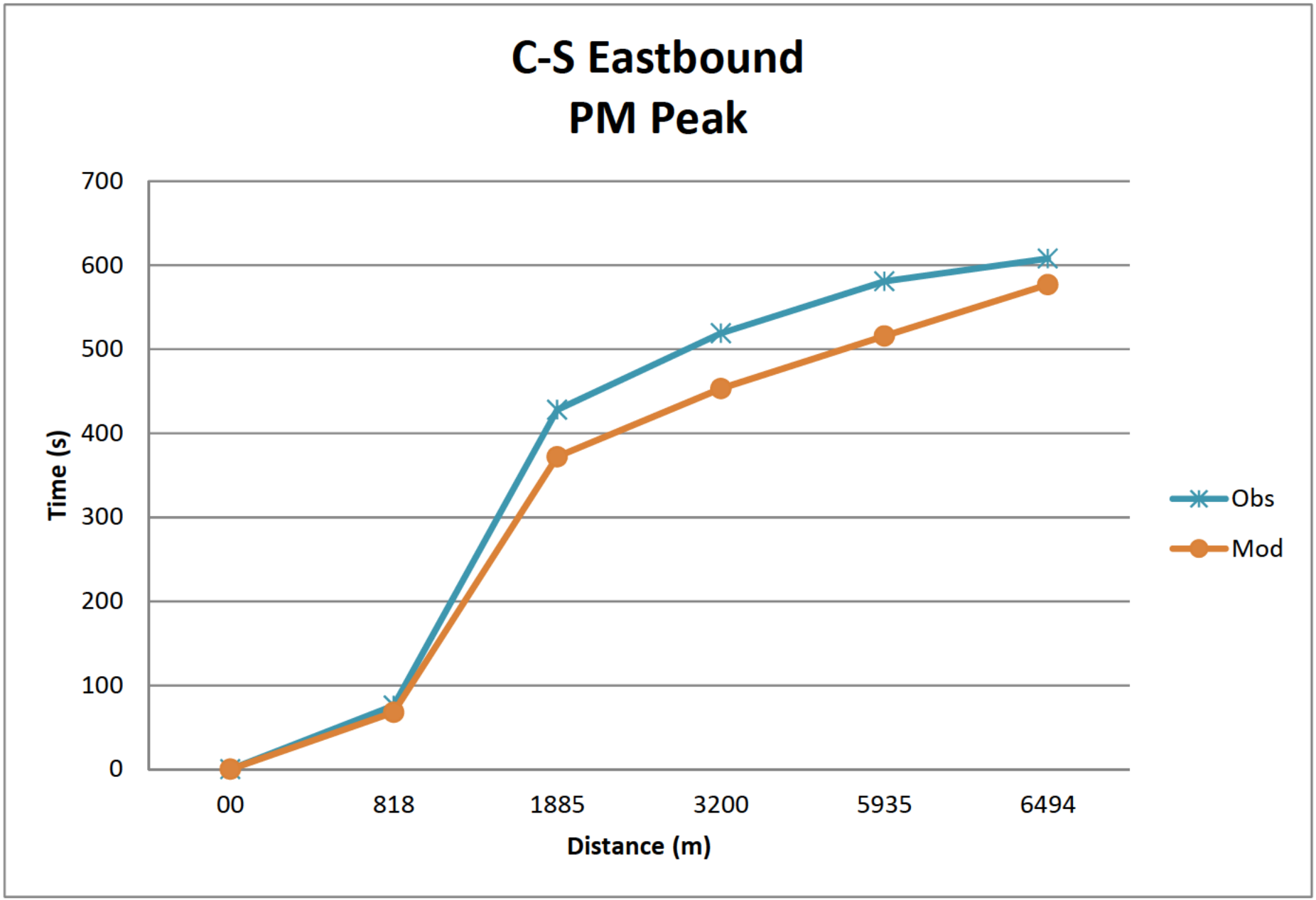

C-R Eastbound
AM Peak
600
500
400
300
200
100
0
Time (s)
00
1650
2078
2542
Distance (m)
Obs
Mod

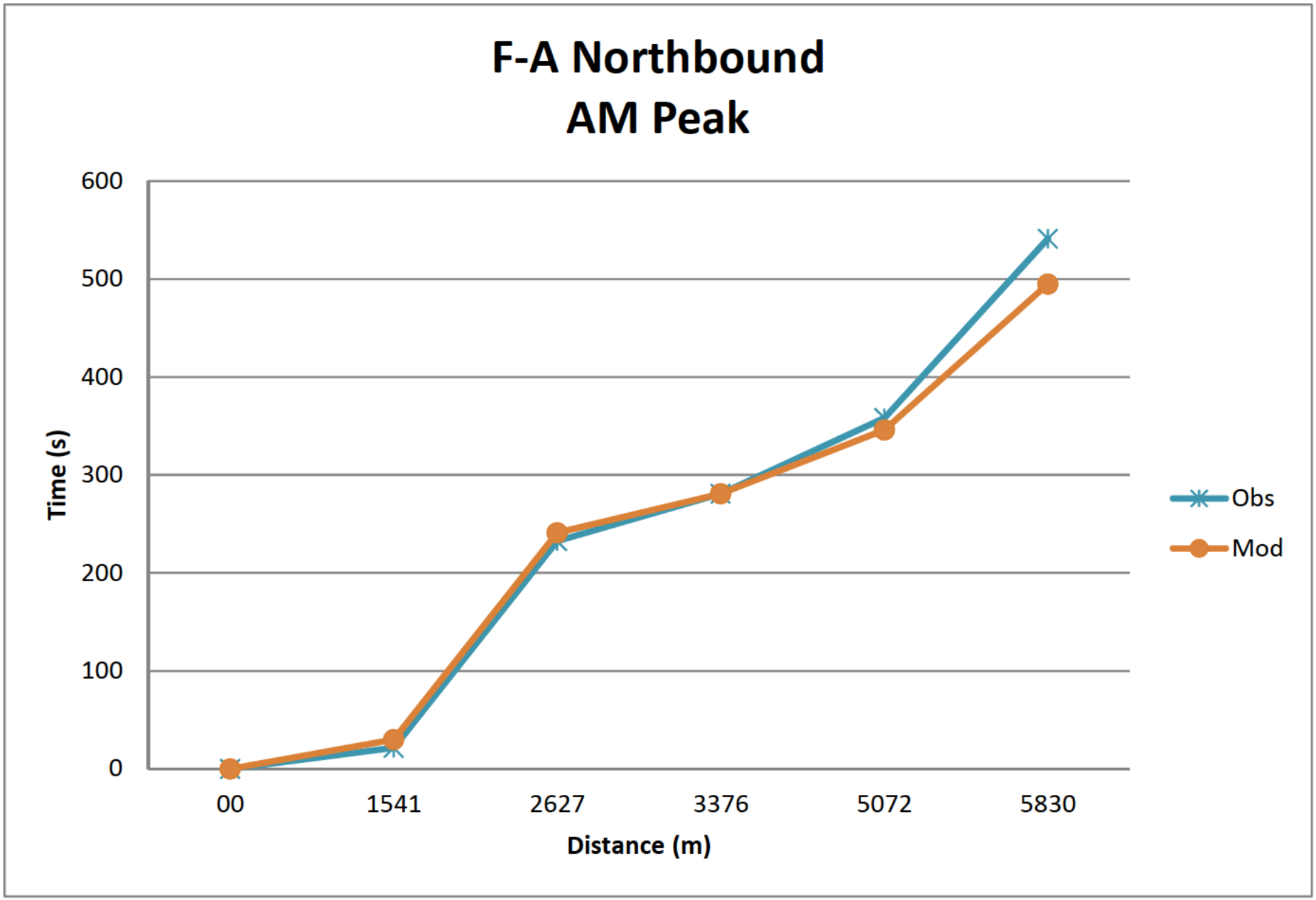

C-R Eastbound
Inter Peak
Time (s)
500
450
400
350
300
250
200
150
100
50
0
00
1650
2078
2542
Distance (m)
Obs
Mod

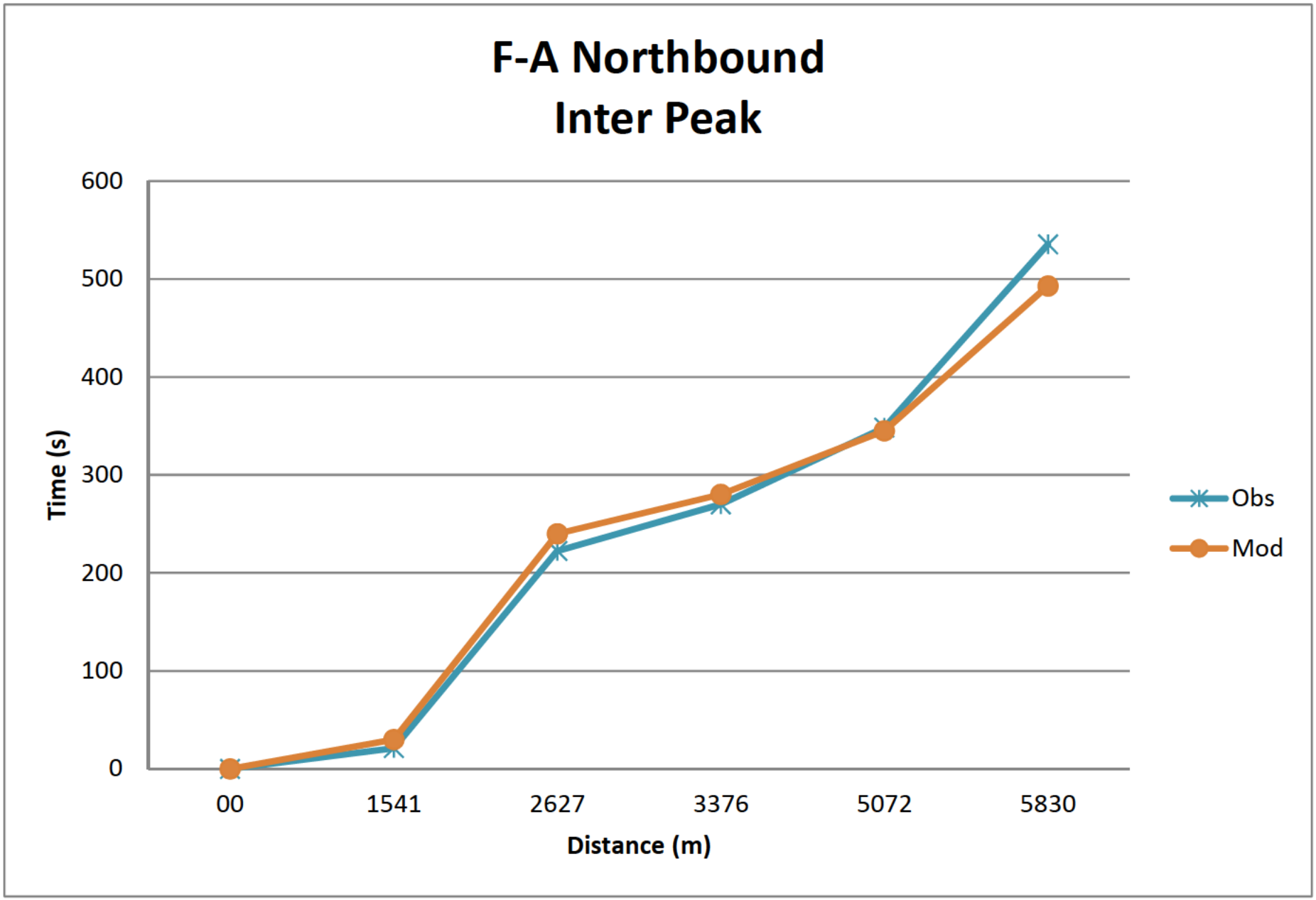

C-R Eastbound
PM Peak
600
500
400
300
200
100
0
Time (s)
00
1650
2078
2542
Distance (m)
Obs
Mod

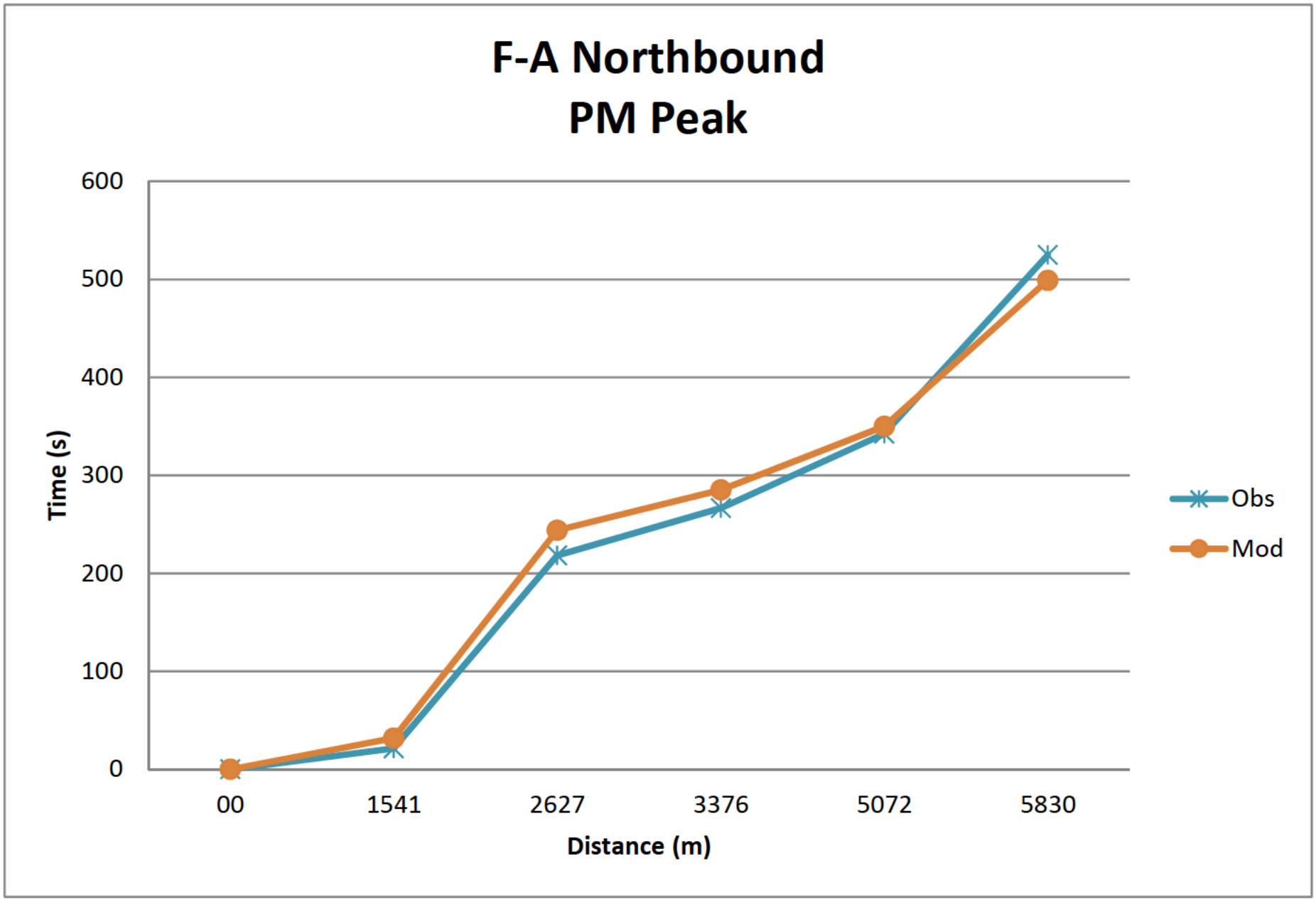

C-S Eastbound
AM Peak
700
600
500
400
300
200
100
0
Time (s)
00
818
1885
3200
5935
6494
Distance (m)
Obs
Mod

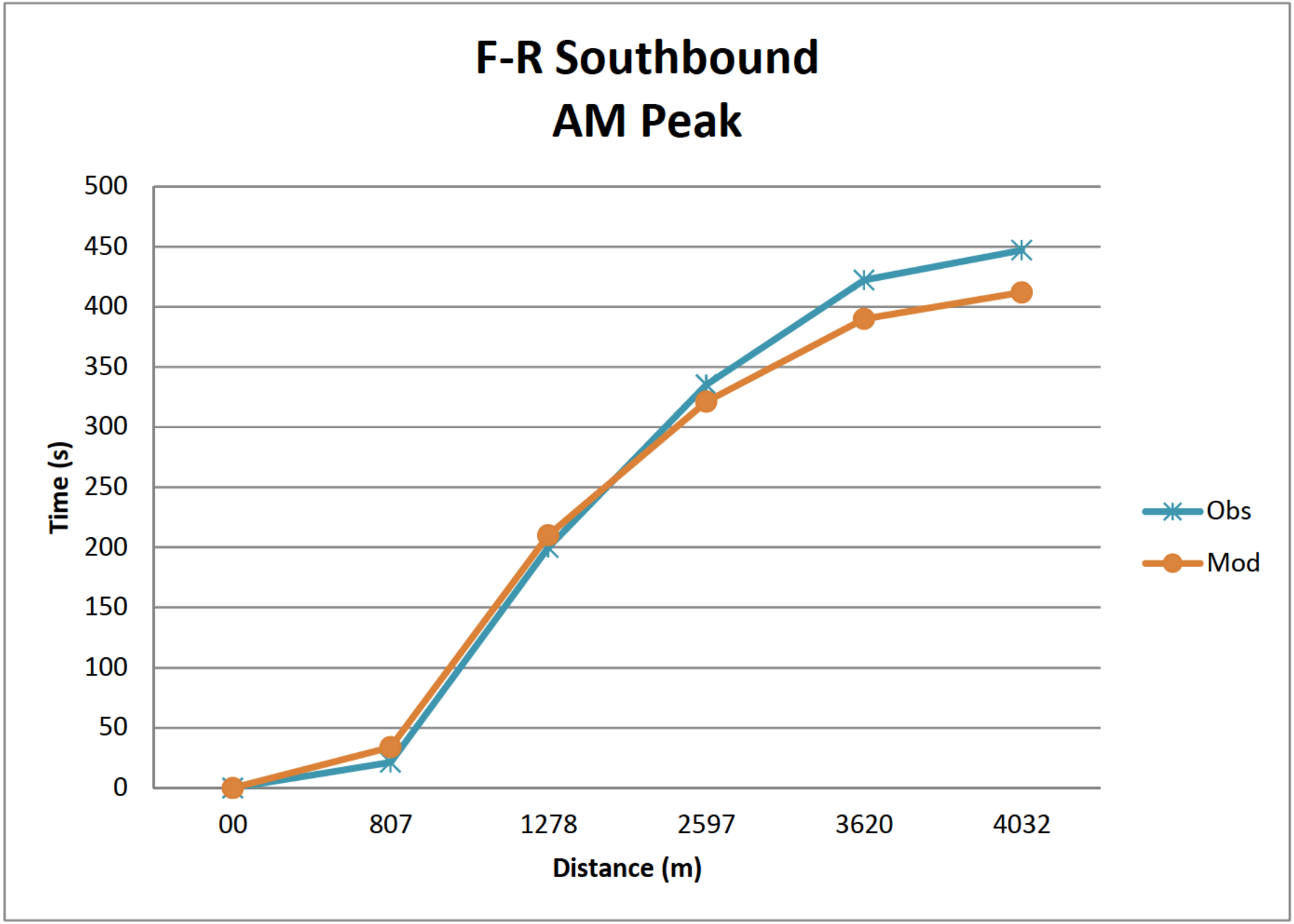

C-S Eastbound
Inter Peak
700
600
500
400
300
200
100
0
Time (s)
00
818
1885
3200
5935
6494
Distance (m)
Obs
Mod

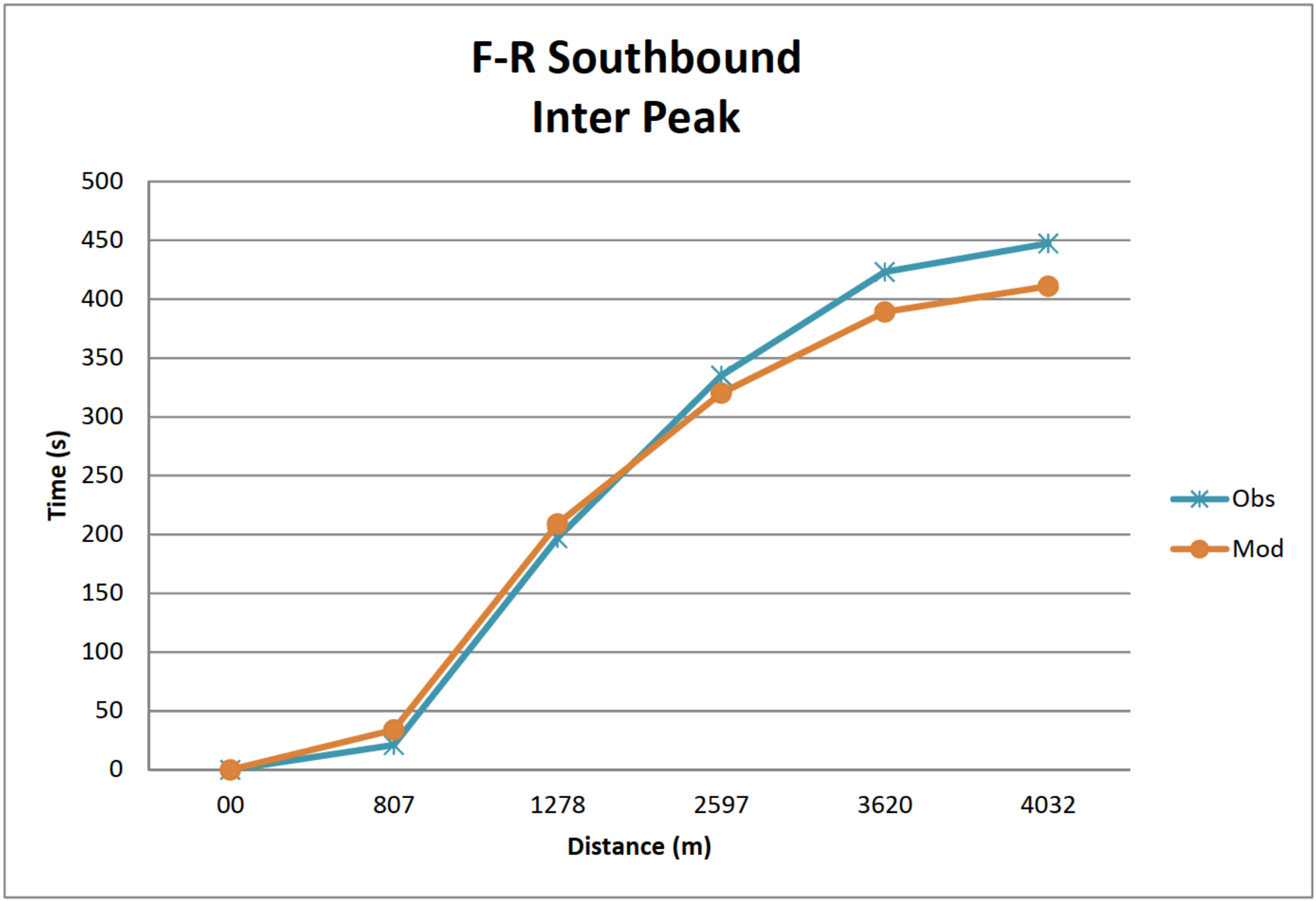

C-S Eastbound
PM Peak
700
600
500
400
300
200
100
0
Time (s)
00
818
1885
3200
5935
6494
Distance (m)
Obs
Mod

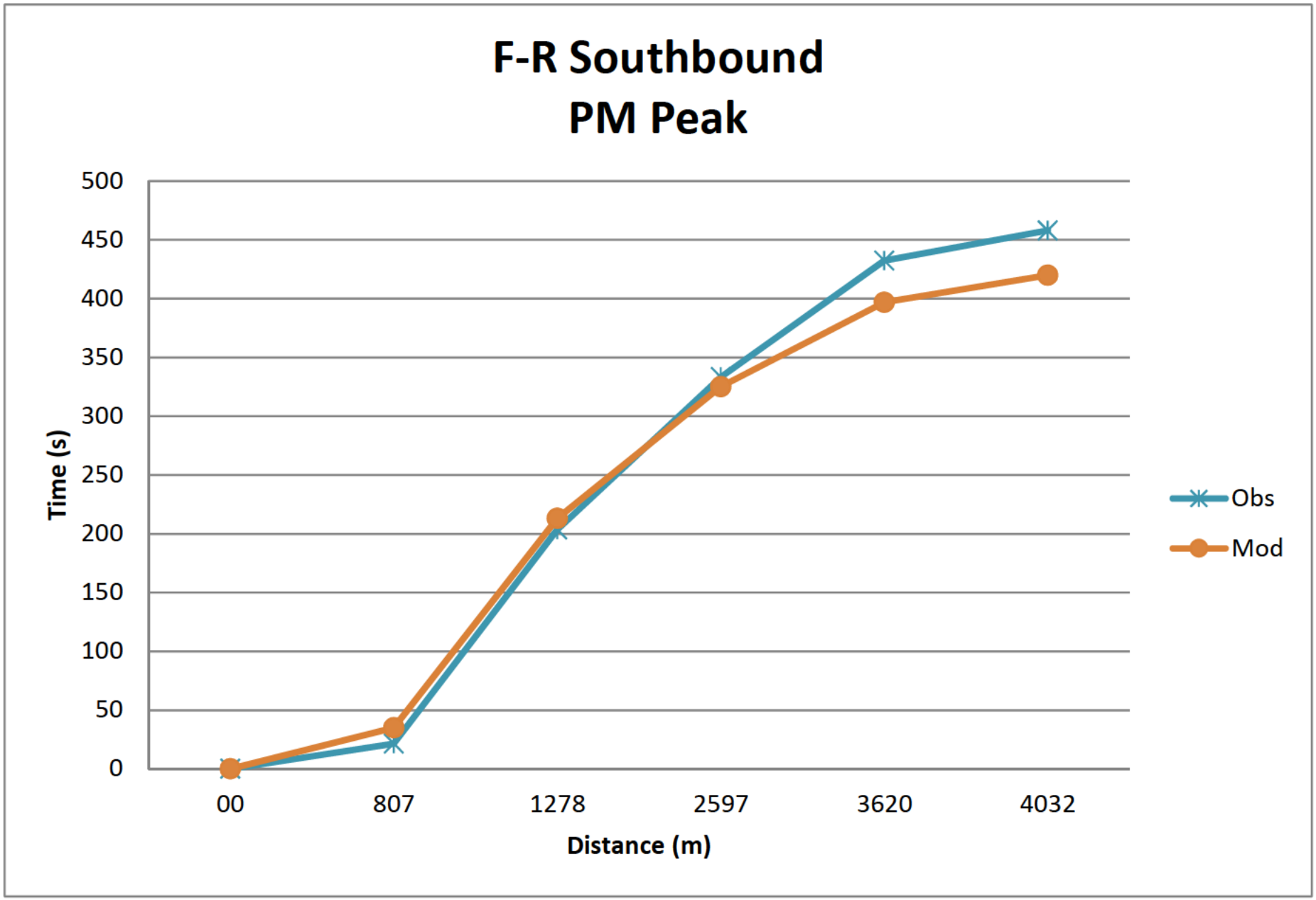

F-A Northbound
AM Peak
600
500
400
300
200
100
0
Time (s)
00
1541
2627
3376
5072
5830
Distance (m)
Obs
Mod

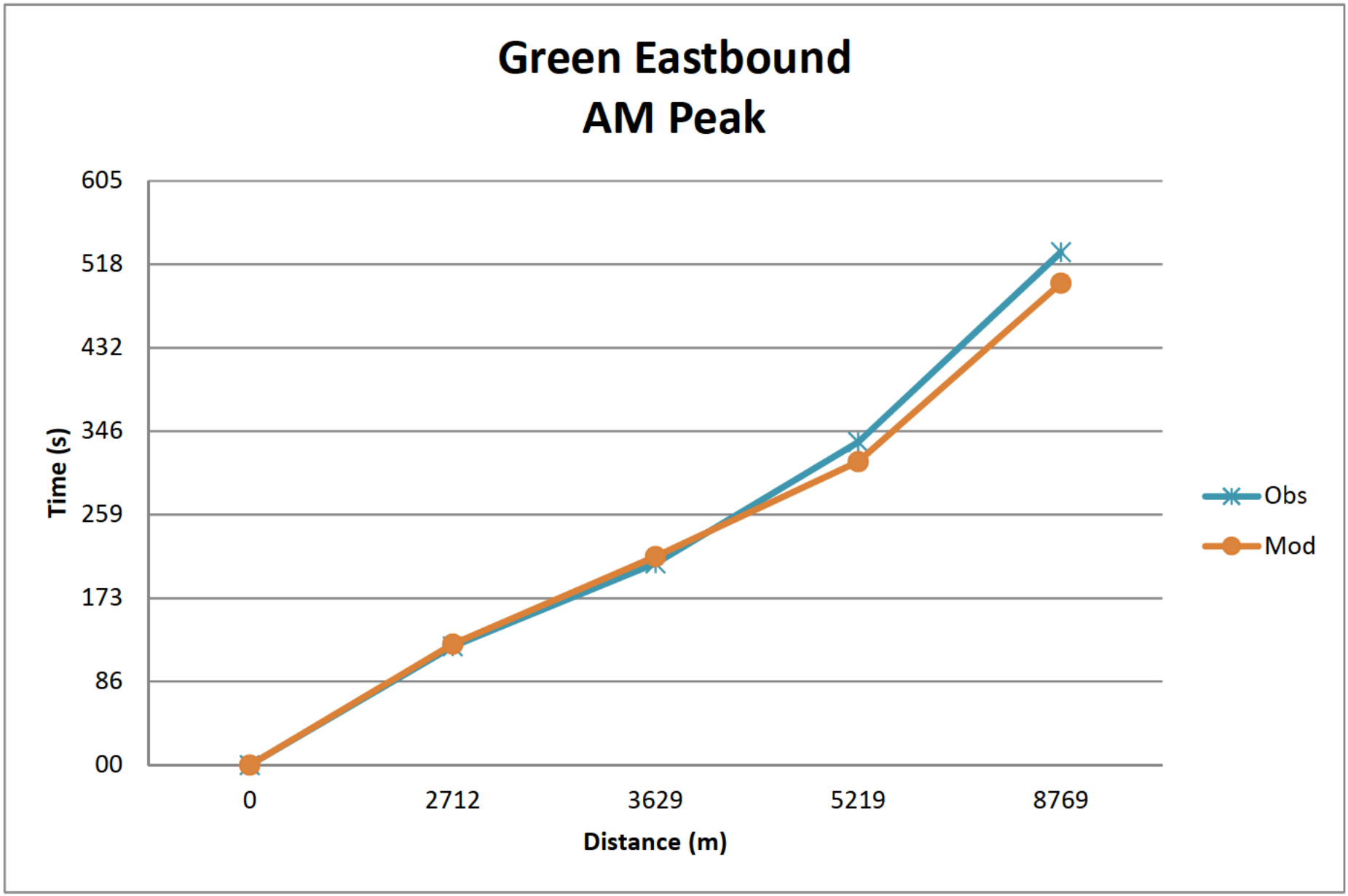

F-A Northbound
Inter Peak
600
500
400
300
200
100
0
Time (s)
00
1541
2627
3376
5072
5830
Distance (m)
Obs
Mod

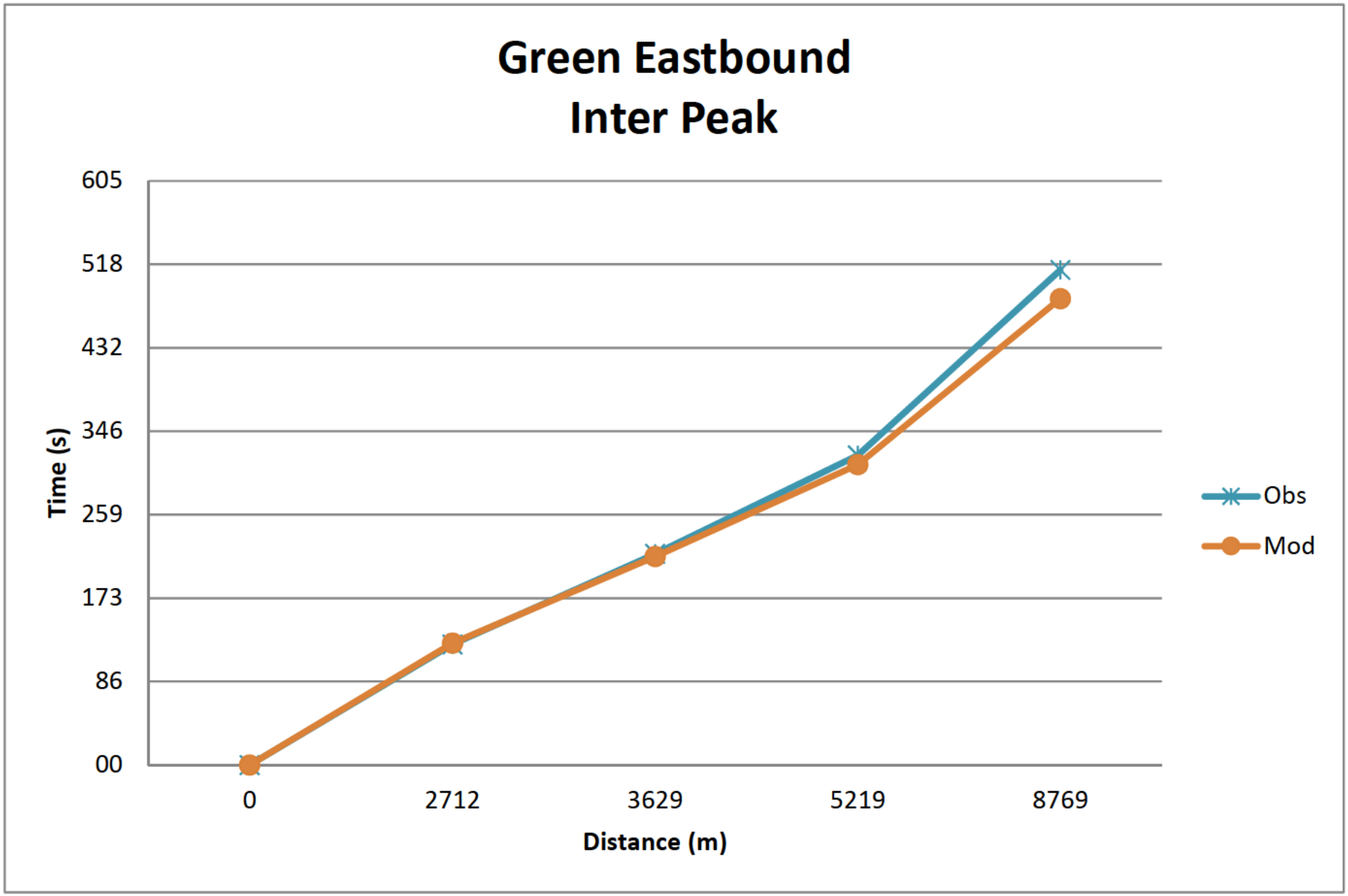

F-A Northbound
PM Peak
600
500
400
300
200
100
0
Time (s)
00
1541
2627
3376
5072
5830
Distance (m)
Obs
Mod

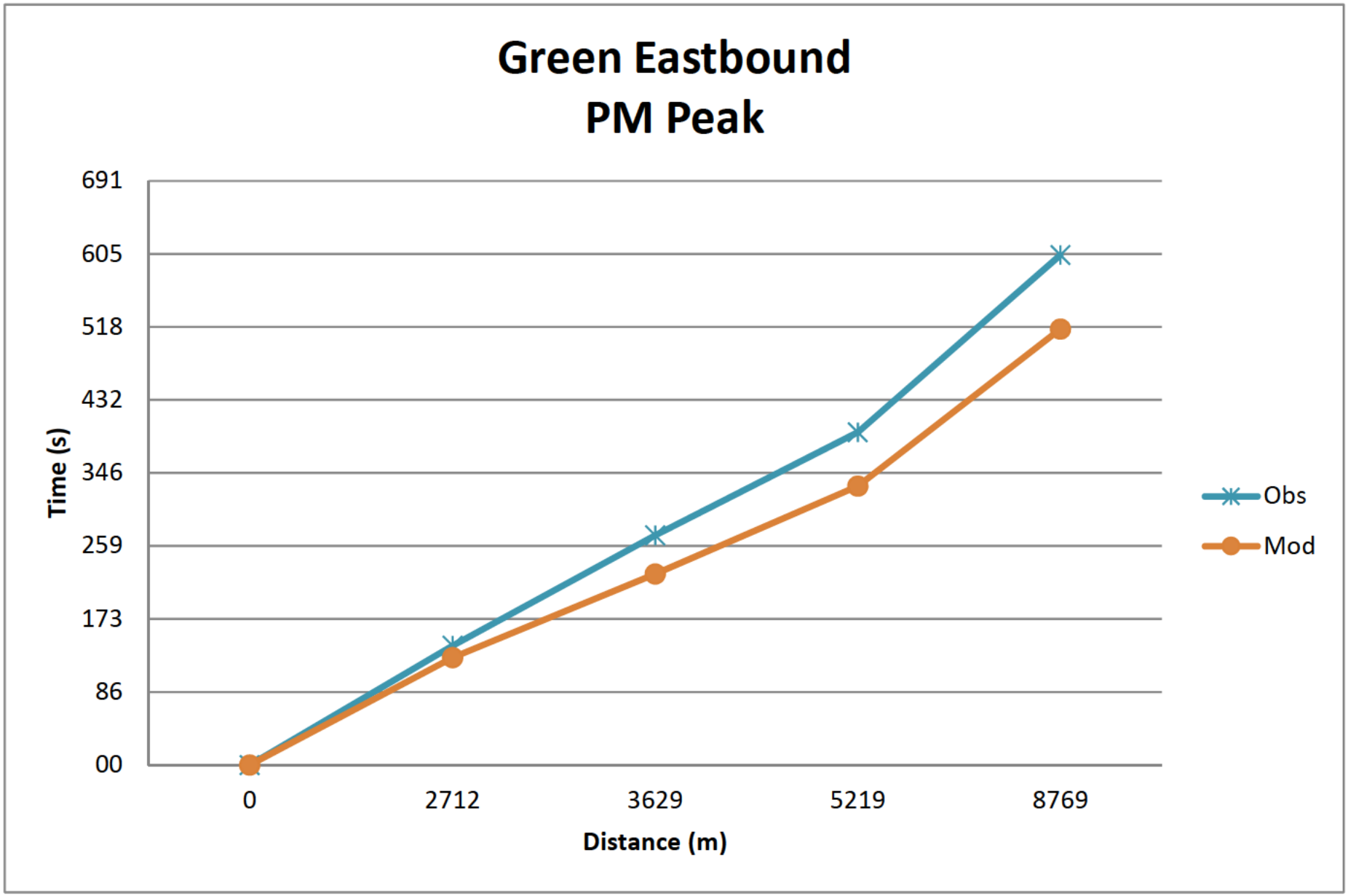

F-R Southbound
AM Peak
Time (s)
500
450
400
350
300
250
200
150
100
50
0
00
807
1278
2597
3620
4032
Distance (m)
Obs
Mod

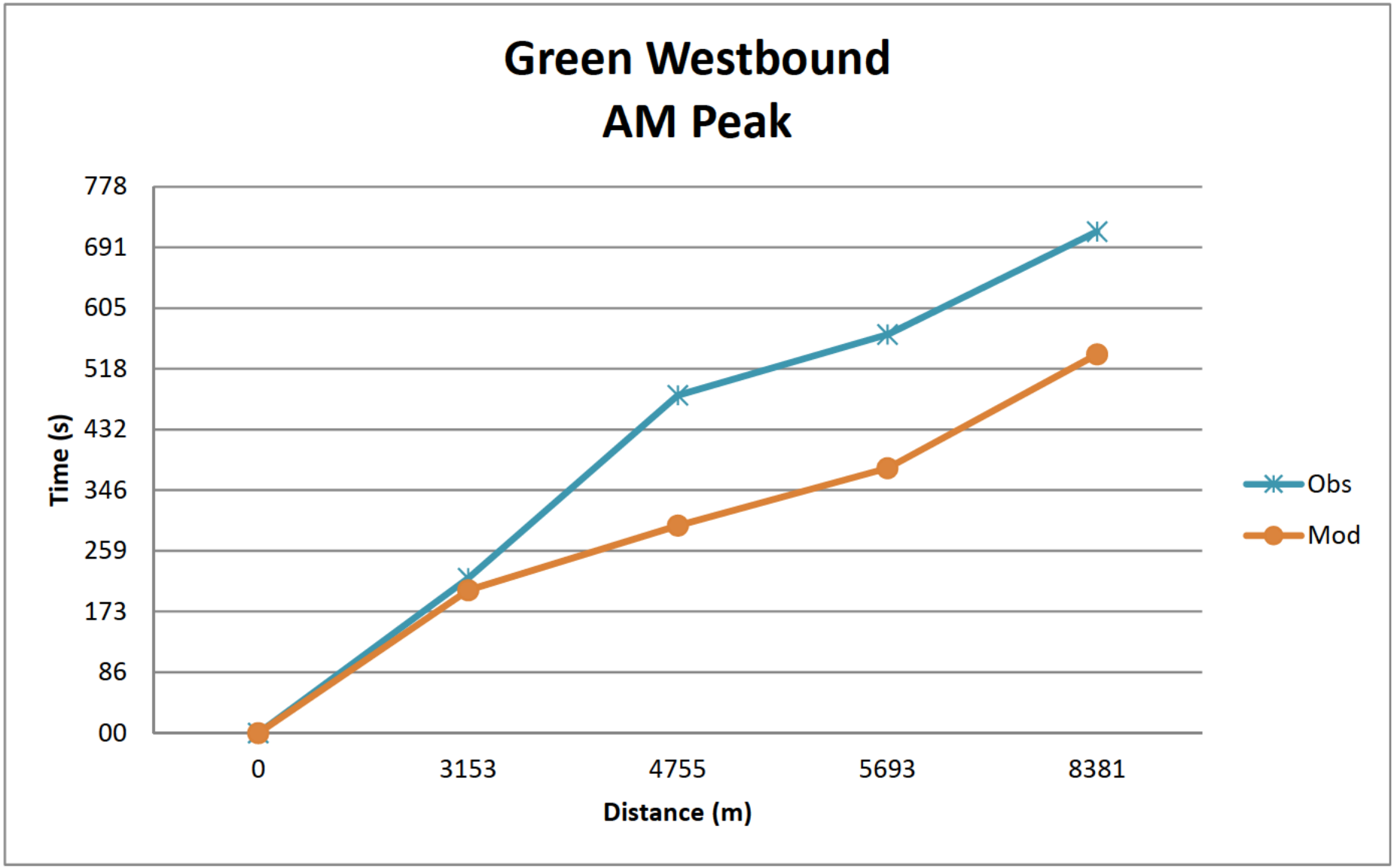

F-R Southbound
Inter Peak
500
450
400
350
300
250
200
150
100
50
0
Time (s)
00
807
1278
2597
3620
4032
Distance (m)
Obs
Mod

