Mabe Village Transport Improvements

Feasibility Study

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Feasibility Study

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1 INTRODUCTION

1.1 Overview

1.1.1 CORMAC Solutions Ltd (CSL) has been commissioned by Mabe Parish Council to produce a Feasibility Study into providing Traffic Improvements to Mabe Village close to Falmouth. The location for the study is shown in figure 1.

Figure 1 – Study Area

1.1.2 At present, Mabe is a popular rat run for Falmouth-bound vehicles heading east on the A394. Vehicles are able to turn right onto Antron Hill at Longdowns and cut through to the Asda roundabout on the A39, which gives access to Penryn and Falmouth. Travelling via Mabe is approximately 1km shorter than using the alternative A394 / A39 Treliever Roundabout route.

1.1.3 Within Mabe, a mixture of on-street parking and engineered features act to create shuttle working in places, restricting traffic speeds. This effect is however somewhat reduced by the relatively steep west to east downhill gradient within the village.

1.1.4 With the centre of Mabe, the junction of Antron Hill with Church Street and Treliever Road has an unusual layout, with short give-way links over a section of Antron Hill requiring eastbound traffic to give way to Treliever Road and westbound traffic to give way to Church Street.

1.1.5 The parish council has provided the following list of key issues to be addressed within this study:

- The possibility of introducing a 20 mph speed limit in and around the centre of the village and along Cunningham Park.

- The possibility of introducing a 40 mph speed limit along Antron Hill between the village boundary and Longdowns or the parish boundary with Budock.
- Whether reversing either or both the 'pinch points' on Kernick Hill and Antron Hill might be beneficial.
- What measures might be introduced that would have the effect of reducing the volume of traffic passing through the village.
- What scope there is for improving pedestrian safety:
    - At the junction of Treliever Road and Church Road (through, in particular, the introduction of footpaths); and,
    - Near the village shop.
- What might be done to introduce better/safer parking in the centre of the village, not least for the purpose of serving the village shop (possibly through the introduction of short-stay parking bays).
- Options to improve pedestrian safety around Antron Hill and its adjoining road network, particularly for school children.
- For all of the above to contribute to creating a better, healthier and thriving village centre for the community.

1.1.6 A further consideration is that any proposals should not adversely impact the viability of the businesses within the village. This report makes no assessment of this point. One of the key aims of the study is to reduce levels of through traffic. It is not known at this stage what proportion of trade local businesses draw from through traffic. It is therefore recommended that this is discussed with business owners as part of any future consultation.

1.2 Study Format and Scope

1.2.1 The purpose of this study is to set out and assess a number of potential options aimed at reducing traffic volumes and speeds through the village of Mabe. Key to this will be making the route less attractive to through traffic. This study therefore extends to the west of the village, up to and including the junction of Antron Hill with the A394.

1.2.2 It is unusual for traffic calming schemes to be based in only one type of speed reducing feature; the majority combine a variety of different measures in order to achieve maximum impact (e.g. kerb build outs combined with speed cushions). This report therefore sets out the advantages and disadvantages of a range of different traffic calming measures.

1.2.3 The advantages and disadvantages of the traffic calming measures are summarised individually. In addition, their performance against the key issues is summarised in a table, with up to 10 points (best score) awarded against each issue. These scores are subjective and are used in section 5. An example table is set out below:

Key issue	Score	Comments
Speed reduction	10	-
Through traffic reduction	10	-
Pedestrian improvements at Treliever Road / Church Road junction	10	-
Pedestrian improvements close to shop	10	-
Pedestrian improvements on Antron Hill	10	-
Parking improvements	10	-
Community contribution	10	-
TOTAL	**70**	

Table 1: Example summary table

1.2.4 The study provides some example 'area wide' scheme drawings in order to demonstrate different approaches that could be adopted. It is anticipated that these example schemes could form the basis of initial consultation, with a preferred scheme being developed as a result of comments received. Depending on budget constraints for any construction works, a lower cost, 'fall back' scheme could also be developed.

1.2.5 This study has been produced with reference to the following advice and guidance documents:

- Design Manual for Roads and Bridges
- Manual for Streets
- Manual for Streets 2
- English Heritage Streets for All South West
- Traffic Signs Manual
- Local Transport Note 3/08:Mixed Priority Routes: Practitioners' Guide
- Local Transport Note 1/08: Traffic Management and Streetscape
- Local Transport Note 1/11: Shared Space
- Traffic Advisory Leaflet 1/04: Village Speed Limits
- Traffic Advisory Leaflet 11/00: Village traffic calming - reducing accidents
- Traffic Advisory Leaflet 9/99: 20 mph speed limits and zones
- Traffic Advisory Leaflet 3/01: Urban Street Activity in 20 mph Zones - Seedley, Salford
- Local Transport Note 1/07: Traffic Calming

2 SITE AND EXISTING CONDITIONS

2.1 Site Description

2.1.1 Mabe lies approximately 4.3km to the northwest of Falmouth. The Village layout is generally clustered around the junction of Antron Hill with Church Road and Treliever Road, with some additional ribbon residential development to the north along the eastern side of Treliever Road.

2.1.2 The village comprises approximately 270 dwellings, the majority of which are found in the residential culs de sac of Carnsew Close, Gweal Darras, Cunningham Park and Antron Way.

2.1.3 In the centre of Mabe, the junction of Antron Hill with Church Street and Treliever Road has an unusual layout, with short give-way links over a section of Antron Hill requiring eastbound traffic to give way to Treliever Road and westbound traffic to give way to Church Street.

Figure 1: Antron Hill / Church Street / Treliever Road Junction

2.1.4 To the north of the above junction, there is an area of on-street parking in a chicane arrangement outside the local shop. This results in an informal one-way shuttle working system over this stretch. Aside from this area, parking is restricted in the centre of the village by a mixture of single and double yellow parking restrictions and frequent private accesses.

2.1.5 The following road widths apply in the centre of the village:

- Antron Hill 6.7m – 5.2m
- Treliever Road 5.4m
- Church Street 4.9m

2.1.6 There are pinch point gateway features on the east and west entry points to Mabe on Antron Hill. Both of these features give priority to downhill (eastbound) traffic. Whilst there may be some localised benefits in this at the feature itself, this is likely to limit their effectiveness at reducing speeds. This is particularly of note on the western feature, which gives priority to vehicles entering the village.

Figure 2: Western pinch point feature prioritising traffic entering village

2.1.7 There is a tabletop feature on the northern entry on Treliever Road. There is no entry treatment to the south on Church Road.

2.1.8 The 30mph speed limit extends between 235m to the west of Gweal Darras, 12m to the south of the Treliever Roundabout on Treliever Road, 138m to the west of Cunningham Park and 142m south of Trenoweth Lane on Church Road. The Church Road speed limit starts a considerable distance outside the centre of the village. On-site observations indicate only one additional repeater sign on this link, approximately 35m to the south of Spargo Court.

2.1.9 Due to the dispersed nature of the key facilities within the village, there are no obvious pedestrian desire lines, although some localised pedestrian facilities may be beneficial, particularly around the Antron Hill / Church Road junction.

2.2 Local Facilities

2.2.1 The main local facilities within the village are:

- Mabe Community Primary School
- Mabe Post Office and Londis Store
- The Hair Shop
- The New Inn Public House

2.2.2 Penryn College is the main secondary school for Mabe. It is located on Kernick Road. It is a walk of approximately 1.3km from the centre of the village, equating to around 16/17 minutes.

2.2.3 There is a large Asda Supermarket and B&Q retail warehouse off Kernick Road, approximately 600m to the east of the centre of the village. Both of these retailers attract significant volumes of traffic and are likely to contribute to the rat running experienced by the village.

2.2.4 Despite the relatively steep gradient of Antron Hill, this lies between the 'acceptable' (1000m) and 'preferred maximum' (2000m) walking for travel to school set out in the Institution of Highways and Transportation's document Providing for Journeys on Foot. Cycling would also be possible, although no dedicated facilities are currently provided. The Asda roundabout and busy A39 do however create a significant barrier to pedestrian and cycle movement along this route.

2.3 Sustainable Travel

2.3.1 There are footways throughout the centre of the village, but these are of variable and often limited width; on-site observations suggest that they are often obstructed by parking.

2.3.2 There are no dedicated cycle facilities within Mabe.

2.3.3 There are a number of bus stops within Mabe. Services have recently been reduced, and the village is now only served by the following routes:

Service	Route	Frequency		
		Weekday	Saturday	Sunday
2	Penzance - Perranuthnoe - Praa Sands - Helston - Falmouth	2 hours (0800 – 1900)	2 hours (0800 – 1900)	No service
2a	Helston – Manhay – Rame – Longdowns – Mabe – Tremough Campus	PM school bus only (1550)	No service	No service
235	Truro College - Carnon Downs - Helston - Coverack	Truro College PM bus only (1659)	No Service	No Service
442	Camborne - Falmouth	2 services / day (1101 and 1326)	2 services / day (1101 and 1326)	No Service
41B	Troon - Camborne - Pool - Redruth - Penryn - Falmouth	Hourly evening service (0805 – 0005)	Hourly evening service (0805 – 0005)	2 hours (0900 – 1730)
88	Falmouth-Penryn-Truro	Hourly service (1004 – 1504)	No Service	No Service

Table 2: Mabe Bus Services

2.4 Committed and Potential Local Development Sites

2.4.1 Planning permission has recently (17th April 2013) been approved for the construction of 90 dwellings, access, estate roads and landscaping on Land Off Treliever Road (PA12/09580). This development takes its access from Treliever Hill. The associated Section 106 agreement includes a sum of £135,000 as a highways contribution to be spent on highway works and / or transport improvements within the parish of Mabe.

2.4.2 There are a further five sites within or close to the village identified within Cornwall Council's Strategic Housing Land Availability Assessment (SHLAA):

- Former Sid Knowles Waste Site, Antron Hill (4.6ha)
- Land to north of Antron Hill, Mabe TR10 9HH (1.5ha)
- Antron Hill, Mabe (2.6ha)

2.4.3 Based on a nominal semi-rural density of 30 dwellings per hectare, these sites combined would have the potential to provide a further 260 dwellings. It should however be noted that a site's inclusion in the Assessment does not imply that it will be made available for housing. The SHLAA is a technical study and not a policy document. It will identify possible housing sites and assess overall housing potential but ultimately decisions on which sites should be brought forward for development will be determined through the Cornwall Local Plan process. Given the recent grant of PA12/09580 it is considered unlikely that there will be any significant number of new residential planning consents granted in the near future.

2.5 Traffic Levels

2.5.1 Historic traffic survey data has been used to support this study. The counts used are as follows:

- Automatic Traffic Counter (ATC) placed just to the west of Mabe on Antron Hill from 20/01/2012 to 22/02/2012
- Manual count at Kernick Road Roundabout 24/05/2006
- Manual count at Kernick Road Roundabout 30/10/2006
- Manual count at Antron Hill / Church Road junction 29/04/2004
- Manual count at Antron Hill / Church Road junction 19/05/2007

2.5.2 The results of the surveys are included as Appendix A and are summarised below:

Direction	AM Peak (0800-0900)	PM Peak (1600-1700)	Daily (24hr)
Westbound (to Longdowns)	119	172	1635
Eastbound (to Mabe)	178	110	1285

Table 3: Antron Hill 2012 ATC Results (weekday averages)

2.5.3 The ATC also indicates that Antron Hill is used by relatively few HGVs; typically fewer than 10 per day.

2.5.4 The ATC also records vehicle speeds. When examining vehicle speeds, it is usual practice to measure 85th percentile speeds. This is the speed that 85% of total traffic will be travelling at or under (i.e. only 15% of drivers will exceed this speed). However, for information, the average speeds recorded are also set out:

Direction	85^{th} Percentile	Average
Westbound (to Longdowns)	43.9	36.3
Eastbound (to Mabe)	47.8	39.7

Table 4: Antron Hill ATC Speed Results (with 60mph zone)

2.5.5 The manual turning counts obtained are relatively old. The pattern of movements observed does suggest a significant proportion of rat running vehicles. The counts record more vehicles travelling through the village than the newer ATC data; this may indicate that rat running has reduced slightly in the intervening period. The counts are included in Appendix A and are summarised (along with the ATC data) in the diagrams also contained within Appendix A.

2.6 Road Safety

2.6.1 Based on the brief provided by the parish council, it is clear that there is a perception that the highway layout within Mabe is dangerous, particularly to vulnerable road users such as pedestrians and cyclists.

2.6.2 The highway layout within the village is relatively unusual and footway provision is not continuous. The layout of the junction of Antron Hill with Church Street and Treliever Road is likely to be a particular barrier to pedestrian movement, as it is unlikely that pedestrians would 'feel' safe crossing in this location. It is highly likely that this limits walking and cycling within the village.

2.6.3 Examination of the recorded personal injury accident (PIA) statistics for the area indicate that since 2010 there have been a total of 5 incidents within the 30mph speed limit in the village, 4 slight and 1 serious, with the serious incident occurring on Treliever Road. The accident statistics are attached as Appendix B. The incidents to do not demonstrate any clear pattern of cluster occurring.

2.6.4 Along the full length of Antron Hill, there have been 4 PIAs (excluding those within the 30mph limit, but including on at the A394 / Antron Hill junction); all of these have been slight.

2.6.5 In numerical terms, this is a low level of accidents, and it would appear that the perceived risk outweighs the actual risk. However, the relationships between highway layout, perceived risk and actual risk are not straightforward and there are likely to be a number of factors at work. For example, the perceived risk may be restricting pedestrian numbers so much that they are very unlikely to be involved in an accident. Alternatively, the unusual highway layout may mean that the majority of drivers and pedestrians take additional care.

2.6.6 It is important that any changes to the village layout maintain or reduce on the relatively low accident rate whilst reducing barriers to pedestrian movement. One key way to do this would be to reduce the number of vehicle movements in the area.

2.6.7 At the Asda roundabout, there have been 5 accidents since 2010, all of which have been slight.

2.6.8 On the 'alternative route', continuing along the A394 from Longdowns to Tremough and then turning right down the A39 to the Asda Roundabout, there have been 9 accidents, 7 slight and 2 fatal. This is a more significant history, primarily due to the two fatal accidents, although it should be viewed in the context of the higher number of vehicles using this route.

3 POTENTIAL TO REDUCE SPEED LIMITS

3.1.1 The parish council requested an examination of the possibilities of introducing the following:

- A 20 mph speed limit in and around the centre of the village and along Cunningham Park.
- A 40 mph speed limit along Antron Hill between the village boundary and Longdowns or the parish boundary with Budock.

3.1.2 Based on site visit observations, centre of the village and Cunningham Park both appear to be suitable for the introduction of a 20mph speed limit. The introduction of such a limit would be in line with the advice contained in Department for Transport circular 01/2013 Setting Local Speed Limits, which asks local authorities to “consider the introduction of more 20 mph limits and zones, over time, in urban areas and built-up village streets that are primarily residential, to ensure greater safety for pedestrians and cyclists”.

3.1.3 The introduction of a 20mph would need to be accompanied by traffic calming and/or regular repeater signing (no more than 50m-100m between features depending on how the limit is introduced).

3.1.4 As an alternative to physical traffic calming there may be the potential to use technology in the form of average speed enforcement cameras following the recent Home Office approval for use in 20mph zones. Cornwall Council is currently evaluating a number of trial schemes. Use elsewhere in the country has shown such technology to be effective at limiting speed.