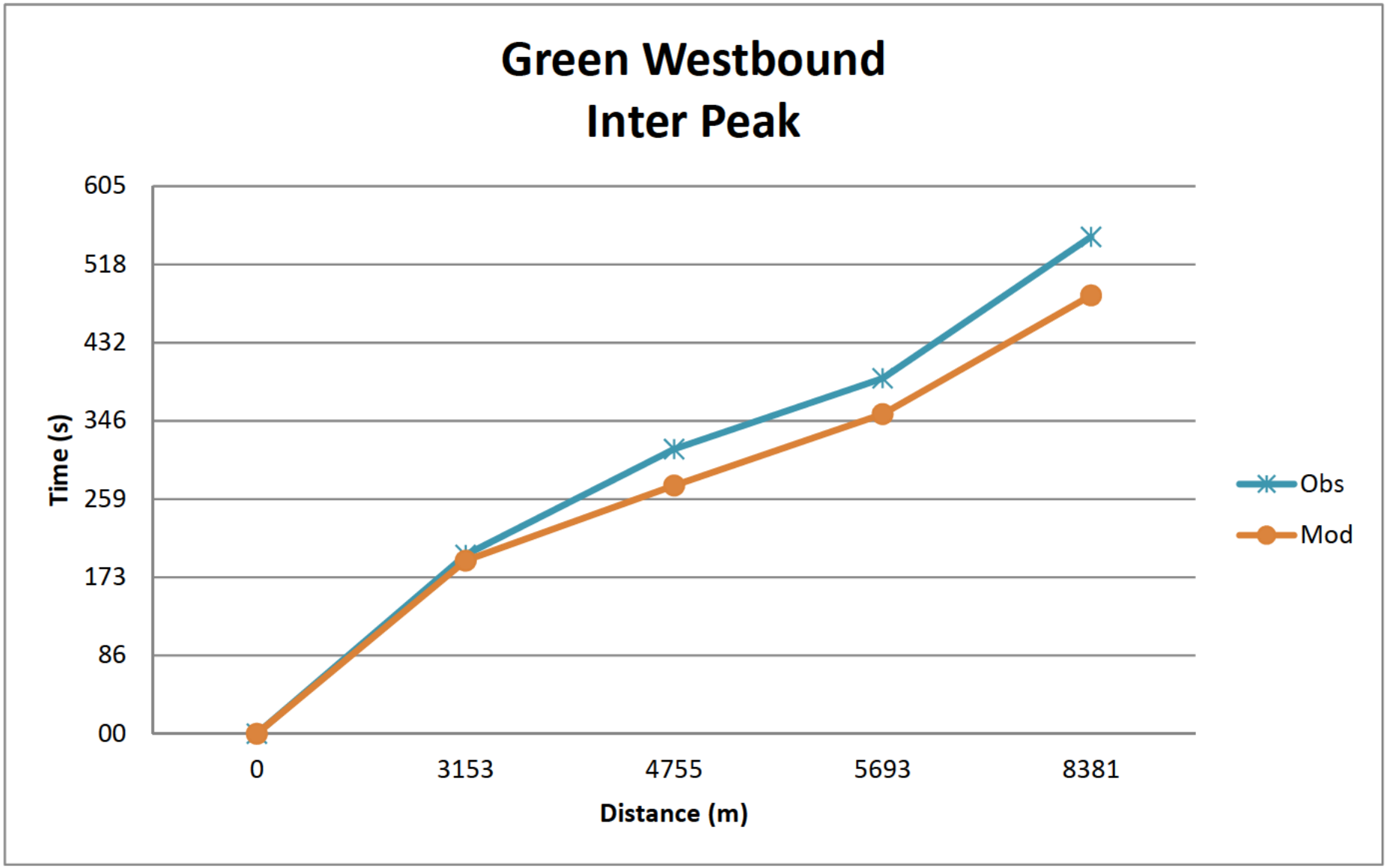

F-R Southbound
PM Peak
500
450
400
350
300
250
200
150
100
50
0
Time (s)
00
807
1278
2597
3620
4032
Distance (m)
Obs
Mod

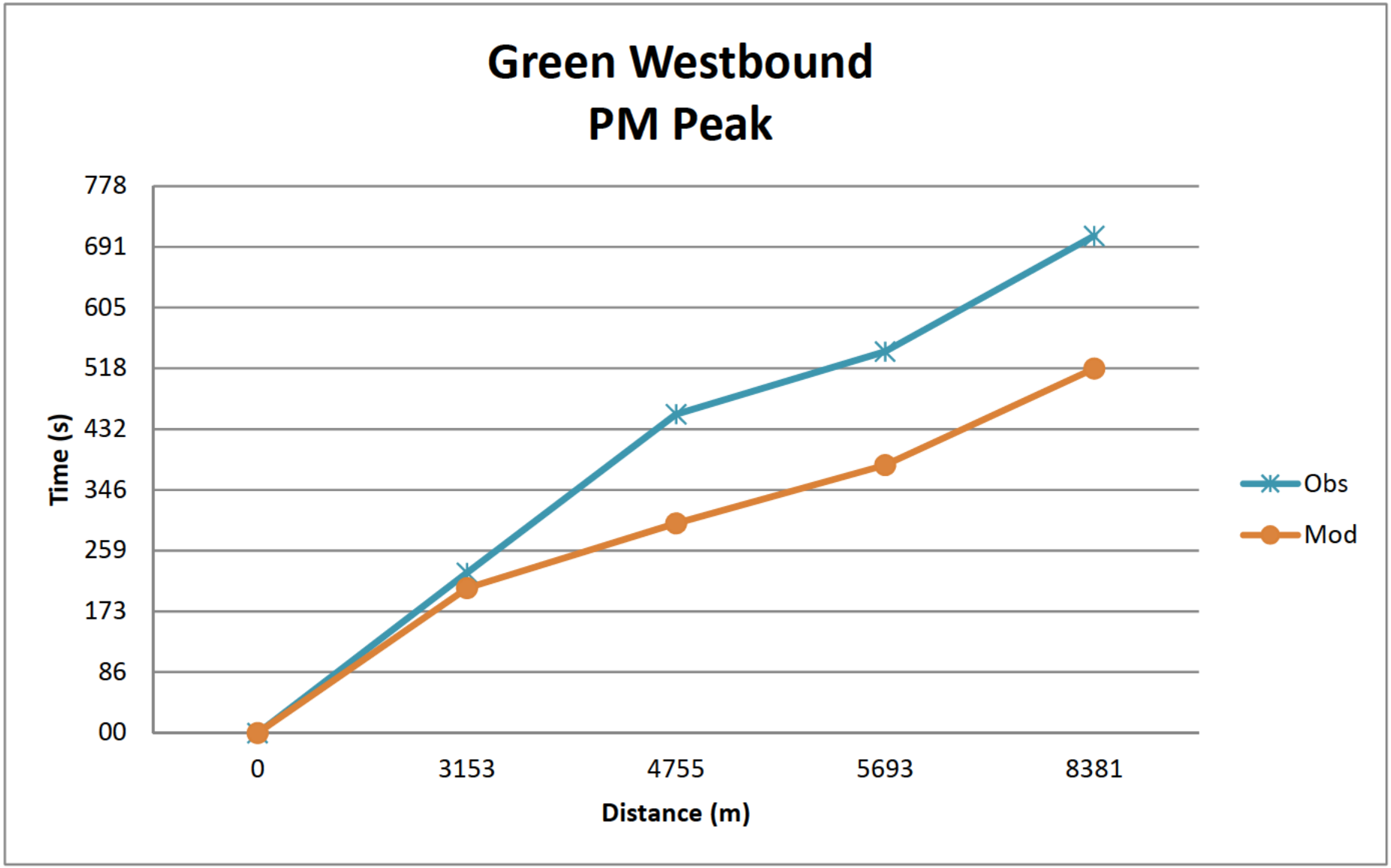

Green Eastbound
AM Peak
605
518
432
346
259
173
86
00
Time (s)
0
2712
3629
5219
8769
Distance (m)
Obs
Mod

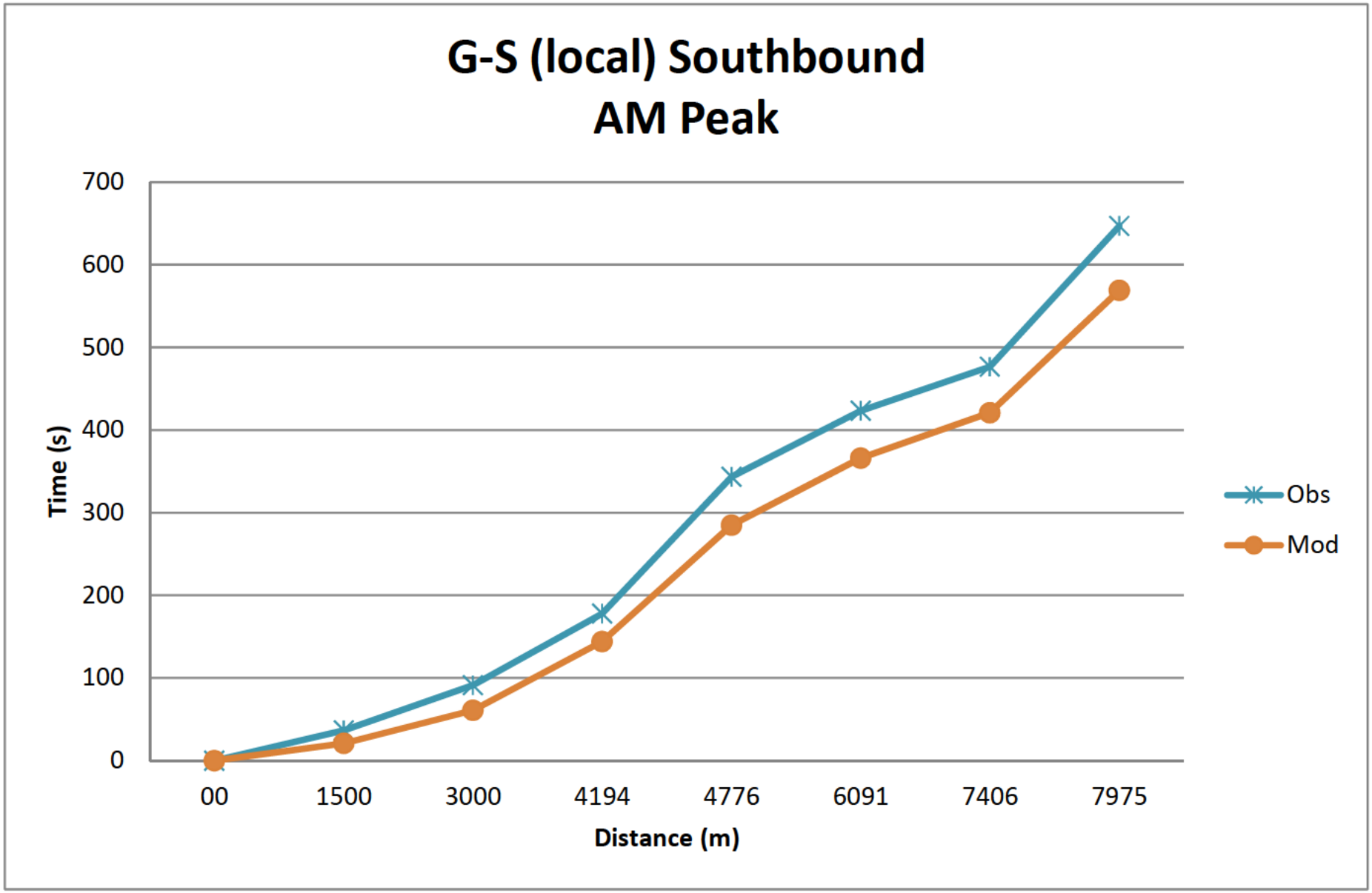

Green Eastbound
Inter Peak
605
518
432
346
259
173
86
00
Time (s)
0
2712
3629
5219
8769
Distance (m)
Obs
Mod

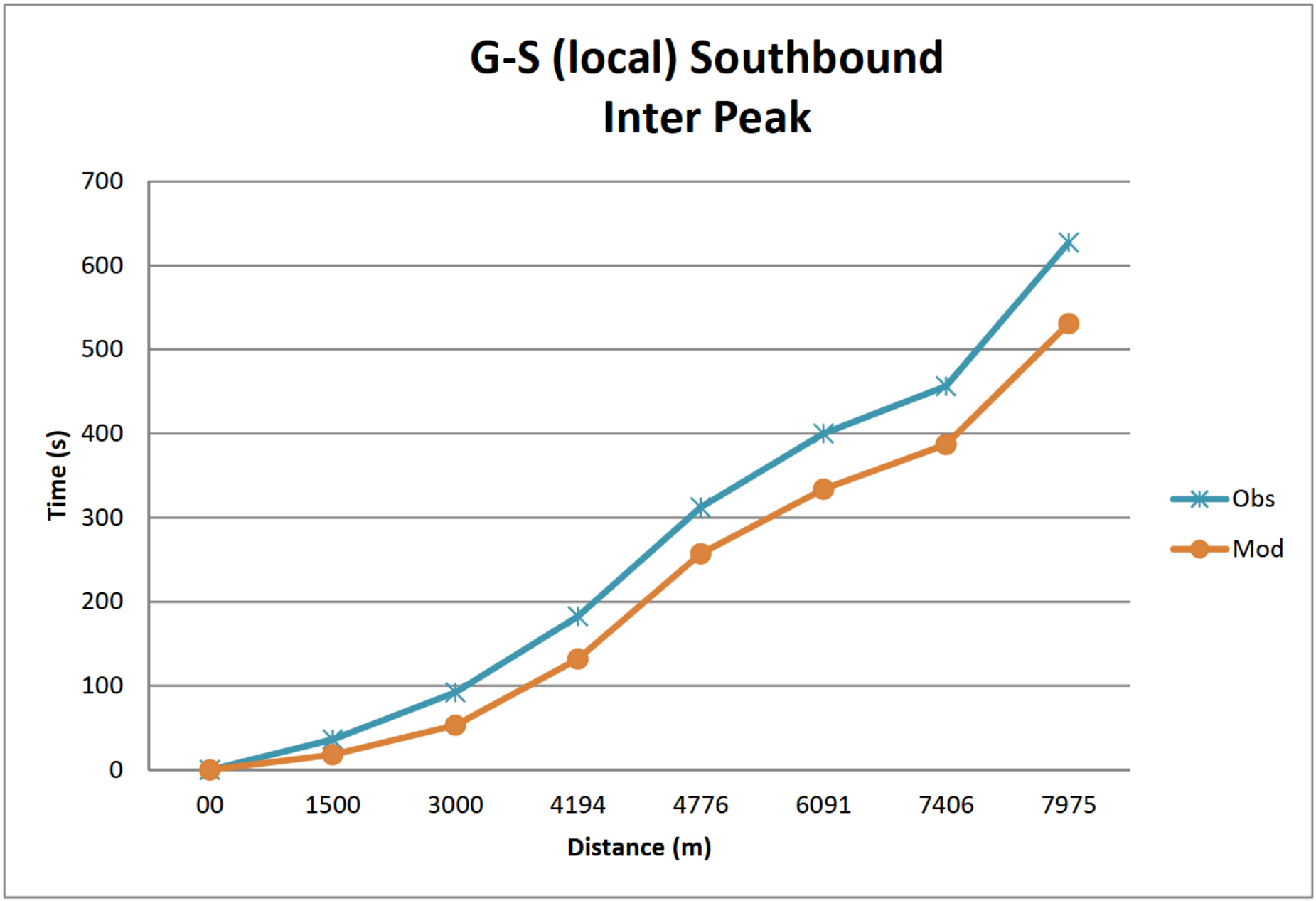

Green Eastbound
PM Peak
691
605
518
432
346
259
173
86
00
Time (s)
0
2712
3629
5219
8769
Distance (m)
Obs
Mod

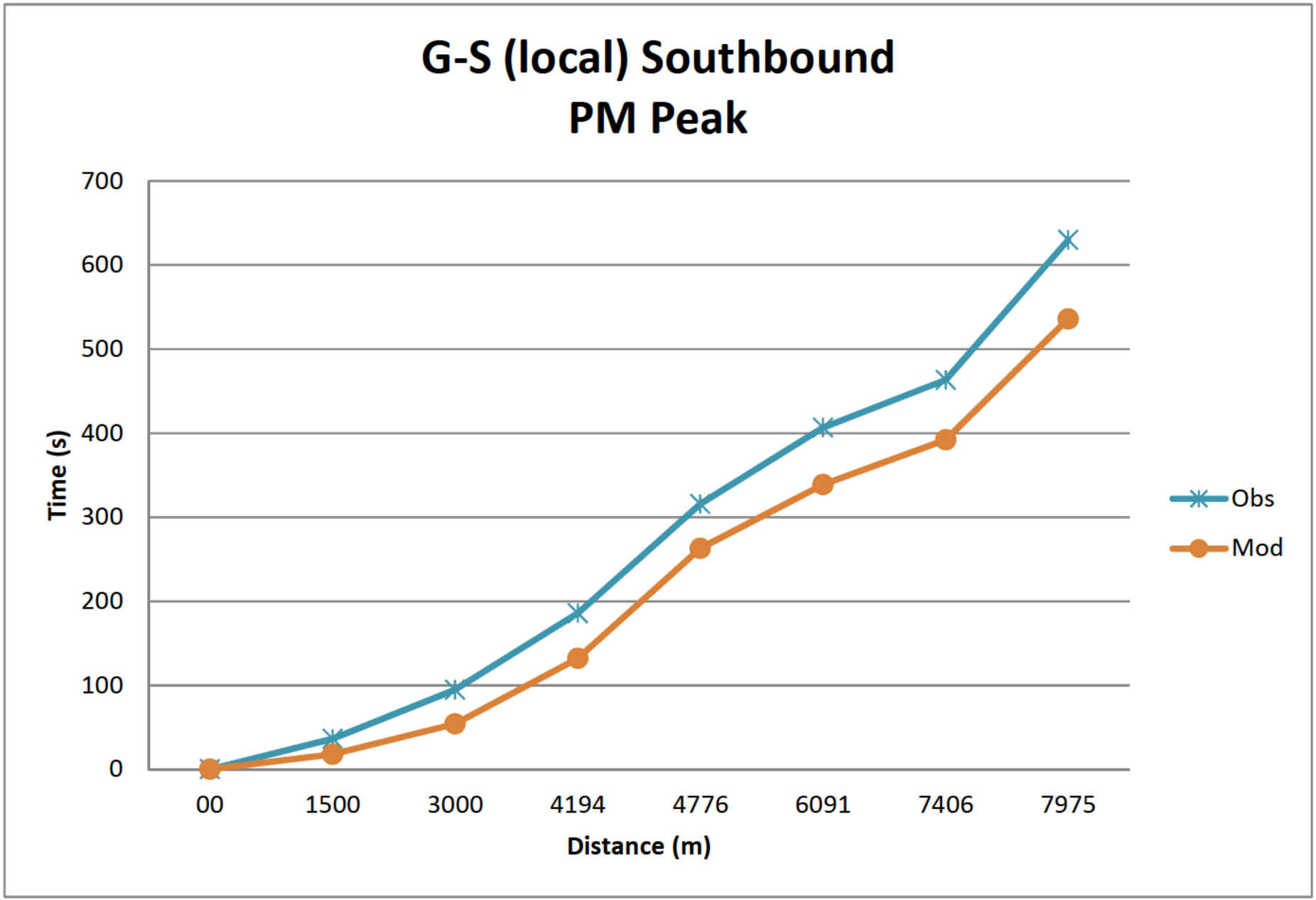

Green Westbound
AM Peak
778
691
605
518
432
346
259
173
86
00
Time (s)
0
3153
4755
5693
8381
Distance (m)
Obs
Mod

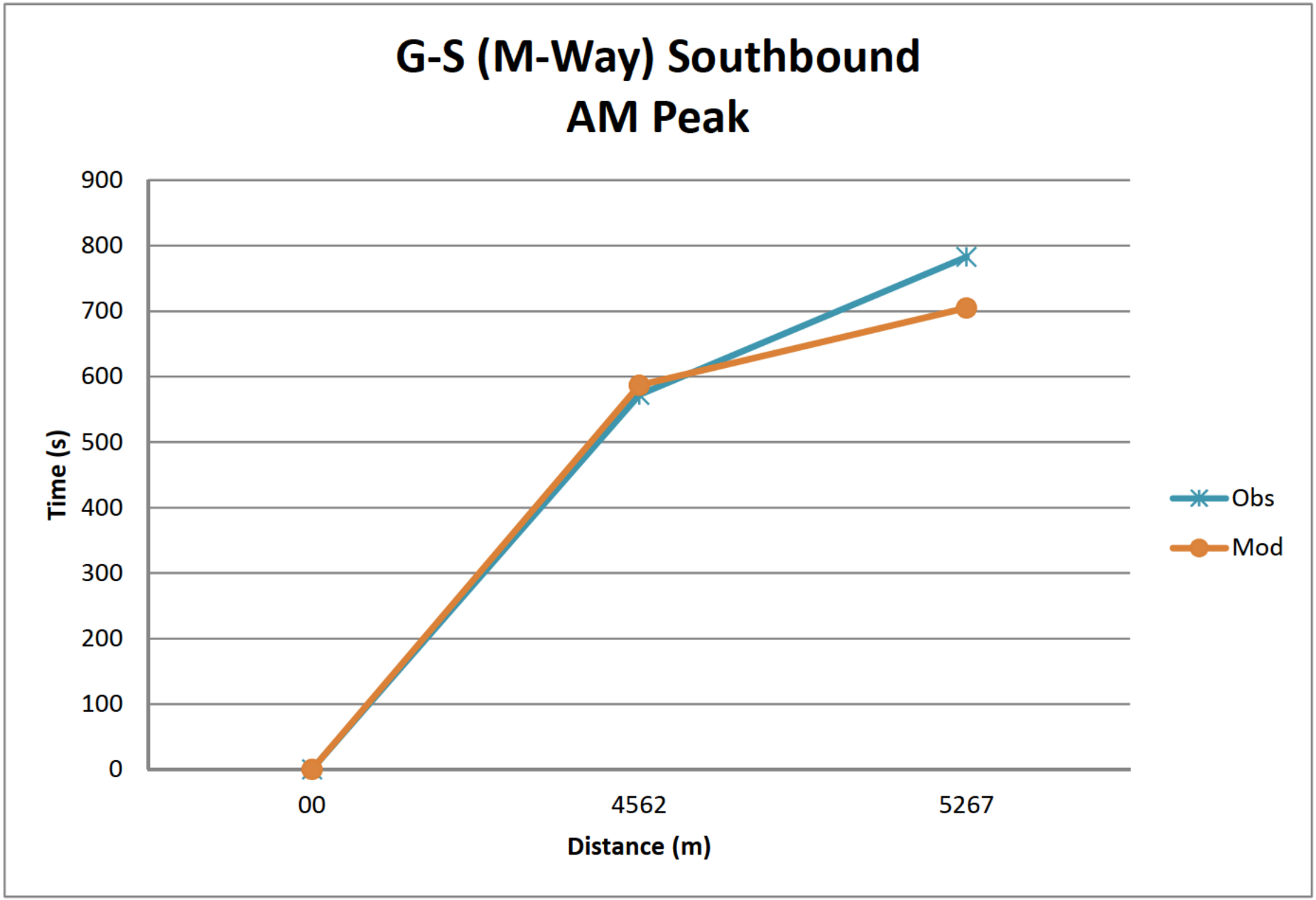

Green Westbound
Inter Peak
605
518
432
346
259
173
86
00
Time (s)
0
3153
4755
5693
8381
Distance (m)
Obs
Mod

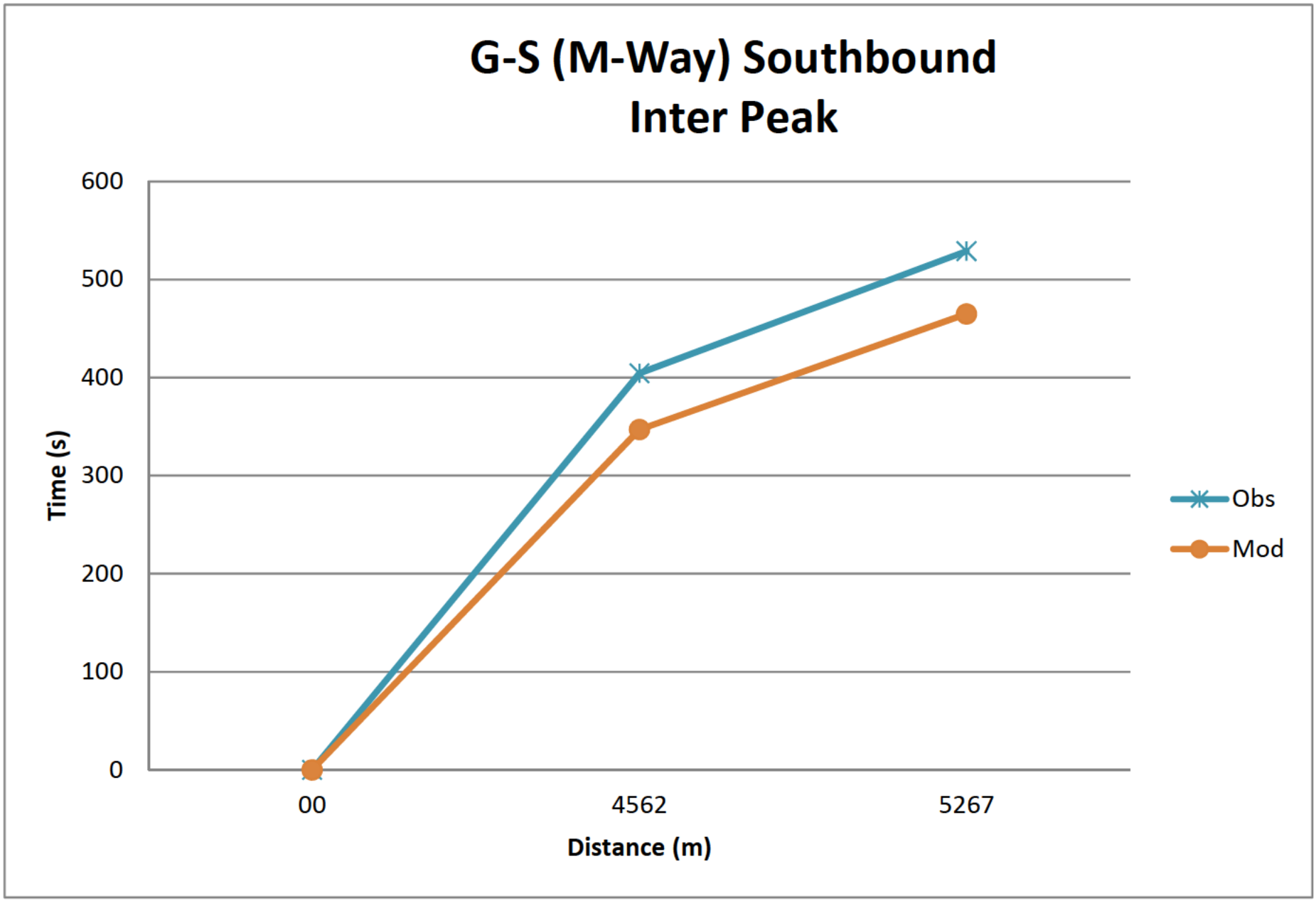

Green Westbound
PM Peak
778
691
605
518
432
346
259
173
86
00
Time (s)
0
3153
4755
5693
8381
Distance (m)
Obs
Mod

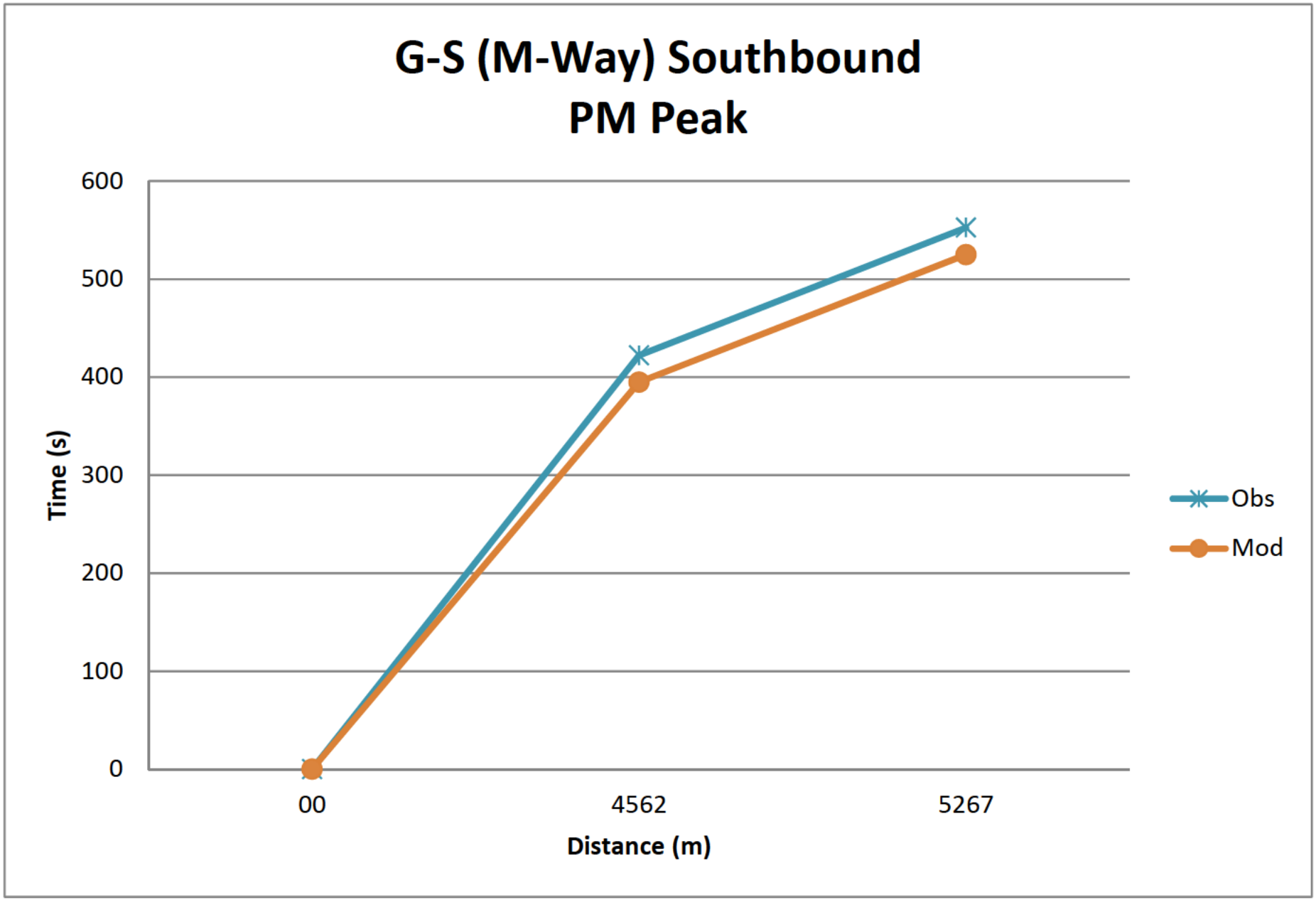

G-S (local) Southbound
AM Peak
700
600
500
400
300
200
100
0
Time (s)
00
1500
3000
4194
4776
6091
7406
7975
Distance (m)
Obs
Mod

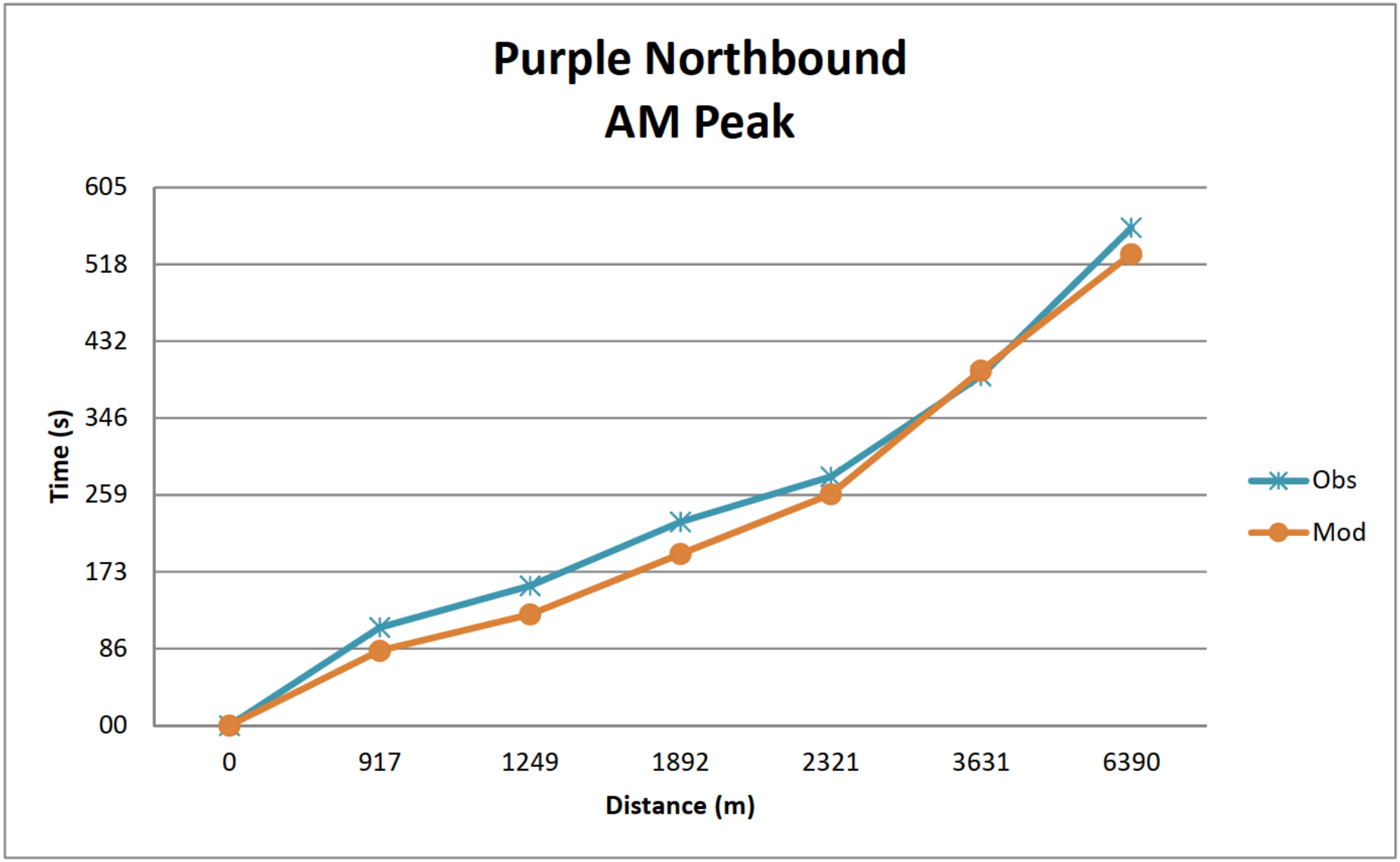

G-S (local) Southbound
Inter Peak
700
600
500
400
300
200
100
0
Time (s)
00
1500
3000
4194
4776
6091
7406
7975
Distance (m)
Obs
Mod

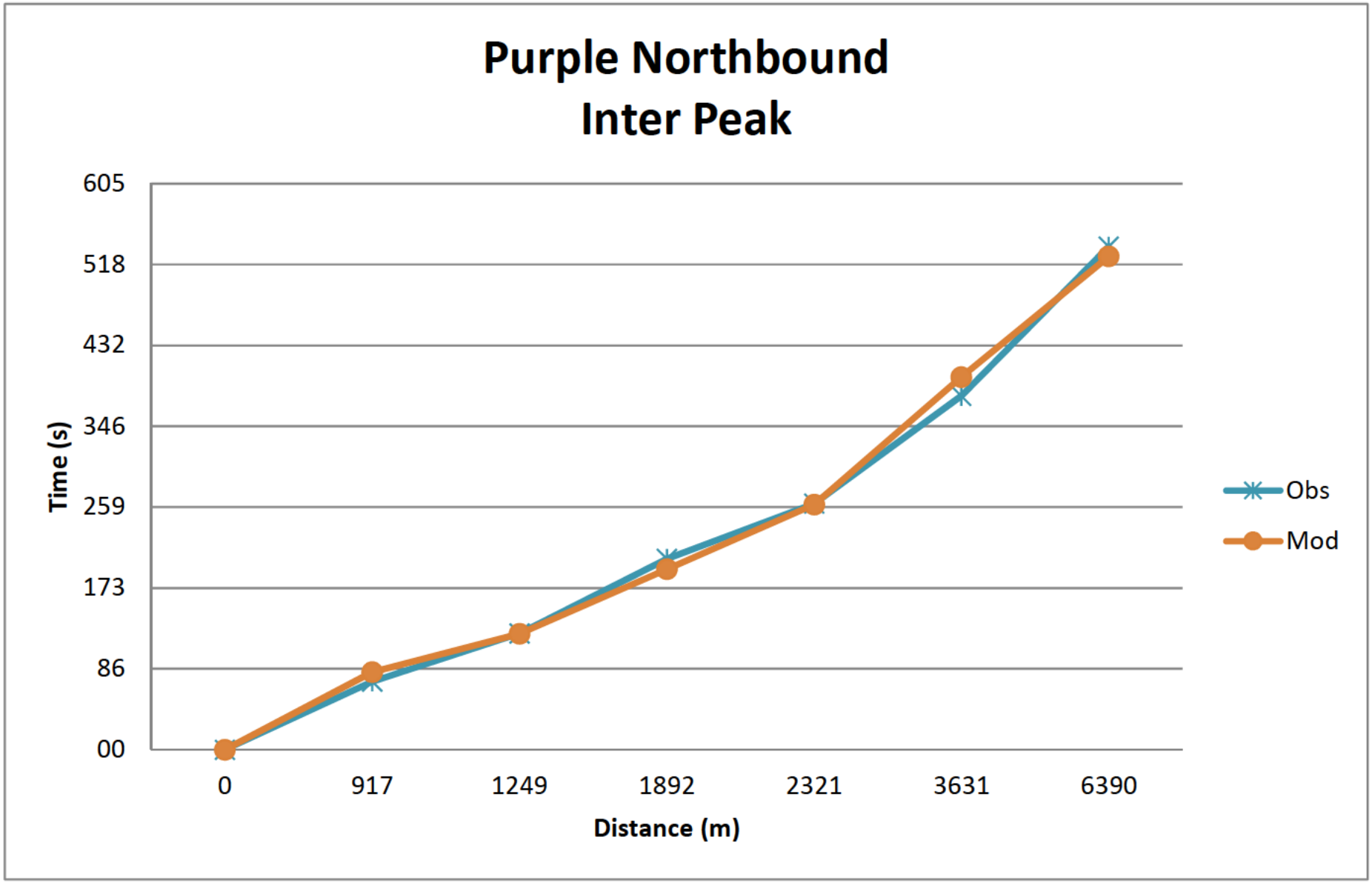

G-S (local) Southbound
PM Peak
700
600
500
400
300
200
100
0
Time (s)
00
1500
3000
4194
4776
6091
7406
7975
Distance (m)
Obs
Mod

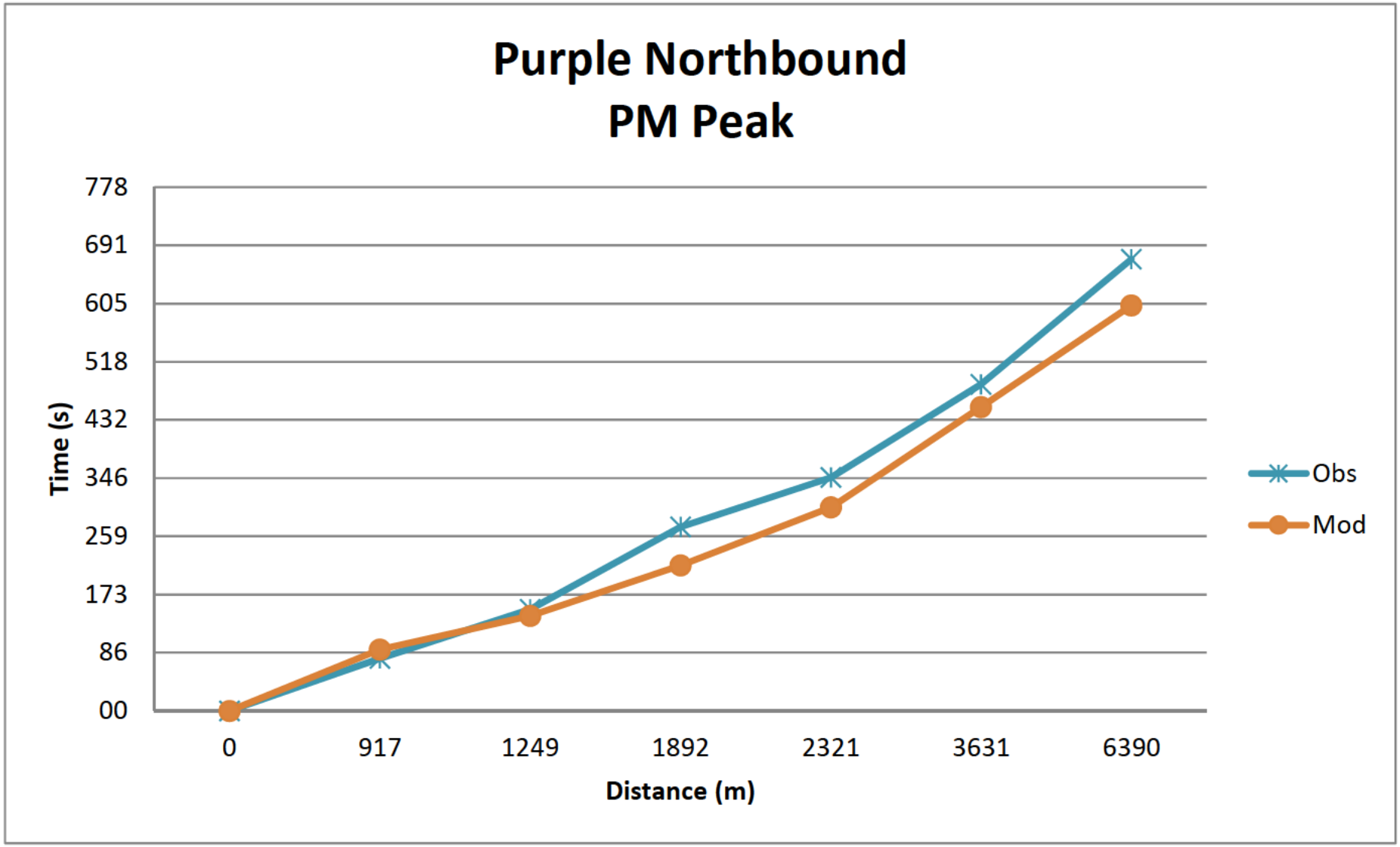

G-S (M-Way) Southbound
AM Peak
900
800
700
600
500
400
300
200
100
0
Time (s)
00
4562
5267
Distance (m)
Obs
Mod

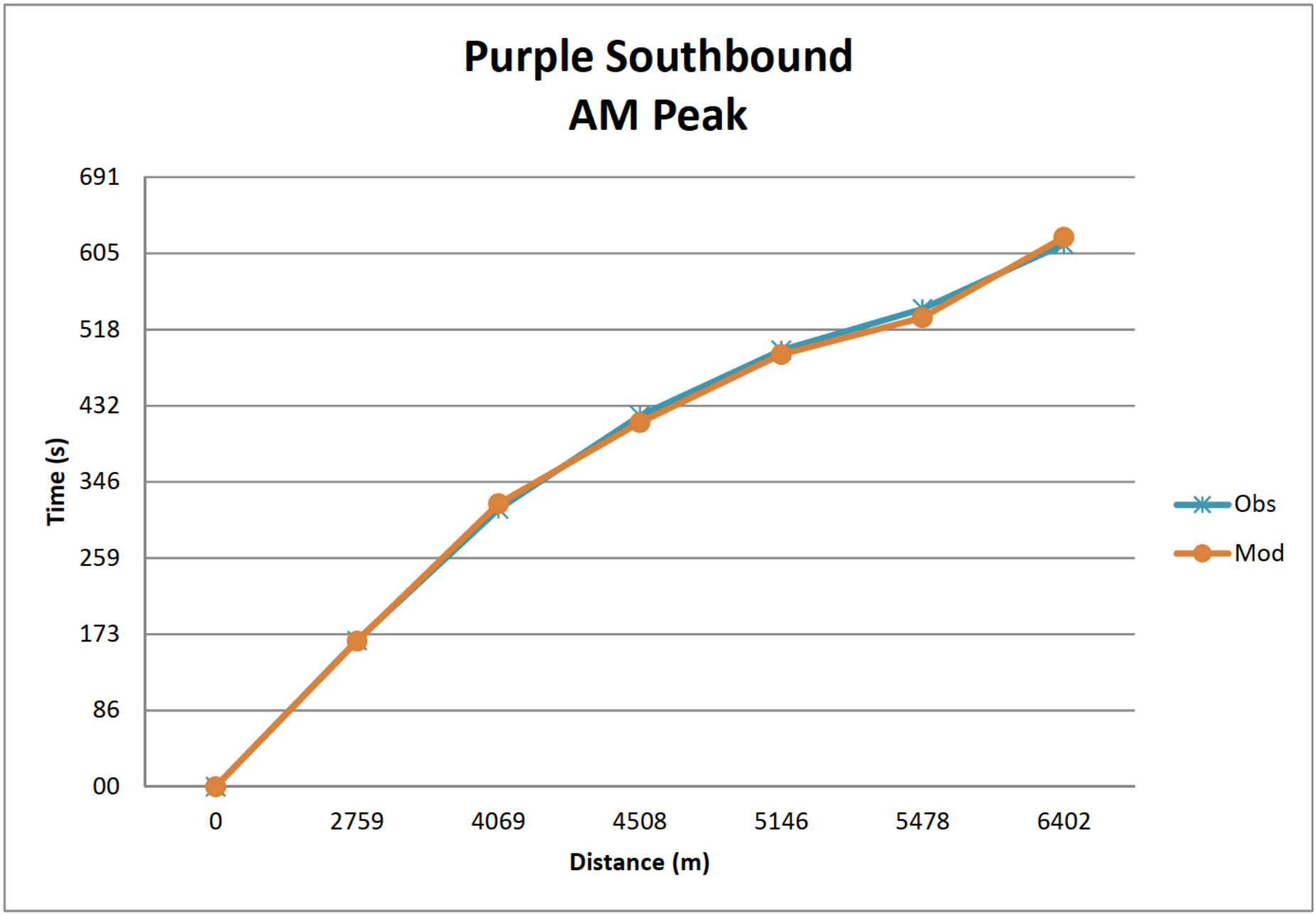

G-S (M-Way) Southbound
Inter Peak
600
500
400
300
200
100
0
Time (s)
00
4562
5267
Distance (m)
Obs
Mod

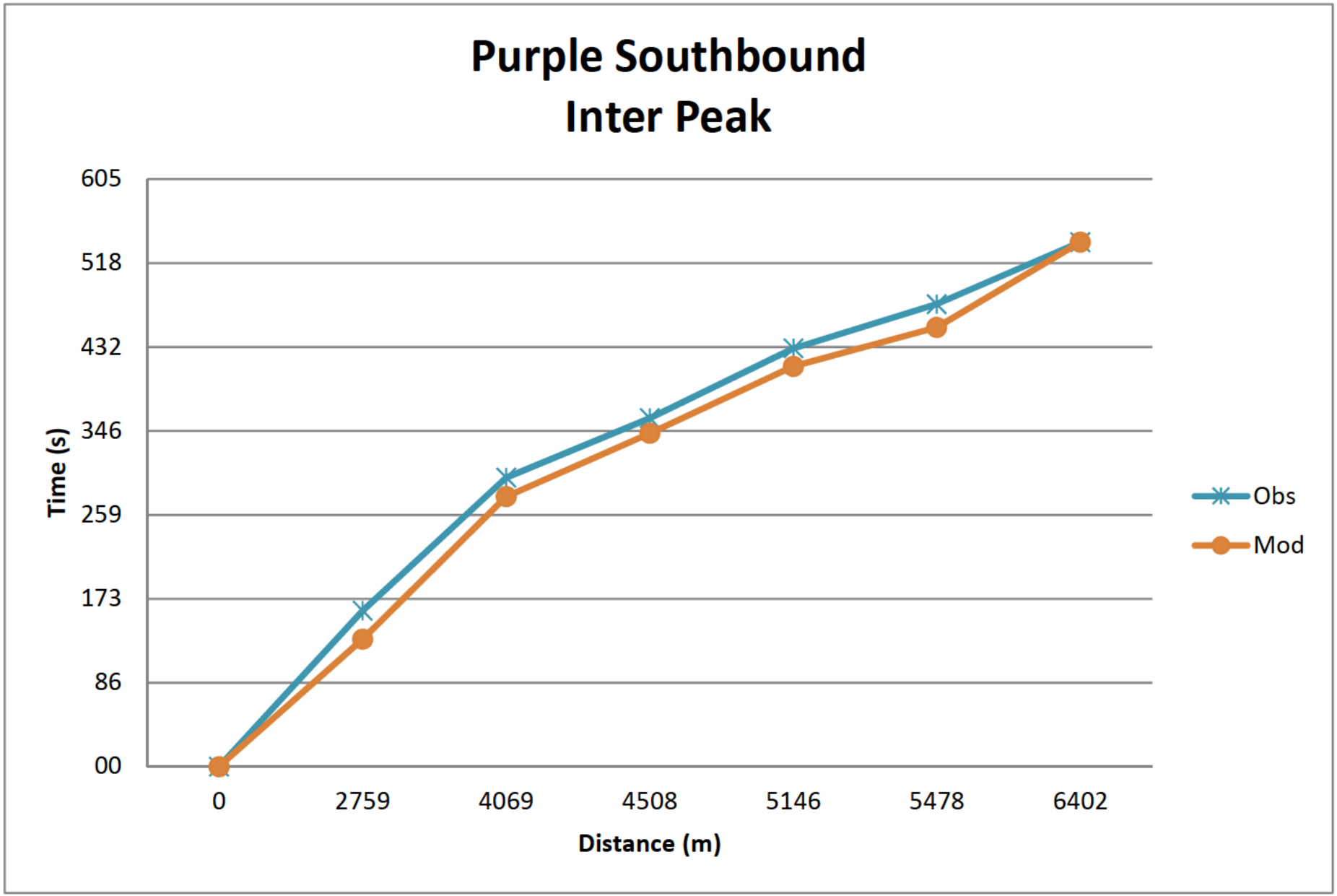

G-S (M-Way) Southbound
PM Peak
600
500
400
300
200
100
0
Time (s)
00
4562
5267
Distance (m)
Obs
Mod

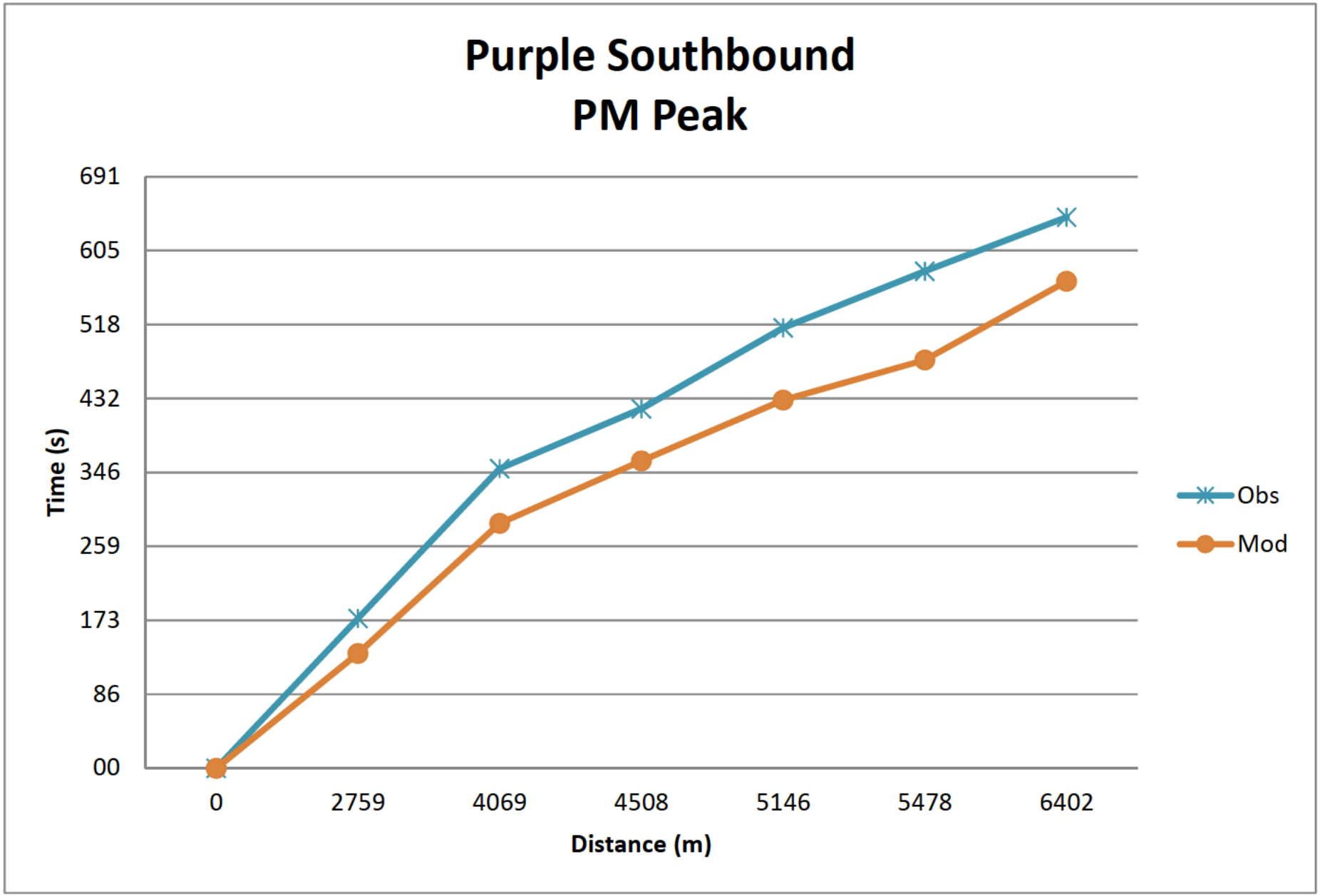

Purple Northbound
AM Peak
605
518
432
346
259
173
86
00
Time (s)
0
917
1249
1892
2321
3631
6390
Distance (m)
Obs
Mod

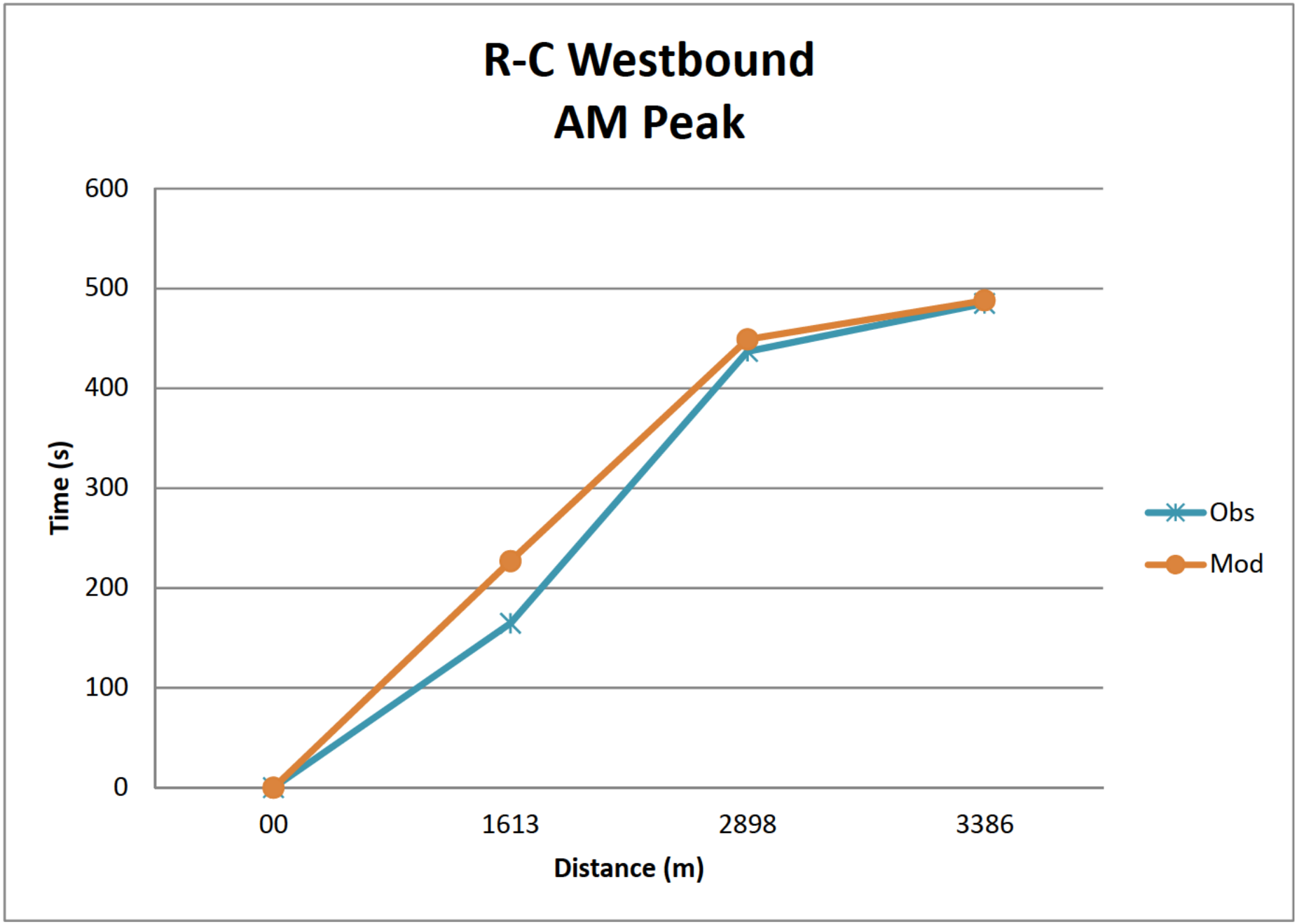

Purple Northbound
Inter Peak
605
518
432
346
259
173
86
00
Time (s)
0
917
1249
1892
2321
3631
6390
Distance (m)
Obs
Mod

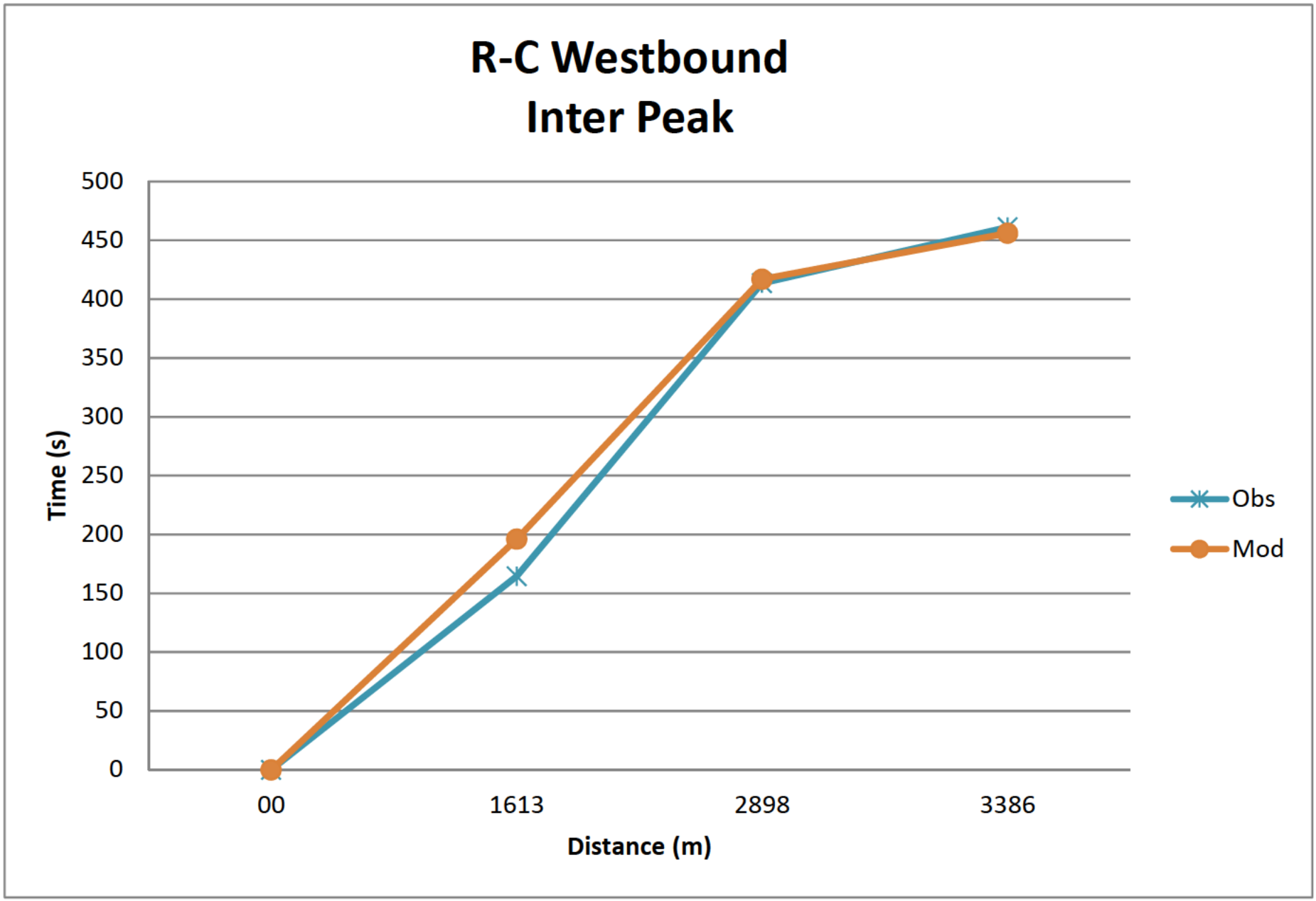

Purple Northbound
PM Peak
778
691
605
518
432
346
259
173
86
00
Time (s)
0
917
1249
1892
2321
3631
6390
Distance (m)
Obs
Mod

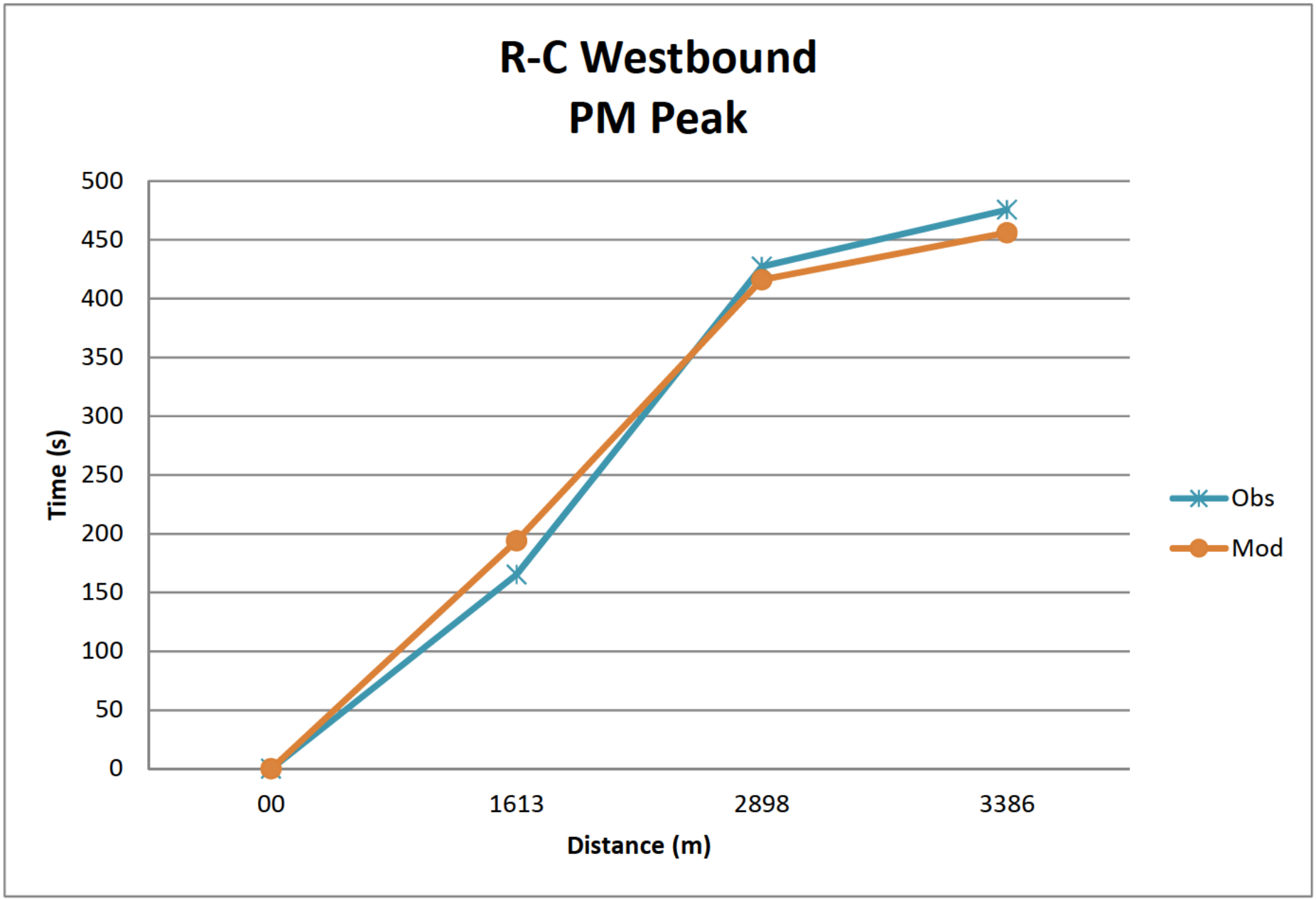

Purple Southbound
AM Peak
691
605
518
432
346
259
173
86
00
Time (s)
0
2759
4069
4508
5146
5478
6402
Distance (m)
Obs
Mod

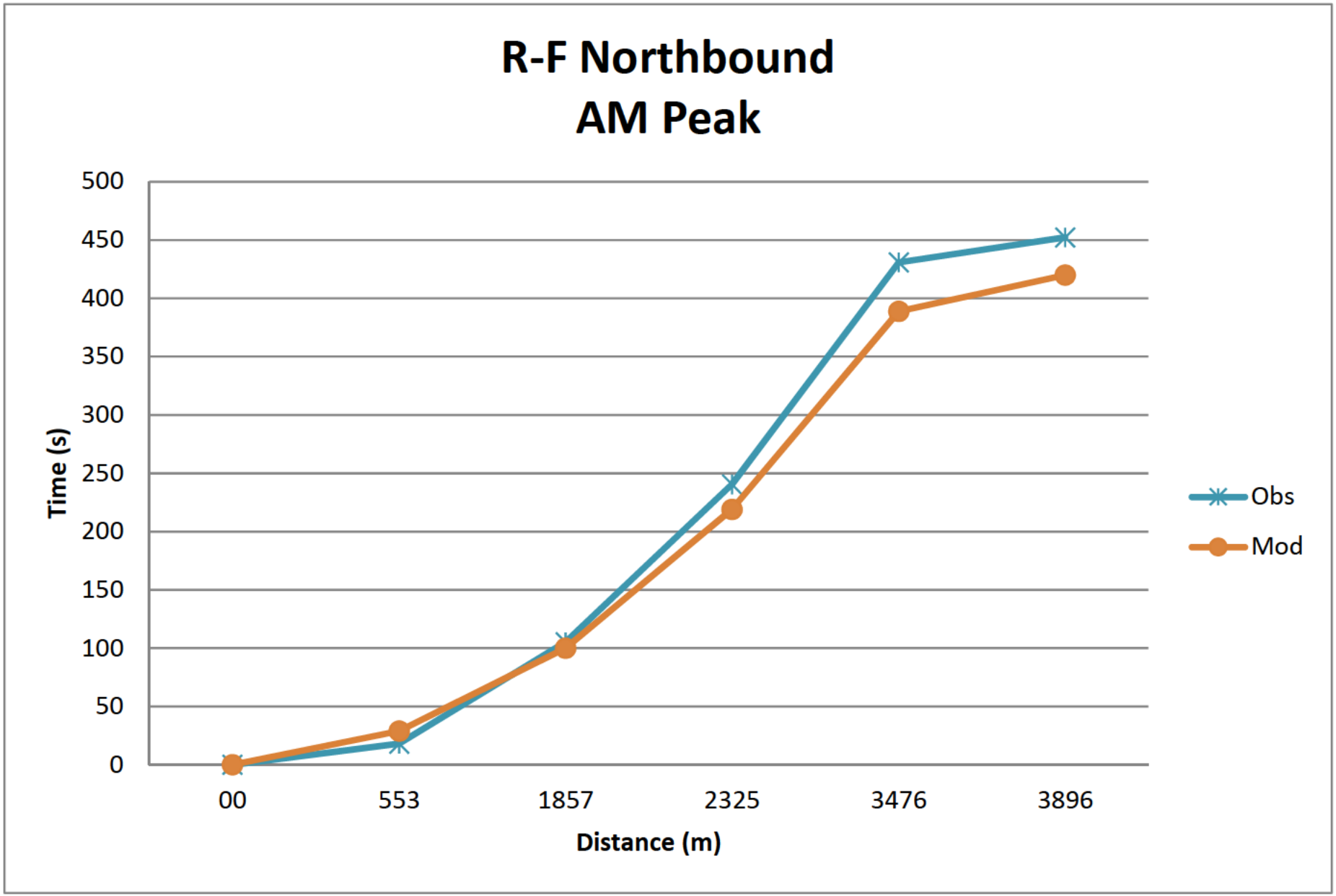

Purple Southbound
Inter Peak
605
518
432
346
259
173
86
00
Time (s)
0
2759
4069
4508
5146
5478
6402
Distance (m)
Obs
Mod

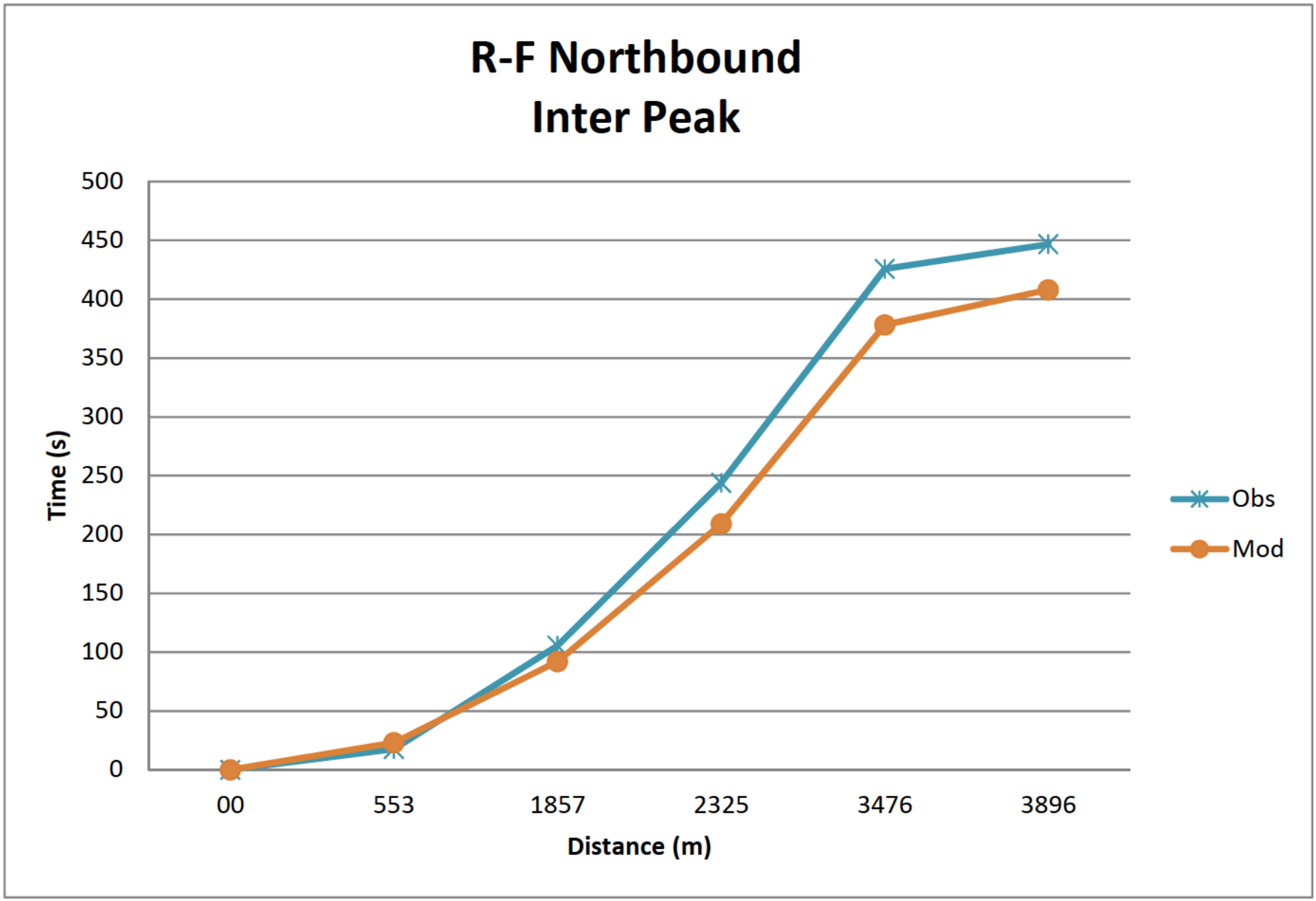

Purple Southbound
PM Peak
691
605
518
432
346
259
173
86
00
Time (s)
0
2759
4069
4508
5146
5478
6402
Distance (m)
Obs
Mod

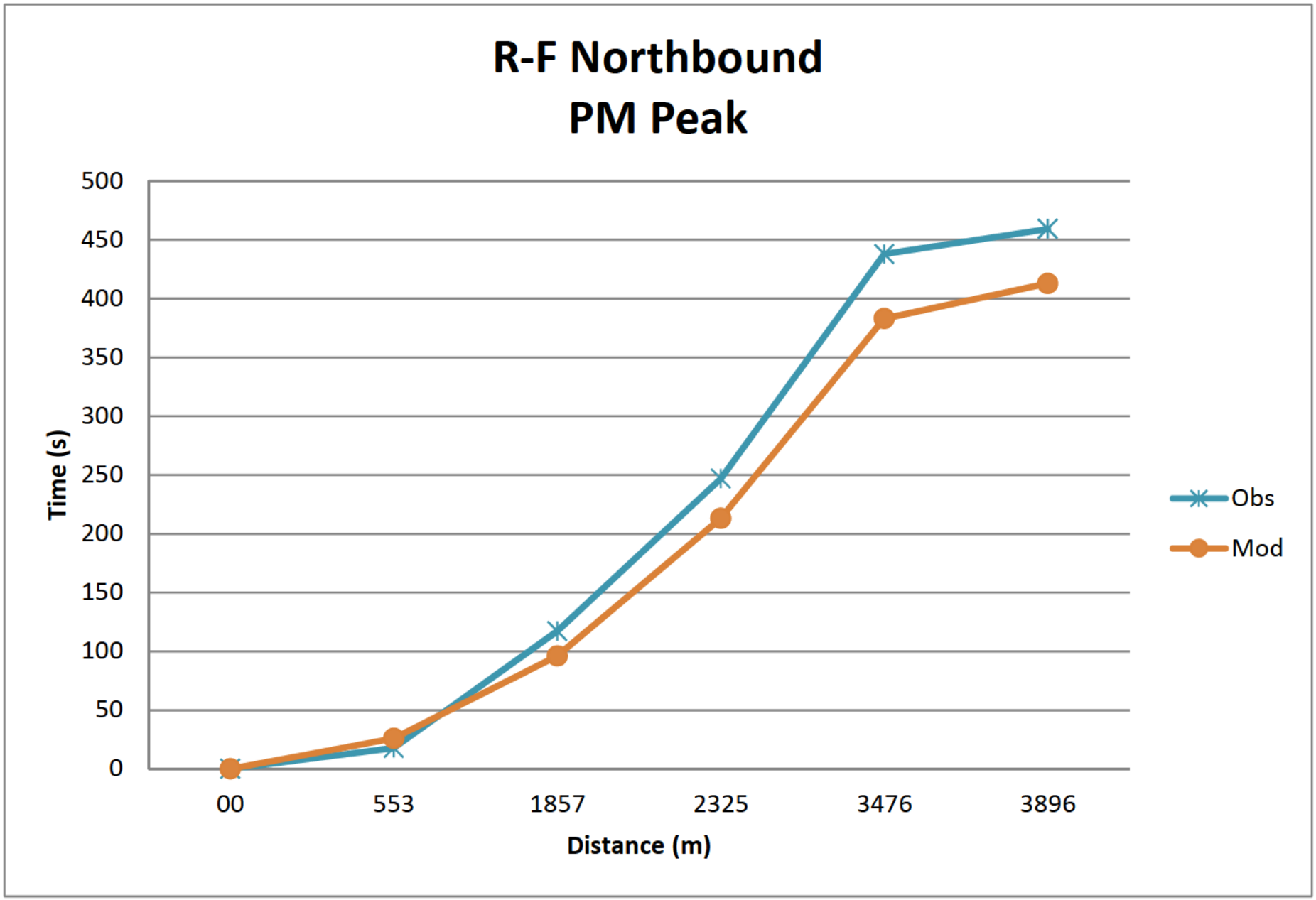

R-C Westbound
AM Peak
600
500
400
300
200
100
0
Time (s)
00
1613
2898
3386
Distance (m)
Obs
Mod

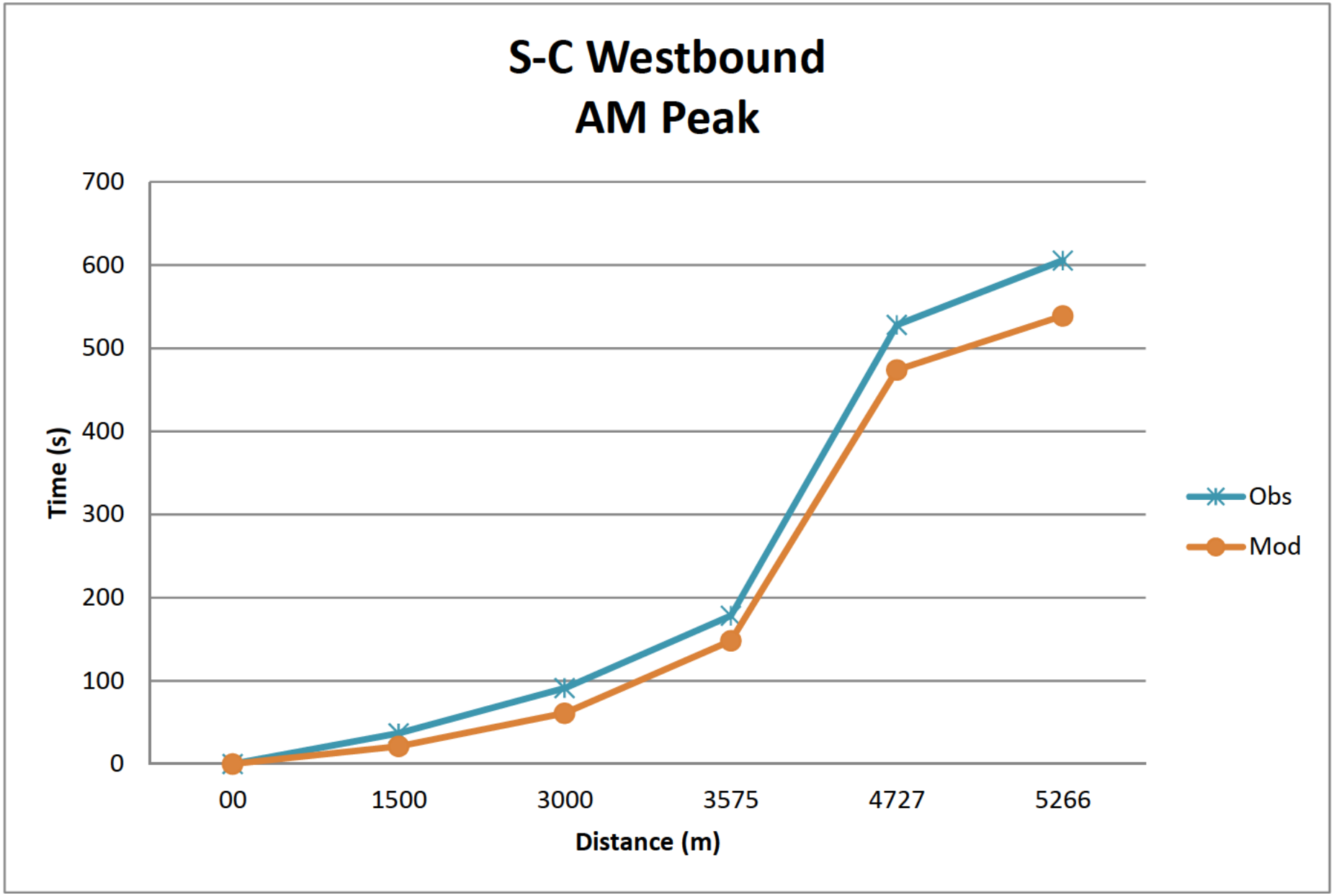

R-C Westbound
Inter Peak
500
450
400
350
300
250
200
150
100
50
0
Time (s)
00
1613
2898
3386
Distance (m)
Obs
Mod

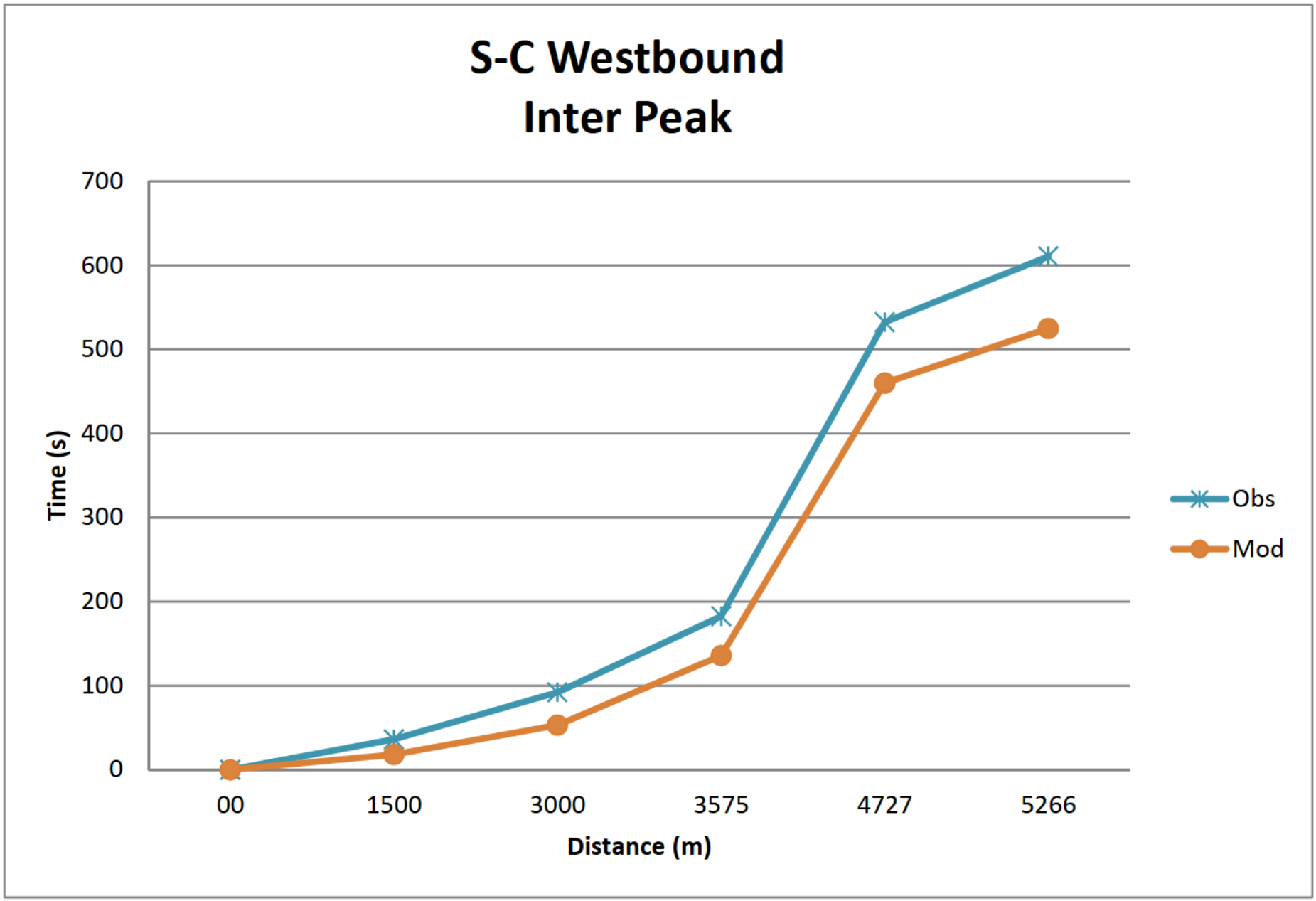

R-C Westbound
PM Peak
500
450
400
350
300
250
200
150
100
50
0
Time (s)
00
1613
2898
3386
Distance (m)
Obs
Mod