3.1.5 In relation to the 40mph limit to the west of the village, this is not considered to be appropriate over the full length of the road. The route is relatively straight, and the 40mph limit is unlikely to be self-enforcing. This section of road would not be suitable for traffic calming measures. It is therefore recommended that the existing national speed limit is retained. With consultation, it may be possible to introduce a short length of 40mph limit prior to entry to the village in order to reinforce the need for motorists to reduce their speed.

3.1.6 The recently released Department for Transport circular 01/2013 provides advice on setting speed limits. It recommends that local authorities consider the introduction of more 20mph zones within primarily residential areas, including villages. However, it also states that speed limits should encourage self compliance and that the situation should mean that the speed should be seen as a maximum rather than target speed.

3.1.7 The guidance recommends the use of the ‘speed limit appraisal tool’ (SLAT). This piece of software is distributed by the Department for Transport. It involves five key steps:

- Defining a network of links
- Measuring accidents

- Measuring traffic flows
- Measuring traffic speeds
- Estimating Costs
- The tool quantifies the effects in terms of changes in:
- Speed, both for mean and 85th percentile speed
- Traffic flows
- Accidents
- Travel Time
- Vehicle Operating Costs
- CO2 Emissions
- NOx Emissions

3.1.8 The tool forecasts speed changes between before and after the imposition of the proposed speed limit. The user is required to forecast any changes in traffic flows on links. All the other changes are estimated based on the calculated changes in mean speed and the traffic flows specified by the user. Based on these changes and using standard WebTAG parameters the annual cost savings due to each type of change are calculated. These costs are then discounted. The tool advises a 10 year scheme appraisal period and hence discounts the costs over the 10 year period to give a Present Value of Benefit (PVB). Essentially, the tool monetises the long term impact of the scheme in terms of journey times, fuel costs and emissions.

3.1.9 There are a number of issues with the DfT software that somewhat restrict its usefulness in this situation, as they relate to limitations in the data relating to speed limit changes within villages. Essentially, the tool cannot calculate the implications of introducing a 20mph within a village. The assessment has therefore been conducted classifying Mabe as an 'Urban Area'. The implications of this are unknown, but are thought unlikely to be significant.

3.1.10 The full appraisal output is included as Appendix C. It concludes that the introduction of a 20mph limit would reduce speeds in the centre of the village and along Cunningham Park and would result in an overall cost in transport efficiency of approximately £1,163,323 and an increase in NOx and greenhouse gas emissions. Essentially this is because of the additional time taken to travel through the village and the increased emissions and fuel use resulting from the slower travel.

3.1.11 However, the tool predicts that this would be balanced by a reduced accident risk, resulting in a £1,112,618 monetised benefit.

3.1.12 The tool predicts that 85th percentile speeds would reduce to 16-22mph.

3.1.13 On balance, it is considered that the introduction of a 20mph limit in the centre of the village and on Cunningham Park would be a benefit and worth pursuing. This would need to be accompanied by regular traffic calming.

3.1.14 It is not considered appropriate to introduce a 40mph limit between Mabe and Longdowns, apart from a short section on entry to the village to help with a smooth reduction in traffic speeds.

4 REDUCING THROUGH TRAFFIC

4.1 Through Traffic

4.1.1 Rat running traffic is one of the most significant issues facing the village. The traffic survey indicates that the majority of this is heading towards the Asda roundabout from Longdowns.

4.1.2 Travelling through Mabe is approximately 1km shorter than using the A394 / Treliever roundabout. Although the A394 is a national speed limit route, so is much of the length of Antron Hill.

4.1.3 The junction between Antron Hill and the A394 has Antron Hill as the minor arm. There is a right turn facility on the A394 and Antron Hill has an exceptionally large bellmouth, with no central island. The junction is also unusually 'open', with vegetation set significantly back from the give-way line. These factors, combined with its direct alignment with the A394 at this point combine to make Antron Hill appear to be a high speed route and an attractive choice for drivers.

4.1.4 One point of note is that, if rat-running through Mabe is reduced, it is likely that additional traffic would be required to use the A394 and the Tremough junction. There would be an associated 'displaced' accident risk increase on this alternative route.

4.1.5 It must further be noted that the main way to reduce rat running is to make the 'preferred' route more attractive and the rat run less advantageous. Options to improve the A394 are limited, as it is already a national speed limit road for much of its length, and congestion is limited. There may be some long-term improvement resulting from future works to improve the Treluswell junction, which can cause congestion back to the Treliever roundabouts, but this is unlikely in the short term.

4.1.6 The most effective way to reduce through traffic is therefore to make Antron Hill less attractive to drivers by making it slower and / or more inconvenient (e.g. road humps). There would inevitably be some resulting inconvenience to residents of the village who will have no choice but to use Antron Hill. This would need to be offset against any reductions in through traffic.

4.2 Junction Works

4.2.1 There is significant opportunity to reduce the size of this junction and to use landscaping to make the route less attractive to drivers. Works to this junction would be likely to influence driver route choice. Whilst any works must be balanced with traffic capacity, particularly for busy periods such as car boot fair days, such periods are limited in number and duration. Any additional delays experienced during these limited periods should be viewed in the context of the wider benefits brought to the village. In addition, there are alternative routes out of Mabe that residents, familiar with such events, would be likely to use.

4.2.2 A potential revised layout is shown in drawing EDG0275_F_003 appended to this report. Capacity testing has been carried out for this layout in order to examine how well it would function in terms of queues and delay. This testing covers the neutral month AM and PM peak periods. This is accepted practice, but does exclude exceptionally busy periods, such as car boot days. However, for the reasons set out in the previous paragraph, it is considered that it would not be appropriate to sacrifice the wider benefits of the scheme in order to avoid delays during such limited time periods.

4.2.3 The capacity testing has been carried out using the Transport Research Laboratory's Junctions 8 software, which is the accepted 'industry standard' for assessing how priority junctions operate. The software examines the relationship of the traffic flows at the junction to the theoretical capacity of the junction. It expresses this relationship as a 'RFC' (ratio of flow to capacity) and also predicts the likely queues and driver delays. It is widely accepted that a junction is likely to operate with minimal congestion if RFCs remain below 0.85, although higher values can also be acceptable in some circumstances.

4.2.4 The full results of the modelling are included as Appendix D, with a summary in the following table:

Movement	AM Peak			PM Peak		
	RFC	Delay	Queue	RFC	Delay	Queue
Antron Hill out	0.384	0.32	0.62	0.545	0.42	1.18
A394 right turn in	0.206	0.14	0.26	0.104	0.15	0.12

Table 5: Antron Hill / A394 Capacity Testing – Revised Layout

4.2.5 The results show that the revised junction layout would operate well within its theoretical capacity, with no significant queues or delays occurring.

4.2.6 Due to the variety of circumstances and local road networks that are present in other rat running situations, it is not possible to provide a reliable estimate of the reduction in through traffic that might be achieved without detailed modelling using micro-simulation that allows for route choice. However, if combined with an appropriate traffic calming scheme within the village, it should, over time, be possible to change driver habits and significantly reduce through traffic.

4.3 Road Closures

4.3.1 Road closures have the potential to eliminate through traffic, but would impact on local residents and would therefore require significant consultation.

4.3.2 In the majority of cases, the route remains open to pedestrians, cyclists and equestrians, but is closed to motorised traffic. An alternative is a one-way closure, but in this case it would limit the benefits and would be likely to be abused. A traffic regulation order would be required for either approach. In the unlikely event that a full closure was considered necessary, a stopping up order would be required.

4.3.3 Any potential closure would be likely to take the form of a simple barrier or bollards, possibly incorporating planting or trees, closing a short section of road to vehicles. The remainder of the route would remain open, allowing access to properties etc. It would also be possible to make the barrier / gate able to be used for through use by the emergency services.

4.3.4 The key rat run is between Longdowns and the Asda Roundabout. A closure of Antron Hill would sever this, effectively limiting traffic within the village to local traffic only. There are a number of potential points that the route could be severed. Possible locations would be west of the village centre (shortly west of the car boot site), at the Antron Hill / Treliever Road / Church Road junction or to the east of the village at the Asda Roundabout. The locations are illustrated below:

Figure 3: Potential road closure locations

4.3.5 Of the above, the location to the west of the village seems to offer the least disruption to local residents. Other than the increased length of local residents' trips, the main disadvantage would be to increase the number of vehicles on Treliever Road, as those heading from Mabe towards Helston would now use this route up to the Treliever roundabout. This is however likely to be a limited number of trips and is unlikely to be a significant issue.

4.3.6 If the road were closed, through traffic would be largely eliminated (although some through to Argal Reservoir would remain). This may well remove the need for a wider traffic calming scheme, as the majority of traffic would be local and therefore more likely to travel slowly through the village.

4.3.7 There would be a potential impact at the Treliever Roundabouts. The impact is unlikely to be severe, but it would need to be examined if this option were pursued. It would also be possible to implement a trial closure to test this approach.

5 TRAFFIC CALMING OPTIONS

5.1 Introduction

5.1.1 This section examines a number of potential access options for traffic calming within the village and sets out their advantages and disadvantages.

5.1.2 Research undertaken into reducing speeds within villages has drawn the following key conclusions (as set out in LTN 1/07):

- comprehensive measures are required throughout the village if significant speed reductions are to be obtained
- gateways can reduce speeds in their vicinity by up to about 10 mph, but for reductions to be maintained in the village, additional measures need to be used
- the amount of speed reduction broadly mirrors the type of scheme: simple gateway signing and marking provides small reductions, while gateways comprising very striking visual measures or physical measures produce greater benefits
- speed reductions are maximised when visually striking or physical gateways are accompanied by repeated physical measures in the village
- the level of speed reduction achieved is affected by the ‘before’ speeds
- if the spacing of measures is too great, any speed reduction is localised
- There is often a trade-off between scheme effectiveness in terms of vehicle speed and accident reduction, and potential unwanted side effects such as visual intrusion.

5.1.3 LTN 1/07 emphasises the importance of local consultation prior to the introduction of traffic calming schemes within villages. Schemes that involve significant amounts of signage, marking and physical measures can detract from the visual appearance of a village.

5.1.4 There are essentially five main broad categories of traffic calming techniques in common use within the UK:

- Vertical deflections
  - Road humps
  - Speed cushions
  - Speed tables
- Horizontal deflections (‘chicanes’)
  - Footway build outs
  - Parking bays
  - Speed restraint bends
- Road narrowing
  - Lane width restrictions
  - Islands

    - Increase footway widths
    - Parking bays
    - Gateway / Entry feature
- Signage and speed limits
    - Rumble strips
    - Dragon’s teeth
    - Signs
    - Interactive signs
- Pedestrian crossings
    - Informal crossings
    - Pedestrian refuges
    - Road narrowing
    - Controlled crossings

5.1.5 There is a further technique, known as ‘Naked Streets’ or psychological calming that is gaining in popularity. This involves significantly reducing the street marking and signage, in order to provide less guidance to drivers. The aim of this is to increase the cognitive load on the driver, causing them to slow down. It also subconsciously indicates that the road is not just for drivers, but is also a ‘place’ where people live and work. This is discussed in greater detail below.

5.1.6 As with any traffic calming scheme, it is recommended that advice is sought from the local emergency services prior to the implementation of any such scheme within the village.

5.1.7 The above measures are discussed in more detail below. Local examples of similar measures are provided, where deemed appropriate, along with a discussion of their likely impact.

5.2 Vertical deflections

5.2.1 Vertical deflections tend to be effective at reducing speeds, with their effect linked to how frequent they are and the severity of the deflection.

5.2.2 Whilst effective at reducing speeds, they do have an adverse impact on buses and bus passenger comfort. They can also affect emergency vehicle response times.

5.2.3 There are a number of different types of vertical deflection used to reduce traffic speeds:

- Road humps
- Speed cushions
- Speed tables

5.2.4 Due to the use of Antron Hill by buses, the most appropriate form of deflection for Mabe would be a mix of speed tables or cushions, as these have less effect on large vehicles. Example photographs of both features from nearby Perranwell are shown in the following images.

Figure 4: Speed table (bottom) and speed cushions (top)

5.2.5 In order to achieve the most effective speed reduction, calming features would be spaced no more than 60-70m apart. It is usual practice to provide a mix of tables and cushions, often combined with horizontal deflections or road width reductions (see following sections). A potential layout drawing is attached as drawing EDG0275_F_001.

5.2.6 An alternative way forward may be to construct a raised table filling the entire Antron Hill / Treliever Road / Church Road junction. The principle of this would be to reduce local speeds significantly, benefiting pedestrians at this important location.

5.2.7 There are regulations in place that set out the maximum height of vertical traffic features and also the maximum gradients associated with them. There is further guidance regarding minimising their impact on bus passengers and emergency vehicles. More 'severe' deflections result in lower vehicle speeds, but have a greater impact on bus passengers and emergency vehicles. More severe features can also have a greater impact on noise levels, with vehicle speeding up and slowing down, and, often, the noise of vehicles' suspension, etc. as they negotiate the deflection.

5.2.8 Department for Transport Local Transport Note 1/07 Traffic Calming (LTN 1/07) recommends a maximum height of 75mm for road humps (the maximum permitted is 100mm) and a gradient of 1/15 as being the best compromise between speed reduction and bus passenger comfort. It should however be noted that these may have to be carefully reviewed on Antron Hill due to the gradient of the road itself.

5.2.9 A further consideration is drainage, as full width features can result in ponding (i.e. formation of large puddles) if they obstruct highway drainage. This can usually be addressed through careful design without the need to construct additional gullies.

5.3 Cost

5.3.1 Vertical traffic calming features are a relatively low cost option that can be 'retro fitted' without major works to the local highway layout. The approximate cost to install a raised table is £10,000, and a pair of speed cushions is around £4,250.

5.3.2 Signing and lining is not a mandatory requirement, but can be used to emphasise the size of the deflection. This potentially increases their effectiveness, but must be balanced with the visual impact on streetscape.

5.3.3 Based on regular features every 60-70m though the village centre, a total of around features 15 would be required. The likely total estimated cost of the scheme (including signing, lining and associated horizontal deflections) would therefore be £80-90,000.

5.4 Speed Reduction

5.4.1 The effect of speed tables and cushions on vehicle speeds depends on their severity and regularity. Table 4.3 of LTN 1/07 examines the effects of nominal 75-100mm height full road humps on vehicle speeds and is reproduced below:

Mean 'before' speed (mph)	Spacing between humps (m)						
	20	40	60	80	100	120	140
	Mean 'after' speed between humps (mph) – note 85th percentile speeds likely to be 4-5mph higher than means						
20	13	14	15	16	18	19	20
25	15	16	17	18	20	21	22
30	17	18	19	20	22	23	24
35	19	20	21	22	24	25	26

Table 6: LTN 1/07 – Effects of Speed Humps on Vehicle Speeds

5.4.2 Based on the above and a likely spacing of around 60m between features, the expected mean speeds through the village could reduce to approximately 15-21mph if full width ramps were used throughout.

5.4.3 However, it should be noted that, due to the use of the route by buses, the scheme is more likely to consist of a mix of full width ramps and speed cushions.

5.4.4 Analysis of a number of speed cushion installations (Layfield & Parry, 1998) showed that for an average cushion spacing of 70 metres and cushion width of 1700 mm, average speeds were reduced by about 10 mph to an overall average of 22 mph and an 85th percentile of 26 mph. This indicates that cushion widths of 1700 mm and spacings of 60 and 100 metres would give mean speeds of 20.5 and 24.5 mph respectively.