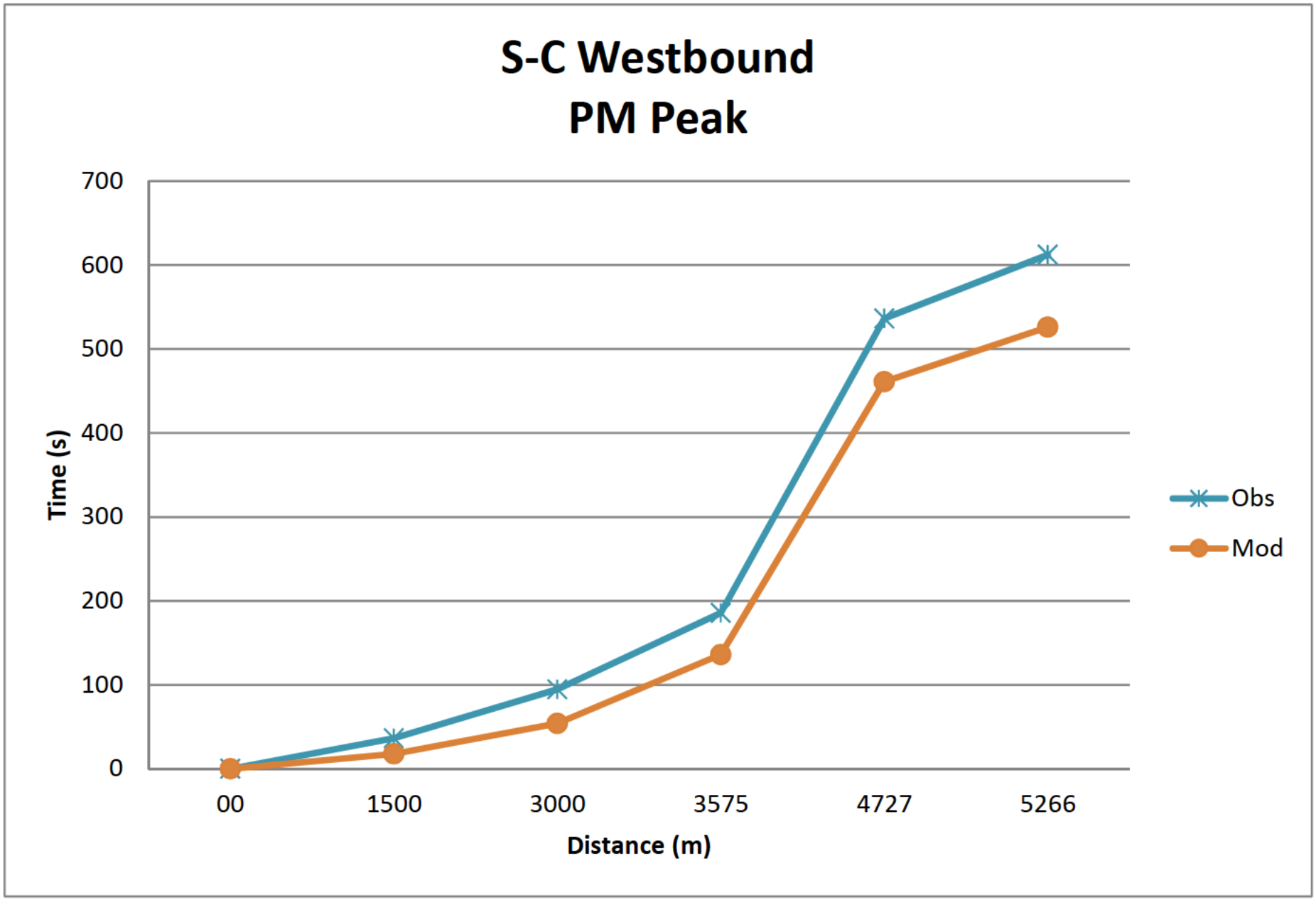

R-F Northbound
AM Peak
500
450
400
350
300
250
200
150
100
50
0
Time (s)
00
553
1857
2325
3476
3896
Distance (m)
Obs
Mod

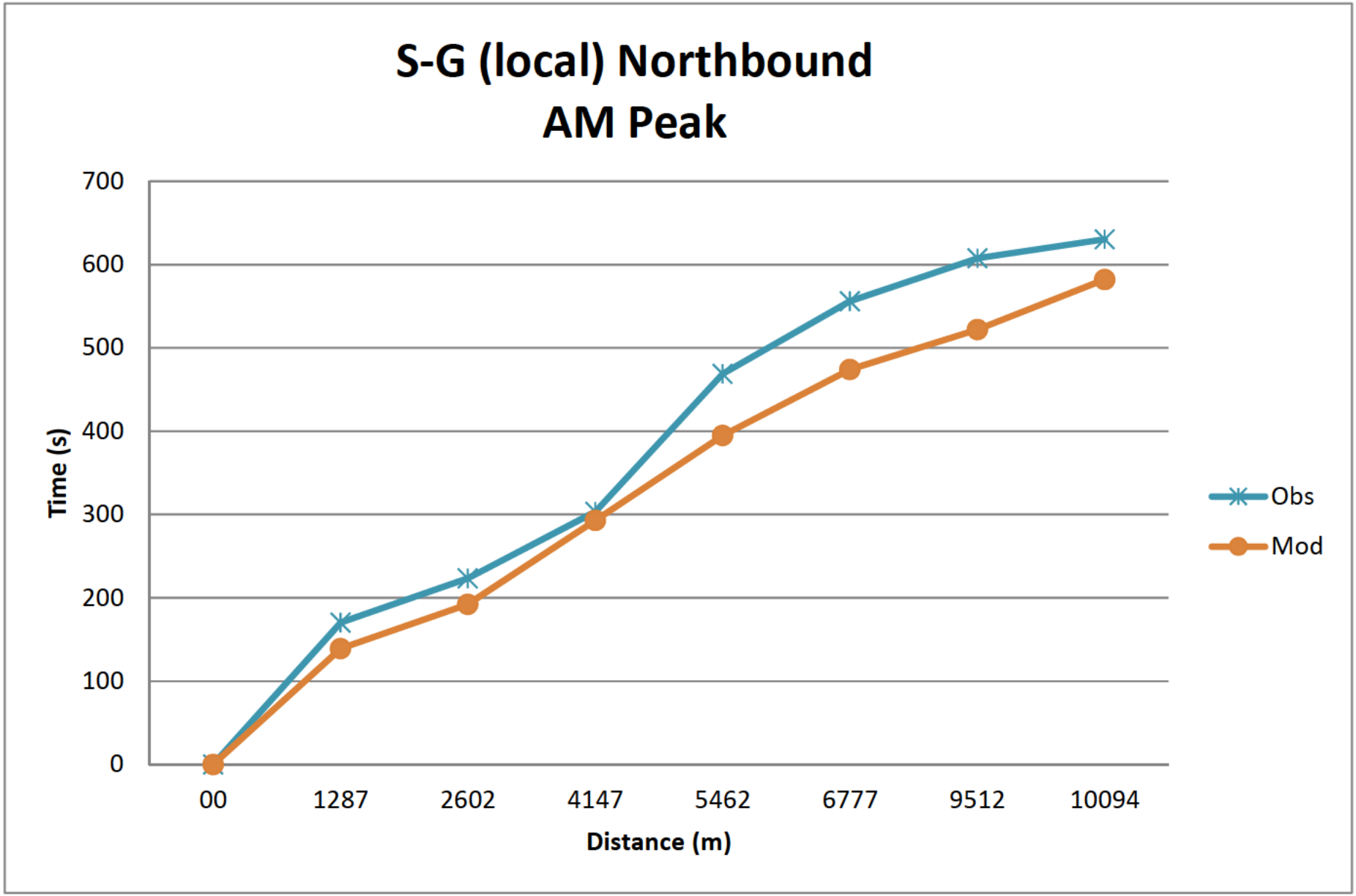

R-F Northbound
Inter Peak
Time (s)
500
450
400
350
300
250
200
150
100
50
0
00
553
1857
2325
3476
3896
Distance (m)
Obs
Mod

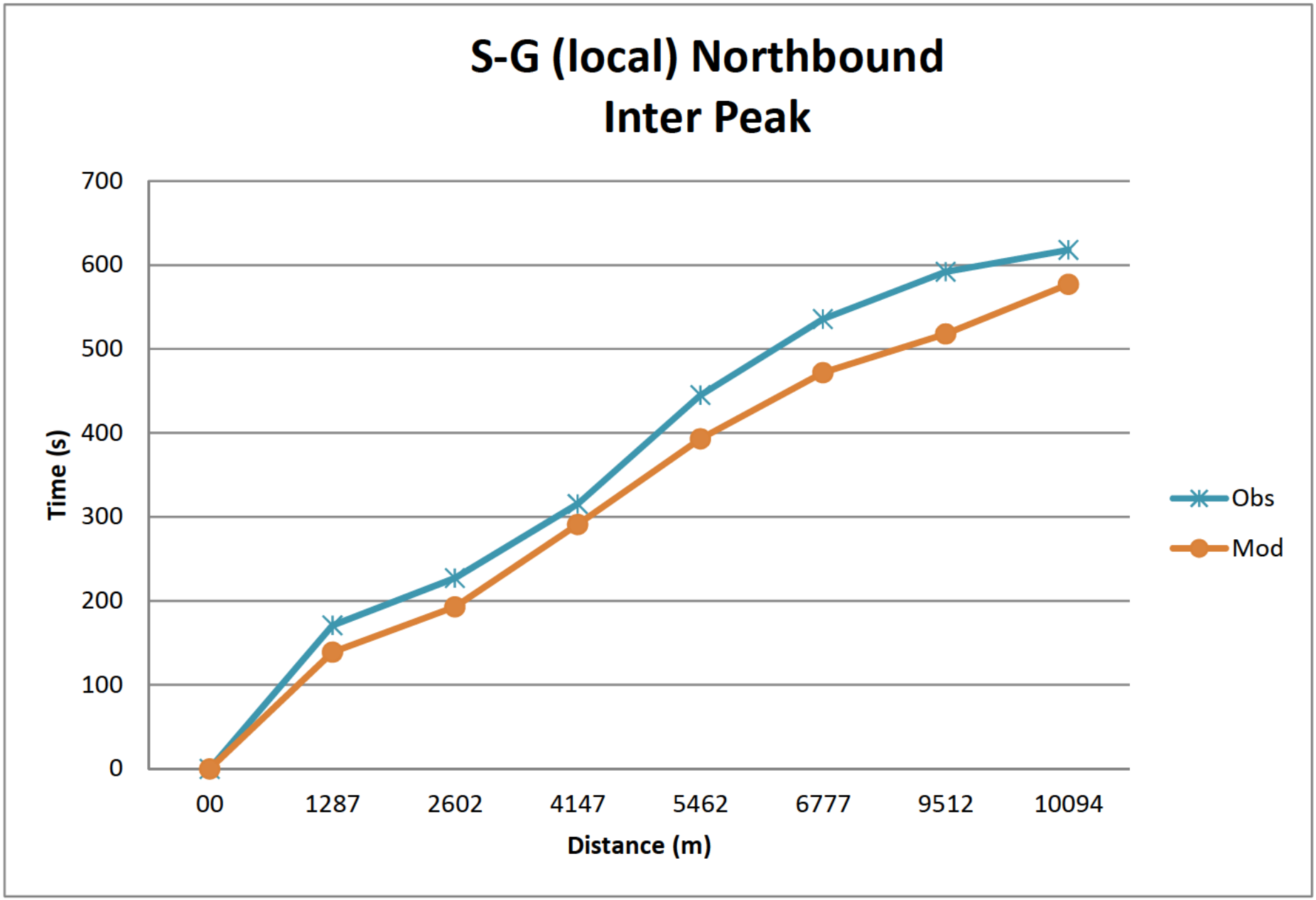

R-F Northbound
PM Peak
500
450
400
350
300
250
200
150
100
50
0
Time (s)
00
553
1857
2325
3476
3896
Distance (m)
Obs
Mod

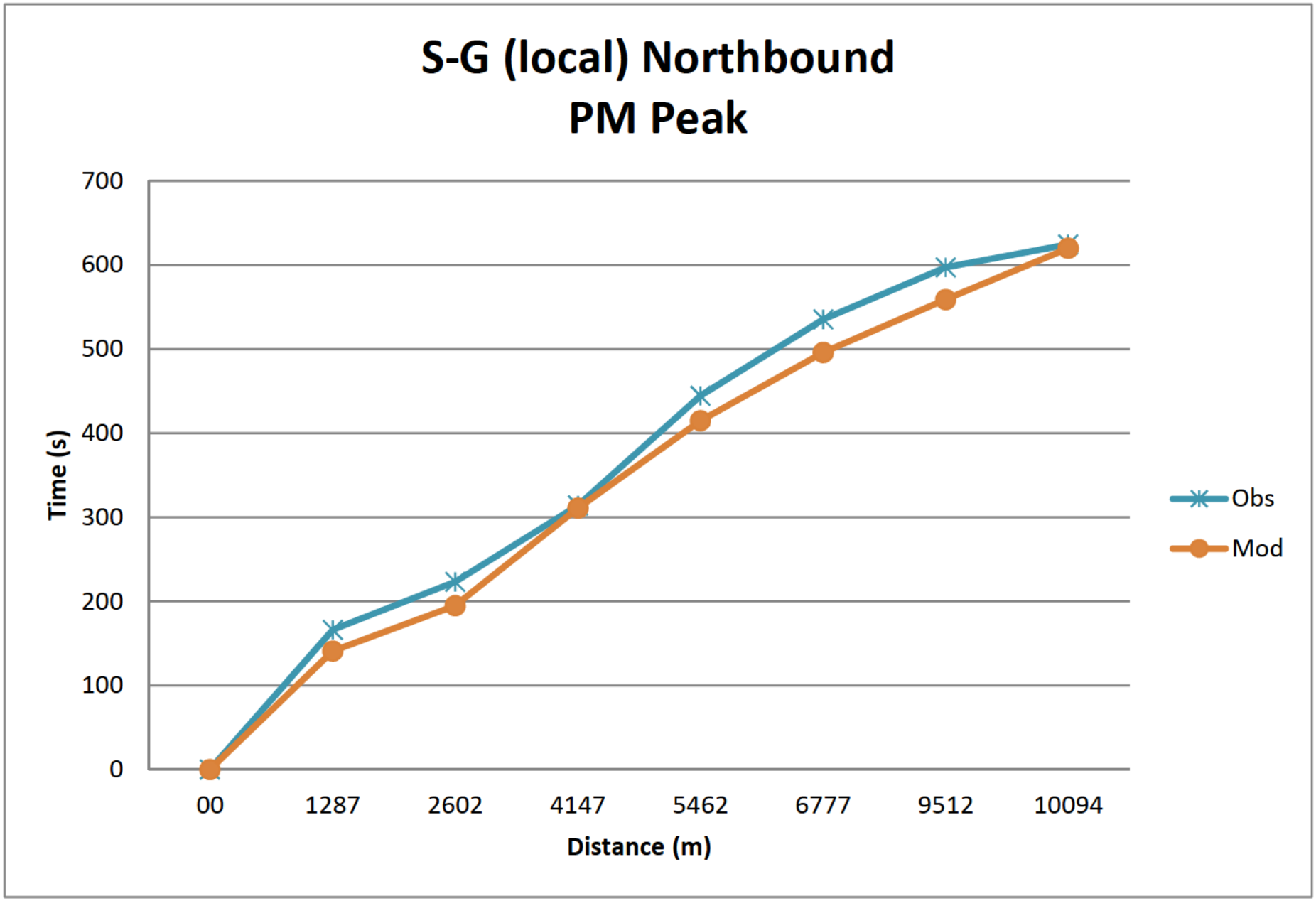

S-C Westbound
AM Peak
700
600
500
400
300
200
100
0
Time (s)
00
1500
3000
3575
4727
5266
Distance (m)
Obs
Mod

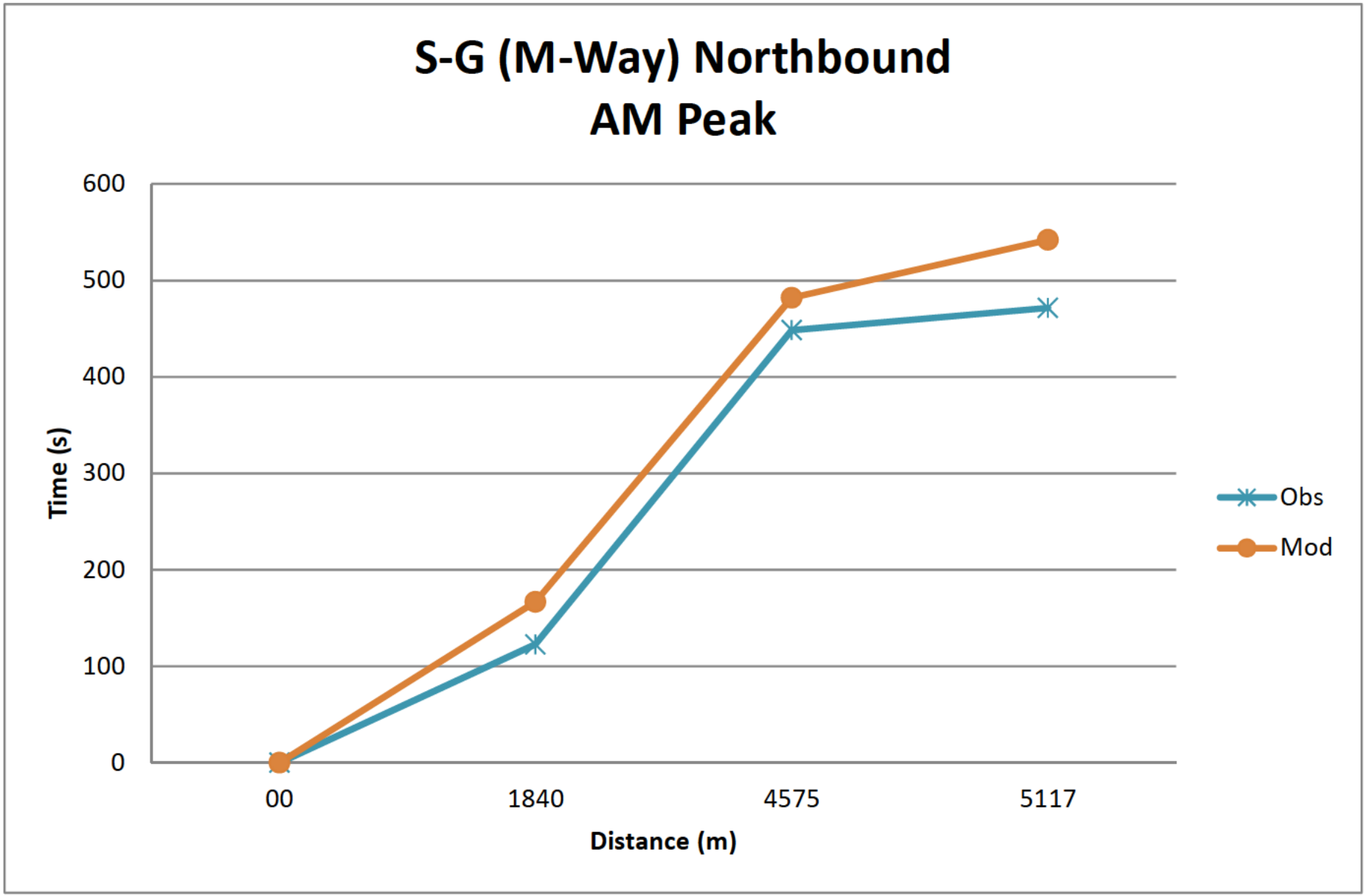

S-C Westbound
Inter Peak
700
600
500
400
300
200
100
0
Time (s)
00
1500
3000
3575
4727
5266
Distance (m)
Obs
Mod

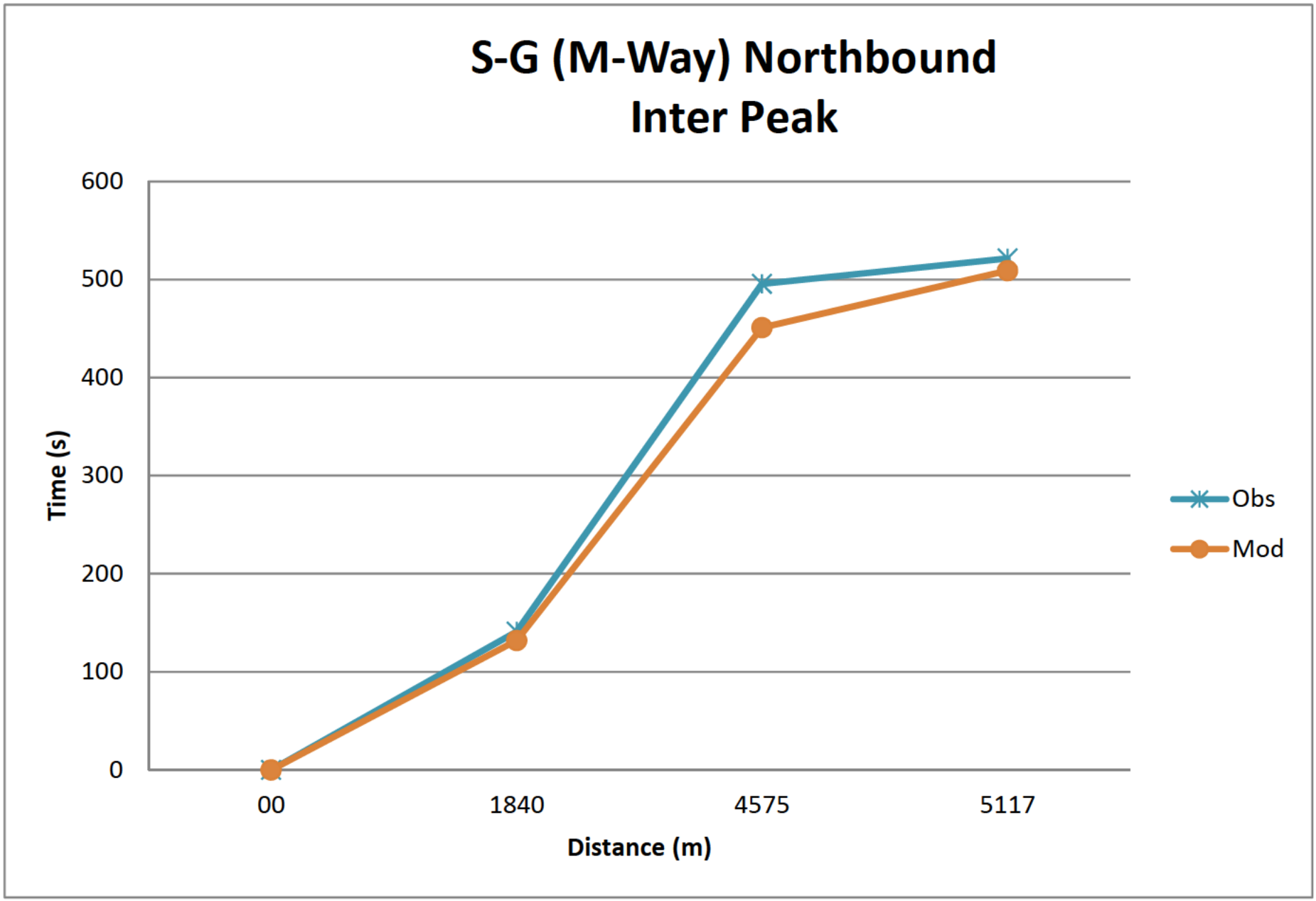

S-C Westbound
PM Peak
700
600
500
400
300
200
100
0
Time (s)
00
1500
3000
3575
4727
5266
Distance (m)
Obs
Mod

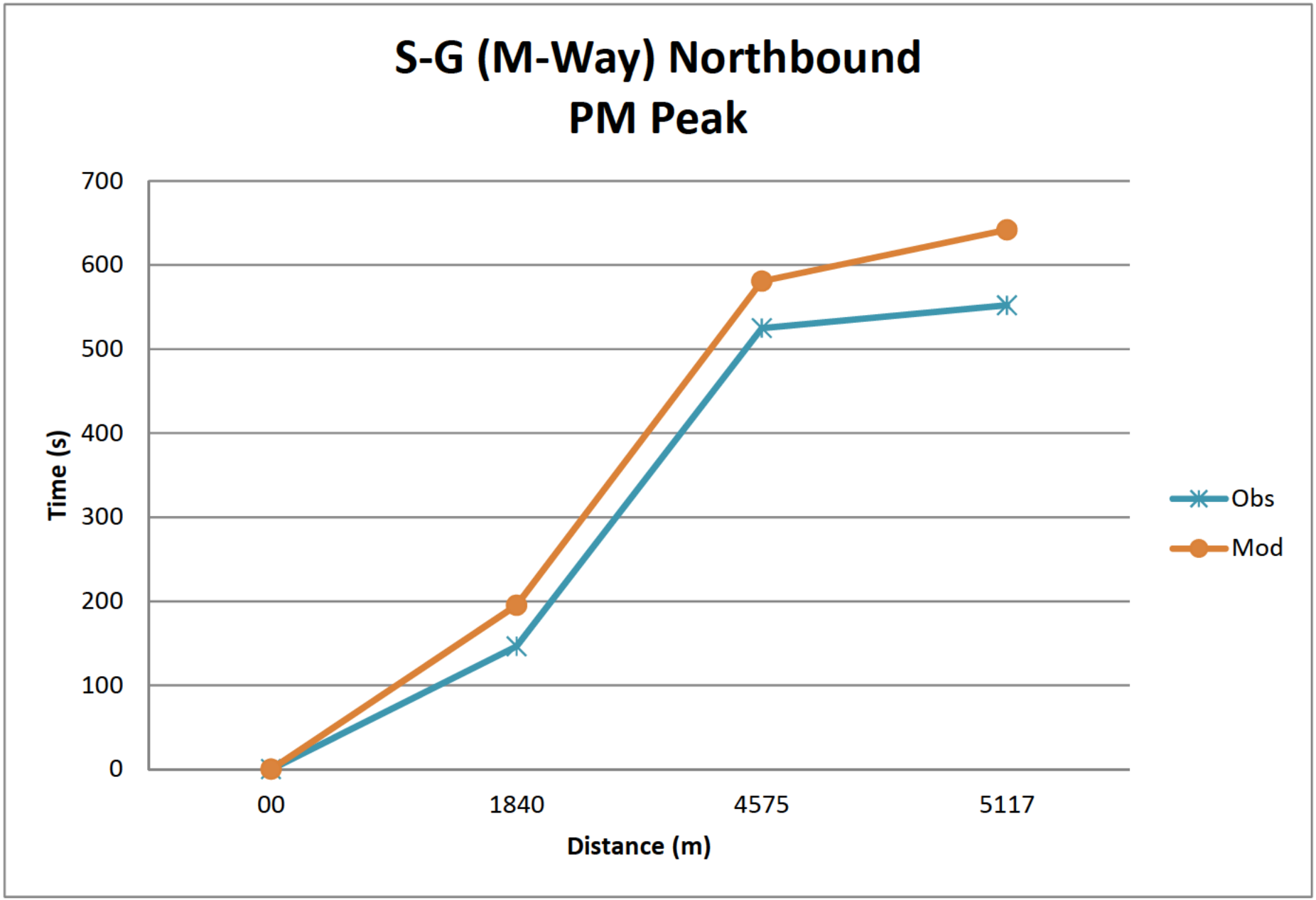

S-G (local) Northbound
AM Peak
700
600
500
400
300
200
100
0
Time (s)
00
1287
2602
4147
5462
6777
9512
10094
Distance (m)
Obs
Mod

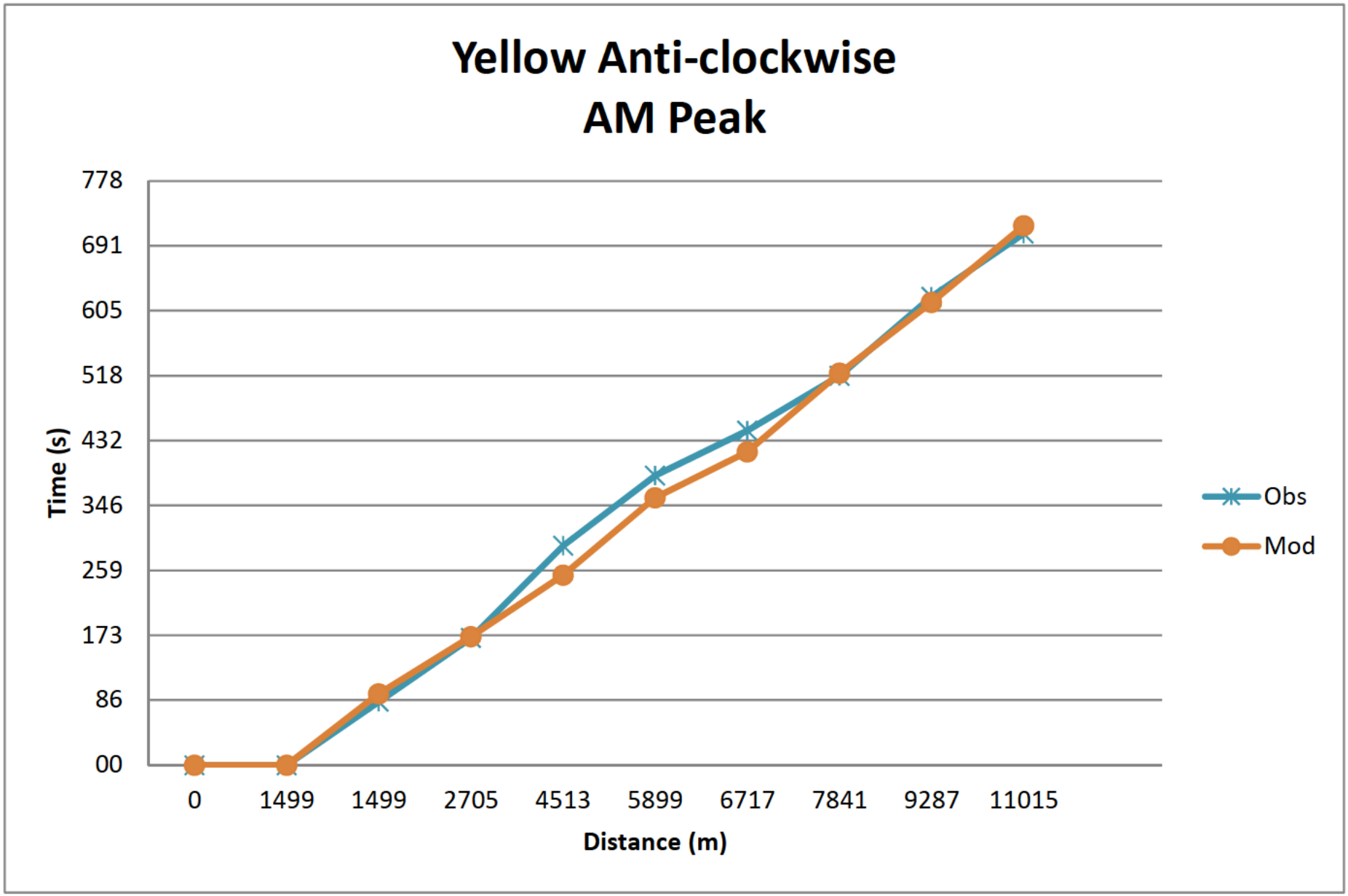

S-G (local) Northbound
Inter Peak
700
600
500
400
300
200
100
0
Time (s)
00
1287
2602
4147
5462
6777
9512
10094
Distance (m)
Obs
Mod

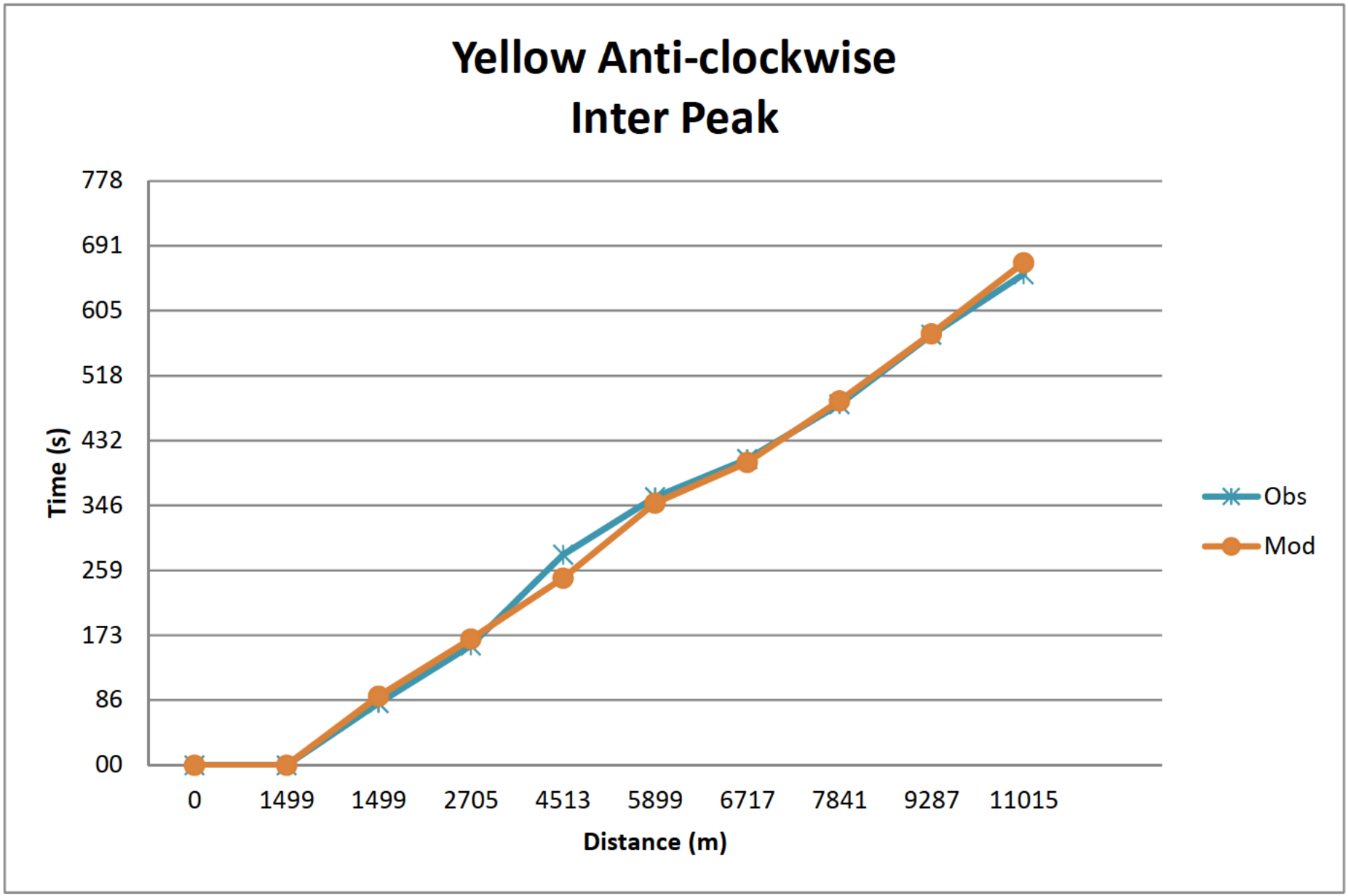

S-G (local) Northbound
PM Peak
700
600
500
400
300
200
100
0
Time (s)
00
1287
2602
4147
5462
6777
9512
10094
Distance (m)
Obs
Mod

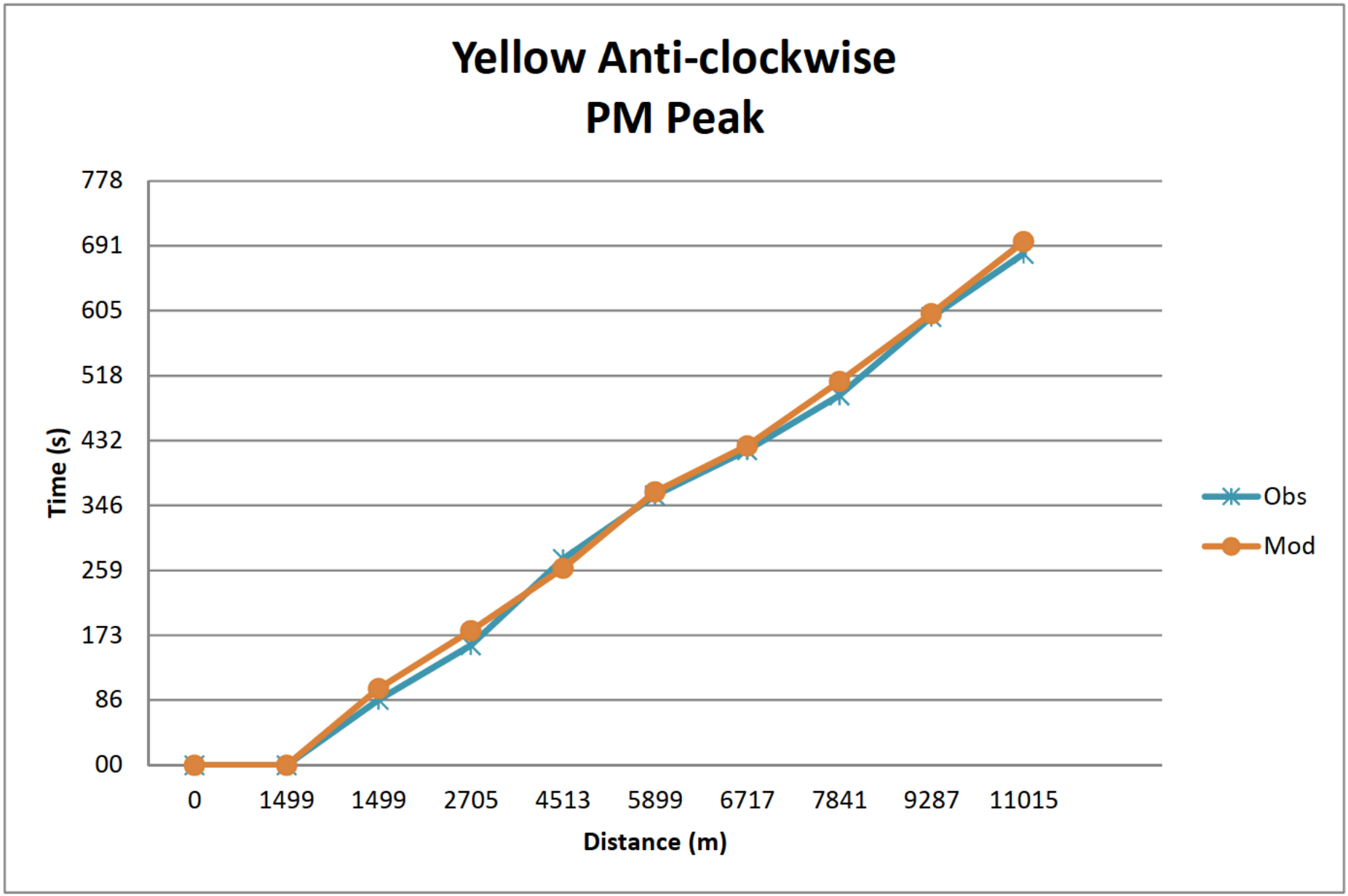

S-G (M-Way) Northbound
AM Peak
600
500
400
300
200
100
0
Time (s)
00
1840
4575
5117
Distance (m)
Obs
Mod

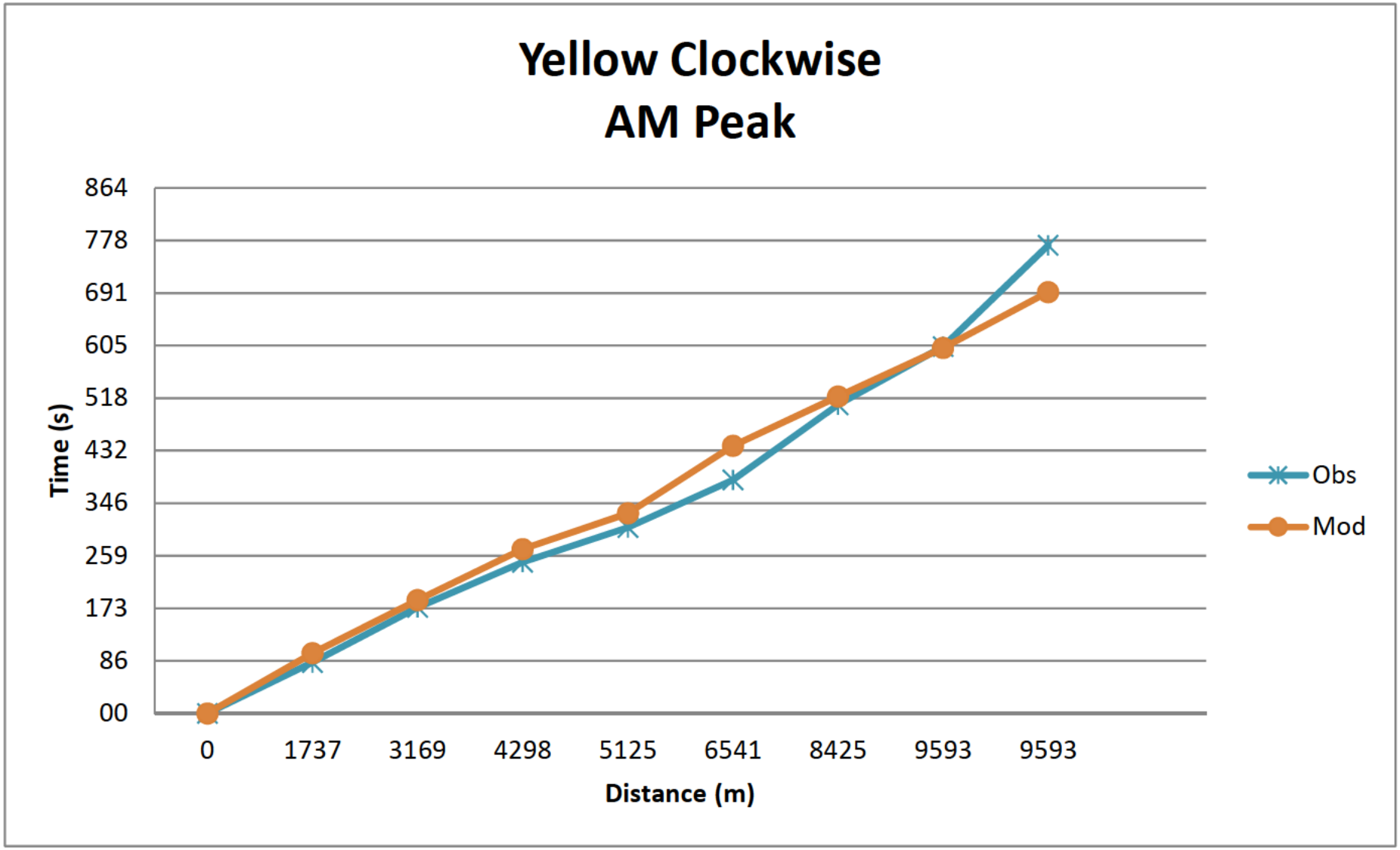

S-G (M-Way) Northbound
Inter Peak
600
500
400
300
200
100
0
Time (s)
00
1840
4575
5117
Distance (m)
Obs
Mod

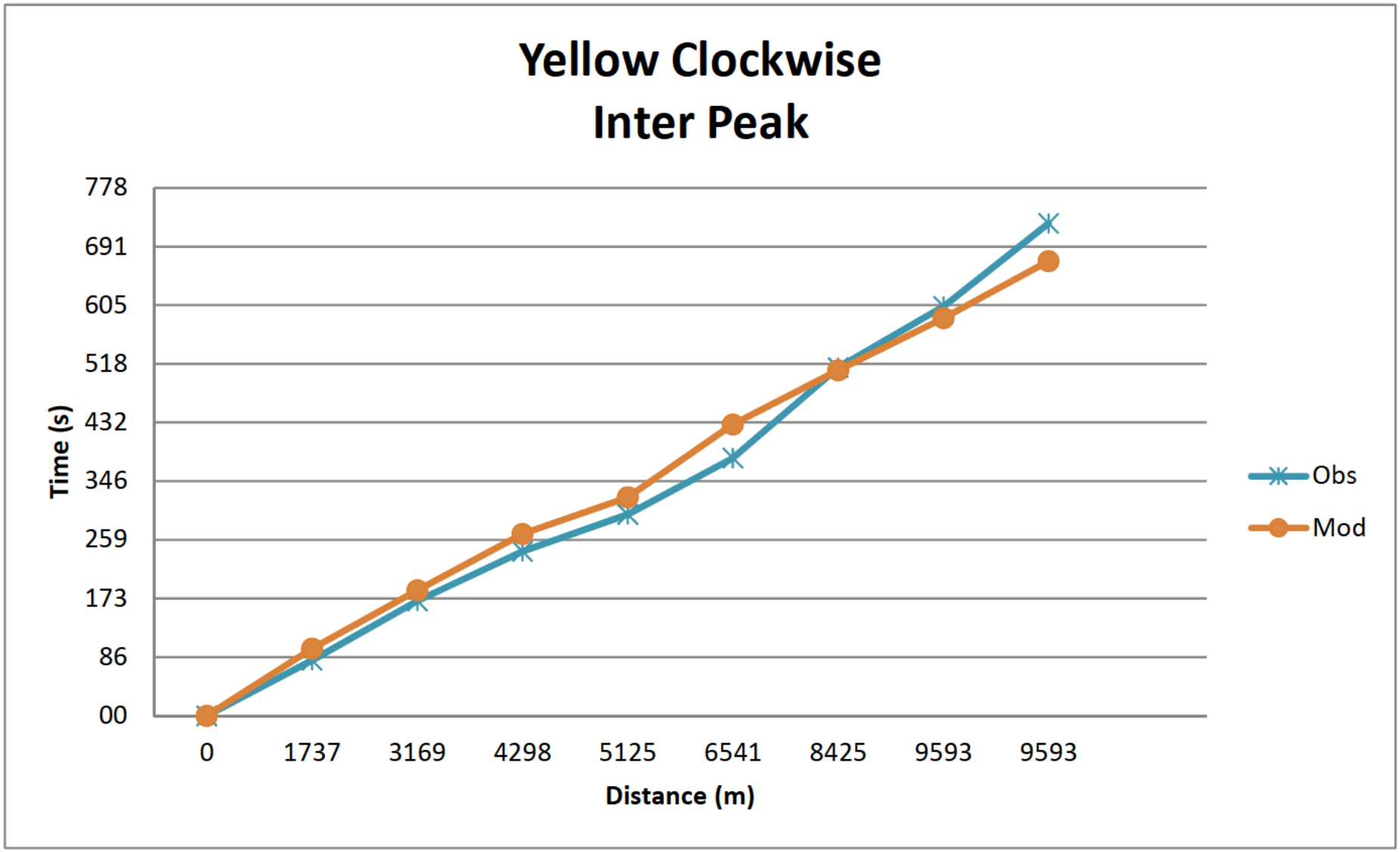

S-G (M-Way) Northbound
PM Peak
700
600
500
400
300
200
100
0
Time (s)
00
1840
4575
5117
Distance (m)
Obs
Mod

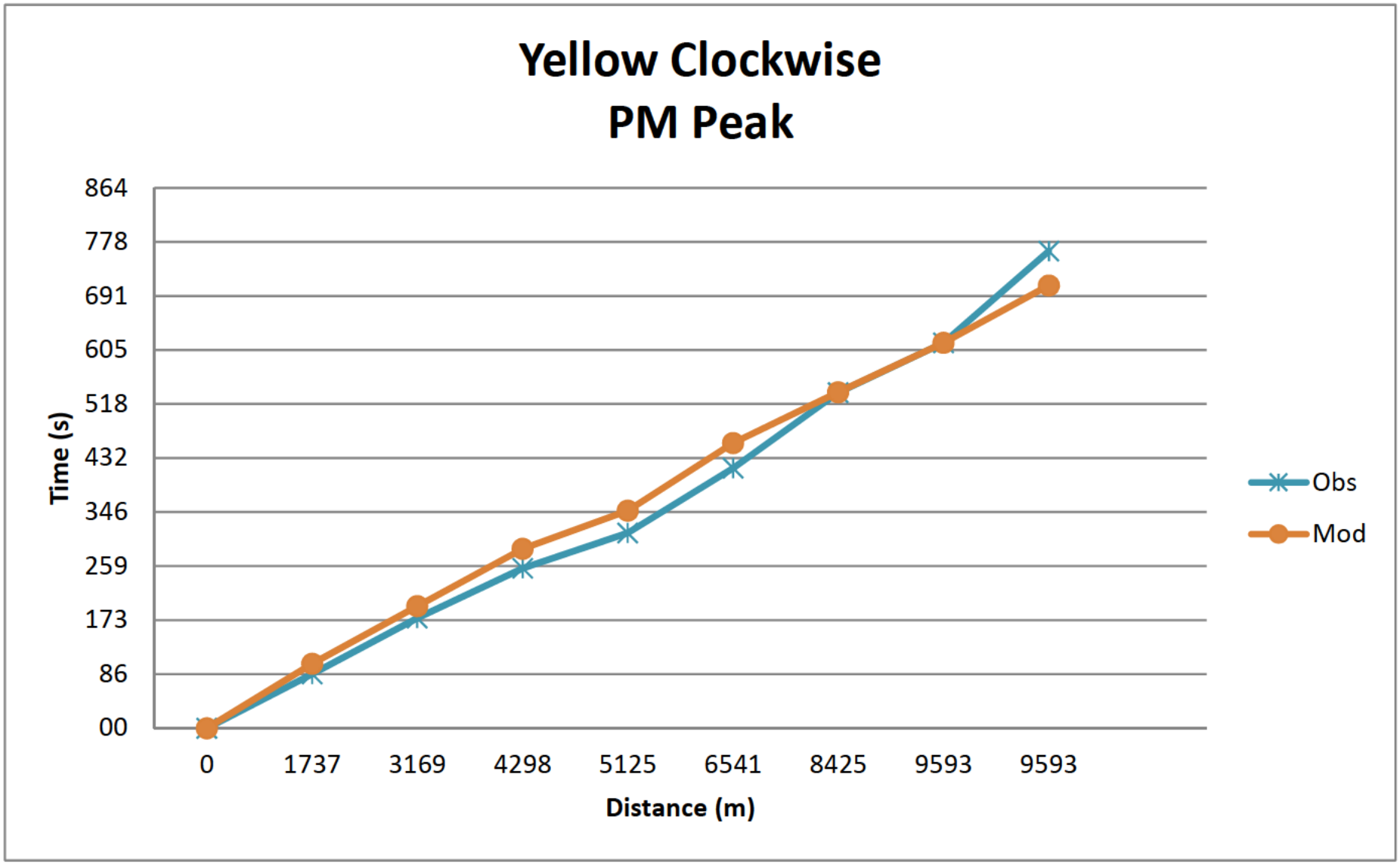

Yellow Anti-clockwise
AM Peak
778
691
605
518
432
346
259
173
86
00
Time (s)
0
1499
1499
2705
4513
5899
6717
7841
9287
11015
Distance (m)
Obs
Mod


Yellow Anti-clockwise
Inter Peak
778
691
605
518
432
346
259
173
86
00
Time (s)
0
1499
1499
2705
4513
5899
6717
7841
9287
11015
Distance (m)
Obs
Mod

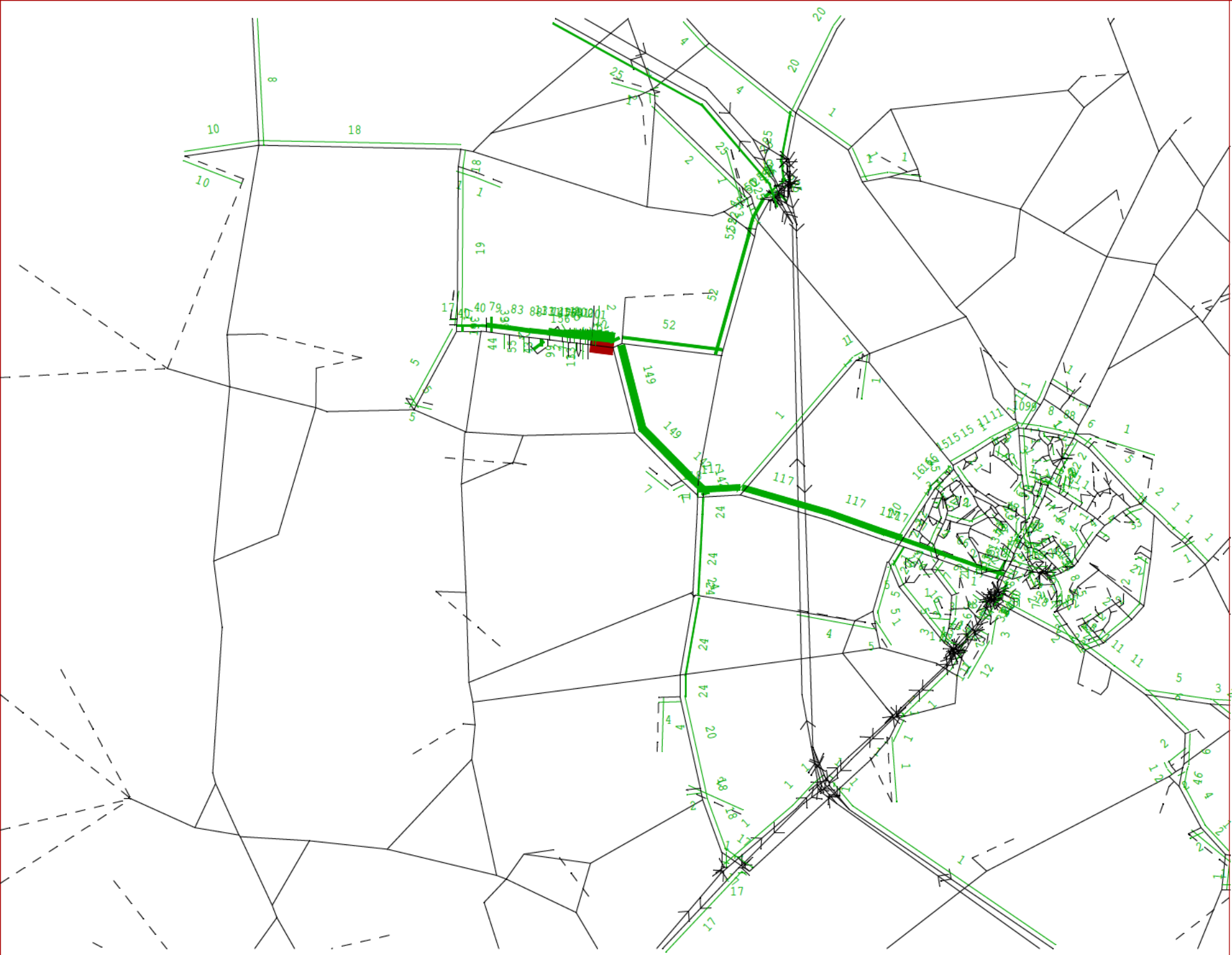

Yellow Anti-clockwise
PM Peak
778
691
605
518
432
346
259
173
86
00
Time (s)
0
1499
1499
2705
4513
5899
6717
7841
9287
11015
Distance (m)
Obs
Mod


Yellow Clockwise
AM Peak
Time (s)
864
778
691
605
518
432
346
259
173
86
00
0
1737
3169
4298
5125
6541
8425
9593
9593
Distance (m)
Obs
Mod


Yellow Clockwise
Inter Peak
778
691
605
518
432
346
259
173
86
00
Time (s)
0
1737
3169
4298
5125
6541
8425
9593
9593
Distance (m)
Obs
Mod


Yellow Clockwise
PM Peak
Time (s)
864
778
691
605
518
432
346
259
173
86
00
0
1737
3169
4298
5125
6541
8425
9593
9593
Distance (m)
Obs
Mod

Appendix I – Select Link Analysis



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71494

Link Annot:

S.L.A.

Bandwidths =
100./mm

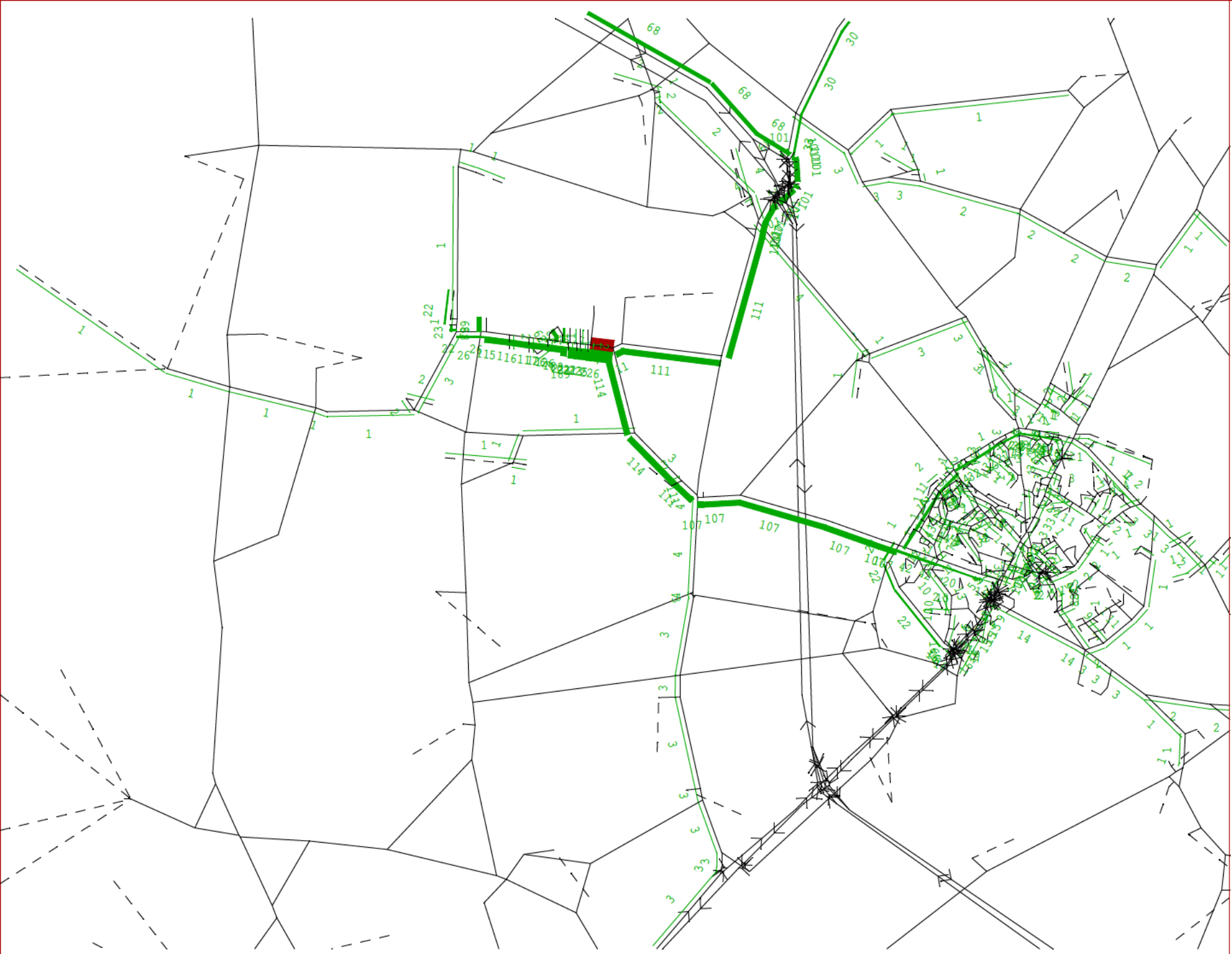
Selected
Link
Assignment
Thru links:
96002 40990

Total Demand
Flow = 201

Network fixd
Flow = 2

All User Cls

2- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71494

Link Annot:

S.L.A.

Bandwidths =
100./mm

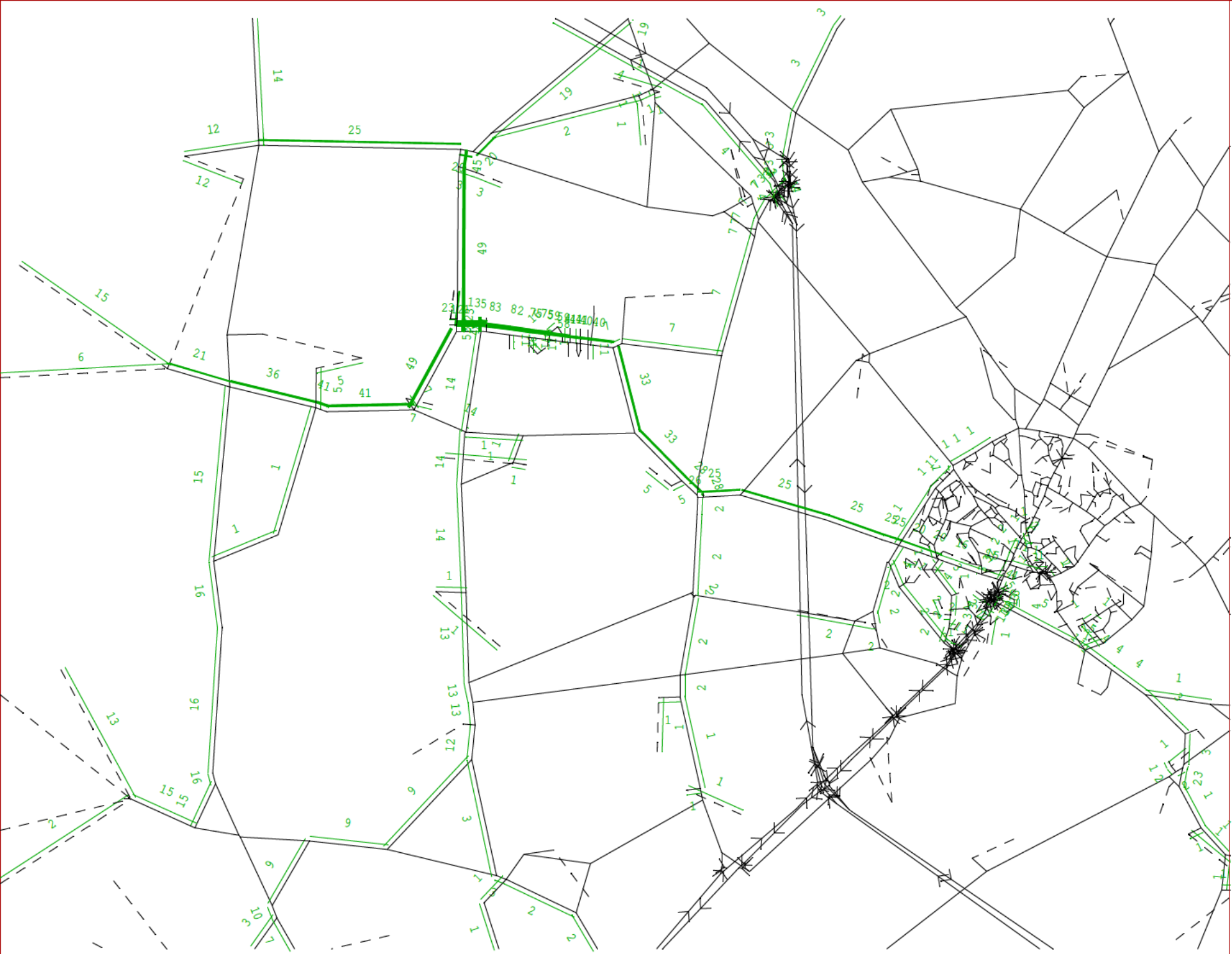
Selected
Link
Assignment
Thru links:
40990 96002

Total Demand
Flow = 226

Network fixd
Flow = 3

All User Cls

2- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71494

Link Annot:

S.L.A.

Bandwidths =
100./mm

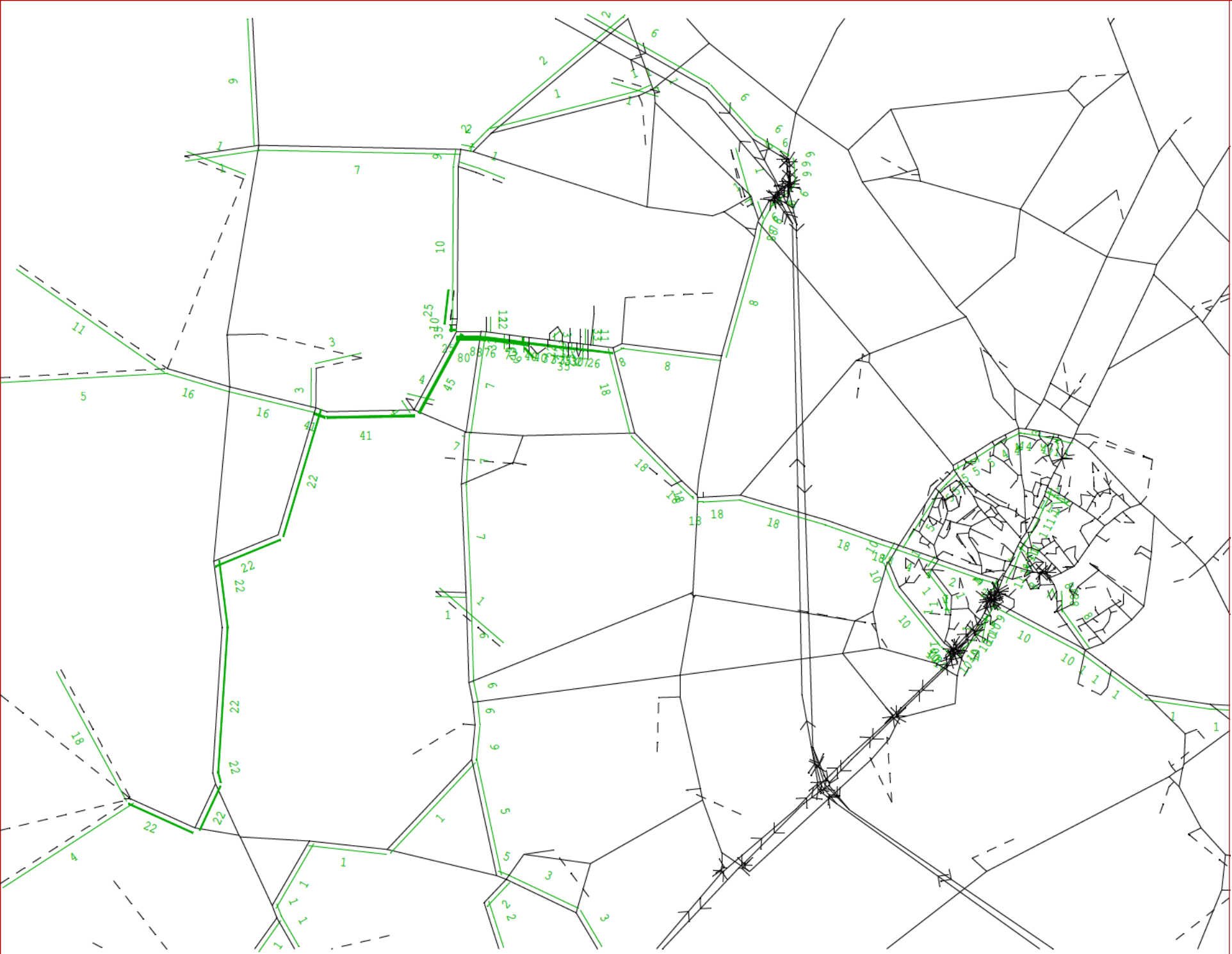
Selected
Link
Assignment
Thru links:
40985 96026

Total Demand
Flow = 135

Network fixd
Flow = 2

All User Cls

2- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71494

Link Annot:

S.L.A.

Bandwidths =
100./mm

Selected
Link
Assignment
Thru links:
96026 40985

Total Demand
Flow = 88

Network fixd
Flow = 2

All User Cls

2- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71590

Link Annot:

S.L.A.

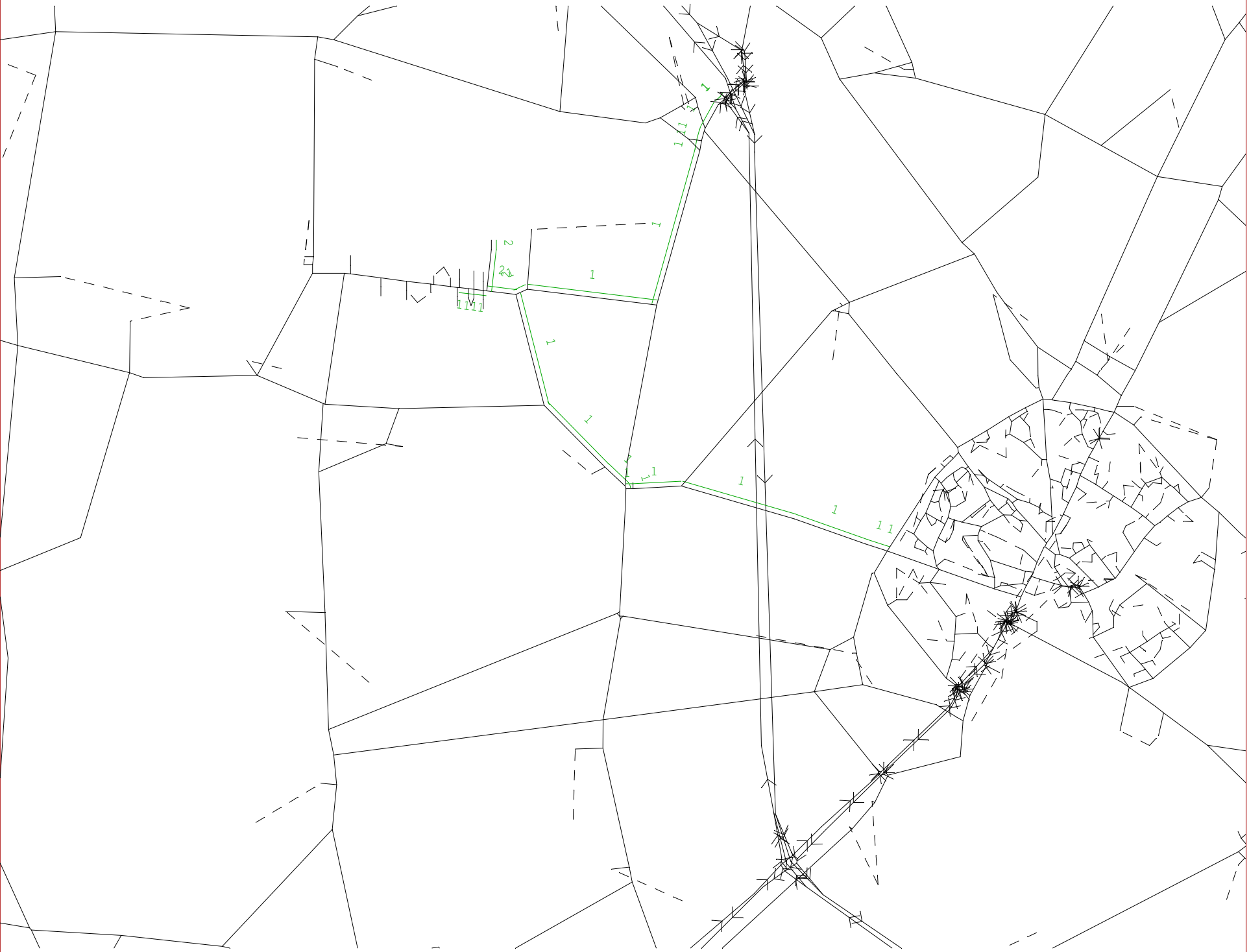
Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1300

Total Demand
Flow = 0.50

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 55745

Link Annot:

S.L.A.

Bandwidths =
100./mm

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71590

Link Annot:

S.L.A.

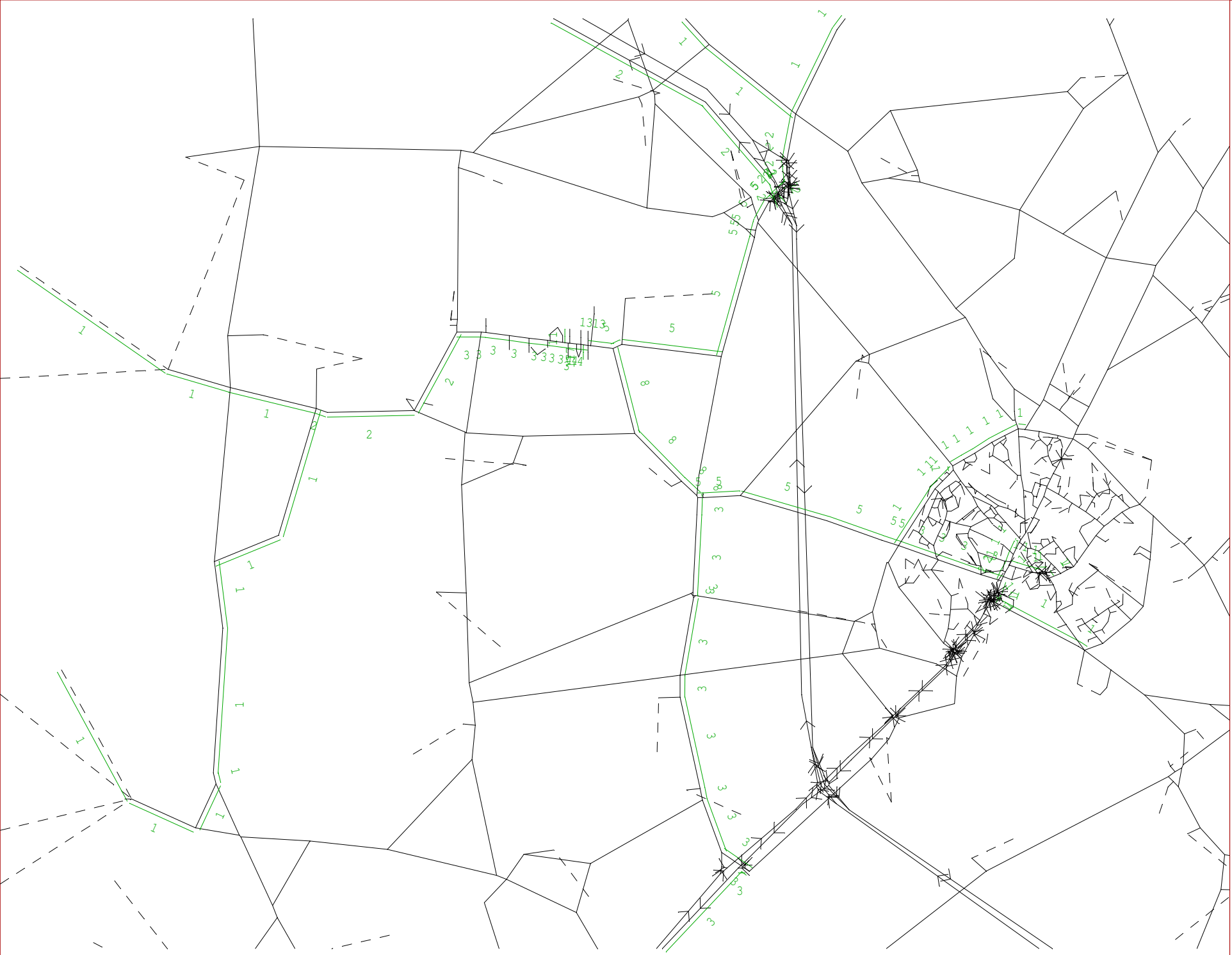
Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1301

Total Demand
Flow = 2.75

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71590

Link Annot:

S.L.A.

Bandwidths =
100./mm

Selected
Link
Assignment
Thru origin
Zone 1301

Total Demand
Flow = 17

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71590

Link Annot:

S.L.A.

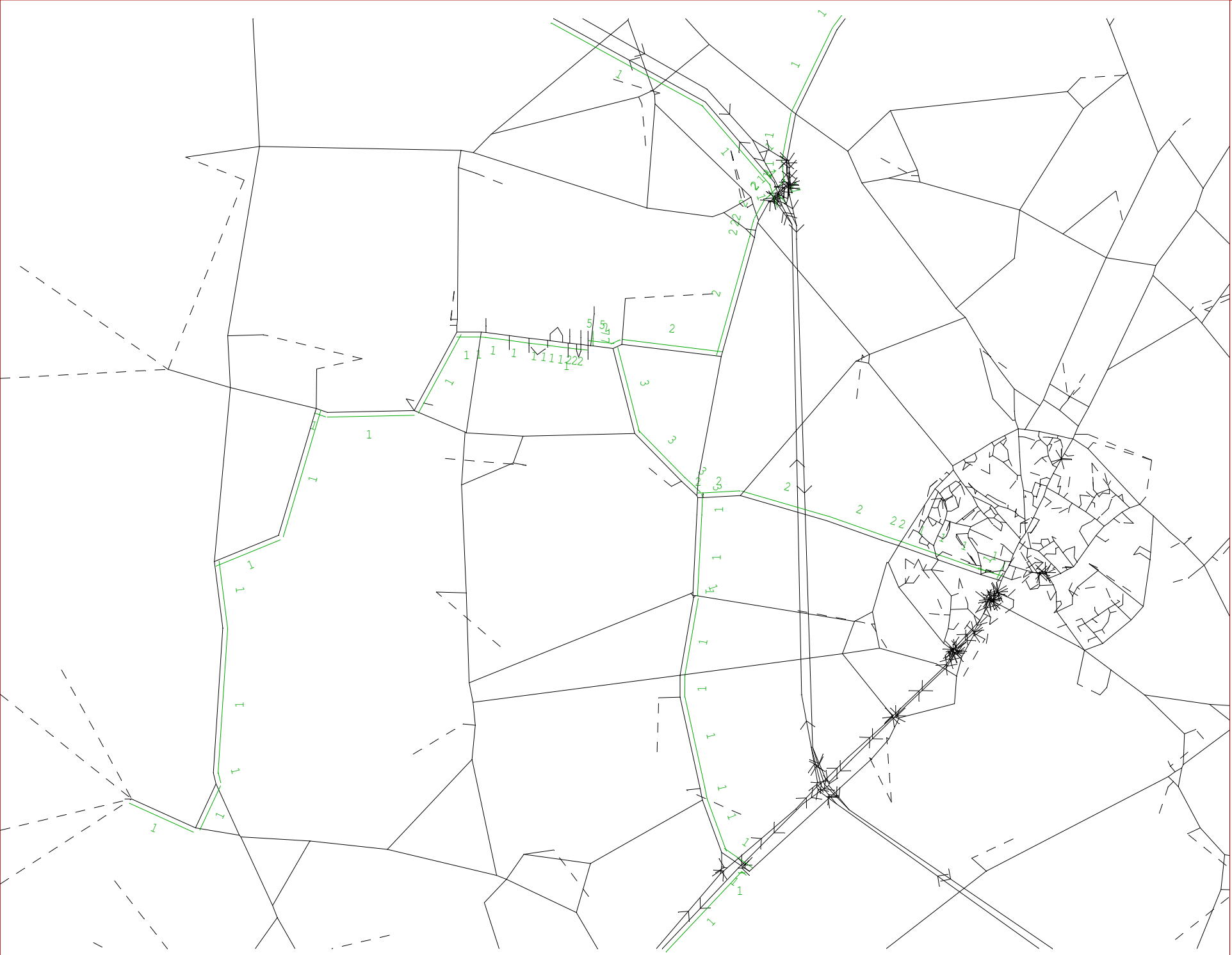
Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1302

Total Demand
Flow = 0.73

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71590

Link Annot:

S.L.A.

Bandwidths =
100./mm

Selected
Link
Assignment
Thru origin
Zone 1302

Total Demand
Flow = 6.94

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71590

Link Annot:

S.L.A.

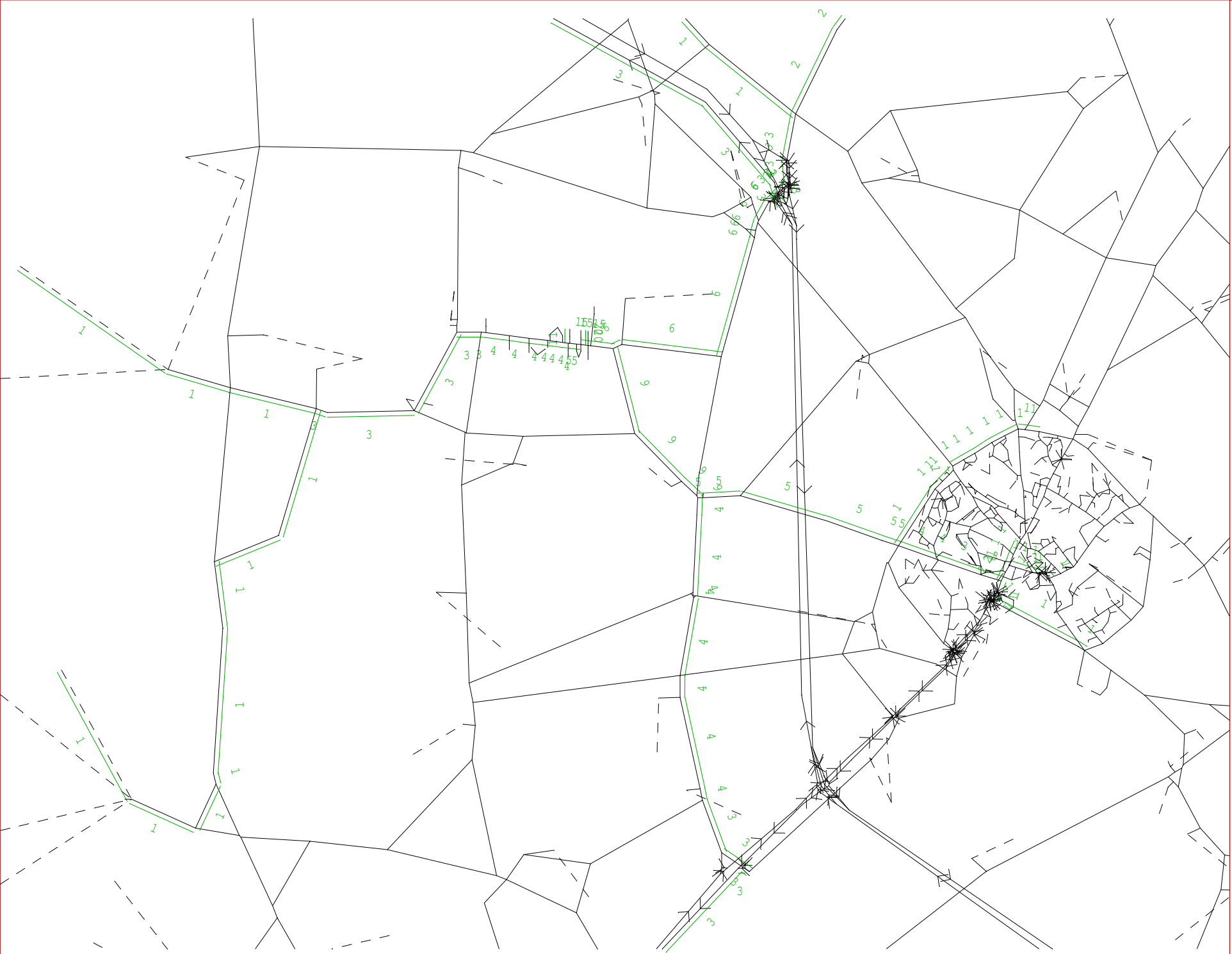
Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1303

Total Demand
Flow = 2.13

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71590

Link Annot:

S.L.A.

Bandwidths =
100./mm

Selected
Link
Assignment
Thru origin
Zone 1303

Total Demand
Flow = 20

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71590

Link Annot:

S.L.A.

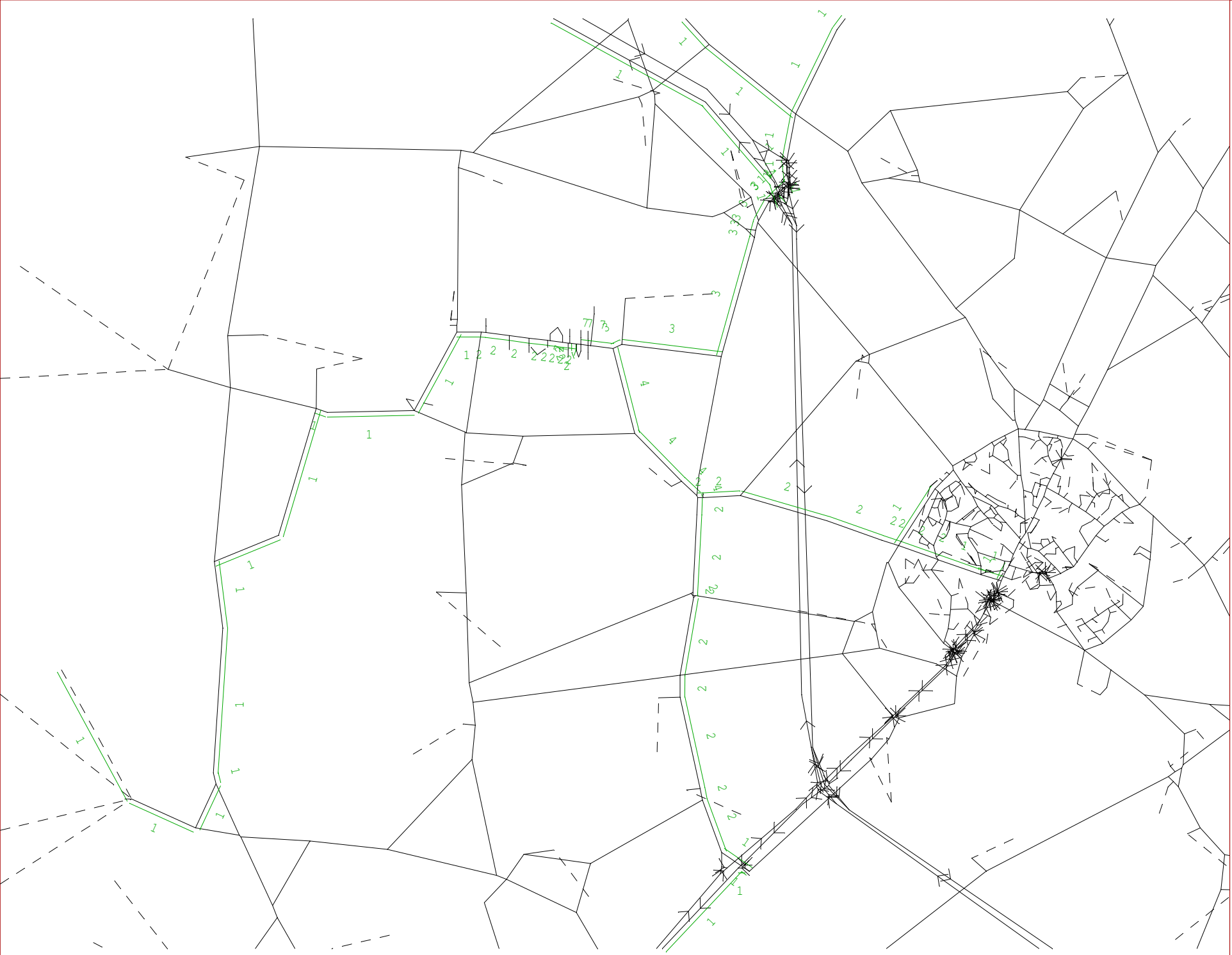
Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1304

Total Demand
Flow = 1.01

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71590

Link Annot:

S.L.A.