5.4.5 The combined effect of the overall scheme is therefore likely to result in average vehicle speeds of between a little over around 22mph.

5.5 Safety

5.5.1 There have been a number of studies of the effect of vertical traffic calming on road safety.

5.5.2 There is a strong link between vehicle speeds and accident frequency and severity. Reducing vehicle speeds usually results in an associated reduction in both of these. LTN1/07 suggests that a 1mph reduction in mean vehicle speeds will reduce accidents by 5%.

5.5.3 It should however be noted that the village currently has a low accident history. In a relatively safe environment, such as Mabe, examination of percentage reductions in accidents tends to be deceptive, as one accident would equate to a large percentage change.

5.5.4 As a result of this, it not appropriate to predict a direct, statistically significant reduction in accident numbers. Notwithstanding this, it is reasonable to conclude that accident risk and severity would generally be reduced as a result of lower vehicle speeds.

5.6 Wider Issues

5.6.1 A comprehensive traffic calming scheme can not only reduce vehicle speeds, but also reduce vehicle numbers, by making routes less attractive. Whilst changes in vehicle flows are difficult to predict due to a variety of local factors, LTN1/07 suggests that likely reductions are in the order of 20% for full width ramps and an average of 24% for speed cushion schemes.

5.6.2 There is a visual impact associated with road humps and cushions, and they can make rural villages appear to be more urban in character. This varies from site to site and would be a matter for local consultation. Visual impact could be reduced by omitting or minimising signing and lining, although this may reduce the speed reduction effect of the measures.

5.6.3 Vertical traffic calming schemes generally have a beneficial impact in terms of reduced vehicle-related noise levels. This is a result of reduced vehicle speeds and traffic numbers. There can however be a change in the 'character' of the noise, with acceleration and deceleration, suspension and tyre noise etc. This may be particularly apparent to residents living close to individual features.

5.6.4 A more complex relationship exists between traffic calming and vehicle emissions. Low speed driving is usually associated with higher individual vehicle emissions due to more regular acceleration and deceleration. Smooth, consistent, low speed driving however results in relatively low emissions. One of the issues with a vertical traffic calming scheme is that they often result in 'stop / start' driving rather than smooth driving, so individual vehicle emissions can be relatively high. This must however be offset against the likely reduction in vehicles travelling through the village. It is very unlikely that any potential increases in emissions would result in unacceptable levels of pollution, although there may be an increase when compared to the current baseline.

5.6.5 On-street parking can be adversely affected by full width tables. This would need to be examined as part of any detailed scheme design.

5.7 Advantages and Disadvantages of vertical traffic calming

- Advantages
  - Low cost (circa £4,250 - £10,000 per feature)
  - Effective speed reduction
  - Deterrent to through traffic
  - Self-enforcing.
  - Can be used by pedestrians as a crossing point (speed tables)
- Disadvantages
  - Limited effect on large vehicles
  - May delay emergency vehicles
  - Potential noise change of character as vehicles change speed

- o Potential increase in vehicle emissions
- o If used, signs and road lining that may affect village setting
- o On-street parking may be affected
- o Can lead to vehicles ‘weaving’ to minimise effect of cushions
- o Potentially irritating to local residents
- o ‘Bus friendly’ tables often have limited effect on vehicle speeds

5.7.1 The performance against key local concerns is summarised below:

Key issue	Score	Comments
Speed reduction	8	Need to accommodate buses and large vehicles likely to limit effect on cars
Through traffic reduction	7	High ‘nuisance value’ likely to deter through vehicles, but may irritate local residents
Pedestrian improvements at Treliever Road / Church Road junction	5	Raised table junction would improve matters for pedestrian by slowing vehicles at this point.
Pedestrian improvements close to shop	4	No physical improvements, but reduced vehicle speeds and numbers would benefit pedestrians
Pedestrian improvements on Antron Hill	4	No physical improvements, but reduced vehicle speeds and numbers would benefit pedestrians
Parking improvements	0	Regularly spaced features may limit on street parking
Community contribution	3	Likely to be detrimental to village appearance, but reduced vehicle speeds and numbers would be a benefit
TOTAL	**31**	

Table 7: Vertical deflections summary table

5.8 Horizontal deflections

5.8.1 Horizontal deflections are essentially road features that cause drivers to deviate from their normal path, these are often referred to as chicanes, although tightly radiused bends (speed control curves) can also used within new developments.

5.8.2 Due to the straight alignment of Antron Hill, there is no realistic potential to introduce speed control curves, and therefore some form of chicane feature would be the most likely approach. There is a danger that a simple set of kerb build outs on either side of the carriageway could appear quite ‘artificial’ and therefore detrimental to the village setting. A more appropriate way forwards may be to use marked parking bays to create the chicane.

5.8.3 The use of marked parking bays would also potentially allow the removal of the existing yellow line restrictions within the village. This could be done by amending the existing Traffic Regulation Orders (TROs) that prohibit parking on the yellow lines to instead make the centre of the village either a ‘restricted’ or ‘controlled’ zone, where parking can only take place in marked bays. It should be noted that marked bays can be indicated by a change in surface finish and white lines are not required. This approach could also therefore benefit the streetscape within the village.

5.8.4 Clearly it not possible to guarantee that parking bays would always be occupied, and it may therefore be appropriate to use kerb build outs to delimit the parking areas. An example layout from nearby Carnon Downs is shown in the following photograph:

Figure 5: Potential parking bay layout from Carnon Downs

5.9 Cost

5.9.1 Simple kerb build outs cost approximately £7,000 to construct. A chicane feature requires 2 such build outs, but there would be a potential cost saving due to them being constructed simultaneously. The likely cost of a simple kerb buildout chicane would therefore be in the region of £12,000.

5.9.2 If parking bays were used to form the chicane, then costs would be higher, due to additional construction works and the necessity of amending existing or introducing new TROs. Cost could vary considerably depending on the materials used and the complexity of the TROs. Likely costs would be in the region of £25,000.

5.10 Speed Reduction

5.10.1 The route through Mabe has to remain viable for buses and other large vehicles, such as farm traffic. These require more road space and less severe deflections, reducing the effectiveness of the measures on private cars.

5.10.2 Based on dimensions set out in Tables 6.2 and 6.3 of LTN1/07, a chicane that could accommodate large vehicles at very low speeds would be likely to achieve car speeds of around 25mph.

5.11 Safety

5.11.1 Previous studies of chicanes have noted a 54% reduction in PIAs, or 47% in urban areas. Accident severities were also reduced. There were however some additional damage only incidents, with vehicles colliding with the build outs.

5.11.2 Again, applying a straightforward reduction to accident rates within Mabe is likely to be misleading. However it is likely that there would be fewer PIAs due to reduced vehicle speeds and a potential reduction in through traffic.

5.11.3 Through traffic is likely to be reduced. A study detailed in LTN 1/07 shows average reductions of around 15% at sites with one-way working and 7% at sites with two-way working. It should be noted that the sites showed significant variation, ranging between a 55% reduction to a 15% increase.

5.12 Wider Issues

5.12.1 Attitude surveys carried out on behalf of the DfT have shown that horizontal deflections are more disliked than vertical features.

5.12.2 Acceleration and deceleration movements at chicanes have been shown to increase individual exhaust emissions. However, this may be offset by a reduction in vehicle numbers.

5.12.3 In terms of locating the features, care would have to be taken to avoid affecting vehicular access to properties with driveways. Carriageway drainage would also need to be considered.

5.12.4 If sensitively designed, kerb build outs can provide opportunities to improve streetscape, for example through the introduction of planting etc.

5.12.5 Road narrowings and chicanes can cause concerns to cyclists due to the narrow road widths and the fear that drivers may attempt to overtake. Whilst cycle bypasses can be provided, chicanes could prove to be a barrier to cycling within the village. Similar issues would apply to equestrians.

5.12.6 Chicanes are not generally suitable at points where pedestrians cross, as drivers concentrate on manoeuvring and less on on-street activity.

5.13 Advantages and Disadvantages of horizontal traffic calming

- Advantages
    - Deterrent to through traffic
    - Self-enforcing
    - Provide opportunities for street planting
    - Parking bays could be used to create a more ‘natural’ appearance

- Disadvantages
    - Limited speed reduction due to need to accommodate large vehicles
    - May be unpopular with residents
    - Higher cost than vertical calming
    - May delay emergency vehicles
    - Potential noise change of character as vehicles change speed

- o Potential increase in vehicle emissions
- o If used, signs and road lining that may affect village setting
- o Possible increase in damage only accidents
- o May dissuade cyclists
- o Unsuitable for areas where pedestrians cross

5.13.1 The performance against key local concerns is summarised below:

Key issue	Score	Comments
Speed reduction	5	Need to accommodate buses and large vehicles likely to limit effect on cars. Few opportunities to provide chicanes within village centre.
Through traffic reduction	5	Need to accommodate buses and large vehicles likely to limit effect on cars
Pedestrian improvements at Treliever Road / Church Road junction	2	No physical improvements. Reduced vehicle speeds would be a benefit, but reductions at this point likely to be minimal.
Pedestrian improvements close to shop	2	Chicanes not suitable for pedestrian crossing locations, but reduced vehicle numbers and speeds would be a marginal benefit.
Pedestrian improvements on Antron Hill	2	No physical improvements. Reduced vehicle speeds would be a marginal benefit.
Parking improvements	7	Protected parking bays could be used to create chicane type features. Traffic regulation orders would be required.
Community contribution	5	Sensitively designed build outs would offer opportunities for planting etc. to improve street scene. Opportunities would be limited in village centre.
TOTAL	**28**	

Table 8: Horizontal deflections summary table

5.14 Road narrowing

5.14.1 Mabe already benefits from two road narrowings in the form of the two gateway features on Antron Hill. It is however acknowledged that due to the way that they are aligned, they do not currently achieve the full speed reductions that could be possible.

5.14.2 There is an additional 'natural' narrowing in the form of the parking that occurs close to the shop, which regularly restricts this section to one-way working.

5.14.3 In the case of Mabe, the most successful approach would probably be to reverse the existing gateway features and to formalise the on-street parking arrangements to maximise the delays to through traffic. It is not possible to guarantee that cars would be parked at all times, so it is most likely that the parking would be formalised using kerb build outs to ensure that the speed constraint was maintained even when the parking was unoccupied. These build outs would also reduce the crossing distances for pedestrians.

5.14.4 The effectiveness of the existing gateway features could also be enhanced by increasing their visual impact to emphasise the narrowing effect. This could be done with signing and lining, or ‘dragons’ teeth’ (as in nearby Carharrack).

Figure 6: Dragons’ teeth gateway feature (Carharrack)

5.14.5 Whilst dragons’ teach are undoubtedly conspicuous, they do impact visually on the streetscape. In this location, the use of planters and street furniture is likely to be more appropriate. The example picture below is taken from Streets for All South West published by English Heritage:

Figure 7: Example gateway feature

5.14.6 LTN1/07 suggests that gateway features are effective at reducing local speeds, but need to be combined with other traffic calming measures to achieve a significant ‘area wide’ effect.

5.14.7 Road narrowings can also take place over a longer distance by reallocating roadspace. Within Mabe, this would be an opportunity to provide additional footways within the village. Alternatively, parking bays could be used to narrow the space available to through traffic.

5.14.8 A further possible approach would be to narrow the carriageway visually by the use of overrunnable buildouts along lengths of the highway. These can be overrun when necessary by larger vehicles, but give the impression of a narrower carriageway and hence cause drivers to proceed with greater care. An example from Buriton in Hampshire is shown below:

Figure 8: Overrunable buildouts

5.14.9 As the buildouts would be overrunnable, they could be used more flexibly and located where full height build outs may not be achievable. It is unlikely that vehicles would choose to overrun them on a regular basis, and only do so when necessary, so the visual impact of the narrowing would be significant and would slow traffic.

5.14.10 This could be a potential approach to address the lack of footway in the centre of the village, where the need to accommodate large vehicles turning would preclude the use of full-height kerbs. Clearly this would not be ideal, as large vehicles would need to use the kerbs on occasion. However, it would represent a significant improvement over the current situation.

5.14.11 A further opportunity may be to increase the width of existing central islands or provide new ones to narrow the through road. However, due to the limited width available, this would potentially put pedestrians in a vulnerable location within the highway and is not considered a suitable option in this location.

5.15 Cost

5.15.1 The cost of the scheme would depend on the layout and materials used. Assuming the use of good quality materials such as block paving, etc, then the approximate cost of the scheme shown in drawing EDG0275_F_002 would be in the region of £130,000.

5.15.2 If features such as planters are used, there would also be an on-going maintenance cost to be considered, although this could potentially be taken on by the parish council.

5.16 Speed Reduction

5.16.1 LTN 1/07 refers to a number of examples of road narrowing schemes. Their effectiveness at speed reduction is more varied than the vertical tables discussed above.

- Minor gateway features – general 3mph reduction in 85th percentile speeds
- Significant gateway features – general 6-7mph reduction in 85%ile speeds

5.16.2 Wider roadspace reallocation works have also been studied, although only one site was examined, so the sample size is limited. However, average speeds of 7-8mph and 85th percentile speed reductions of 8-10mph were achieved. It should be noted that this was in a 30mph limit and mean speed was 31mph after the introduction of the scheme.

5.16.3 It should be noted that, in areas with low traffic flows, vehicles are unlikely to meet opposing traffic, and are therefore able to use the full width of the road (albeit narrowed). This would potentially limit the speed reduction effect if traffic flows through the village were to reduce significantly.

5.17 Safety

5.17.1 There is limited data available on the safety implications of road narrowings. A study in Germany showed an increase in accident numbers at sites with narrowings.

5.17.2 This is however a very small sample size and is therefore limited in terms of providing any indication as to the likely effect within Mabe. It should also be noted that a reduction in through traffic would be likely to reduce accident numbers. A reduction in vehicle speeds is also likely to result in a reduction in accident severity.

5.18 Wider Issues

5.18.1 As previously highlighted, road narrowing type schemes can adversely impact on cyclists and equestrians.

5.18.2 Wider area road width reductions are likely to result in fewer changes of speed, and consequently lower emissions than individual features. These may also create an opportunity to provide additional facilities for pedestrians where the highway corridor is of sufficient width. There would however be a cost implication associated with the wider area of works required.

5.18.3 Well placed road narrowings can provide convincement crossing points for pedestrians, limiting the amount of carriageway that they need to cross. This could be particularly beneficial around the area of the village shop.

5.18.4 Signing and lining could be used to enable any potential gateway to remain conspicuous. However, this needs to be balanced with the visual impact that such an 'engineering-lead' solution may have. Alternatively, a sensitively designed gateway feature (e.g. using local stone) could help to enhance the character and distinctiveness of the village.