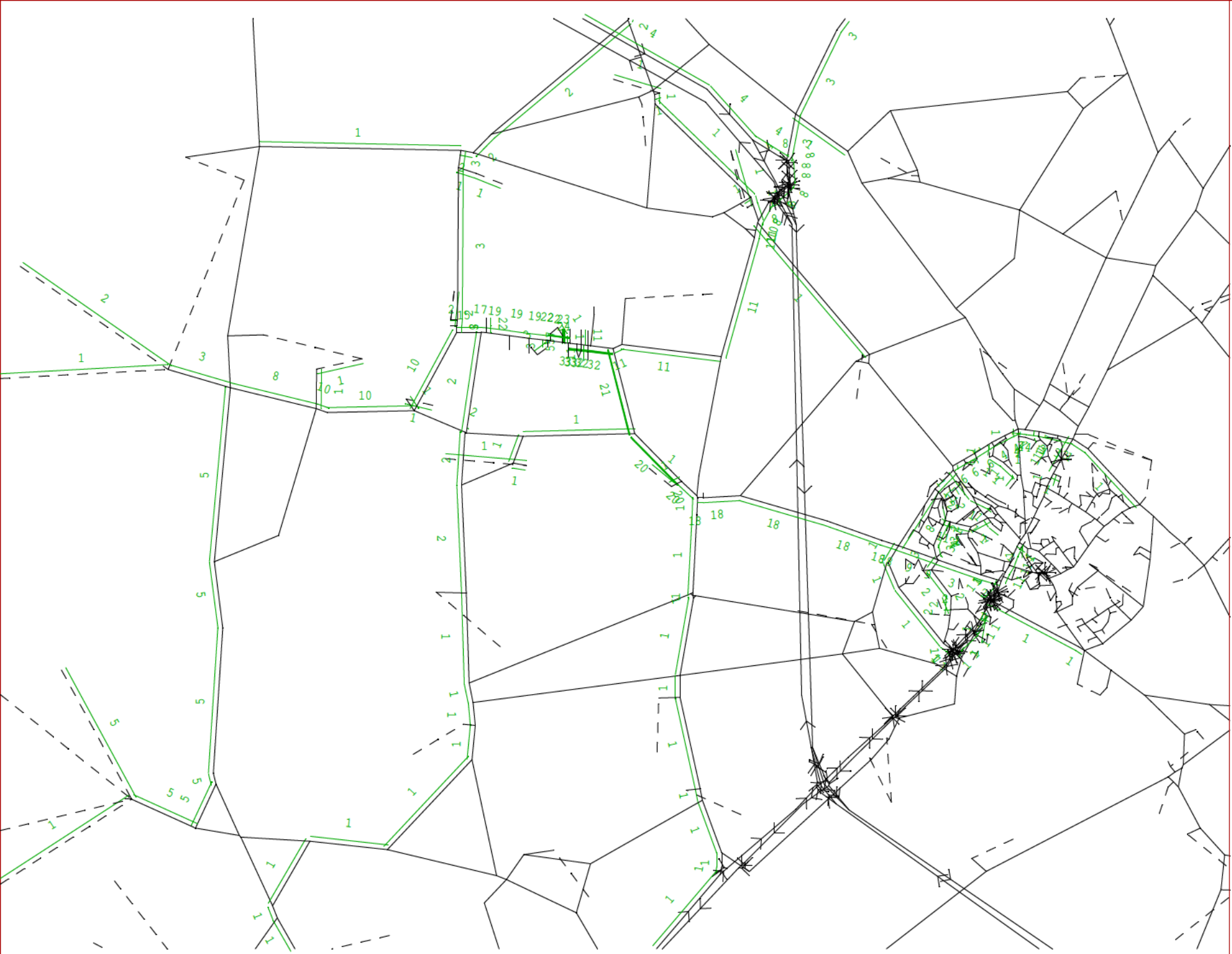
Bandwidths =
100./mm

Selected
Link
Assignment
Thru origin
Zone 1304

Total Demand
Flow = 9.08

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71590

Link Annot:

S.L.A.

Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1305

Total Demand
Flow = 57

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71590

Link Annot:

S.L.A.

Bandwidths =
100./mm

Selected
Link
Assignment
Thru origin
Zone 1305

Total Demand
Flow = 3.65

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71590

Link Annot:

S.L.A.

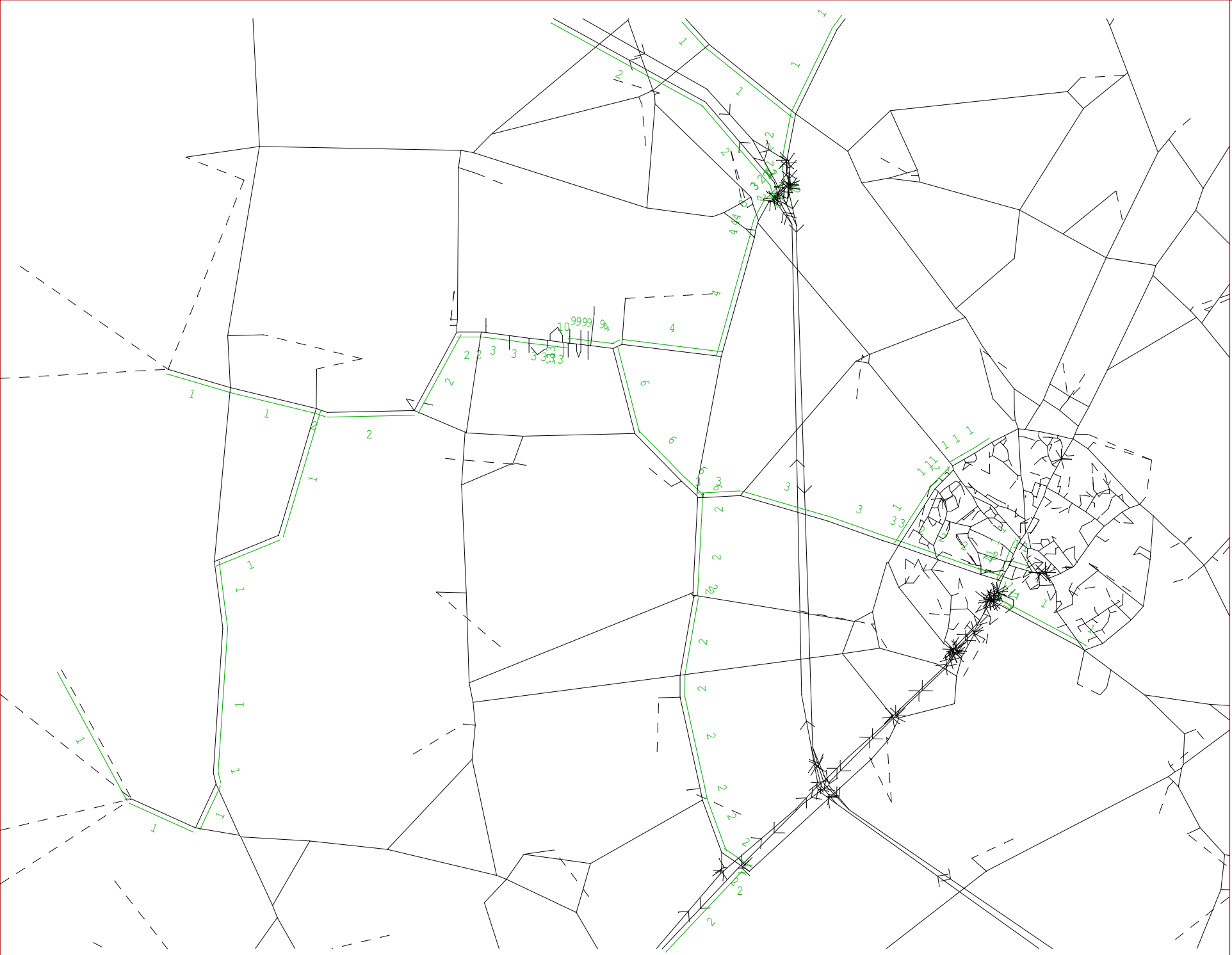
Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1306

Total Demand
Flow = 1.37

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71590

Link Annot:

S.L.A.

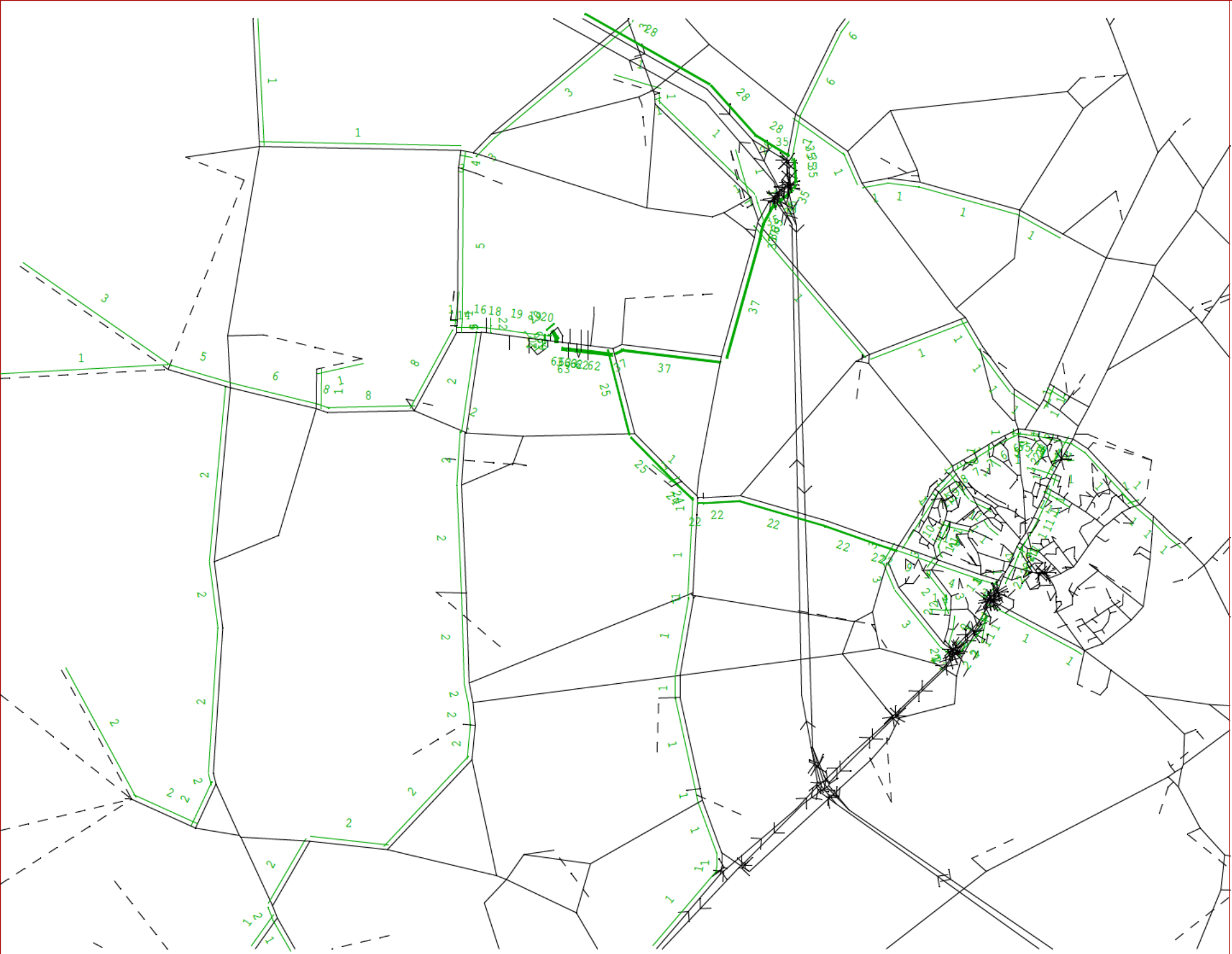
Bandwidths =
100./mm

Selected
Link
Assignment
Thru origin
Zone 1306

Total Demand
Flow = 13

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71590

Link Annot:

S.L.A.

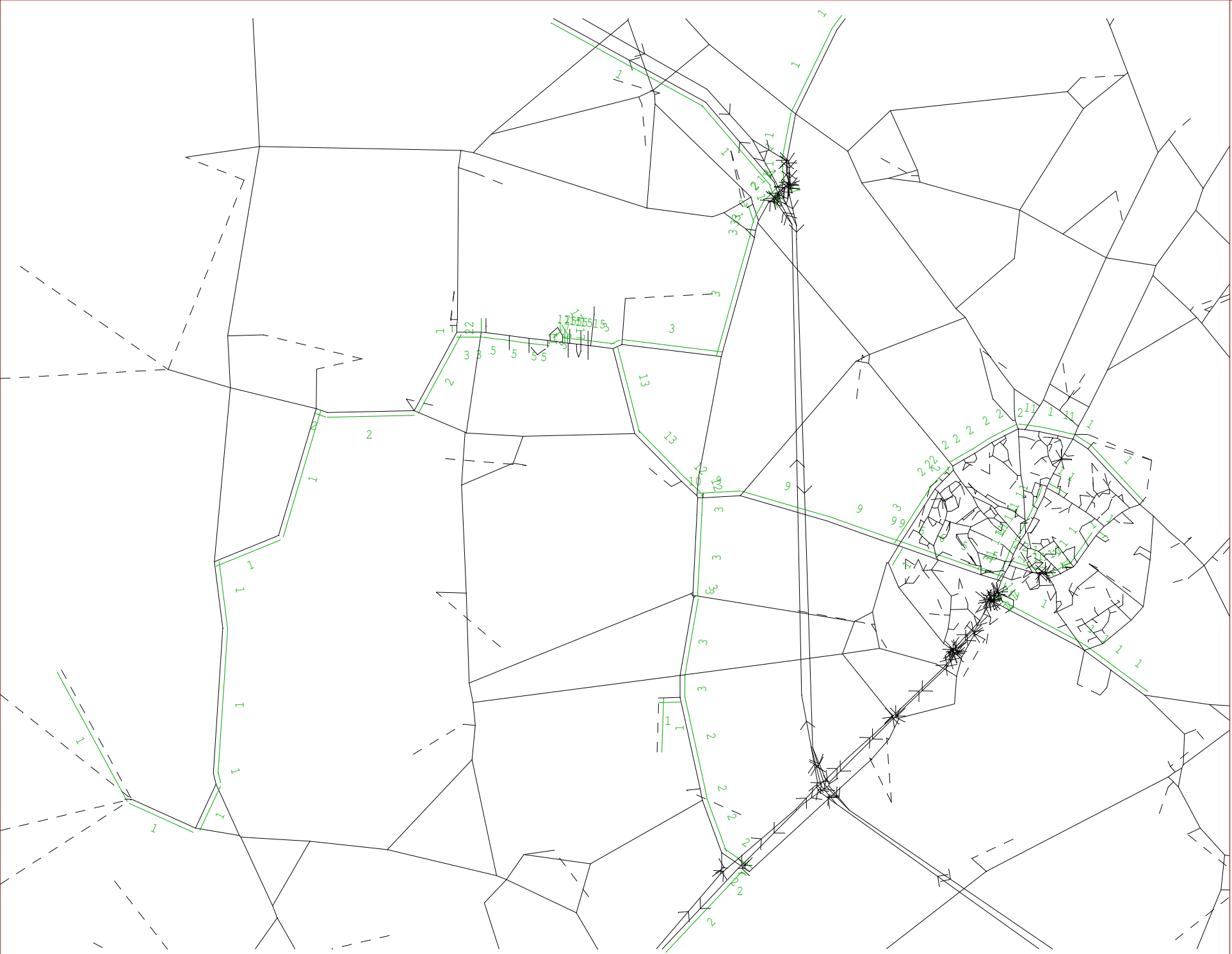
Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1307

Total Demand
Flow = 83

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71590

Link Annot:

S.L.A.

Bandwidths =
100./mm

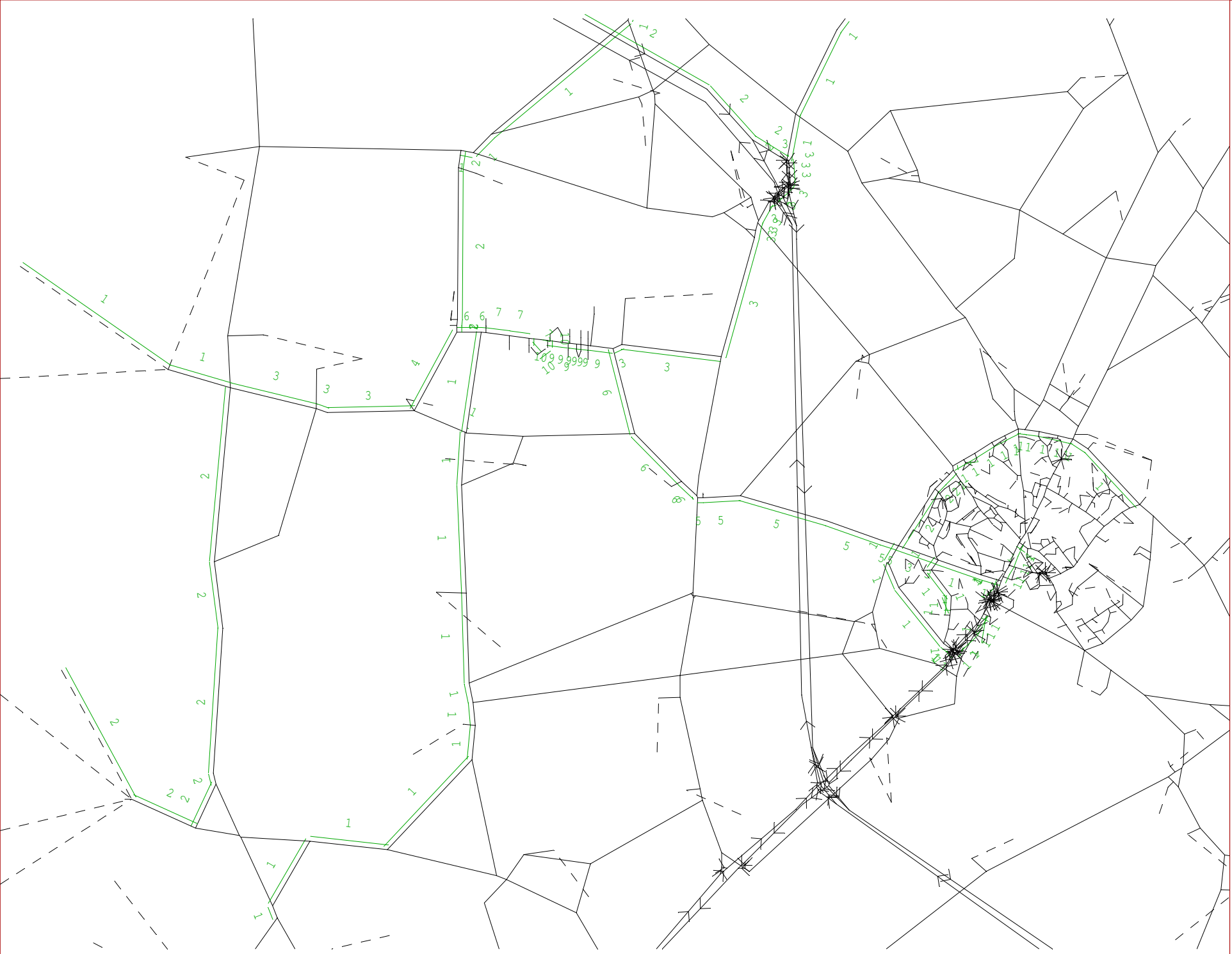
Selected
Link
Assignment
Thru origin
Zone 1307

Total Demand
Flow = 22

All User Cls

7- 8-18
WHITE YOUNG

Bicester Network - 2016 Revalidation AM Peak 7- 8-18



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71590

Link Annot:

S.L.A.

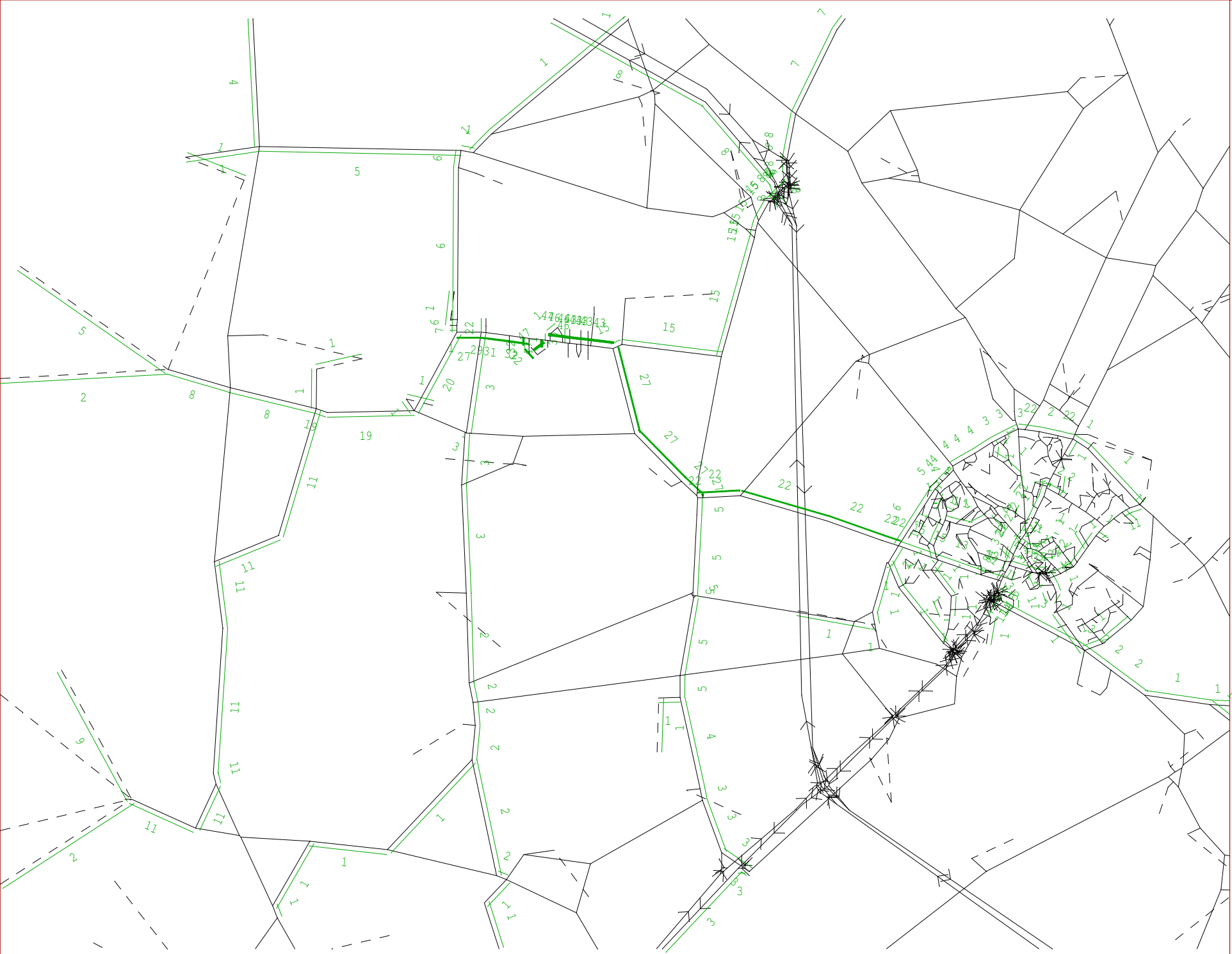
Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1308

Total Demand
Flow = 17

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71590

Link Annot:

S.L.A.

Bandwidths =
100./mm

Selected
Link
Assignment
Thru origin
Zone 1308

Total Demand
Flow = 79

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71590

Link Annot:

S.L.A.

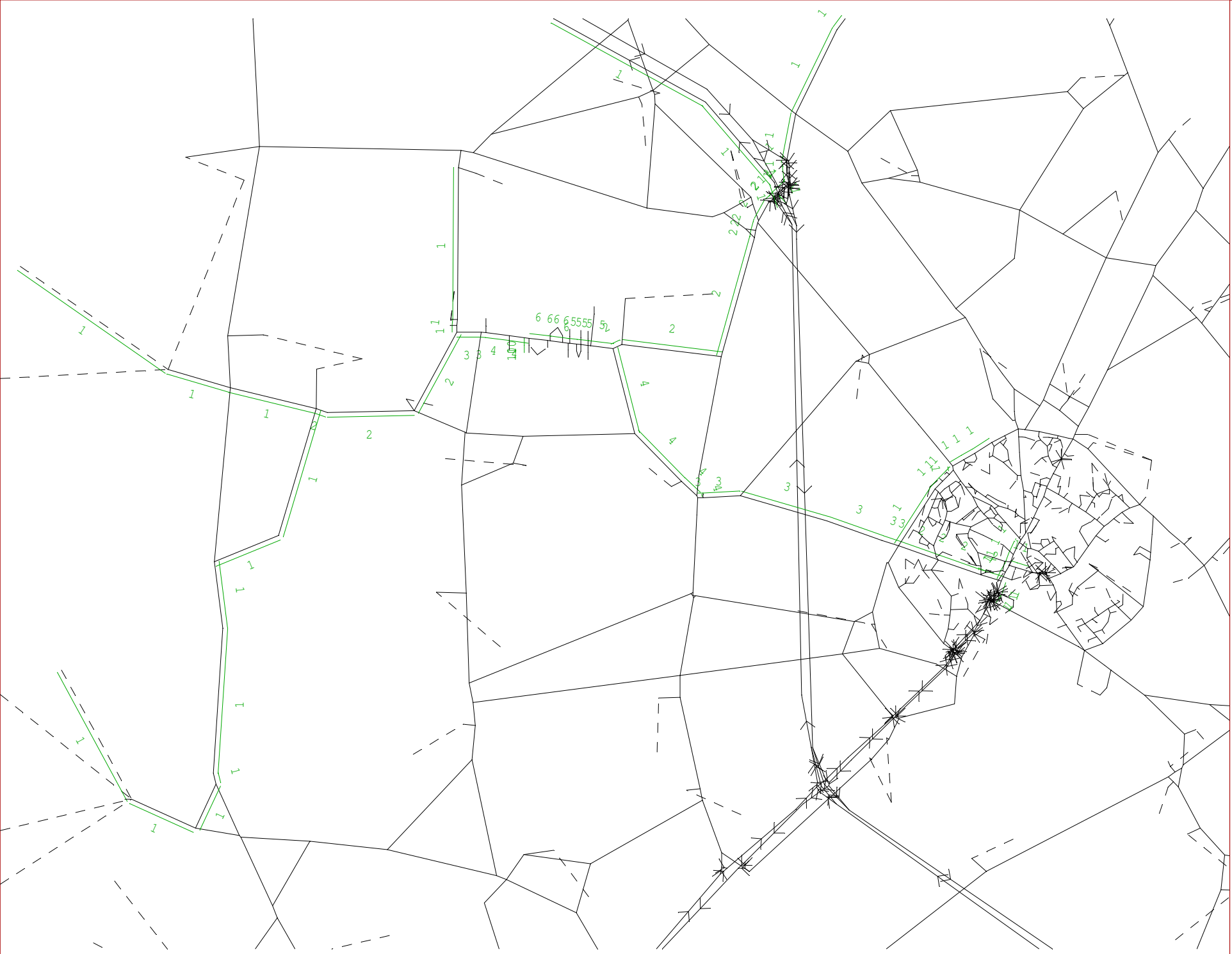
Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1309

Total Demand
Flow = 1.33

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71590

Link Annot:

S.L.A.

Bandwidths =
100./mm

Selected
Link
Assignment
Thru origin
Zone 1309

Total Demand
Flow = 9.98

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71590

Link Annot:

S.L.A.

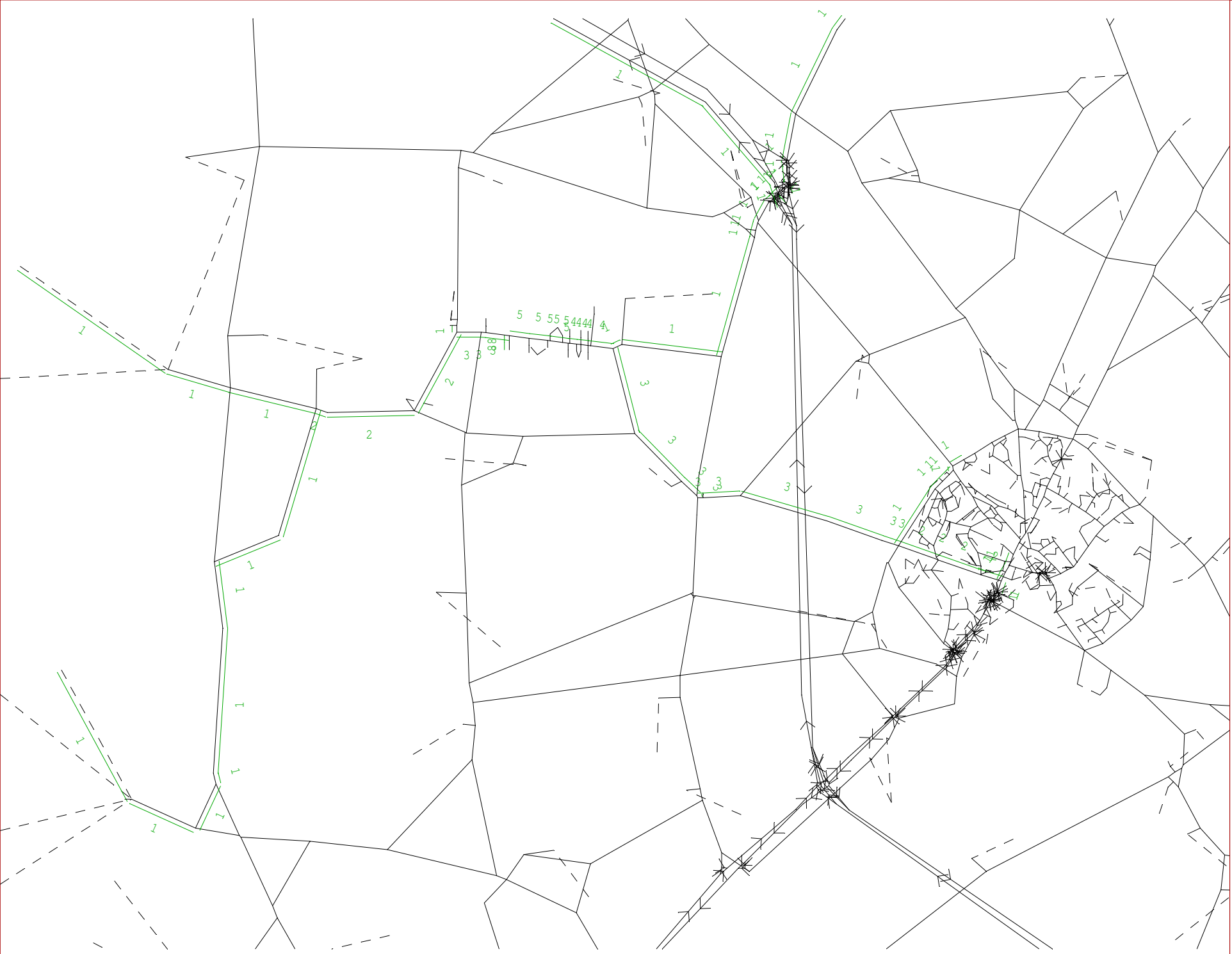
Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1310

Total Demand
Flow = 3.35

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71590

Link Annot:

S.L.A.

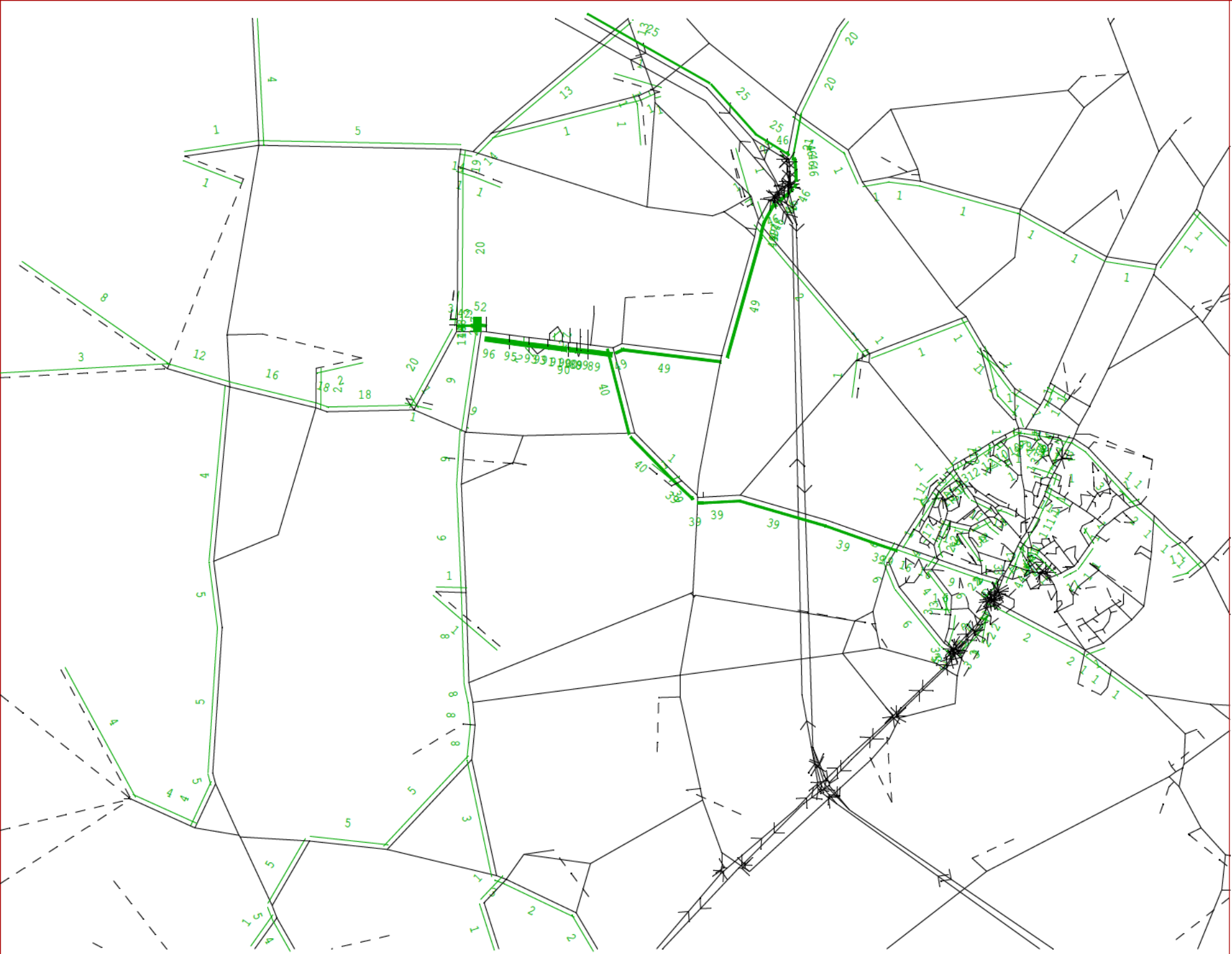
Bandwidths =
100./mm

Selected
Link
Assignment
Thru origin
Zone 1310

Total Demand
Flow = 8.44

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71494

Link Annot:

S.L.A.

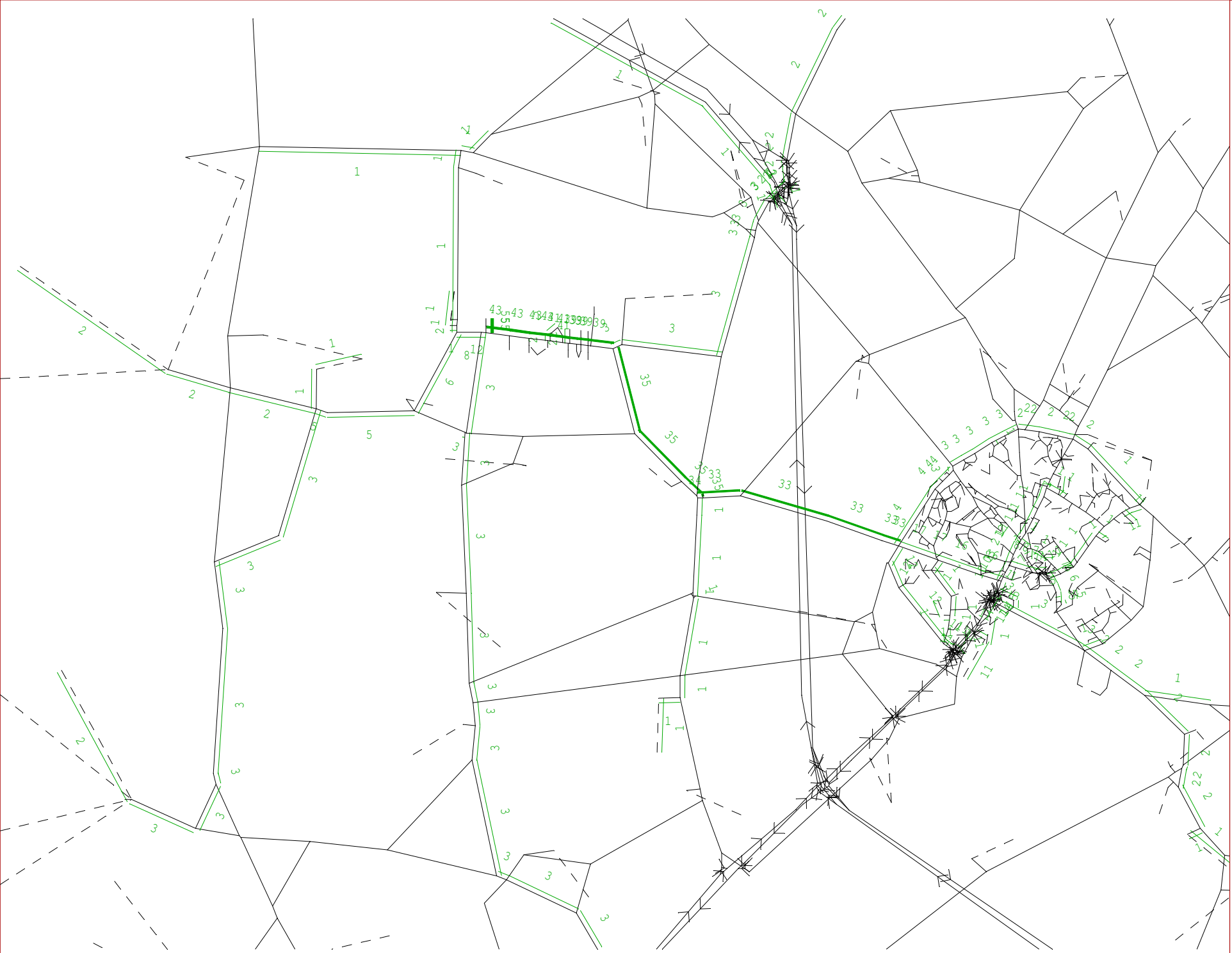
Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1311

Total Demand
Flow = 148

All User Cls

2- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_AM

Scale 71590

Link Annot:

S.L.A.