5.18.5 As with other schemes involving kerb relocation, drainage and on-street parking need to be carefully considered.

5.19 Summary

- Advantages
  - Deterrent to through traffic
  - Self-enforcing.
  - Can be used by pedestrians as a crossing point
  - Provide opportunities for street planting
- Disadvantages
  - Effect may be limited if traffic flows reduce significantly
  - May impact on cyclists and pedestrians
  - On-street parking may be affected

5.19.1 The performance against key local concerns is summarised below:

Key issue	Score	Comments
Speed reduction	6	Speed reduction effect would be limited if through traffic were reduced
Through traffic reduction	5	Unlikely to reduce through traffic significantly on its own. Would need to be combined with other works.
Pedestrian improvements at Treliever Road / Church Road junction	2	Need to accommodate larger vehicles prevents narrowing at this point. Reduced vehicle numbers would be a marginal benefit.
Pedestrian improvements close to shop	7	Footway could be improved and crossing width reduced
Pedestrian improvements on Antron Hill	4	Existing footway could be widened in areas. Longer areas of narrowing would reduce speeds over a similarly longer area
Parking improvements	7	Protected parking bays could be used to create chicane type features. Traffic regulation orders would be required.
Community contribution	6	Sensitively designed build outs would offer opportunities for planting etc. to improve street scene. May increase footfall in village centre.
TOTAL	**31**	

Table 9: Road narrowing summary table

5.20 Signage

5.20.1 The potential to introduce a 20mph speed limit within the village is examined in Section 3 of this report. This could be reinforced with signage. Conventional signage generally has limited impact on its own, and can be counterproductive, as drivers may concentrate on signage and be less aware of their surroundings.

5.20.2 The village already benefits from a vehicle activated speed sign (VAS) just to the west of Gweal Darras. Local Transport Note 1/07 states at paragraph 3.3.4:

5.20.3 Vehicle activated speed reminder signs have been used at the entry to 30 mph limit areas to alert drivers who are exceeding the speed limit by a pre-set margin (see Section 9.1). The signs are usually blank until a vehicle approaches at a speed above the pre-set speed. Speed reductions of about 2 to 6 mph have been obtained in 85th percentile speeds at the signs. Mean 'after' speeds were generally at or below the 30 mph limit and 85th percentile speeds still above the limit.

5.20.4 Further research by the Transport Research Laboratory (Vehicle-activated signs – a large scale evaluation) has found no evidence that the effectiveness of the signs reduces over time. The sign is therefore likely to be an effective speed reduction measure for the village.

5.21 Cost

5.21.1 The cost of installing a VAS is approximately £9,500. Typically a village like Mabe would have a sign on each of the key entry points. Adding further signs would therefore in the region of £9,500 - £38,000 depending on how many roads signs were installed.

5.22 Speed Reduction

5.22.1 The effectiveness of VAS is studied in the Transport Research Laboratory Report 548, Vehicle-activated signs – a large scale evaluation. At 30mph limit sites, the average reduction in average speed was 4.5mph, with the majority of sites seeing an average speed of below 30mph. On sites where the introduction of the VAS was coupled with a reduction in speed limit from 30mph to 20 mph, the average reduction in average speed was 6.1mph, although it should be noted that average speeds remained greater than or equal to 25mph.

5.22.2 The study found no evidence that the effectiveness of VAS reduced over time.

5.22.3 It is not known if the speed reducing effect of the signs is sustained over a wider area, so effective speed reduction on entry to the village may not translate to speed reductions within village centre.

5.23 Safety

5.23.1 In relation to accidents, the study concluded that the installation of the signs resulted in a "highly statistically significant" reduction in accident numbers at the sites with 30 and 40mph limits. The average reduction in accident rates was 58%, with the severity of accidents being unchanged. As previously discussed, it is misleading to apply this reduction to existing accident levels in Mabe, but it is reasonable to conclude that the installation of VAS at the village would reduce accident risk.

5.24 Wider Issues

5.24.1 In terms of public support, the VAS were shown to be well supported and understood. One key advantage is that only drivers exceeding the limit are targeted. Clearly there is no adverse impact on buses or emergency vehicle response times.

5.24.2 Depending on the location of the signs, it may be necessary to supply power to them, which may increase the cost of installation.

5.25 Summary

- Advantages
    - Effective speed reduction
    - Little disruption during installation
    - No adverse impact on cyclists and pedestrians
    - Can be used by pedestrians as a crossing point
    - Provide opportunities for street planting
    - Only targets vehicles exceeding speed limit
    - One sign already operational in the village
- Disadvantages
    - Unlikely to reduce speeds to less than 20mph if lower limit introduced
    - Relatively expensive
    - Limited benefit to centre of village in terms of pedestrian facilities
    - Most significant route already covered, so additional benefit likely to be limited

5.25.1 The performance against key local concerns is summarised below:

Key issue	Score	Comments
Speed reduction	4	Research indicates effective speed reduction over a long period. However, there is a sign already in place, so unlikely to be a significant reduction compared to current levels.
Through traffic reduction	3	Sign already in place, so unlikely to be a significant reduction compared to current levels.
Pedestrian improvements at Treliever Road / Church Road junction	2	Marginal benefit in terms of reduced vehicle speeds.
Pedestrian improvements close to shop	2	Marginal benefit in terms of reduced vehicle speeds.
Pedestrian improvements on Antron Hill	2	Marginal benefit in terms of reduced vehicle speeds.
Parking improvements	0	No impact
Community contribution	2	Marginal benefit in terms of reduced vehicle speeds.
TOTAL	**15**	

Table 10: VAS summary table

5.26 Pedestrian Crossings

5.26.1 Facilities within Mabe are generally clustered around the Antron Hill / Treliever Road / Church Road junction, with the shop, pub, hairdressers and post box. In addition there is the school along Cunningham Park, which can also be reached via a pedestrian path from Treliever Road, approximately 50m north of the Carnsew Close junction.

5.26.2 Pedestrian crossings can be either controlled or uncontrolled. Uncontrolled crossings give priority to vehicles and usually comprise dropped kerbs (ideally with tactile paving to aid the visually impaired) and possibly a central island to allow people to cross the road in two parts. Controlled crossings give pedestrians priority and include both traffic signal controlled crossings and zebra crossings.

5.26.3 There are no controlled pedestrian crossings in the village. There is similarly no school crossing patrol in the village.

5.26.4 The introduction of pedestrian crossings within Cornwall is covered by Part 4 of Cornwall Council's Traffic Engineering Manual. As a minimum, 50 pedestrians per hour are required during 4 peak hours.

5.26.5 The document also uses the accepted methodology for assessing the need for a controlled pedestrian crossing, the PV2 calculation (as set out in Volume 8, Section 5 of the DMRB (TA 68/96)). In this calculation, V is the 2-way total hourly flow of vehicles and P is the 2-way total hourly flow of pedestrians crossing the road within 50m on either side of the site at busy times. Given the location of the school, it is likely that the counts would be undertaken at peak school periods. In Cornwall, if the calculated value exceeds 75,000,000 then the site would meet the criterion for considering the provision of a controlled crossing.

5.26.6 West Sussex County Council has further developed this methodology to make allowances for the vulnerability of those using the crossing, accident history and the difficulty in crossing the road. This is known as the ADPV2, where A = accident weighting factor, D = difficulty factor for road traffic conditions, P = weighted sum of pedestrian movements (children under 16 count as 4) and V = weighted volume of traffic.

5.26.7 Given the location of the school, and therefore the potential number of children crossing the road, this may be a more appropriate methodology to apply.

5.26.8 Further survey work would be required in order to establish whether this threshold would be met within Mabe. On-site observations suggest that is unlikely, as there is a lack of an obvious crossing point and destination that concentrates pedestrian movements. Similarly, whilst vehicular flows are relatively high for a village location, they are not high in absolute terms.

5.26.9 The most likely location that may meet the criteria is around the Antron Hill / Treliever Road / Church Road junction, where it is likely that the school in particular creates concentrated crossing movements. Unfortunately however, the layout of the junction and visibilities achieved would preclude the introduction of a controlled crossing. There may be additional difficulties with the local gradient.

5.26.10 If a crossing were to be justified, based on the village location then a zebra crossing would probably be the preferred solution. Traffic lights are unlikely to be appropriate.

5.26.11 The main issue is the parking outside the shop. This is well used and its removal is likely to be unpopular and may impact adversely on the shop. Clearly it would not be appropriate to require pedestrians to cross from between the cars.

5.26.12 Any controlled crossing must be accompanied by a minimum of two zigzag markings to define the no parking area either side of the crossing. This equates to a minimum distance of just under 3m. These would prohibit parking in this area.

5.26.13 It should be noted that, in low speed environments, observations have shown that drivers will regularly give way to pedestrians, even at uncontrolled crossing points. This is explained in more detail in paragraph 2.7.8 of LTN 1/07

5.26.14 Where traffic speeds are low, it has been observed that some motorists give way to pedestrians crossing the road at locations that are not formal pedestrian crossing facilities. For example, this was noticed from an early stage at kerb-to-kerb road humps in Burnthouse Lane, Exeter, and it commonly occurs at the road humps in the Shenley Road town centre traffic calming scheme in Borehamwood. Studies of informal crossing places in the Historic Core Zone scheme in Shrewsbury have shown that about 20 per cent of drivers gave way to pedestrians as they were about to cross the road. This relatively high proportion was probably due to low traffic speeds (mean speed about 10–15 mph), high pedestrian flows (about 400 per hour) and the frequency of appropriate crossing places.

5.26.15 *Research carried out for the Department indicated that drivers are more likely to give way to pedestrians waiting at informal crossings when:*

- *there were more pedestrians waiting to cross;*
- *a higher proportion of pedestrians were accompanied by young children;*
- *the site had higher vehicle flows;*
- *the road was either one-way or had a central refuge;*
- *there were other humps as part of the scheme, and;*
- *there was no formal crossing (Wheeler et al., 2003).*

5.26.16 The above research indicates that pedestrians would be likely to benefit from increased driver courtesy if speeds within the village were reduced. This may significantly reduce demand for a controlled crossing.

5.27 Cost

5.27.1 The cost of installing a zebra crossing is circa £25,000.

5.28 Speed Reduction

5.28.1 The speed reduction associated with a zebra crossing would mainly be influenced by the frequency of use by pedestrians. There would be some marginal benefit simply in the presence of the crossing causing more cautious driving.

5.28.2 On-site observations suggest that pedestrian use would be relatively infrequent and it is therefore anticipated that the speed reduction effect would be minimal.

5.29 Safety

5.29.1 None of the recorded accidents within Mabe involves a pedestrian. It is therefore unlikely that there would be a material benefit in road safety. There may however be an increased feeling of security for pedestrians, which could encourage greater levels of pedestrian movement.

5.29.2 Greater numbers of pedestrians could potentially lead to an increase in accident risk. On balance however, it is considered that the road safety impact of a crossing would be neutral.

5.29.3 It should be noted that the gradient within the village may lead to visibility issues, with the crossing road markings not been conspicuous to approaching vehicles. Any crossing proposals should therefore be subject to a formal Road Safety Audit process.

5.30 Wider Issues

5.30.1 The locations where a crossing would be of benefit are most likely on key routes to the school, or close to the shop. The potential for introducing a crossing at these points is limited due to gradient, visibility or simple lack of space.

5.30.2 This, combined with the relatively low pedestrian flows mean that it is unlikely that a controlled crossing would be a realistic possibility in this location.

5.30.3 If a controlled crossing were introduced close to the shop, the existing parking would largely be lost due to the required markings etc. associated with the crossing.

5.31 Summary

- Advantages
  - May encourage pedestrian movements
- Disadvantages
  - Limited places where a crossing could be introduced
  - Limited speed reduction effect
  - Limited effect on through traffic
  - No net safety benefit
  - Unlikely to reduce speeds to less than 20mph if lower limit introduced
  - Potential issue with visibility due to gradient

5.31.1 The performance against key local concerns is summarised below:

Key issue	Score	Comments
Speed reduction	2	Unlikely to have a significant effect due to low pedestrian numbers.
Through traffic reduction	1	Unlikely to influence through traffic significantly.
Pedestrian improvements at Treliever Road / Church Road junction	0	Road geometry prevents the introduction of a controlled crossing at this location.
Pedestrian improvements close to shop	7	A controlled crossing could be introduced in this location if justified by pedestrian numbers.
Pedestrian improvements on Antron Hill	6	A controlled crossing could be introduced in this location if justified by pedestrian numbers.
Parking improvements	0	On-street parking would be affected by introduction of any controlled crossings
Community contribution	3	May encourage pedestrian movements.
TOTAL	**19**	

Table 11: Pedestrian crossing summary table

5.32 Naked Streets

5.32.1 This option would involve significantly reducing signing and lining within the village with the aim of making drivers more aware of their general surroundings and not just the road. Removing the guidance available to drivers can also make them proceed more carefully and slowly.

5.32.2 These schemes usually involve significant streetscape enhancements, such as planting, street trees, etc. and the use of a variety of different materials to achieve a range of surface finishes. They are therefore relatively expensive, but would offer a significant visual benefit to the village.

5.32.3 The following 'before and after' sample illustrations are taken from Traffic in Villages - A Toolkit for Communities Produced by Dorset AONB Partnership and Hamilton-Baillie Associates and launched by the Chartered Institution of Highways and Transportation in 2011:

Figure 9: 'Before and after' naked streets schemes (taken from Traffic in Villages - A Toolkit for Communities)

5.32.4 Antron Hill has a very highways-driven layout, with numerous engineering elements such as road lining and traffic islands. Whilst these engineering measures serve to set clear boundaries between traffic lanes, pedestrians, etc. they also give certainty to drivers by giving them a well defined route through the village, with little indication that the road serves any other function than simply a movement corridor.

5.32.5 Due to the route being relatively well defined, drivers have to pay little attention to their surroundings and are able to continue though the village at speed. Reducing the clarity of the through route means that drivers have to pay more attention to their surroundings and hence travel more slowly.

5.32.6 This option therefore increases frontage activity through planting and removes or reduces road markings to heighten drivers' awareness of the village environment. Clearly such an approach needs to be carefully implemented and monitored, but has been shown to be successful at reducing vehicle speeds in a "natural" way rather than introducing physical calming measures such as build outs and road humps.

5.32.7 It is likely that this approach would be combined with wider scheme (in particular the use of gateway features) though the village using a range of measures such as those set out in:

- Transport Research Laboratory – "Psychological" Traffic Calming
- Traffic Advisory Leaflet 1/04 – Village Speed Limits
- Traffic Advisory Leaflet 1/00 - Traffic calming in villages on major roads
- Dorset AONB Partnership - Traffic in Villages, Safety and Civility for Rural Roads, A toolkit for communities
- Sustrans Information Sheet FF38 – Rural Minor Road Traffic Calming
- Local Transport Note 1/07- Traffic Calming

5.32.8 The Antron Hill / Treliever Road / Church Road junction layout is unusual. However, such non-standard layouts are commonplace in villages throughout Cornwall, and are typical of a historical street grain. Whilst there may be some hesitancy about removing the exiting markings, it must be acknowledged that many similar layouts exist and operate safely throughout Cornwall. If vehicles are travelling slowly enough, they will 'negotiate' for road space / priority and there is little requirement for road markings.

5.32.9 If possible, the removal of road markings should be combined with road narrowing to reduce speeds further and emphasise the importance of pedestrians and other road users.

5.32.10 This 'negotiation' process and speed reduction would fit well with an overrunable footway, with the layout being similar to that seen in the bottom right of Figure 9.

5.32.11 As part of a wider traffic calming scheme though the village, this layout could bring a significant benefit in terms of speed reduction.

5.33 Cost

5.33.1 A naked streets option could be delivered at a various levels of cost depending on the area covered and quality of materials used.

5.33.2 In addition to the cost of the scheme itself, these kind of schemes tend to require more consultation than conventional traffic calming schemes. Streetscape design plays a fundamental role in the success of these schemes and the involvement of the community is key to this.

5.33.3 Without a definitive scheme, it is difficult to cost this option, but an indicative range would be £50,000 - £150,000.

5.34 Speed Reduction

5.34.1 The effectiveness of this approach would depend on a range of factors, such as the area of the scheme and how noticeable the measures were. Schemes of this nature were studies in the Transport Research Laboratory's (TRL's) report Transport Research Laboratory – "Psychological" Traffic Calming. This included driver simulator tests, public perception polls and before and after monitoring at sites where these schemes had been introduced.

5.34.2 The research showed that naked streets schemes did result in speed reductions, but that the effects varied from site to site and scheme to scheme. Reductions in average speeds of around 5-10mph were observed. The larger reductions resulted from more comprehensive schemes, where the measures were combined with road narrowings and speed limit changes. The reductions in mean speeds were greater than would normally be associated with a straightforward change in speed limit.

5.35 Safety

5.35.1 The sites monitored in the above report had no recorded accidents in the 3 years preceding the installation of the calming schemes. No accidents were recorded in the post-installation monitoring period.

5.35.2 As a result, the report did not draw any distinct conclusions on accident risk. It does however emphasise that the link between reduced speed and a reduced frequency and severity of accidents is well established.

5.36 Wider Issues

5.36.1 The naked streets approach has much to recommend it in terms of street design and place making. A sensitively designed scheme could contribute significantly to the general feel of the village.

5.36.2 There would be opportunities for street planting, etc. that could further benefit the community.

5.36.3 The use of higher quality materials and a more detailed layout would be likely to lead to higher initial construction costs and ongoing maintenance costs. It may be that the community takes on some responsibilities for this, particularly in regard to planting and landscaping.

5.36.4 Community consultation and design workshops are an essential part of developing schemes of this nature. Again, this tends to lead to higher initial costs, but usually results in a better scheme with greater community engagement and involvement, leading to intangible benefits such as increase civic pride, etc.

5.37 Summary

- Advantages

- o Effective speed reduction
- o Improved streetscape within village
- o Opportunities to improve facilities for cyclists and pedestrians
- o Provides opportunities for street planting
- o Wider benefits to community

- Disadvantages
  - o Typically higher design and construction costs
  - o Typically higher maintenance costs

5.37.1 The performance against key local concerns is summarised below:

Key issue	Score	Comments
Speed reduction	7	Research indicates effective speed reduction over a long period
Through traffic reduction	5	Unlikely to deter significant numbers of through vehicles, but should be effective if combined with other measures such as gateways and works to the A394 / Antron Hill junction.
Pedestrian improvements at Treliever Road / Church Road junction	6	Probably as big an improvement as could realistically be achieved in this constrained location.
Pedestrian improvements close to shop	6	Depends on scheme layout, but significant improvements should be achievable.
Pedestrian improvements on Antron Hill	6	Depends on scheme layout, but significant improvements should be achievable.
Parking improvements	5	Depends on scheme layout. Would be possible to implement a Parking Zone within the village and formalise parking arrangements to allow removal of yellow lines.
Community contribution	7	Significant opportunities for community engagement during design process and on-going maintenance. A comprehensive scheme would reinforce the 'sense of place' within the village and encourage greater pedestrian movements.
TOTAL	**42**	

Table 12: Naked Streets summary table

5.38 Overall Summary of Options

5.38.1 A summary table for all of the options is set out below:

Key issue	Vertical deflections	Horizontal deflections	Road narrowing	Signage	Pedestrian Crossings	Naked Streets
Speed reduction	8	5	6	4	2	7
Through traffic reduction	7	5	5	3	1	5
Pedestrian improvements at Treliever Road / Church Road junction	5	2	2	2	0	6
Pedestrian improvements close to shop	4	2	7	2	7	6
Pedestrian improvements on Antron Hill	4	2	4	2	6	6
Parking improvements	0	7	7	0	0	5
Community contribution	3	5	6	2	3	7
TOTAL	**31**	**28**	**31**	**15**	**19**	**42**

Table 13: All Options Summary Table

5.38.2 Whilst Naked Streets has the highest score, it is also likely to have the highest cost. This needs to be carefully considered prior to selecting a way forwards.

5.38.3 This report is intended to describe for the Parish Council the traffic calming options available and their likely impact. It is likely that the final scheme would be a combination of all or some of the above, and developed in consultation with Cornwall Council and the local community.

6 RECOMMENDATIONS

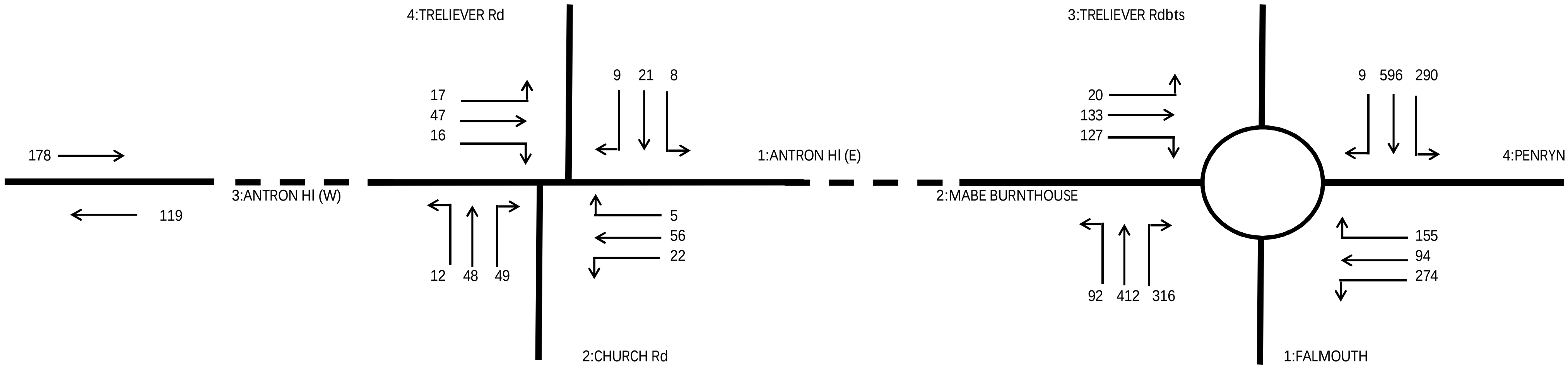
6.1.1 This report shows that rat running between the A394 and Asda roundabout is a significant issue for the village. Reducing this through traffic would reduce accident risk within the village, as well as reducing noise and generally improving the village environment.

6.1.2 Works should be carried out at the Antron Hill / A394 junction to make the route less attractive to through traffic. This should be combined with speed limit reductions and a traffic calming scheme within Mabe.

6.1.3 At this stage a specific recommendations on the form of traffic calming to be used cannot be made, as this should be a matter for discussion with the local community. In order to inform this process, this report has set out a range of traffic calming measures, their likely effects and their advantages and disadvantages.

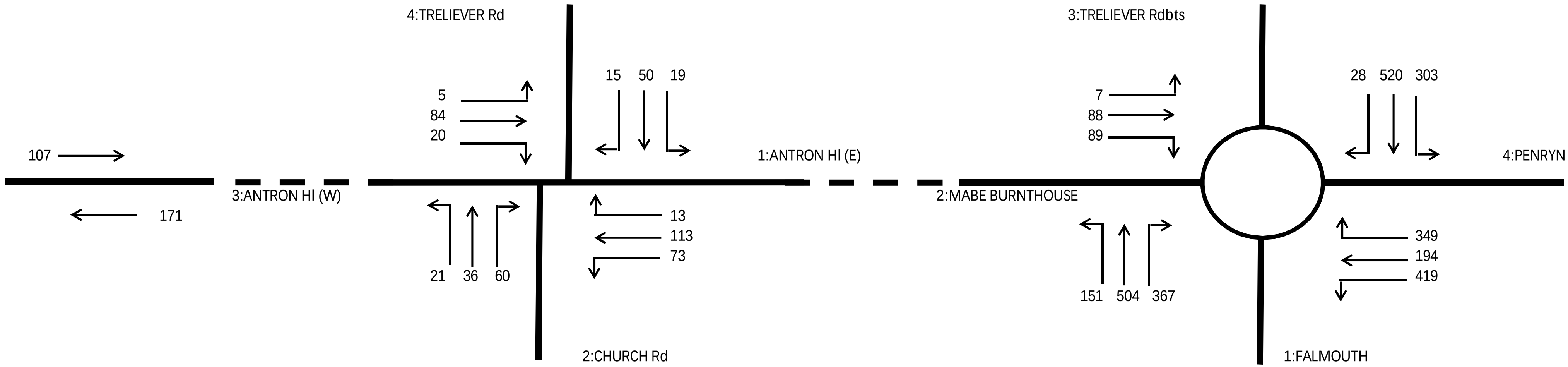
6.1.4 It is likely that any future scheme would use a combination of traffic calming techniques. A number of potential schemes are appended to this document in order to form the basis of discussions during a consultation process.

Appendix A
Traffic Surveys



Mabe Traffic Flow Diagram

Hour Start: 08:00



Mabe Traffic Flow Diagram

Hour Start: 17:00

Site No: 00000976 Site Reference: 00000976
Trenoweth, Mabe - C7 (Tube)
Average Vehicle Count Report Period: 16-Jan-12 to 22-Feb 12 Channel: To Longdowns

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	4-Day Av	7-Day Av
00:00	4	6	7	8	7	13	17	6	9
01:00	1	4	4	4	4	8	10	3	5
02:00	1	3	1	1	2	8	10	1	4
03:00	1	5	2	2	2	5	7	2	3
04:00	3	3	2	4	3	4	3	3	3
05:00	3	5	4	4	3	4	2	4	4
06:00	27	26	28	28	26	8	6	27	21
07:00	104	99	104	103	93	27	12	102	77
08:00	107	128	121	121	106	46	25	119	93
09:00	90	87	84	98	98	75	57	90	84
10:00	98	109	104	101	107	102	77	103	100
11:00	115	110	115	112	125	132	124	113	119
12:00	115	122	128	106	132	147	145	118	128
13:00	117	121	111	125	137	146	129	118	126
14:00	113	128	132	121	139	130	126	123	127
15:00	144	165	159	151	168	142	126	155	151
16:00	163	180	167	179	158	137	113	172	157
17:00	166	176	170	172	174	117	75	171	150
18:00	91	98	99	101	110	77	49	97	89
19:00	57	67	65	58	77	60	39	62	61
20:00	42	48	49	55	56	38	25	49	45
21:00	36	36	48	40	40	33	13	40	35
22:00	19	26	27	29	34	27	15	25	25
23:00	15	18	19	21	22	22	9	18	18
12H,7-19	1423	1521	1493	1491	1547	1277	1058	1482	1402
16H,6-22	1586	1698	1685	1672	1746	1417	1141	1660	1564
18H,6-24	1620	1741	1731	1723	1802	1465	1165	1704	1607
24H,0-24	1633	1767	1751	1747	1824	1507	1213	1725	1635
Am	11:00	08:00	08:00	08:00	11:00	11:00	11:00	08:00	11:00
Peak	115	128	121	121	125	132	124	119	119
Pm	17:00	16:00	17:00	16:00	17:00	12:00	12:00	16:00	16:00
Peak	166	180	170	179	174	147	145	172	157

Site No: 00000976 Site Reference: 00000976
Trenoweth, Mabe - C7 (Tube)
Vehicle Count Report Week Begin: 16-Jan-12 Channel: To Longdowns

Time Begin	Mon 16/01/2012	Tue 17/01/2012	Wed 18/01/2012	Thu 19/01/2012	Fri 20/01/2012	Sat 21/01/2012	Sun 22/01/2012	4-Day Av	7-Day Av
00:00	-	-	-	-	8	13	16	-	-
01:00	-	-	-	-	4	8	11	-	-
02:00	-	-	-	-	3	10	10	-	-
03:00	-	-	-	-	2	5	4	-	-
04:00	-	-	-	-	6	4	3	-	-
05:00	-	-	-	-	4	5	2	-	-
06:00	-	-	-	-	20	7	6	-	-
07:00	-	-	-	-	94	26	9	-	-
08:00	-	-	-	-	135	30	26	-	-
09:00	-	-	-	-	102	76	57	-	-
10:00	-	-	-	-	102	104	63	-	-
11:00	-	-	-	-	130	126	131	-	-
12:00	-	-	-	74	145	150	144	74	105
13:00	-	-	-	120	129	132	116	120	122
14:00	-	-	-	150	150	143	142	150	148
15:00	-	-	-	154	168	141	130	154	151
16:00	-	-	-	185	185	132	122	185	168
17:00	-	-	-	144	176	124	83	144	137
18:00	-	-	-	94	103	74	48	94	86
19:00	-	-	-	71	74	47	40	71	64
20:00	-	-	-	68	63	47	28	68	59
21:00	-	-	-	38	43	38	16	38	36
22:00	-	-	-	35	40	33	16	35	33
23:00	-	-	-	23	21	28	7	23	21
12H,7-19	-	-	-	-	1619	1258	1071	-	-
16H,6-22	-	-	-	-	1819	1397	1161	-	-
18H,6-24	-	-	-	-	1880	1458	1184	-	-
24H,0-24	-	-	-	-	1907	1503	1230	-	-
Am	-	-	-	-	08:00	11:00	11:00	-	-
Peak	-	-	-	-	135	126	131	-	-
Pm	-	-	-	16:00	16:00	12:00	12:00	-	-
Peak	-	-	-	185	185	150	144	185	174

Site No: 00000976 Site Reference: 00000976
Trenoweth, Mabe - C7 (Tube)
Vehicle Count Report Week Begin: 23-Jan-12 Channel: To Longdowns

Time Begin	Mon 23/01/2012	Tue 24/01/2012	Wed 25/01/2012	Thu 26/01/2012	Fri 27/01/2012	Sat 28/01/2012	Sun 29/01/2012	4-Day Av	7-Day Av
00:00	5	8	12	13	6	16	22	10	12
01:00	0	3	1	3	4	7	8	2	4
02:00	0	7	1	2	1	5	16	3	5
03:00	2	5	0	2	4	9	10	2	5
04:00	3	1	3	5	4	3	2	3	3
05:00	4	7	3	5	3	1	1	5	3
06:00	37	26	34	35	35	7	6	33	26
07:00	113	101	110	99	105	23	14	106	81
08:00	110	135	115	135	108	55	31	124	98
09:00	106	83	66	107	96	78	58	91	85
10:00	95	108	92	89	89	112	68	96	93
11:00	112	95	101	114	138	155	104	106	117
12:00	122	125	132	105	113	165	137	121	128
13:00	112	128	110	122	142	156	121	118	127
14:00	113	117	141	120	141	124	119	123	125
15:00	134	161	133	155	156	141	132	146	145
16:00	166	171	168	176	149	160	108	170	157
17:00	154	173	155	183	168	128	63	166	146
18:00	87	94	83	96	106	78	46	90	84
19:00	48	62	60	49	88	64	41	55	59
20:00	45	57	57	51	50	43	27	53	47
21:00	40	32	47	36	35	37	8	39	34
22:00	17	29	28	37	26	34	10	28	26
23:00	14	20	20	21	24	22	9	19	19
12H,7-19	1424	1491	1406	1501	1511	1375	1001	1456	1387
16H,6-22	1594	1668	1604	1672	1719	1526	1083	1635	1552
18H,6-24	1625	1717	1652	1730	1769	1582	1102	1681	1597
24H,0-24	1639	1748	1672	1760	1791	1623	1161	1705	1628
Am	07:00	08:00	08:00	08:00	11:00	11:00	11:00	-	-
Peak	113	135	115	135	138	155	104	125	128
Pm	16:00	17:00	16:00	17:00	17:00	12:00	12:00	-	-
Peak	166	173	168	183	168	165	137	173	166