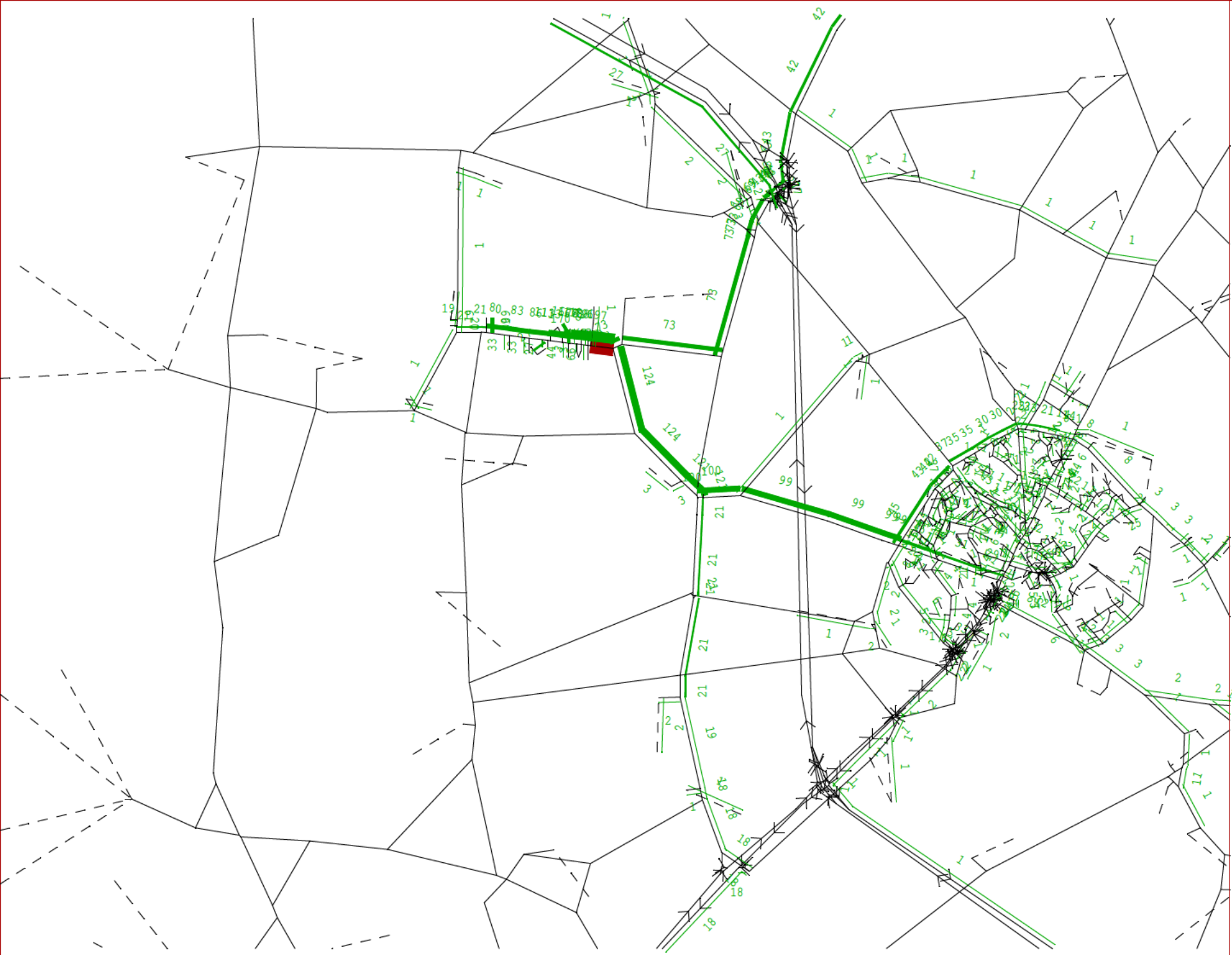
Bandwidths =
100./mm

Selected
Link
Assignment
Thru origin
Zone 1311

Total Demand
Flow = 55

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

Bandwidths =
100./mm

Selected
Link
Assignment
Thru links:
96002 40990

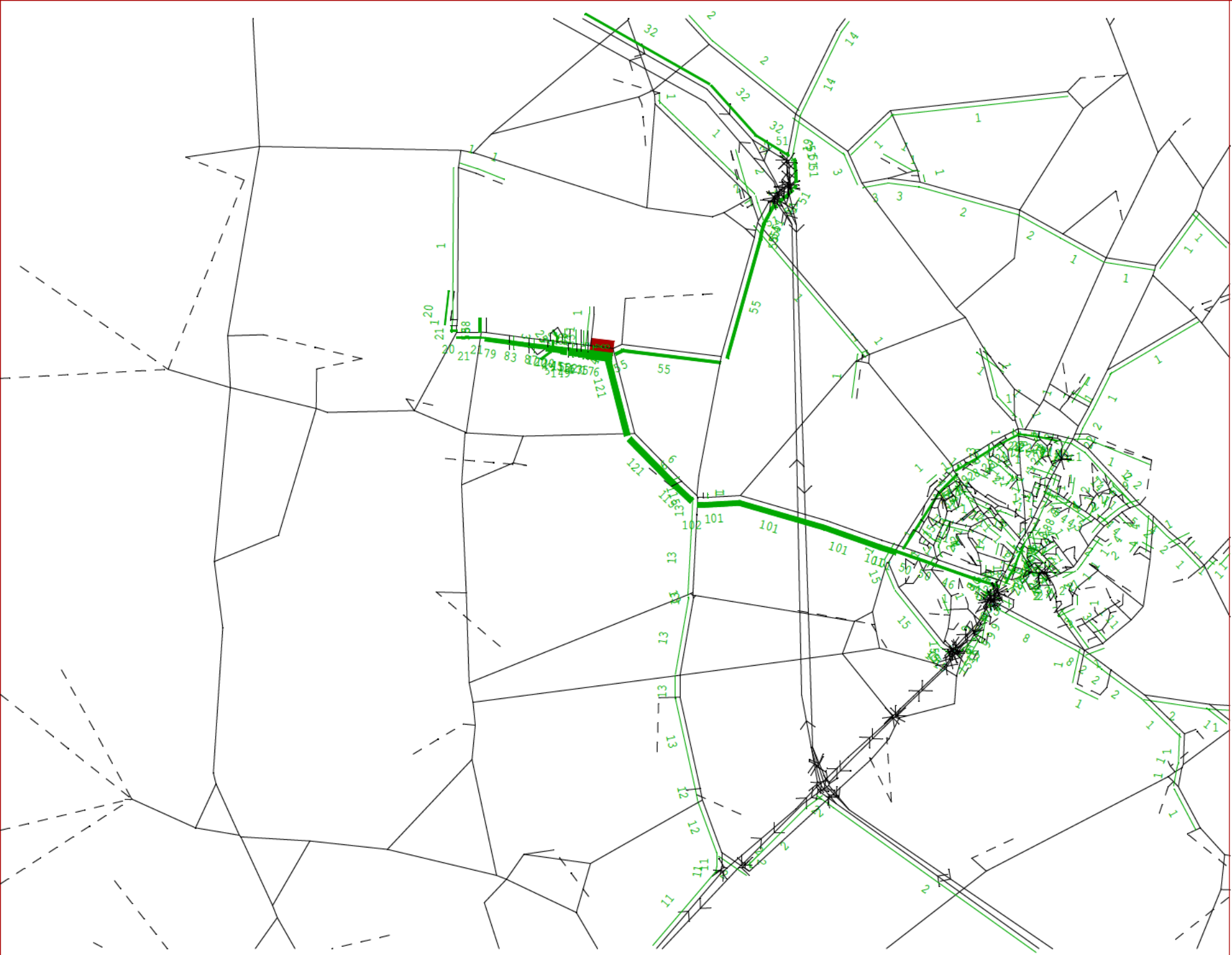
Total Demand
Flow = 197

Network fixd
Flow = 2

All User Cls

7- 8-18
WHITE YOUNG

Bicester Network - 2016 Revalidation PM Peak 7- 8-18



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

Bandwidths =
100./mm

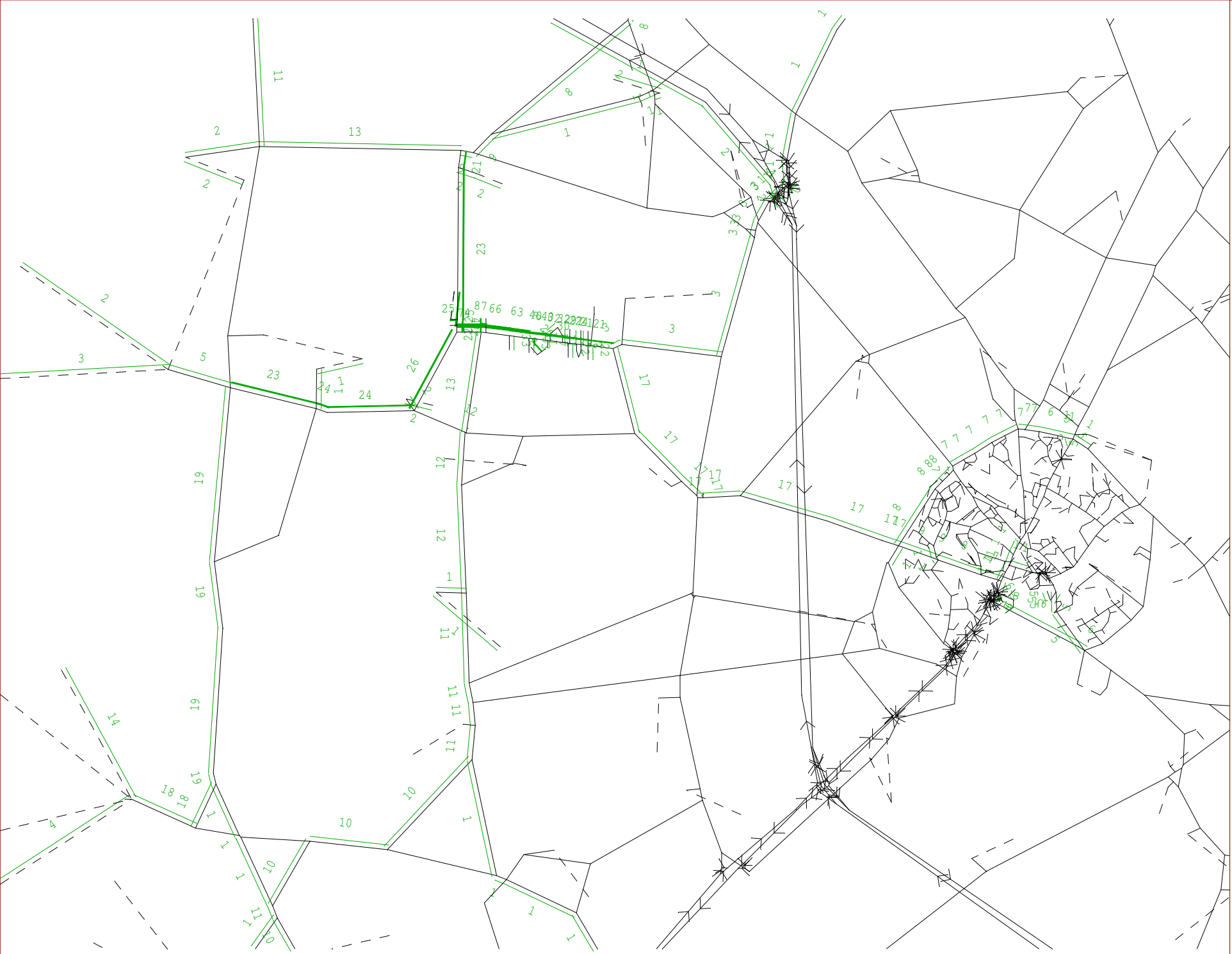
Selected
Link
Assignment
Thru links:
40990 96002

Total Demand
Flow = 176

Network fixd
Flow = 3

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

Bandwidths =
100./mm

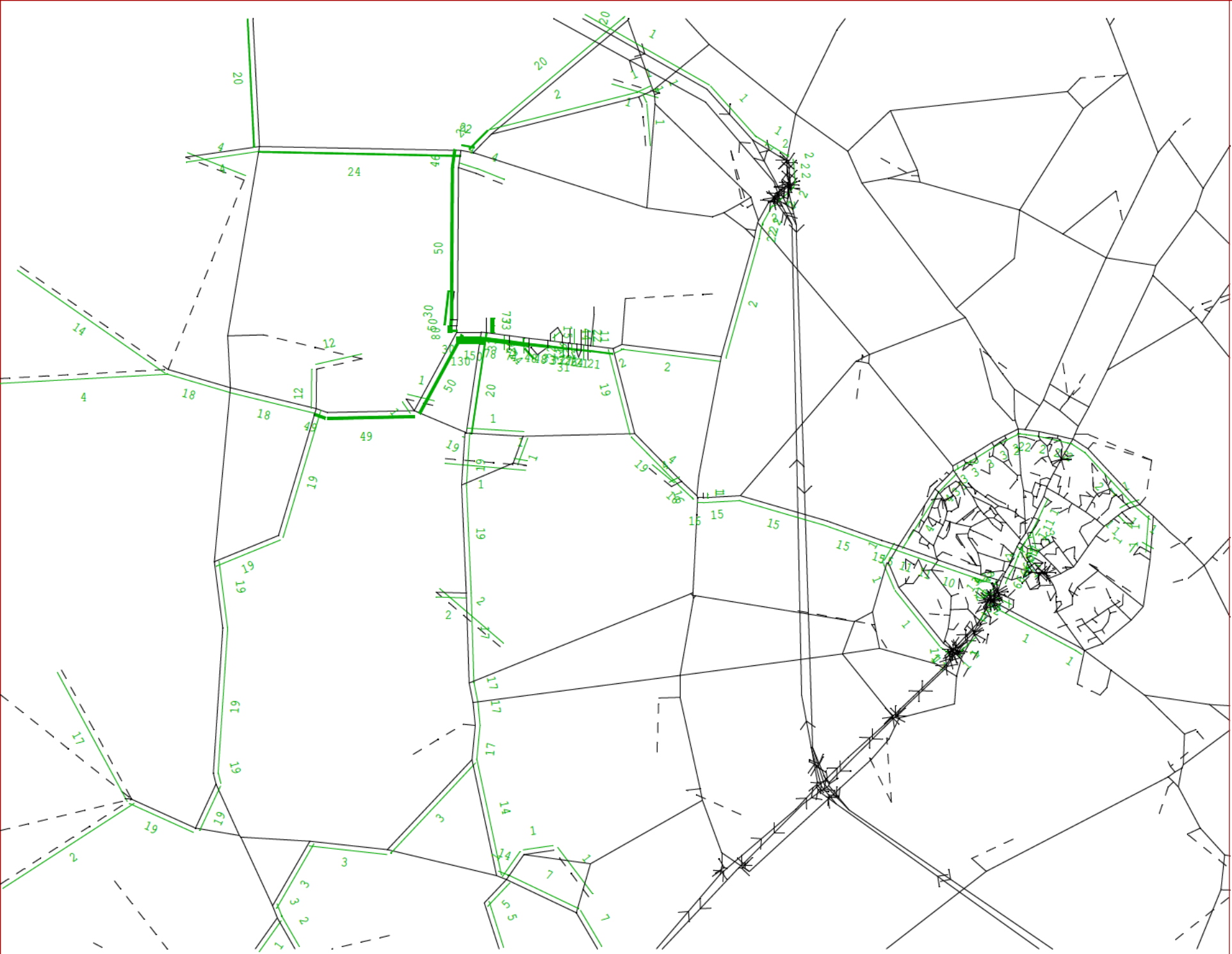
Selected
Link
Assignment
Thru links:
40985 96026

Total Demand
Flow = 87

Network fixd
Flow = 3

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

Bandwidths =
100./mm

Selected
Link
Assignment
Thru links:
96026 40985

Total Demand
Flow = 150

Network fixd
Flow = 2

All User Cls

7- 8-18
WHITE YOUNG

Bicester Network - 2016 Revalidation PM Peak 7- 8-18



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1300

Total Demand
Flow = 1.52

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

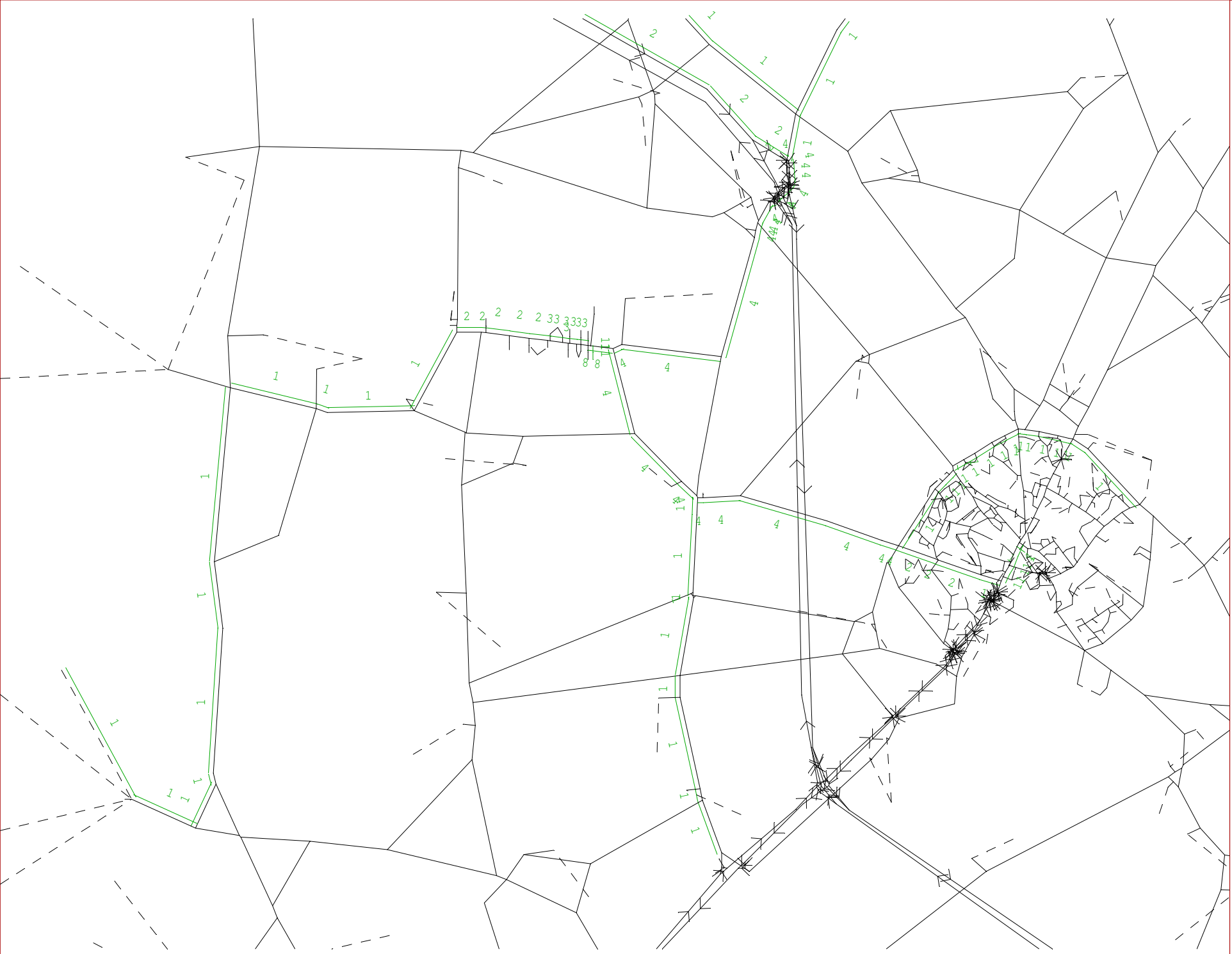
Scale 55745

Link Annot:

S.L.A.

Bandwidths =
100./mm

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

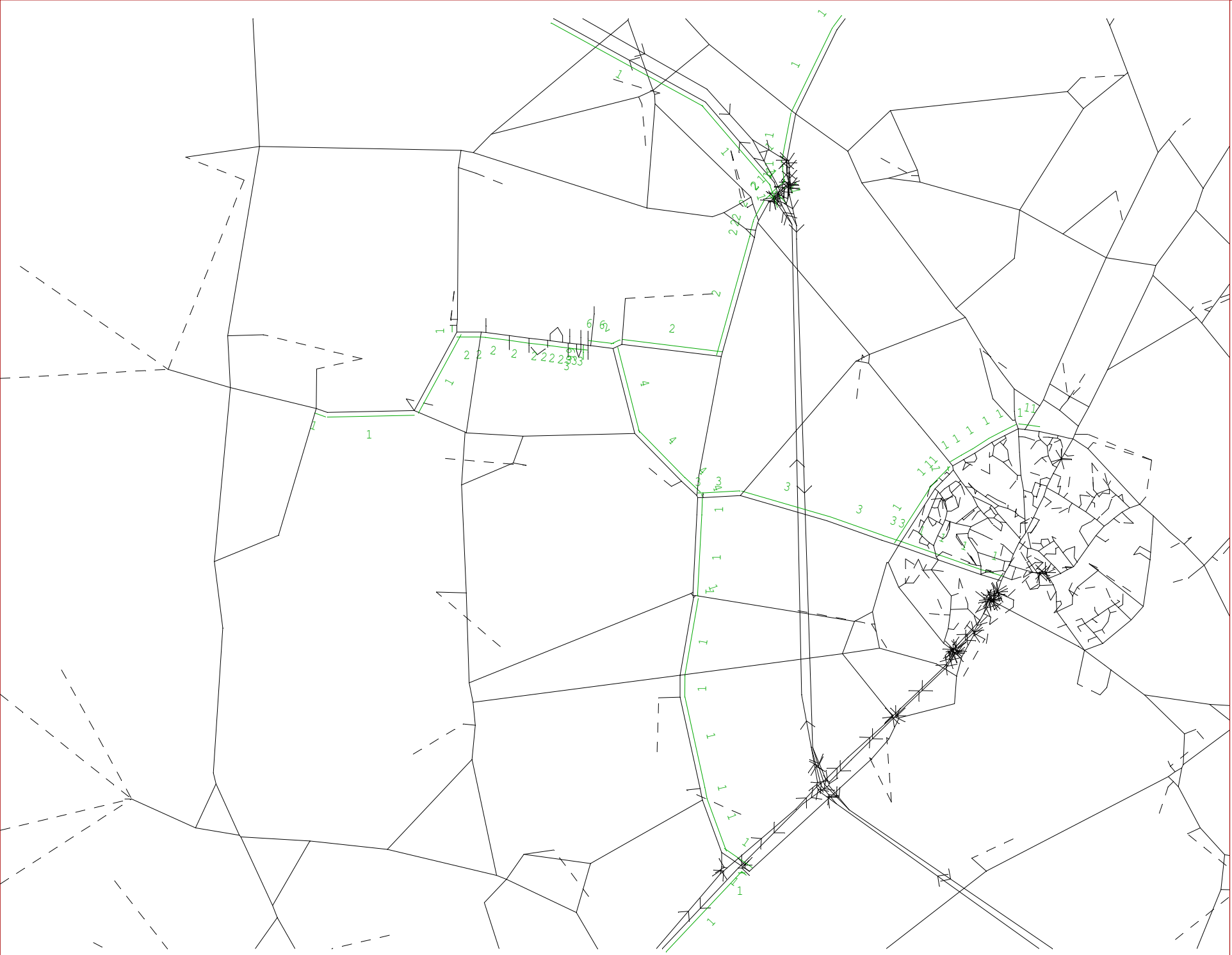
Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1301

Total Demand
Flow = 11

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

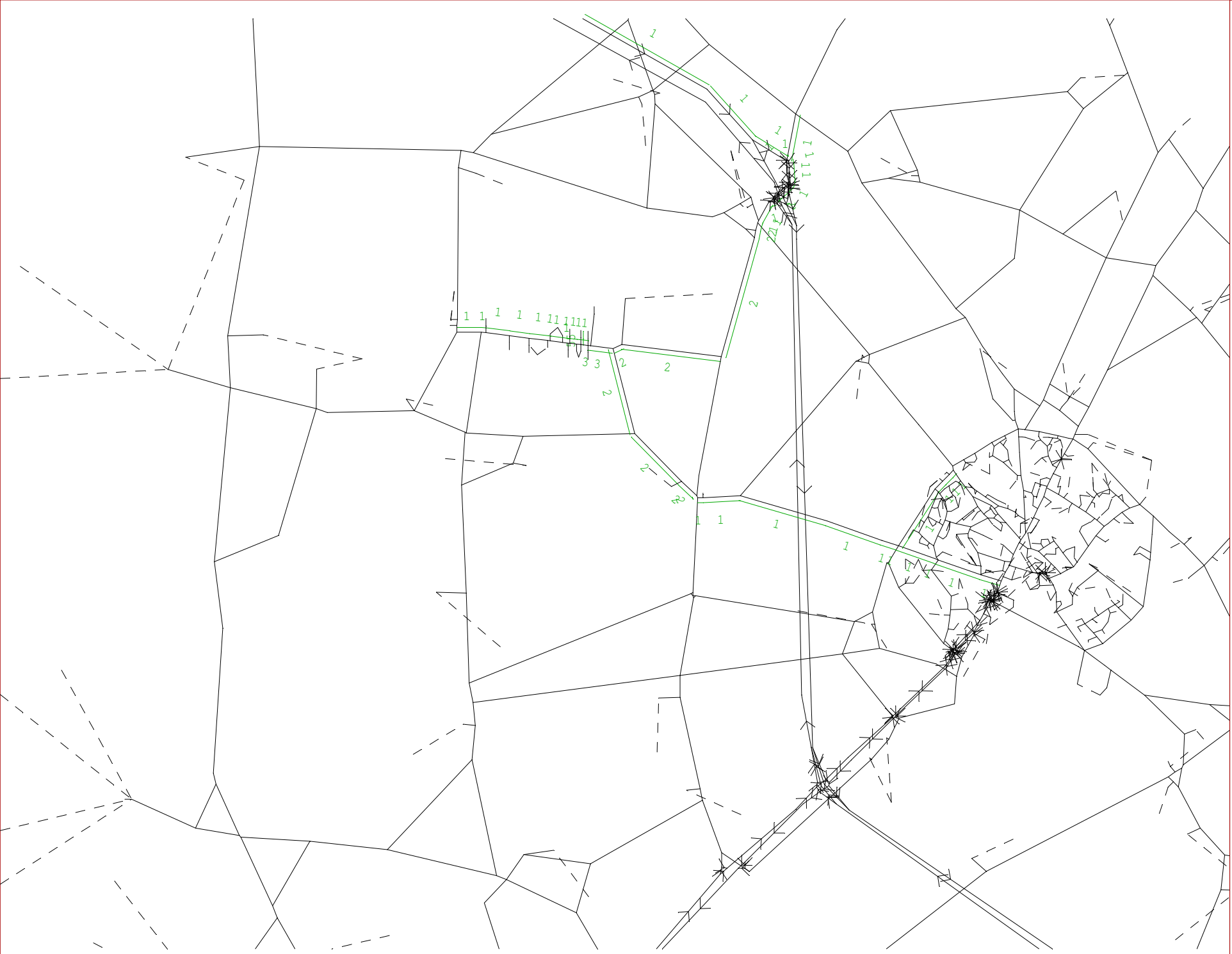
Bandwidths =
100./mm

Selected
Link
Assignment
Thru origin
Zone 1301

Total Demand
Flow = 8.85

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1302

Total Demand
Flow = 4.51

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

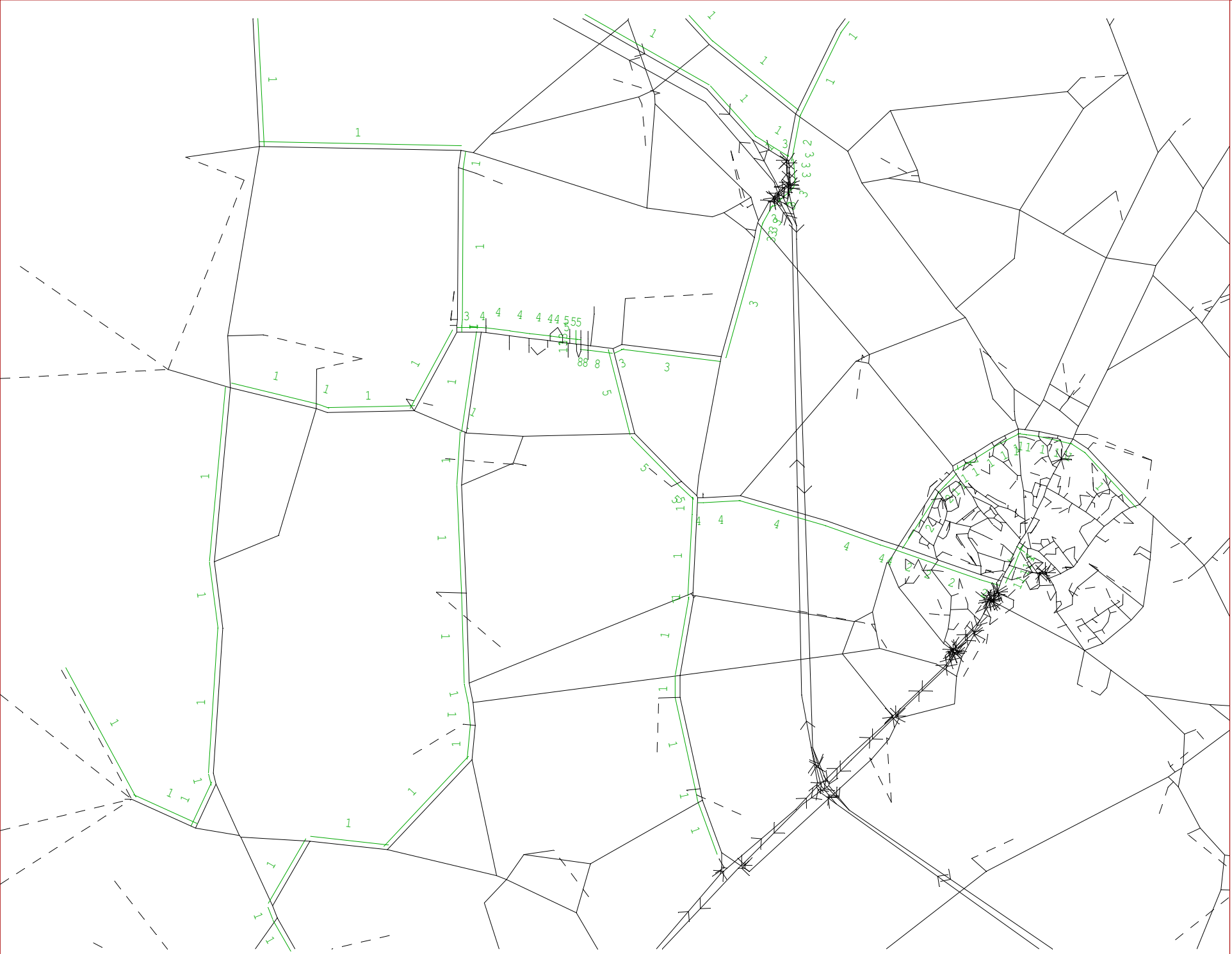
Bandwidths =
100./mm

Selected
Link
Assignment
Thru origin
Zone 1302

Total Demand
Flow = 3.20

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

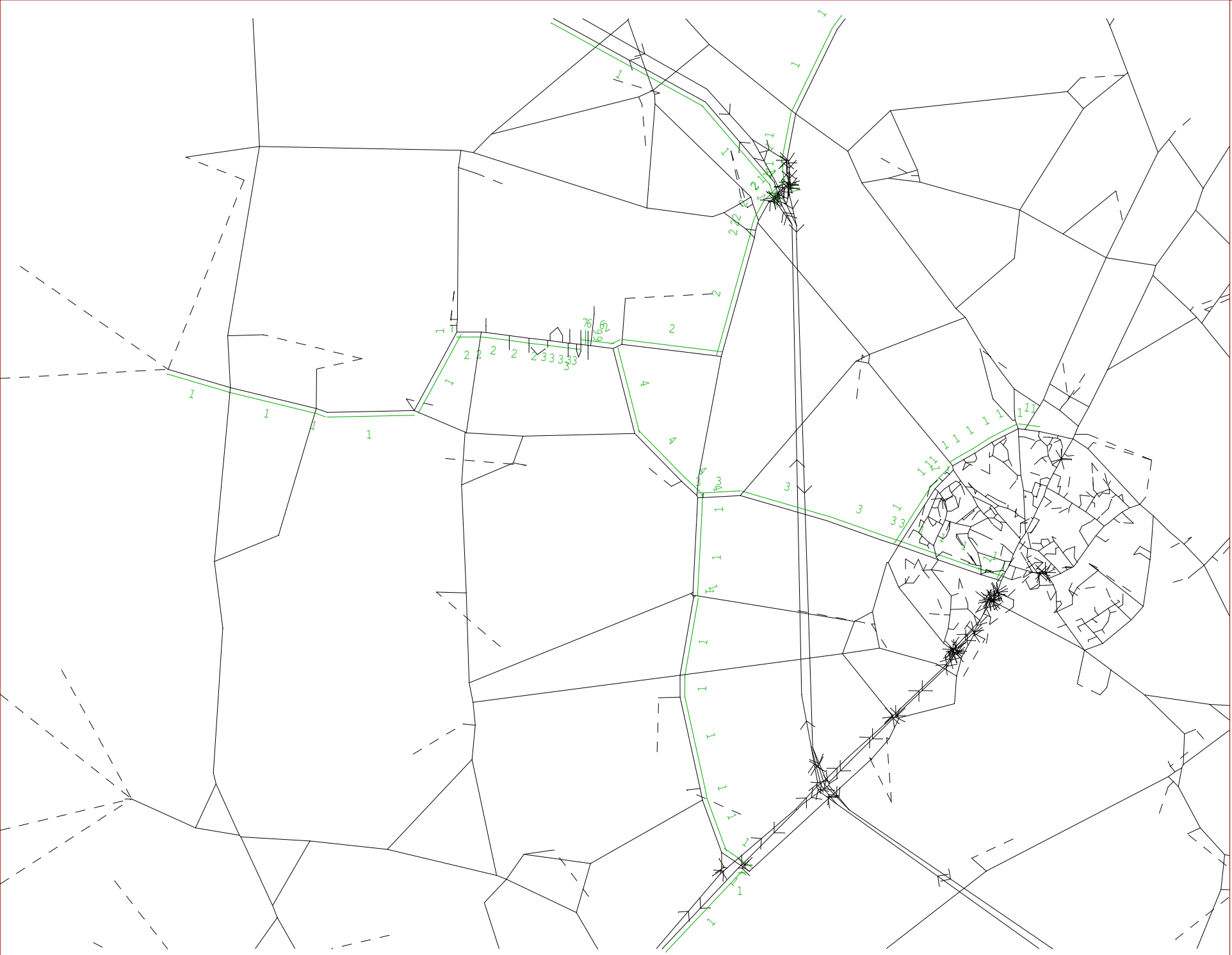
Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1303

Total Demand
Flow = 13

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

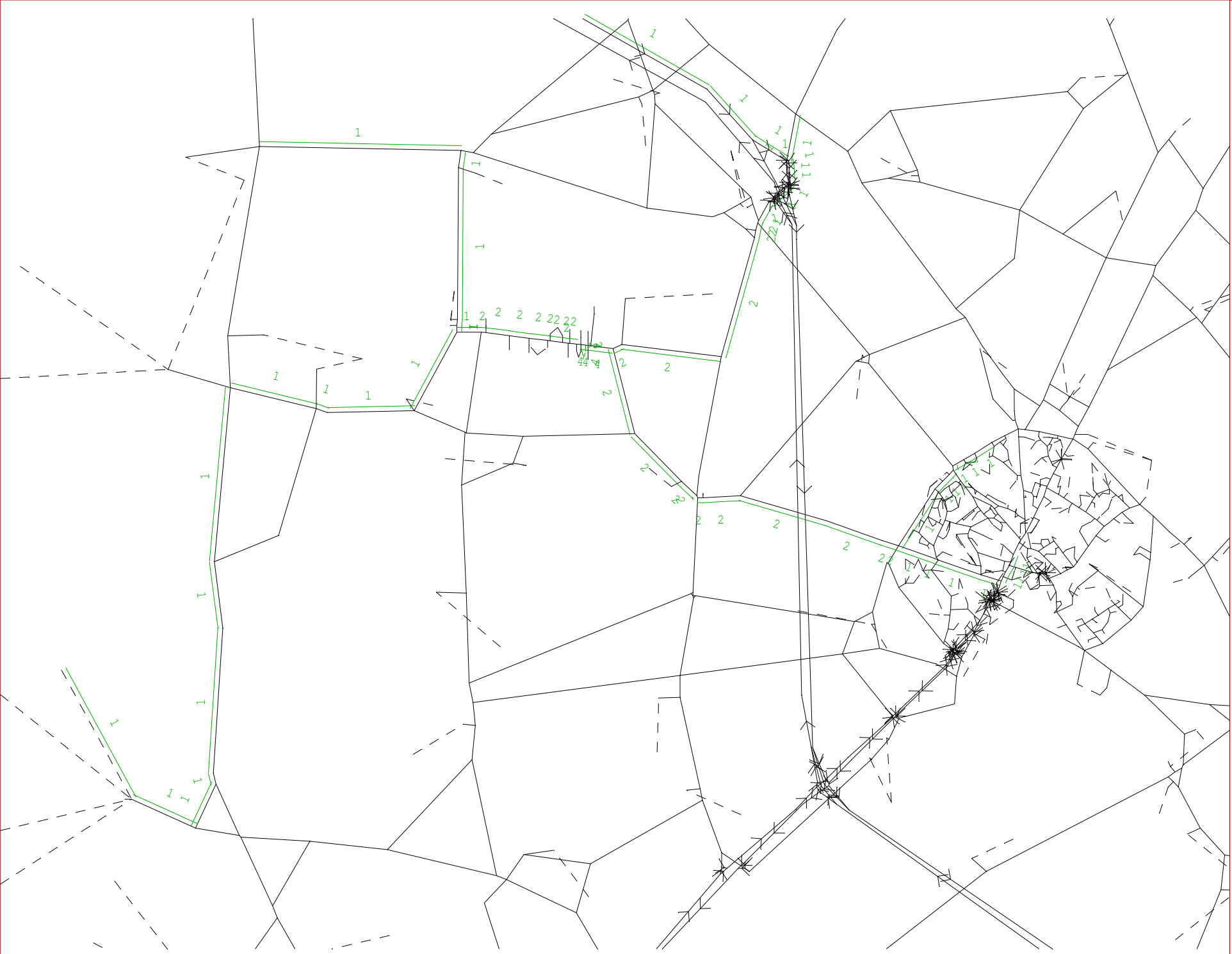
Bandwidths =
100./mm

Selected
Link
Assignment
Thru origin
Zone 1303

Total Demand
Flow = 9.43

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1304

Total Demand
Flow = 5.96

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

Bandwidths =
100./mm

Selected
Link
Assignment
Thru origin
Zone 1304

Total Demand
Flow = 4.31

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

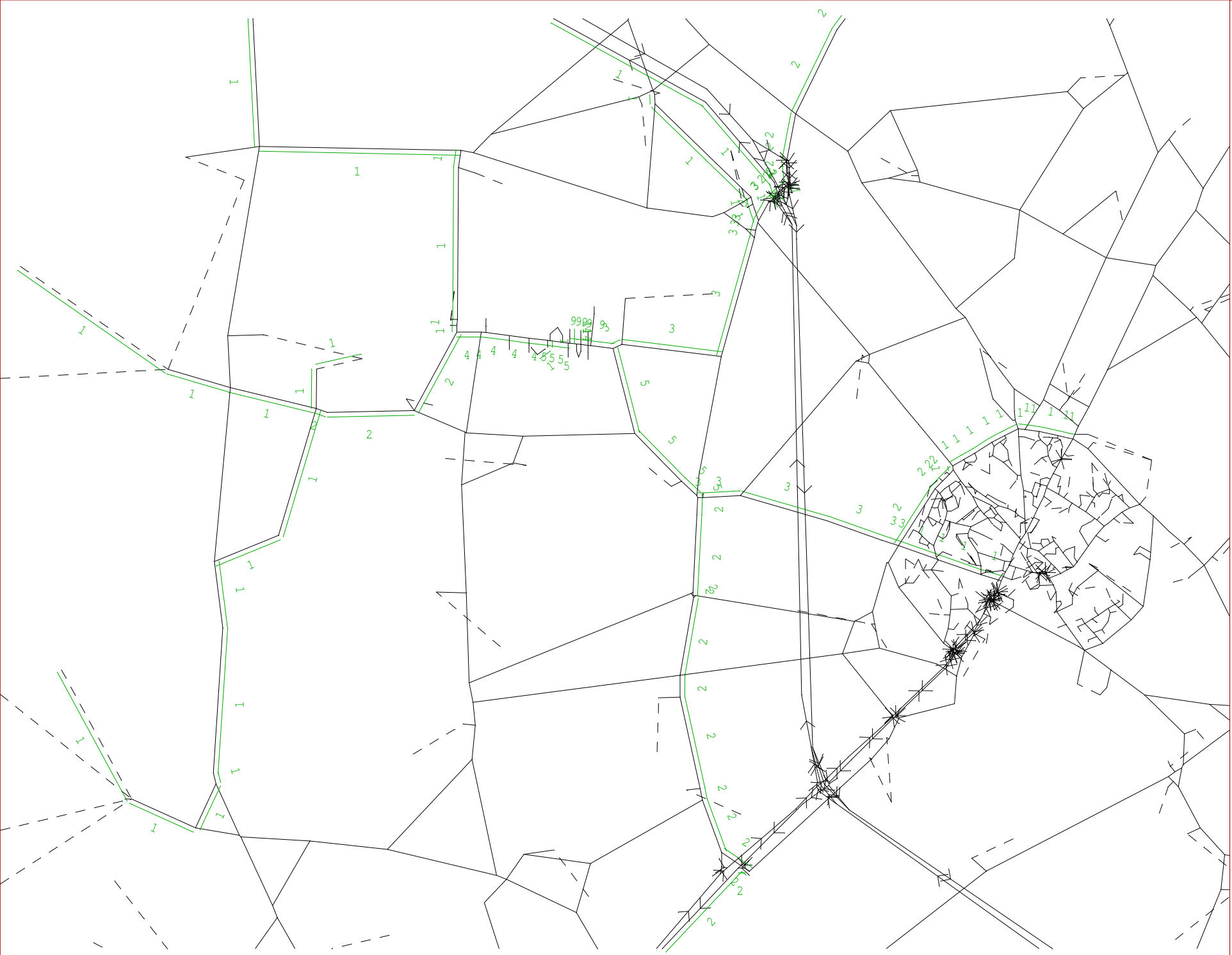
Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1305