Site No: 00000976 Site Reference: 00000976
Trenoweth, Mabe - C7 (Tube)
Vehicle Count Report Week Begin: 30-Jan-12 Channel: To Longdowns

Time Begin	Mon 30/01/2012	Tue 31/01/2012	Wed 01/02/2012	Thu 02/02/2012	Fri 03/02/2012	Sat 04/02/2012	Sun 05/02/2012	4-Day Av	7-Day Av
00:00	5	5	7	6	6	7	19	6	8
01:00	5	4	6	7	4	5	7	6	5
02:00	1	3	1	1	2	9	4	2	3
03:00	0	6	3	1	3	5	6	3	3
04:00	3	4	2	4	2	4	4	3	3
05:00	5	6	3	3	2	4	1	4	3
06:00	29	26	21	28	21	4	4	26	19
07:00	114	97	104	102	93	24	13	104	78
08:00	123	154	121	124	98	49	24	131	99
09:00	83	87	100	79	91	69	53	87	80
10:00	100	113	105	111	101	87	70	107	98
11:00	101	96	128	110	129	118	124	109	115
12:00	99	115	135	114	141	144	153	116	129
13:00	110	116	122	125	149	140	153	118	131
14:00	108	125	135	111	126	114	122	120	120
15:00	139	157	180	135	168	139	115	153	148
16:00	157	162	162	169	138	132	125	163	149
17:00	172	160	173	161	179	112	69	167	147
18:00	93	101	103	109	114	75	57	102	93
19:00	62	74	64	66	72	69	30	67	62
20:00	36	44	59	51	53	36	33	48	45
21:00	38	31	49	41	42	24	12	40	34
22:00	16	26	31	20	30	23	16	23	23
23:00	16	14	18	24	12	14	10	18	15
12H,7-19	1399	1483	1568	1450	1527	1203	1078	1475	1387
16H,6-22	1564	1658	1761	1636	1715	1336	1157	1655	1547
18H,6-24	1596	1698	1810	1680	1757	1373	1183	1696	1585
24H,0-24	1615	1726	1832	1702	1776	1407	1224	1719	1612
Am	08:00	08:00	11:00	08:00	11:00	11:00	11:00	-	-
Peak	123	154	128	124	129	118	124	132	129
Pm	17:00	16:00	15:00	16:00	17:00	12:00	13:00	-	-
Peak	172	162	180	169	179	144	153	171	166

Site No: 00000976 Site Reference: 00000976
Trenoweth, Mabe - C7 (Tube)
Vehicle Count Report Week Begin: 06-Feb-12 Channel: To Longdowns

Time Begin	Mon 06/02/2012	Tue 07/02/2012	Wed 08/02/2012	Thu 09/02/2012	Fri 10/02/2012	Sat 11/02/2012	Sun 12/02/2012	4-Day Av	7-Day Av
00:00	3	7	4	6	10	9	14	5	8
01:00	0	3	2	4	4	11	5	2	4
02:00	1	1	0	1	1	6	11	1	3
03:00	0	5	4	2	0	3	9	3	3
04:00	3	7	2	3	2	3	1	4	3
05:00	1	7	4	9	3	3	3	5	4
06:00	29	29	32	23	33	13	6	28	24
07:00	107	100	100	100	93	21	10	102	76
08:00	104	127	133	118	97	48	24	121	93
09:00	95	86	68	90	99	77	51	85	81
10:00	86	102	101	87	115	103	90	94	98
11:00	128	120	108	116	101	131	118	118	117
12:00	115	103	111	106	121	142	140	109	120
13:00	101	124	95	127	139	148	128	112	123
14:00	115	136	130	126	146	153	116	127	132
15:00	149	174	184	141	172	165	131	162	159
16:00	152	183	179	178	164	132	105	173	156
17:00	154	156	163	187	155	111	78	165	143
18:00	88	98	99	97	113	75	41	96	87
19:00	57	72	81	54	81	62	42	66	64
20:00	43	45	38	52	48	34	21	45	40
21:00	36	39	47	56	38	29	15	45	37
22:00	25	25	28	28	37	19	15	27	25
23:00	12	18	18	16	25	20	8	16	17
12H,7-19	1394	1509	1471	1473	1515	1306	1032	1462	1386
16H,6-22	1559	1694	1669	1658	1715	1444	1116	1645	1551
18H,6-24	1596	1737	1715	1702	1777	1483	1139	1688	1593
24H,0-24	1604	1767	1731	1727	1797	1518	1182	1707	1618
Am	11:00	08:00	08:00	08:00	10:00	11:00	11:00	-	-
Peak	128	127	133	118	115	131	118	127	124
Pm	17:00	16:00	15:00	17:00	15:00	15:00	12:00	-	-
Peak	154	183	184	187	172	165	140	177	169

Site No: 00000976 Site Reference: 00000976
Trenoweth, Mabe - C7 (Tube)
Vehicle Count Report Week Begin: 13-Feb-12 Channel: To Longdowns

Time Begin	Mon 13/02/2012	Tue 14/02/2012	Wed 15/02/2012	Thu 16/02/2012	Fri 17/02/2012	Sat 18/02/2012	Sun 19/02/2012	4-Day Av	7-Day Av
00:00	4	5	8	8	6	18	13	6	9
01:00	0	3	6	4	4	11	18	3	7
02:00	0	4	3	0	4	8	8	2	4
03:00	1	3	2	2	1	4	6	2	3
04:00	3	2	2	4	2	4	3	3	3
05:00	1	2	2	3	5	7	2	2	3
06:00	15	21	23	23	23	8	7	21	17
07:00	75	93	88	97	78	40	12	88	69
08:00	84	96	98	93	91	47	20	93	76
09:00	65	91	100	104	101	74	65	90	86
10:00	92	123	117	119	128	106	95	113	111
11:00	130	125	117	103	129	132	141	119	125
12:00	123	130	141	129	141	132	151	131	135
13:00	146	130	124	130	124	153	127	133	133
14:00	126	140	138	144	134	115	129	137	132
15:00	154	168	151	172	174	123	124	161	152
16:00	184	202	169	186	155	129	107	185	162
17:00	186	218	186	187	192	108	83	194	166
18:00	99	106	107	107	116	85	53	105	96
19:00	65	67	63	51	68	59	44	62	60
20:00	40	47	50	55	66	32	18	48	44
21:00	41	47	47	28	42	37	14	41	37
22:00	20	16	23	27	37	25	16	22	23
23:00	18	19	23	22	27	26	11	21	21
12H,7-19	1464	1622	1536	1571	1563	1244	1107	1548	1444
16H,6-22	1625	1804	1719	1728	1762	1380	1190	1719	1601
18H,6-24	1663	1839	1765	1777	1826	1431	1217	1761	1645
24H,0-24	1672	1858	1788	1798	1848	1483	1267	1779	1673
Am	11:00	11:00	11:00	10:00	11:00	11:00	11:00	-	-
Peak	130	125	117	119	129	132	141	123	128
Pm	17:00	17:00	17:00	17:00	17:00	13:00	12:00	-	-
Peak	186	218	186	187	192	153	151	194	182

Site No: 00000976 Site Reference: 00000976
Trenoweth, Mabe - C7 (Tube)
Vehicle Count Report Week Begin: 20-Feb-12 Channel: To Longdowns

Time Begin	Mon 20/02/2012	Tue 21/02/2012	Wed 22/02/2012	Thu 23/02/2012	Fri 24/02/2012	Sat 25/02/2012	Sun 26/02/2012	4-Day Av	7-Day Av
00:00	4	5	4	8	-	-	-	5	-
01:00	0	5	5	4	-	-	-	4	-
02:00	1	1	0	0	-	-	-	1	-
03:00	1	5	1	2	-	-	-	2	-
04:00	4	2	2	4	-	-	-	3	-
05:00	5	5	7	2	-	-	-	5	-
06:00	26	26	30	32	-	-	-	29	-
07:00	109	102	120	118	-	-	-	112	-
08:00	114	128	138	134	-	-	-	129	-
09:00	103	88	86	109	-	-	-	97	-
10:00	118	97	103	101	-	-	-	105	-
11:00	105	116	119	118	-	-	-	115	-
12:00	116	138	119	105	-	-	-	120	-
13:00	115	105	105	128	-	-	-	113	-
14:00	104	120	115	77	-	-	-	104	-
15:00	144	164	149	-	-	-	-	152	-
16:00	156	180	156	-	-	-	-	164	-
17:00	163	175	172	-	-	-	-	170	-
18:00	88	89	104	-	-	-	-	94	-
19:00	55	60	59	-	-	-	-	58	-
20:00	44	48	43	-	-	-	-	45	-
21:00	27	30	52	-	-	-	-	36	-
22:00	18	32	26	-	-	-	-	25	-
23:00	16	17	18	-	-	-	-	17	-
12H,7-19	1435	1502	1486	-	-	-	-	1474	-
16H,6-22	1587	1666	1670	-	-	-	-	1641	-
18H,6-24	1621	1715	1714	-	-	-	-	1683	-
24H,0-24	1636	1738	1733	-	-	-	-	1702	-
Am	10:00	08:00	08:00	08:00	-	-	-	-	-
Peak	118	128	138	134	-	-	-	130	-
Pm	17:00	16:00	17:00	-	-	-	-	-	-
Peak	163	180	172	-	-	-	-	172	-

Site No: 00000976 Site Reference: 00000976
Trenoweth, Mabe - C7 (Tube)
Average Vehicle Count Report Period: 16-Jan-12 to 22-Feb 12 Channel: To Mabe

Time Begin	Mon	Tue	Wed	Thu	Fri	Sat	Sun	4-Day Av	7-Day Av
00:00	3	3	2	2	3	8	7	3	4
01:00	1	1	2	2	1	4	7	1	3
02:00	2	3	2	2	2	5	4	2	3
03:00	1	3	1	2	2	4	4	2	3
04:00	3	4	4	5	4	6	3	4	4
05:00	11	7	9	9	9	6	3	9	8
06:00	21	22	20	21	21	9	4	21	17
07:00	91	88	88	92	81	26	14	90	69
08:00	177	185	180	171	168	51	21	178	136
09:00	93	98	105	98	97	66	43	98	86
10:00	89	87	89	93	109	92	80	89	91
11:00	94	92	101	99	107	114	96	96	100
12:00	87	94	90	99	101	115	106	92	99
13:00	91	100	89	94	101	111	100	94	98
14:00	86	92	87	88	92	96	96	88	91
15:00	94	104	103	107	106	88	80	102	97
16:00	101	117	101	120	112	76	68	110	99
17:00	95	110	113	108	94	75	57	107	93
18:00	64	80	68	73	72	62	51	71	67
19:00	41	44	48	49	55	49	33	46	46
20:00	23	25	27	29	31	28	22	26	26
21:00	16	24	22	25	27	20	14	22	21
22:00	15	20	15	14	17	20	8	16	16
23:00	7	6	8	10	12	14	5	8	9
12H,7-19	1161	1246	1213	1241	1240	972	811	1216	1127
16H,6-22	1263	1361	1331	1365	1374	1078	884	1330	1237
18H,6-24	1285	1388	1354	1389	1403	1112	896	1354	1261
24H,0-24	1306	1410	1374	1411	1425	1145	924	1375	1285
Am	08:00	08:00	08:00	08:00	08:00	11:00	11:00	08:00	08:00
Peak	177	185	180	171	168	114	96	178	136
Pm	16:00	16:00	17:00	16:00	16:00	12:00	12:00	16:00	16:00
Peak	101	117	113	120	112	115	106	110	99

Site No: 00000976 Site Reference: 00000976
Trenoweth, Mabe - C7 (Tube)
Vehicle Count Report Week Begin: 16-Jan-12 Channel: To Mabe

Time Begin	Mon 16/01/2012	Tue 17/01/2012	Wed 18/01/2012	Thu 19/01/2012	Fri 20/01/2012	Sat 21/01/2012	Sun 22/01/2012	4-Day Av	7-Day Av
00:00	-	-	-	-	4	9	7	-	-
01:00	-	-	-	-	1	6	2	-	-
02:00	-	-	-	-	2	5	5	-	-
03:00	-	-	-	-	2	6	1	-	-
04:00	-	-	-	-	5	6	3	-	-
05:00	-	-	-	-	8	6	3	-	-
06:00	-	-	-	-	27	11	4	-	-
07:00	-	-	-	-	89	24	14	-	-
08:00	-	-	-	-	186	56	23	-	-
09:00	-	-	-	-	100	56	53	-	-
10:00	-	-	-	-	105	78	70	-	-
11:00	-	-	-	-	110	119	100	-	-
12:00	-	-	-	64	123	110	98	64	84
13:00	-	-	-	101	108	106	99	101	102
14:00	-	-	-	94	96	93	101	94	95
15:00	-	-	-	108	114	85	74	108	101
16:00	-	-	-	108	133	77	85	108	104
17:00	-	-	-	108	102	77	54	108	95
18:00	-	-	-	65	77	69	51	65	65
19:00	-	-	-	46	59	51	36	46	47
20:00	-	-	-	31	31	21	23	31	28
21:00	-	-	-	26	27	27	16	26	25
22:00	-	-	-	14	16	15	8	14	14
23:00	-	-	-	14	7	11	5	14	11
12H,7-19	-	-	-	-	1343	950	822	-	-
16H,6-22	-	-	-	-	1487	1060	901	-	-
18H,6-24	-	-	-	-	1510	1086	914	-	-
24H,0-24	-	-	-	-	1532	1124	935	-	-
Am	-	-	-	-	08:00	11:00	11:00	-	-
Peak	-	-	-	-	186	119	100	-	-
Pm	-	-	-	17:00	16:00	12:00	14:00	-	-
Peak	-	-	-	108	133	110	101	108	111

Site No: 00000976 Site Reference: 00000976
Trenoweth, Mabe - C7 (Tube)
Vehicle Count Report Week Begin: 23-Jan-12 Channel: To Mabe

Time Begin	Mon 23/01/2012	Tue 24/01/2012	Wed 25/01/2012	Thu 26/01/2012	Fri 27/01/2012	Sat 28/01/2012	Sun 29/01/2012	4-Day Av	7-Day Av
00:00	3	4	2	4	5	11	12	3	6
01:00	1	0	0	3	1	5	7	1	2
02:00	2	4	1	2	3	5	6	2	3
03:00	1	3	1	2	3	5	7	2	3
04:00	2	4	4	4	2	6	7	4	4
05:00	12	7	7	11	10	6	2	9	8
06:00	24	20	24	21	21	9	3	22	17
07:00	104	87	89	94	88	27	13	94	72
08:00	195	206	198	193	193	52	23	198	151
09:00	80	110	99	93	94	67	39	96	83
10:00	98	80	78	92	105	105	78	87	91
11:00	72	99	92	94	104	122	94	89	97
12:00	84	79	93	103	74	108	114	90	94
13:00	86	104	87	89	103	120	93	92	97
14:00	83	84	81	86	78	98	83	84	85
15:00	96	106	103	116	101	100	70	105	99
16:00	103	114	103	118	116	89	54	110	100
17:00	92	105	124	104	109	90	55	106	97
18:00	69	72	61	59	80	60	44	65	64
19:00	32	40	44	52	55	46	23	42	42
20:00	28	19	26	22	29	28	20	24	25
21:00	20	29	19	29	18	25	10	24	21
22:00	9	21	17	13	17	24	6	15	15
23:00	4	3	9	11	8	16	5	7	8
12H,7-19	1162	1246	1208	1241	1245	1038	760	1214	1129
16H,6-22	1266	1354	1321	1365	1368	1146	816	1327	1234
18H,6-24	1279	1378	1347	1389	1393	1186	827	1348	1257
24H,0-24	1300	1400	1362	1415	1417	1224	868	1369	1284
Am	08:00	08:00	08:00	08:00	08:00	11:00	11:00	-	-
Peak	195	206	198	193	193	122	94	198	172
Pm	16:00	16:00	17:00	16:00	16:00	13:00	12:00	-	-
Peak	103	114	124	118	116	120	114	115	116

Site No: 00000976 Site Reference: 00000976
Trenoweth, Mabe - C7 (Tube)
Vehicle Count Report Week Begin: 30-Jan-12 Channel: To Mabe

Time Begin	Mon 30/01/2012	Tue 31/01/2012	Wed 01/02/2012	Thu 02/02/2012	Fri 03/02/2012	Sat 04/02/2012	Sun 05/02/2012	4-Day Av	7-Day Av
00:00	6	3	1	1	3	3	3	3	3
01:00	2	0	2	0	3	3	5	1	2
02:00	2	4	2	2	3	5	3	3	3
03:00	1	1	1	4	1	2	3	2	2
04:00	4	3	3	2	5	4	1	3	3
05:00	12	9	9	11	11	5	2	10	8
06:00	22	18	19	20	21	9	5	20	16
07:00	89	80	71	89	72	22	16	82	63
08:00	194	208	177	181	148	49	19	190	139
09:00	112	101	122	104	87	68	35	110	90
10:00	75	86	103	81	106	93	78	86	89
11:00	88	95	108	94	107	111	93	96	99
12:00	83	90	101	97	101	110	116	93	100
13:00	97	107	87	106	102	102	114	99	102
14:00	89	102	91	78	98	84	106	90	93
15:00	93	94	114	94	117	90	93	99	99
16:00	108	127	109	123	101	63	55	117	98
17:00	95	104	119	106	77	49	58	106	87
18:00	59	80	75	76	68	60	45	73	66
19:00	50	30	53	48	59	39	39	45	45
20:00	22	24	31	32	22	32	23	27	27
21:00	13	22	23	25	26	18	11	21	20
22:00	10	18	14	15	17	23	7	14	15
23:00	9	8	8	9	9	14	4	9	9
12H,7-19	1182	1274	1277	1229	1184	901	828	1241	1125
16H,6-22	1289	1368	1403	1354	1312	999	906	1354	1233
18H,6-24	1308	1394	1425	1378	1338	1036	917	1376	1257
24H,0-24	1335	1414	1443	1398	1364	1058	934	1398	1278
Am	08:00	08:00	08:00	08:00	08:00	11:00	11:00 -	-	
Peak	194	208	177	181	148	111	93	190	159
Pm	16:00	16:00	17:00	16:00	15:00	12:00	12:00 -	-	
Peak	108	127	119	123	117	110	116	119	117

Site No: 00000976 Site Reference: 00000976
Trenoweth, Mabe - C7 (Tube)
Vehicle Count Report Week Begin: 06-Feb-12 Channel: To Mabe

Time Begin	Mon 06/02/2012	Tue 07/02/2012	Wed 08/02/2012	Thu 09/02/2012	Fri 10/02/2012	Sat 11/02/2012	Sun 12/02/2012	4-Day Av	7-Day Av
00:00	3	3	3	1	3	6	6	3	4
01:00	1	1	2	4	2	5	11	2	4
02:00	1	2	2	3	0	3	5	2	2
03:00	1	5	3	3	4	5	3	3	3
04:00	1	4	4	7	4	7	1	4	4
05:00	8	3	7	8	9	6	4	7	6
06:00	24	21	14	14	13	9	4	18	14
07:00	84	82	93	87	81	29	11	87	67
08:00	183	194	194	164	176	47	16	184	139
09:00	98	96	104	83	108	69	46	95	86
10:00	89	63	76	80	105	87	83	77	83
11:00	91	67	92	110	100	101	103	90	95
12:00	82	91	63	98	98	120	98	84	93
13:00	84	88	97	80	83	120	95	87	92
14:00	82	86	92	108	80	106	94	92	93
15:00	89	103	104	120	103	90	75	104	98
16:00	91	112	104	123	97	71	62	108	94
17:00	90	115	109	109	77	77	54	106	90
18:00	69	85	75	85	67	65	47	79	70
19:00	45	53	50	48	46	55	33	49	47
20:00	17	23	25	27	37	27	17	23	25
21:00	19	24	25	24	28	15	14	23	21
22:00	19	27	13	16	21	26	9	19	19
23:00	5	5	6	8	19	14	7	6	9
12H,7-19	1132	1182	1203	1247	1175	982	784	1191	1101
16H,6-22	1237	1303	1317	1360	1299	1088	852	1304	1208
18H,6-24	1261	1335	1336	1384	1339	1128	868	1329	1236
24H,0-24	1276	1353	1357	1410	1361	1160	898	1349	1259
Am	08:00	08:00	08:00	08:00	08:00	11:00	11:00	-	-
Peak	183	194	194	164	176	101	103	184	159
Pm	16:00	17:00	17:00	16:00	15:00	13:00	12:00	-	-
Peak	91	115	109	123	103	120	98	110	108

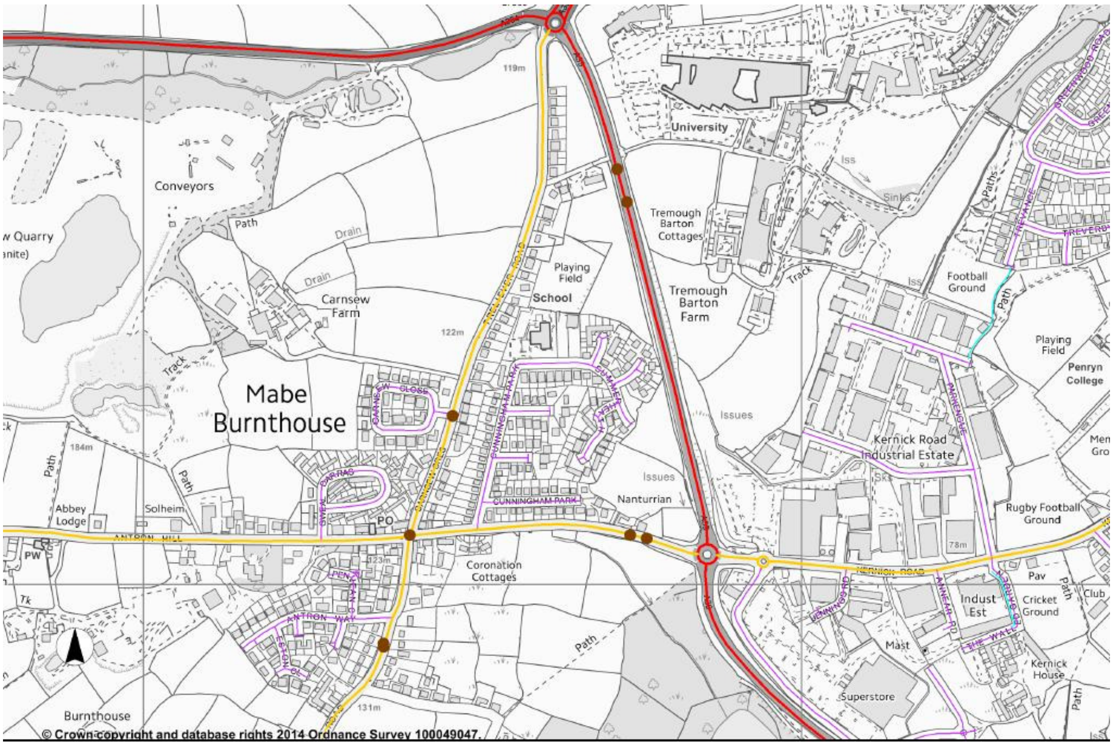
Site No: 00000976 Site Reference: 00000976
Trenoweth, Mabe - C7 (Tube)
Vehicle Count Report Week Begin: 13-Feb-12 Channel: To Mabe

Time Begin	Mon 13/02/2012	Tue 14/02/2012	Wed 15/02/2012	Thu 16/02/2012	Fri 17/02/2012	Sat 18/02/2012	Sun 19/02/2012	4-Day Av	7-Day Av
00:00	2	3	4	4	1	12	8	3	5
01:00	1	2	2	1	0	2	10	2	3
02:00	4	3	6	1	2	7	3	4	4
03:00	1	4	1	2	1	4	4	2	2
04:00	6	4	4	4	5	5	3	5	4
05:00	9	9	11	6	8	5	2	9	7
06:00	21	18	20	23	23	7	2	21	16
07:00	85	94	85	91	76	30	18	89	68
08:00	131	138	147	134	137	51	24	138	109
09:00	90	98	92	107	96	68	44	97	85
10:00	95	106	101	121	125	98	89	106	105
11:00	124	101	124	102	114	115	88	113	110
12:00	98	103	96	122	108	125	102	105	108
13:00	96	113	96	100	109	107	101	101	103
14:00	88	111	97	108	110	101	96	101	102
15:00	90	119	103	96	95	77	87	102	95
16:00	101	133	108	129	112	79	84	118	107
17:00	102	117	111	112	104	82	64	111	99
18:00	64	85	58	82	68	58	66	72	69
19:00	36	54	53	52	54	52	34	49	48
20:00	26	32	29	32	36	33	27	30	31
21:00	15	22	20	19	36	15	17	19	21
22:00	17	17	15	14	16	13	9	16	14
23:00	10	4	11	9	15	14	4	9	10
12H,7-19	1164	1318	1218	1304	1254	991	863	1251	1159
16H,6-22	1262	1444	1340	1430	1403	1098	943	1369	1274
18H,6-24	1289	1465	1366	1453	1434	1125	956	1393	1298
24H,0-24	1312	1490	1394	1471	1451	1160	986	1417	1323
Am	08:00	08:00	08:00	08:00	08:00	11:00	10:00	-	-
Peak	131	138	147	134	137	115	89	138	127
Pm	17:00	16:00	17:00	16:00	16:00	12:00	12:00	-	-
Peak	102	133	111	129	112	125	102	119	116

Site No: 00000976 Site Reference: 00000976
Trenoweth, Mabe - C7 (Tube)
Vehicle Count Report Week Begin: 20-Feb-12 Channel: To Mabe

Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun	4-Day	7-Day
Begin	20/02/2012	21/02/2012	22/02/2012	23/02/2012	24/02/2012	25/02/2012	26/02/2012	Av	Av
00:00	2	4	2	2	-	-	-	3	-
01:00	0	1	2	0	-	-	-	1	-
02:00	1	1	1	2	-	-	-	1	-
03:00	1	3	1	1	-	-	-	2	-
04:00	4	7	3	7	-	-	-	5	-
05:00	12	8	11	8	-	-	-	10	-
06:00	16	34	23	26	-	-	-	25	-
07:00	91	98	101	98	-	-	-	97	-
08:00	182	178	185	185	-	-	-	183	-
09:00	87	85	107	101	-	-	-	95	-
10:00	88	99	85	90	-	-	-	91	-
11:00	94	97	87	93	-	-	-	93	-
12:00	86	106	98	109	-	-	-	100	-
13:00	91	89	78	88	-	-	-	87	-
14:00	88	77	76	54	-	-	-	74	-
15:00	101	97	93	-	-	-	-	97	-
16:00	100	99	82	-	-	-	-	94	-
17:00	98	110	100	-	-	-	-	103	-
18:00	61	77	69	-	-	-	-	69	-
19:00	41	45	40	-	-	-	-	42	-
20:00	24	25	26	-	-	-	-	25	-
21:00	14	22	23	-	-	-	-	20	-
22:00	19	19	14	-	-	-	-	17	-
23:00	8	11	7	-	-	-	-	9	-
12H,7-19	1167	1212	1161	-	-	-	-	1180	-
16H,6-22	1262	1338	1273	-	-	-	-	1291	-
18H,6-24	1289	1368	1294	-	-	-	-	1317	-
24H,0-24	1309	1392	1314	-	-	-	-	1338	-
Am	08:00	08:00	08:00	08:00	-	-	-	-	-
Peak	182	178	185	185	-	-	-	183	-
Pm	15:00	17:00	17:00	-	-	-	-	-	-
Peak	101	110	100	-	-	-	-	104	-

Appendix B
Accident Records


Conveyors
Path
Drain
Carnsew Farm
Track
Mabe Burnthouse
184m
122m
119m
123m
131m
78m
Abbey Lodge
Solheim
PW
PO
Burnthouse
Playing Field
School
CUNNINGHAM PARK
Nanturrian
Coronation Cottages
University
Tremough Barton Cottages
Tremough Barton Farm
Issues
Iss
Sinks
Football Ground
Playing Field
Penryn College
Kernick Road Industrial Estate
Rugby Football Ground
Indust Est
Pav
Cricket Ground
Club
Mast
Kernick House
Superstore
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Appendix C

Speed Limit Appraisal

Appraisal Summary Table

Name of scheme:	Mabe Burnthouse	Date	
Description of scheme:	Speed Reduction	Contact:	
		Name	
		Organisation	
		Role	Promoter/Official

Impacts		Summary of key impacts	Assessment: Quantitative		Assessment: Qualitative	Assessment: Monetary £(NPV)
Economy	TEE Consumers - PVB					-£582,871
	TEE Business - PVB					-£580,452
	Public Accounts - PVC					£70,559
Environmental	Noise					
	Local Air Quality - Tonnes of Nox		0.3			-£194
	Greenhouse gases - Tonnes and NPV of CO2		Change in non-traded carbon over 10y (CO2e)	185.2		-£8,277
			Change in traded carbon over 10y (CO2e)	0.0		
	Landscape					
	Townscape					
	Heritage of Historic resources					
	Biodiversity					
	Water Environment					
Social	Reliability impact on Commuting and Other					
	Physical activity					
	Journey quality					
	Accidents		256.8			£1,112,618
	Security					
	Access to services					
	Affordability					
	Severance					
	Option values					
Public Accounts	Cost to Broad Transport Budget					£11,382