Total Demand
Flow = 3.68

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

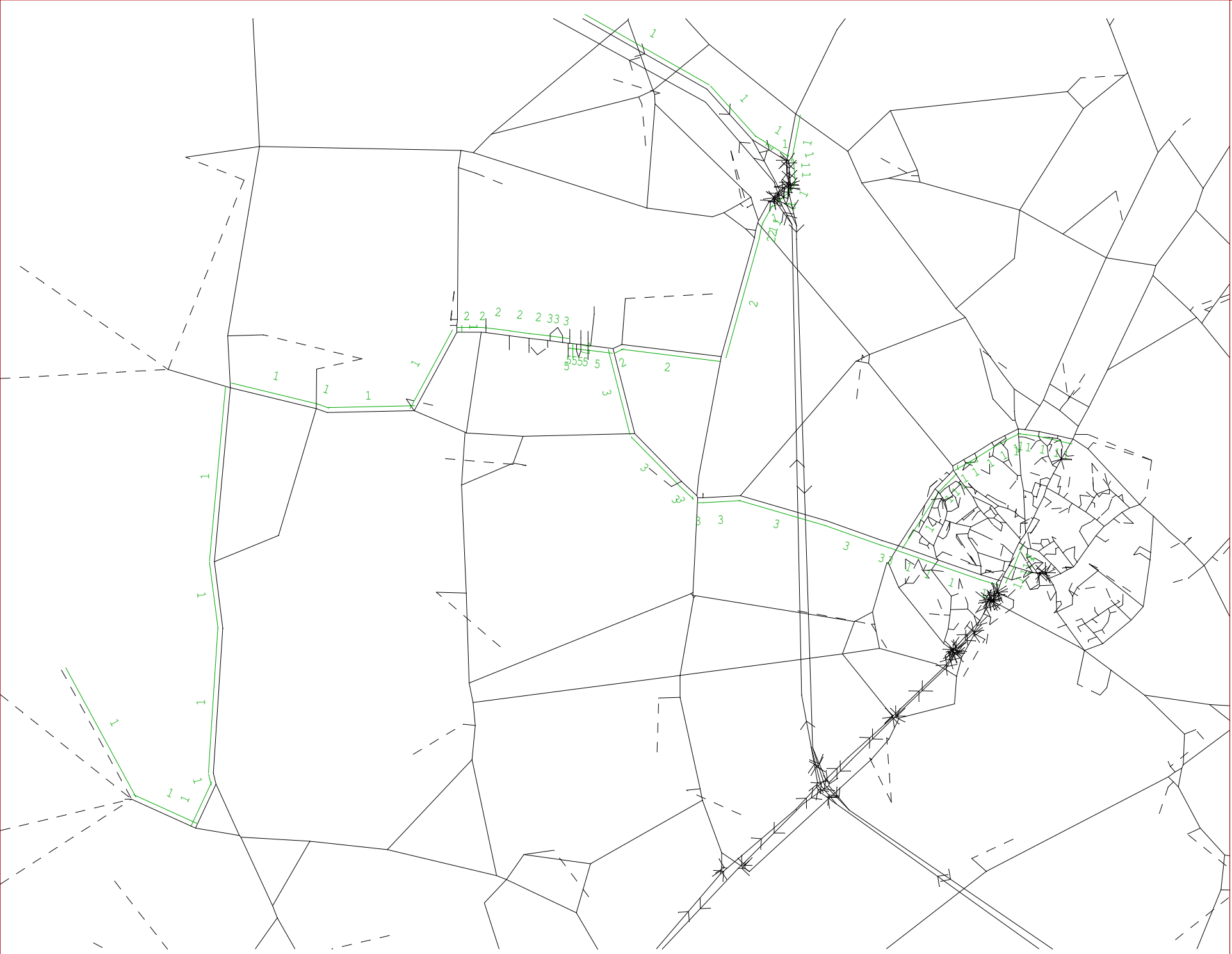
Bandwidths =
100./mm

Selected
Link
Assignment
Thru origin
Zone 1305

Total Demand
Flow = 14

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

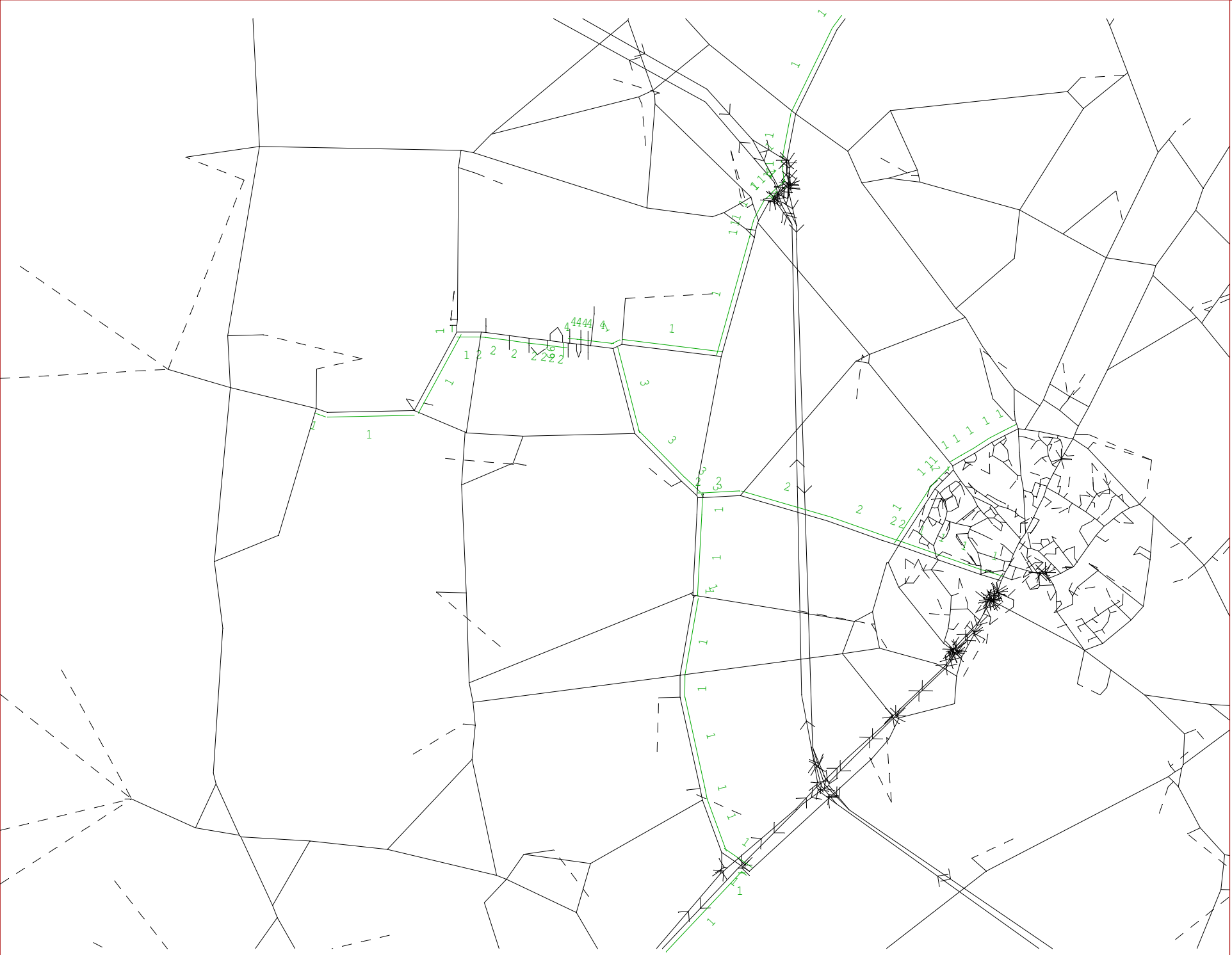
Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1306

Total Demand
Flow = 7.50

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

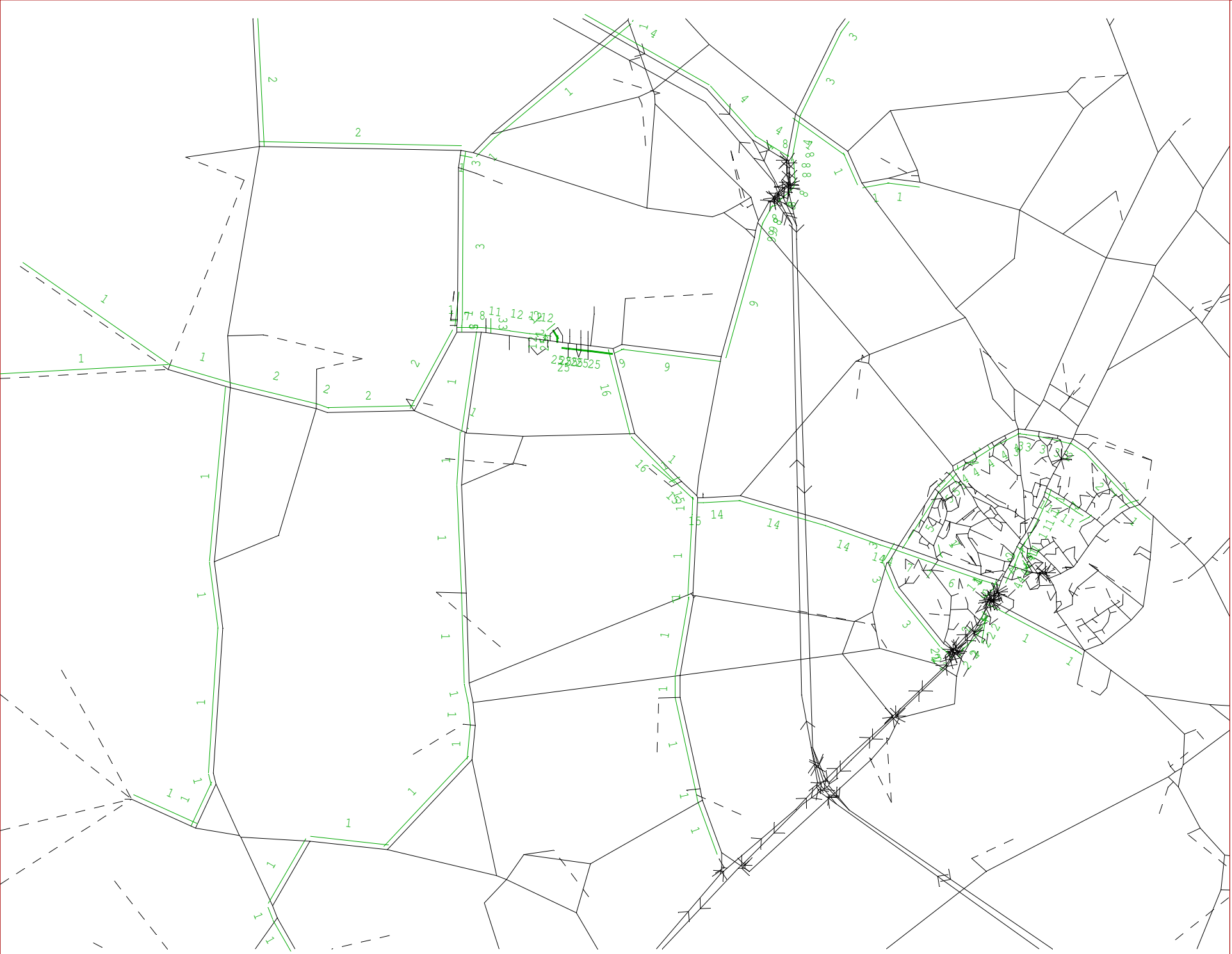
Bandwidths =
100./mm

Selected
Link
Assignment
Thru origin
Zone 1306

Total Demand
Flow = 5.98

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

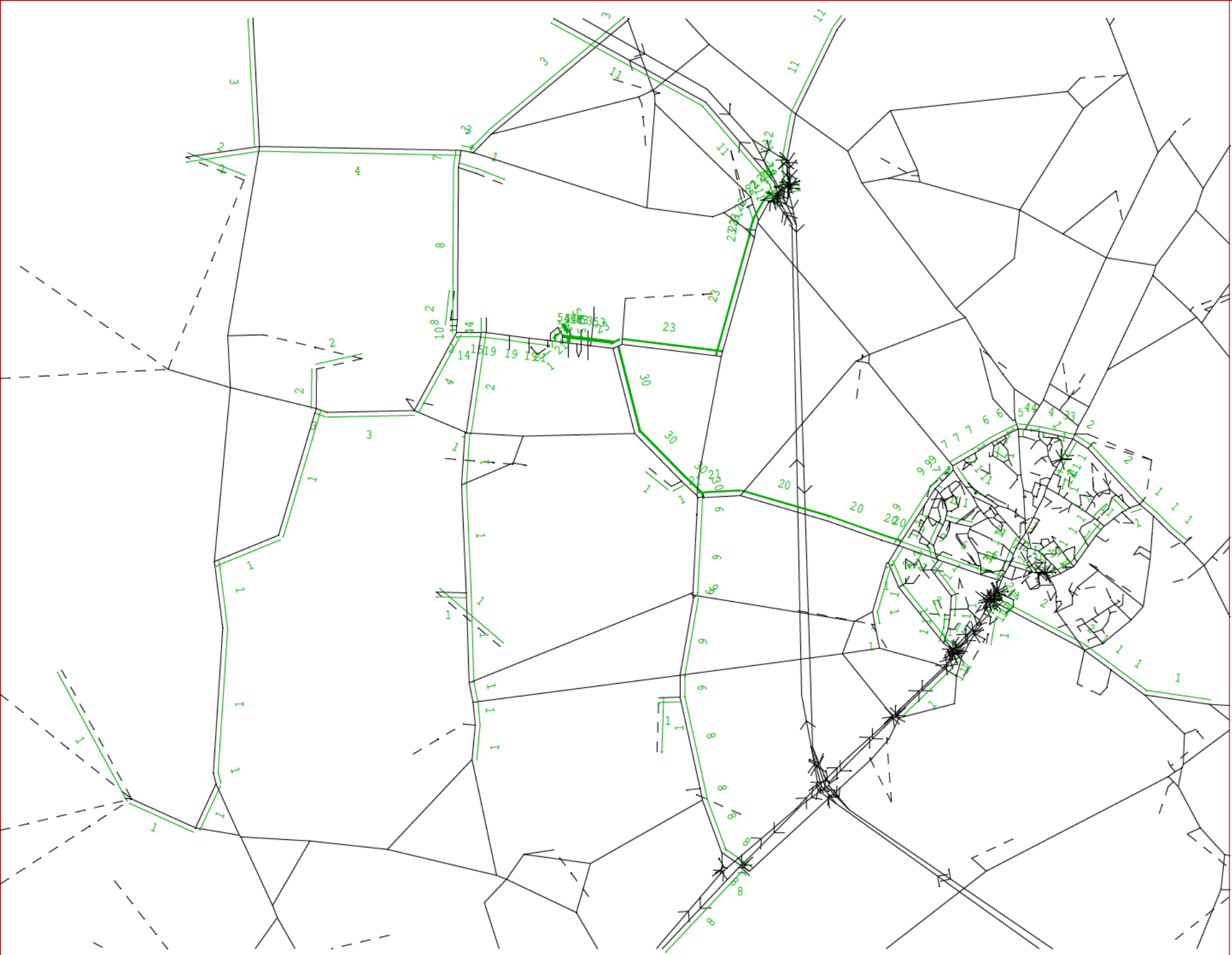
Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1307

Total Demand
Flow = 37

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

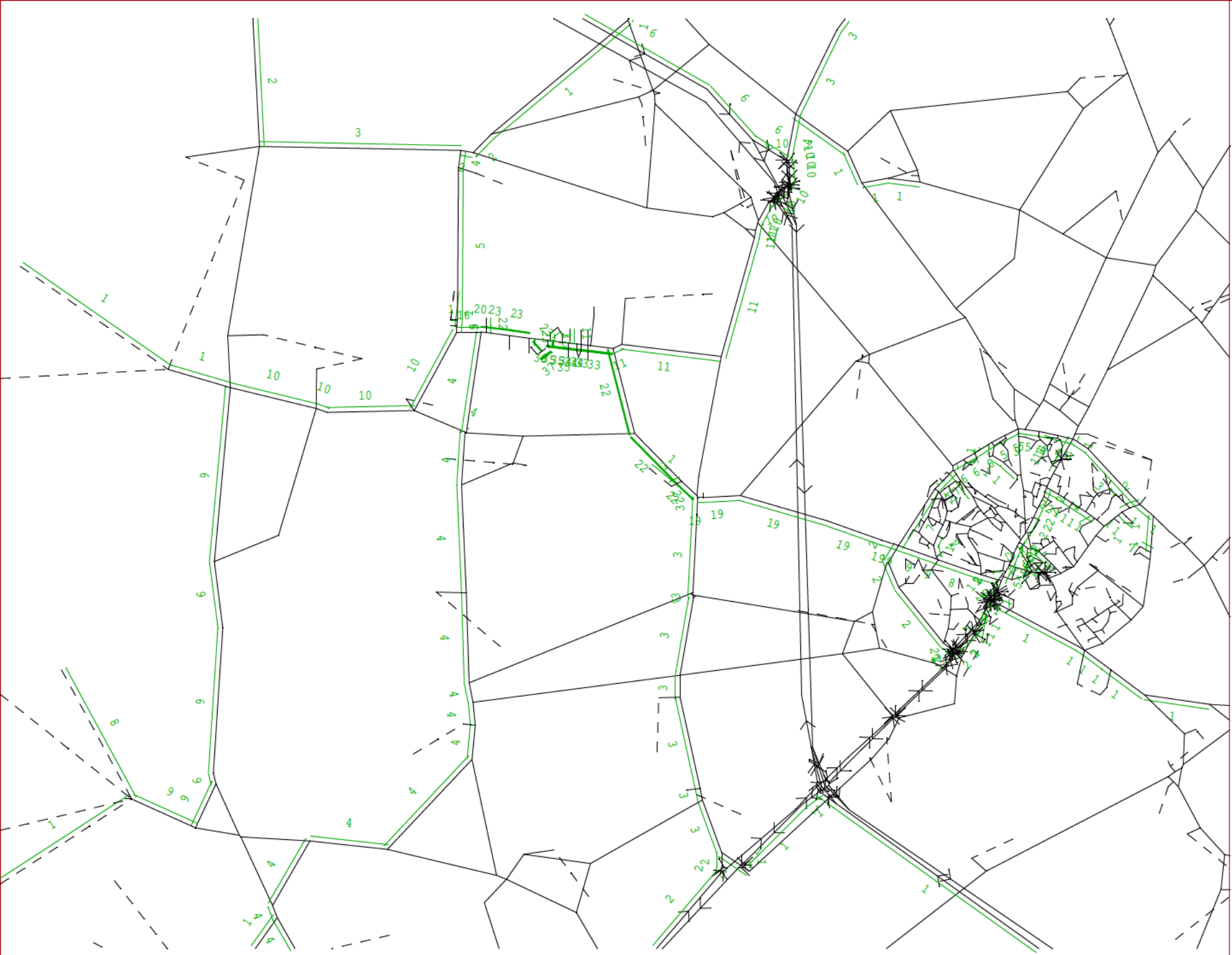
Bandwidths =
100./mm

Selected
Link
Assignment
Thru origin
Zone 1307

Total Demand
Flow = 75

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

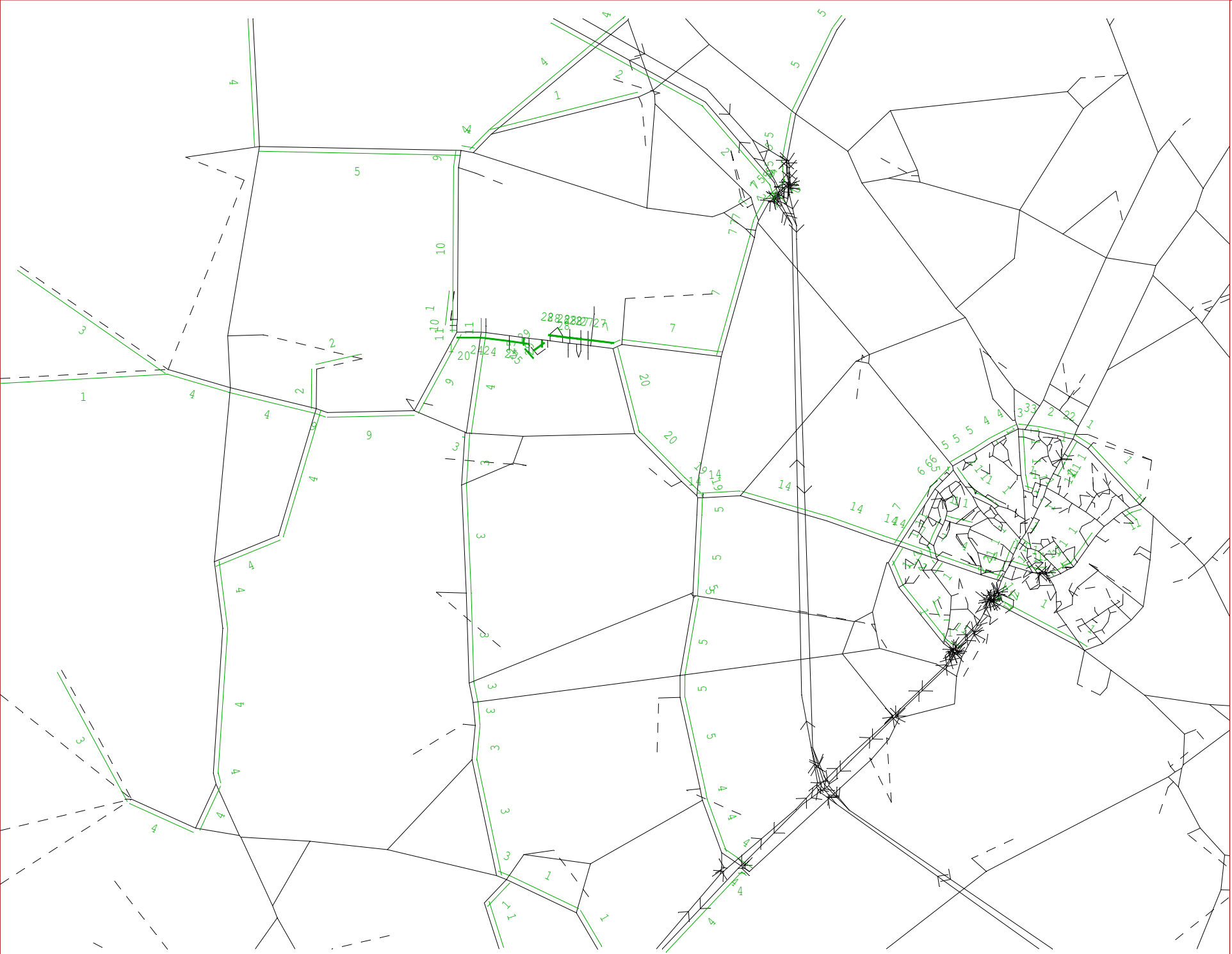
Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1308

Total Demand
Flow = 59

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

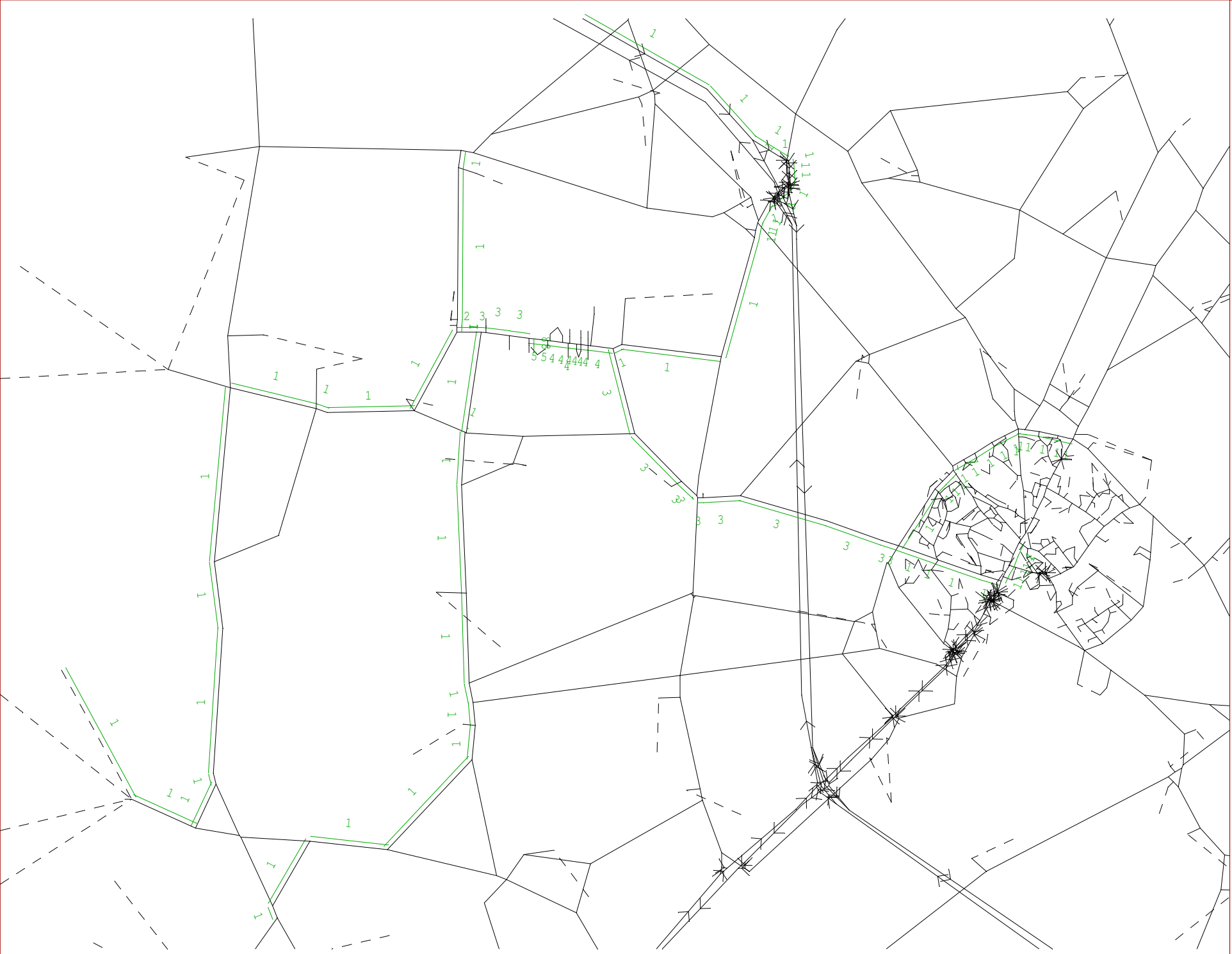
Bandwidths =
100./mm

Selected
Link
Assignment
Thru origin
Zone 1308

Total Demand
Flow = 53

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

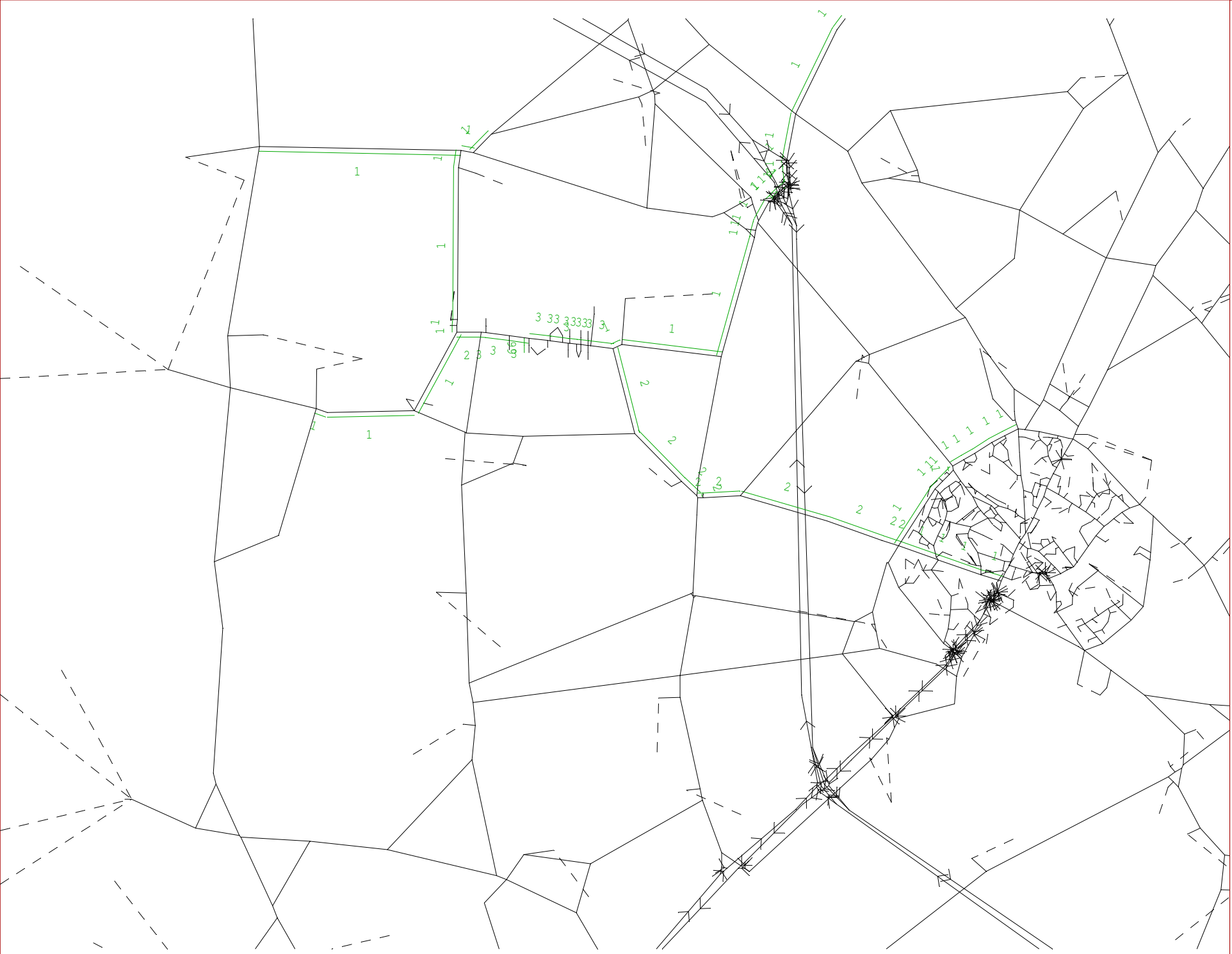
Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1309

Total Demand
Flow = 7.78

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

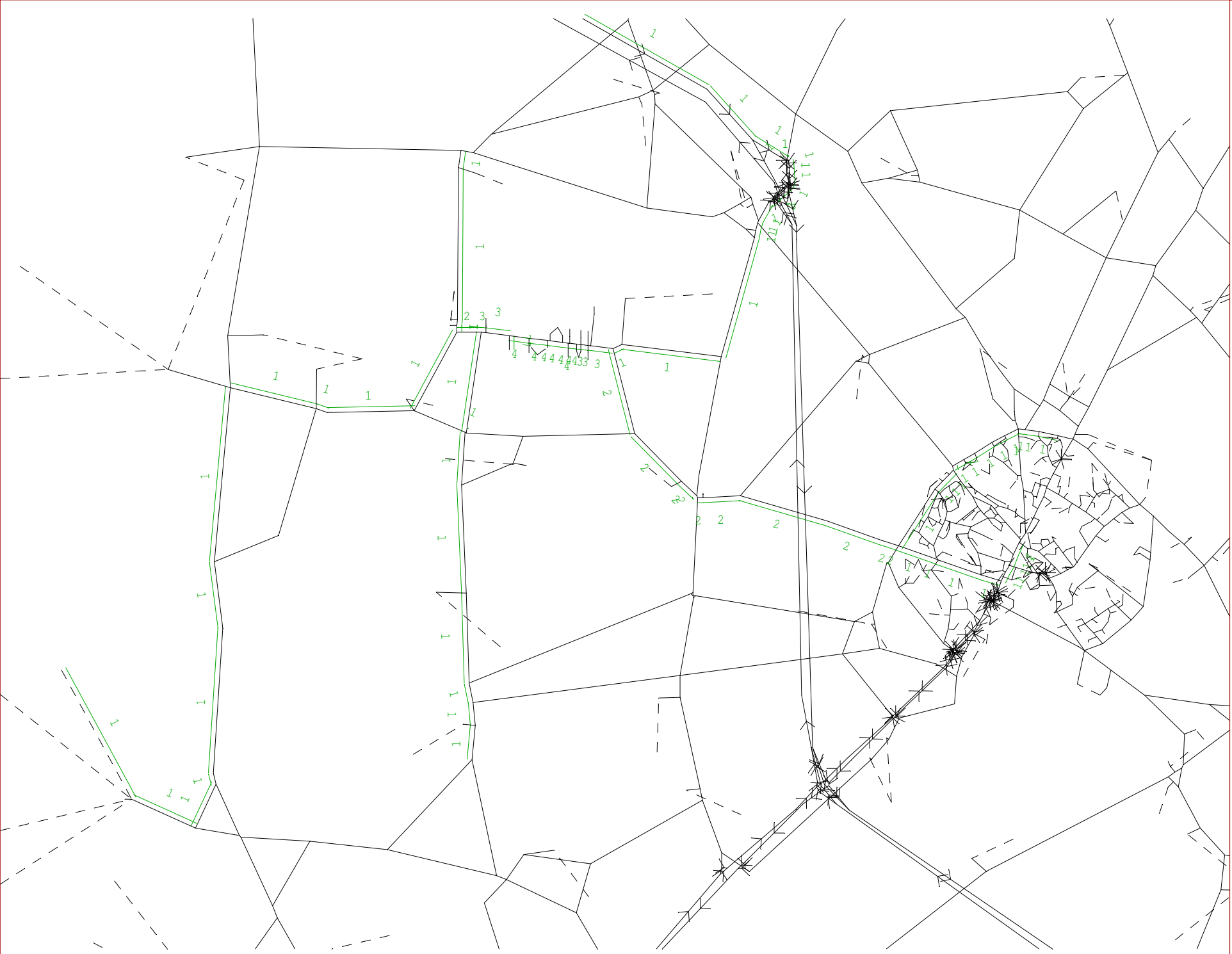
Bandwidths =
100./mm

Selected
Link
Assignment
Thru origin
Zone 1309

Total Demand
Flow = 5.98

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

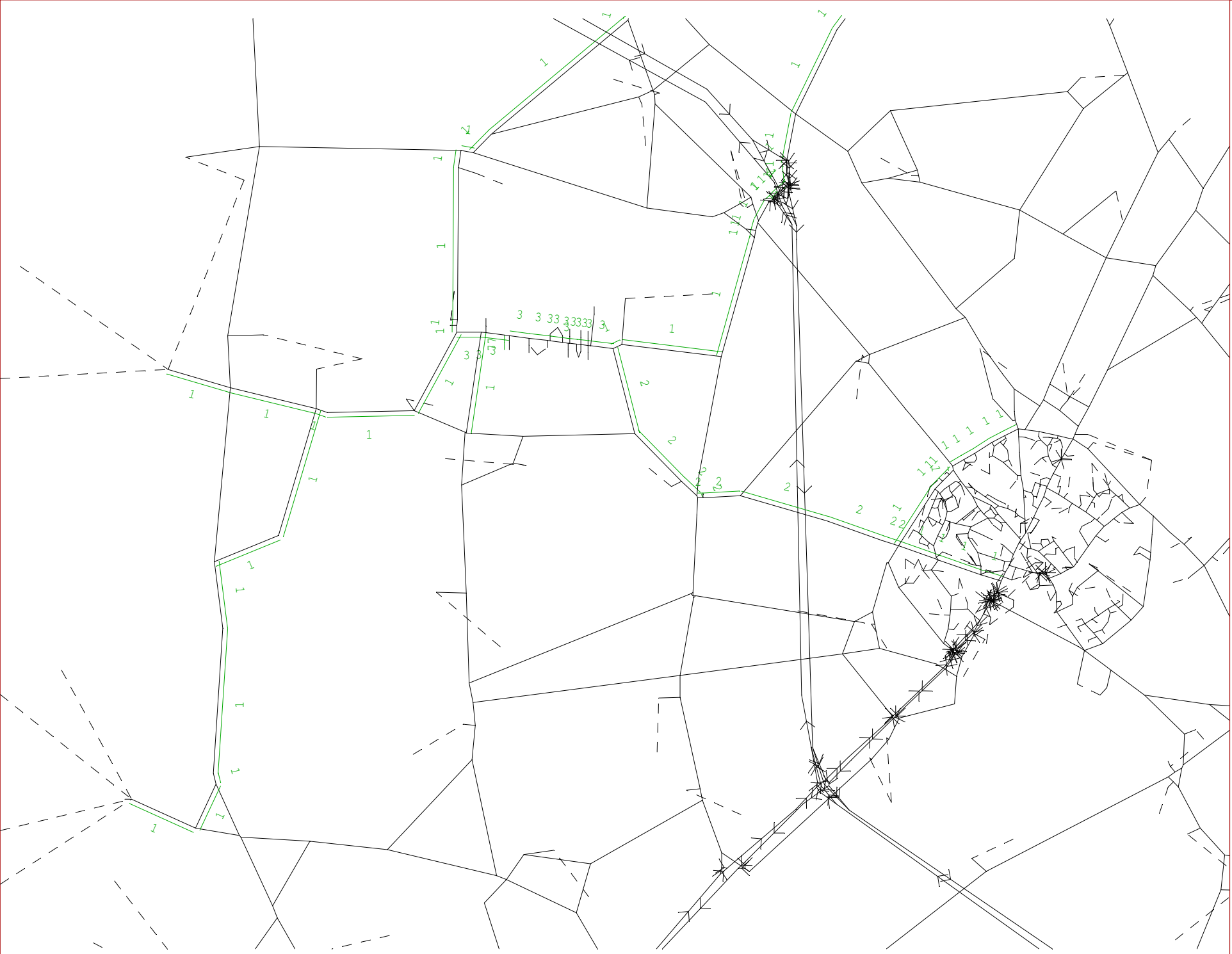
Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1310

Total Demand
Flow = 7.07

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

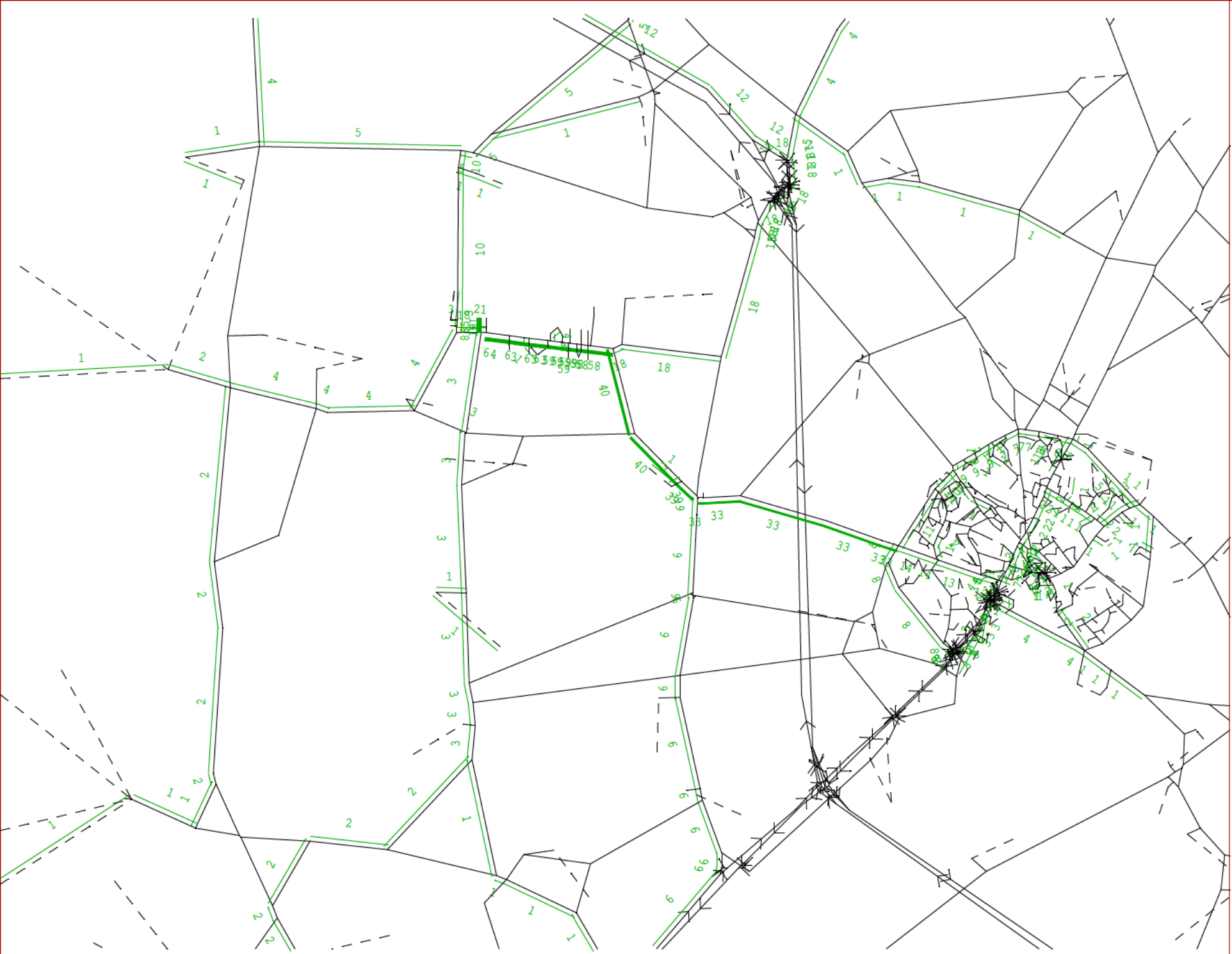
Bandwidths =
100./mm

Selected
Link
Assignment
Thru origin
Zone 1310

Total Demand
Flow = 6.87

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

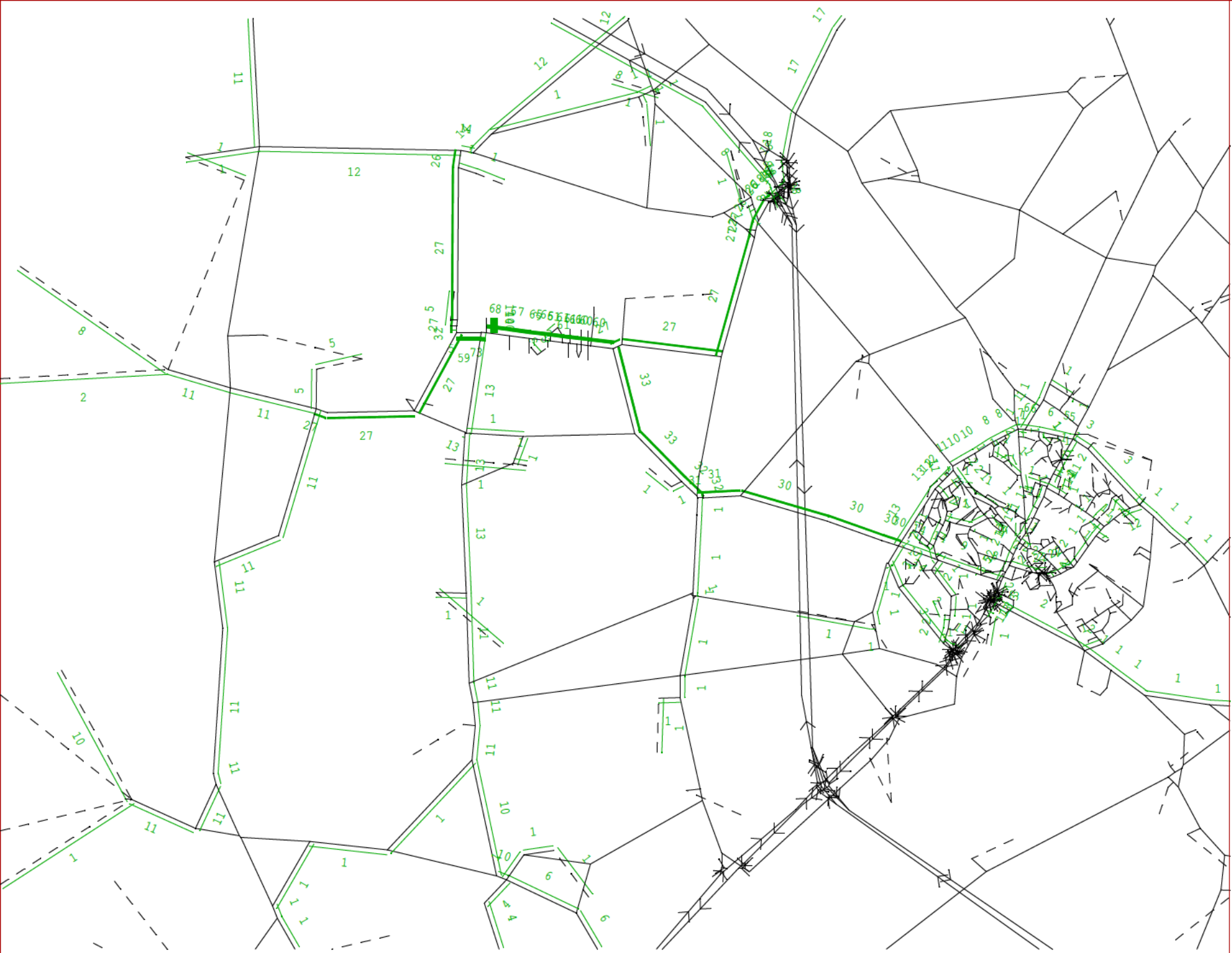
Bandwidths =
100./mm

Selected
Link
Assignment
Thru destin.
Zone 1311

Total Demand
Flow = 85

All User Cls

7- 8-18
WHITE YOUNG



SATURN

Atkins Ltd /
DVV / ITS

_Network.UFS
2016_Base_PM

Scale 71590

Link Annot:

S.L.A.

Bandwidths =
100./mm

Selected
Link
Assignment
Thru origin
Zone 1311

Total Demand
Flow = 140

All User Cls

7- 8-18
WHITE YOUNG