Notes

Study VOT Multipier = 1.0

Speed Change Constraint = True

Vehicle Type Shares by Purpose: Default WebTAG values used

Purpose Shares by Vehicle Type: Default WebTAG values used

Growth Indices by Vehicle Type: Default WebTAG values used

Vehicle Occupancy by Purpose and Vehicle Type: Default WebTAG values used

Link_ID	Link Length kms	Before Speed Limit	After Speed Limit	Before Flow - AADT	After Flow - ADDT	Before Speed - mph	After Speed - mph	Before Speed 85 Percentile	After Speed 85 Percentile	Before Fatal Acidents	After Fatal Accidents	Before Serious Accidents	After Serious Accidents
101	0.58	60	40	2920	2628	27	27	30	29.7	0	0	0	0
102	0.22	30	20	2920	2628	28	16.7	30	17.9	0	0	0	0
103	0.12	30	20	2920	2628	28	16.7	30	17.9	0	0	0	0
201	0.43	30	20	2000	2000	28	26.1	30	27.9	0	0	0	0
202	0.16	30	20	2000	2000	28	26.1	30	27.9	0	0	0	0
203	0.19	30	20	2000	2000	28	26.1	30	27.9	0	0	0	0
301	0.08	30	20	2920	2628	28	26.1	30	27.9	0	0	0	0
302	0.36	30	20	2920	2628	28	26.1	30	27.9	0	0	0	0
401	0.42	30	20	2000	2000	28	26.1	30	27.9	0	0	0	0
402	0.26	30	20	2000	2000	28	26.1	30	27.9	0	0	0	0
100	0.8	60	40	2920	2628	39.7	38.5	47.8	45.9	0	0	0	0
501	0.4	30	20	500	500	22	21.4	25	24.3	0	0	0	0

Before Slight Accidents	After Slight Accidents	Before Damage Only	After Damage Only	Before All Accidents	After All Accidents	Before All PIA Accidents	After All PIA Accidents	Saved Fatal Accidents	Saved Serious Accidents	Saved Slight Accidents	Saved Damage Only	Saved All Accidents	Saved All PIA Accidents
11.2	11.2	87.6	87.6	98.8	98.8	11.2	11.2	0	0	0	0	0	0
11.2	6.7	198.7	131.4	209.9	138	11.2	6.7	0	0	4.5	67.4	71.9	4.5
11.2	6.7	198.7	131.4	209.9	138	11.2	6.7	0	0	4.5	67.4	71.9	4.5
11.2	10.4	198.7	178.5	209.9	188.8	11.2	10.4	0	0	0.9	20.3	21.1	0.9
11.2	10.5	198.7	187.6	209.9	198.1	11.2	10.5	0	0	0.8	11.1	11.9	0.8
11.2	10.5	198.7	187.6	209.9	198.1	11.2	10.5	0	0	0.8	11.1	11.9	0.8
22.5	20.9	397.4	375.3	419.9	396.2	22.5	20.9	0	0	1.6	22.2	23.7	1.6
11.2	10.5	198.7	187.6	209.9	198.1	11.2	10.5	0	0	0.8	11.1	11.9	0.8
11.2	10.5	198.7	187.6	209.9	198.1	11.2	10.5	0	0	0.8	11.1	11.9	0.8
11.2	10.5	198.7	187.6	209.9	198.1	11.2	10.5	0	0	0.8	11.1	11.9	0.8
11.2	10.8	87.6	83.5	98.8	94.4	11.2	10.8	0	0	0.4	4	4.4	0.4
11.2	10.9	198.7	194.5	209.9	205.5	11.2	10.9	0	0	0.3	4.2	4.5	0.3

VOT Benefits (£)	VOC Benefits (£)	Accident Benefits (£)	CO2 Benefits (£)	NOx Benefits (£)	Total PVB 2010 (£)	CO2 Non-Traded (tonnes)	CO2 Traded (tonnes)	Nox (tonnes)
0	0	150691	0	0	150691	0	0	0
-429819	-46510	227844	-3549	-82	-252117	79.42	0	0.115
-244215	-26426	227844	-2016	-46	-44861	45.12	0	0.066
-65961	-6914	59381	-522	-12	-14030	11.7	0	0.017
-24716	-2591	38019	-195	-4	10511	4.38	0	0.007
-29196	-3060	38019	-231	-5	5525	5.18	0	0.008
-17997	-1886	76038	-142	-3	56007	3.19	0	0.005
-77133	-8085	38019	-611	-14	-47826	13.68	0	0.02
-64725	-6785	38019	-512	-12	-34017	11.48	0	0.017
-40163	-4210	38019	-318	-7	-6681	7.12	0	0.011
-52271	-2725	166317	-115	-3	111201	2.58	0	0.005
-7141	-781	14406	-59	-1	6421	1.34	0	0.002

Impacts		Summary of key impacts	Assessment		
			Quantitative	Qualitative	Monetary £(NPV)
Accident and Casualties	Accidents Saved /PVB		256.8		£1,112,618
	Fatal accidents saved over assessment period		0.0		£0
	Severe accidents saved over assessment period		0.0		£0
	Slight accidents saved over assessment period		16.0		£362,095
	All PIA accidents saved over assessment period		16.0		£362,095
	Damage only accidents saved over assessment period		240.7		£750,523
Economy	Journey times for motorised traffic - PVB for travel time				-£1,053,343
	PVB for vehicle operating costs				-£109,980
	Cost of scheme - PVC of scheme				£70,559
Environmental: Traffic Flows and Emissions	Percentage reduction in traffic flow				
	Greenhouse gases - Tonnes and NPV of CO2		Change in non-traded carbon over 10y (CO2e) 185.2 Change in traded carbon over 10y (CO2e) 0.0		-£8,277
	Local Air Quality - Tonnes and NPV of Nox		0.3		-£194
Local Analysis	Environmental impact				
	Level of public anxiety				
	Level of public support				
	Level of severance				
	Conditions and facilities for vulnerable road users				
	Visual and environmental impact of signing and traffic caluming measures				

Transport Economic Efficiency Table (TEE)

Consumers		
User benefits	Private Cars and LGVs	PSV
Travel time	-£493,171	-£48,938
Vehicle operating costs	-£40,762	
User charges	£0	
During Construction & Maintenance	£0	
NET CONSUMER BENEFITS	-£582,871	*(1)*

Business					
User benefits	Total	Goods Vehicles	Business Cars & LGVs	PSV	
Travel time	-£511,234	-£57,875	-£437,349	-£16,011	
Vehicle operating costs	-£69,218	-£37,270	-£22,940	-£9,008	
User charges	0				
During Construction & Maintenance	0				
Subtotal	-£580,452	-£95,145	-£460,288	-£25,018	*(2)*

Private sector provider impacts		
Revenue	0	
Operating costs	0	
Investment costs	0	
Grant/subsidy	0	
Subtotal	0	*(3)*
Other business impacts		
Developer contributions	0	*(4)*
NET BUSINESS IMPACT	-£580,452	*(5) = (2) + (3) + (4)*

TOTAL		
Present Value of Transport Economic Efficiency Benefits	-£1,163,323	*(6) = (1) + (5)*

Notes: Benefits appear as positive numbers, while costs appear as negative numbers.

All entries are discounted present values, in 2010 prices and values

Appendix D
Junction Capacity Testing

PICADY
GUI Version: 5.00 AC Analysis Program Release: 3.0 INTERIM (MAR 2006) © Copyright TRL Limited, 2006 Adapted from PICADY/3 which is Crown Copyright by permission of the controller of HMSO
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Web: www.trlsoftware.co.uk

Run Analysis

Parameter	Values
File Run	M:\..\PICADY\Antron Hill _ A394.vpi
Date Run	19 December 2013
Time Run	15:56:56
Driving Side	Drive On The Left

Arm Names and Flow Scaling Factors

Arm	Arm Name	Flow Scaling Factor (%)
Arm A	From Penryn	100
Arm B	Antron Hill	100
Arm C	From Helston	100

Stream Labelling Convention

Stream A-B contains traffic going from A to B etc.

Run Information

Parameter	Values
Run Title	Antron Hill / A384 Junction nr Longdowns
Location	-
Date	19 December 2013
Enumerator	haywardr [W-EAPBL-L-20035]
Job Number	-
Status	-
Client	-
Description	-

Errors and Warnings

Parameter	Values
Warning	No Errors Or Warnings

Geometric Data

Geometric Parameters

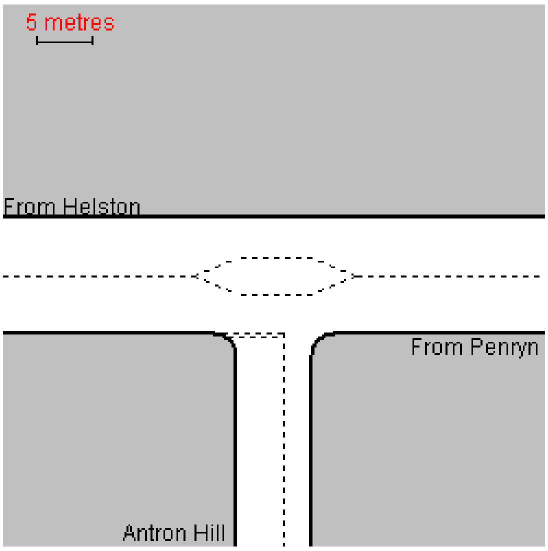
Parameter	Minor Arm B
Major Road Carriageway Width (m)	7.00
Major Road Kerbed Central Reserve Width (m)	0.00
Major Road Right Turning Lane Width (m)	3.40
Minor Road First Lane Width (m)	4.37
Minor Road Visibility To Right (m)	34
Minor Road Visibility To Left (m)	28
Major Road Right Turn Visibility (m)	130
Major Road Right Turn Blocks Traffic	Yes

Slope and Intercept Values

Stream	Intercept for Stream B-A	Slope for A-B	Slope for A-C	Slope for C-A	Slope for C-B
B-A	572.411	0.100	0.252	0.159	0.360
B-C	733.856	0.108	0.272	-	-
C-B	734.040	0.272	0.272	-	-

Note: Streams may be combined in which case capacity will be adjusted
These values do not allow for any site-specific corrections

Junction Diagram



Demand Data

Modelling Periods

Parameter	Period	Duration (min)	Segment Length (min)
First Modelling Period	07:45-09:15	90	15
Second Modelling Period	16:45-18:15	90	15

Direct Entry Flows

Demand Set: Antron Hill / A384 Junction nr Longdowns
Modelling Period: 07:45-09:15

Segment: 07:45-08:00

Arm	Flow (veh / min)
Arm A	7.25
Arm B	1.98
Arm C	14.92

Segment: 08:00-08:15

Arm	Flow (veh / min)
Arm A	7.25
Arm B	1.98
Arm C	14.92

Segment: 08:15-08:30

Arm	Flow (veh / min)
Arm A	7.25
Arm B	1.98
Arm C	14.92

Segment: 08:30-08:45

Arm	Flow (veh / min)
Arm A	7.25
Arm B	1.98
Arm C	14.92

Segment: 08:45-09:00

Arm	Flow (veh / min)
Arm A	7.25
Arm B	1.98
Arm C	14.92

Segment: 09:00-09:15

Arm	Flow (veh / min)
Arm A	7.25
Arm B	1.98
Arm C	14.92

Demand Set: Antron Hill / A384 Junction nr Longdowns Demand Set
Modelling Period: 16:45-18:15

Segment: 16:45-17:00

Arm	Flow (veh/min)
Arm A	13.06
Arm B	2.85
Arm C	10.39

Segment: 17:00-17:15

Arm	Flow (veh/min)
Arm A	13.06
Arm B	2.85
Arm C	10.39

Segment: 17:15-17:30

Arm	Flow (veh/min)
Arm A	13.06
Arm B	2.85
Arm C	10.39

Segment: 17:30-17:45

Arm	Flow (veh/min)
Arm A	13.06
Arm B	2.85
Arm C	10.39

Segment: 17:45-18:00

Arm	Flow (veh/min)
Arm A	13.06
Arm B	2.85
Arm C	10.39

Segment: 18:00-18:15

Arm	Flow (veh/min)
Arm A	13.06
Arm B	2.85
Arm C	10.39

Turning Counts

Demand Set: Antron Hill / A384 Junction nr Longdowns
Modelling Period: 07:45-09:15

From / To	Arm A	Arm B	Arm C
Arm A	-	55	380
Arm B	80	-	39
Arm C	782	113	-

Demand Set: Antron Hill / A384 Junction nr Longdowns Demand Set
Modelling Period: 16:45-18:15

From / To	Arm A	Arm B	Arm C
Arm A	-	60	724
Arm B	76	-	95
Arm C	576	47	-

Turning proportions are calculated from turning count data

Turning Proportions

Demand Set: Antron Hill / A384 Junction nr Longdowns
Modelling Period: 07:45-09:15

From / To	Arm A	Arm B	Arm C
Arm A	0.000	0.126	0.874
Arm B	0.672	0.000	0.328
Arm C	0.874	0.126	0.000

Demand Set: Antron Hill / A384 Junction nr Longdowns Demand Set
Modelling Period: 16:45-18:15

From / To	Arm A	Arm B	Arm C
Arm A	0.000	0.077	0.923
Arm B	0.444	0.000	0.556
Arm C	0.925	0.075	0.000

Heavy Vehicles Percentages

Demand Set: Antron Hill / A384 Junction nr Longdowns
Modelling Period: 07:45-09:15

From / To	Arm A	Arm B	Arm C
Arm A	-	10.0	10.0
Arm B	10.0	-	10.0
Arm C	10.0	10.0	-

Demand Set: Antron Hill / A384 Junction nr Longdowns Demand Set
Modelling Period: 16:45-18:15

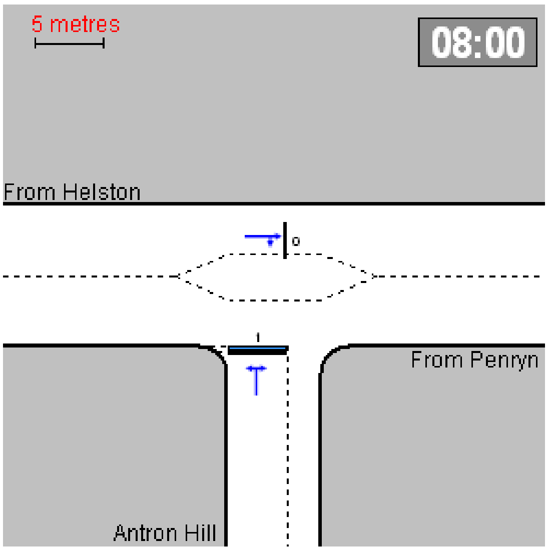
From / To	Arm A	Arm B	Arm C
Arm A	-	10.0	10.0
Arm B	10.0	-	10.0
Arm C	10.0	10.0	-

Default proportions of heavy vehicles are used

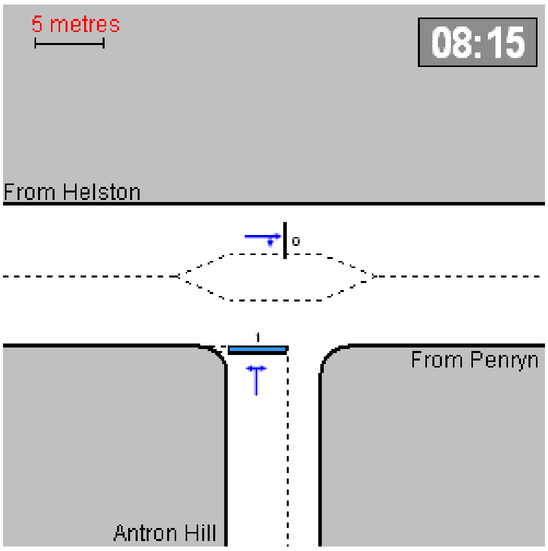
Queue Diagrams

Demand Set: Antron Hill / A384 Junction nr Longdowns
Modelling Period: 07:45-09:15
View Extent: 40m

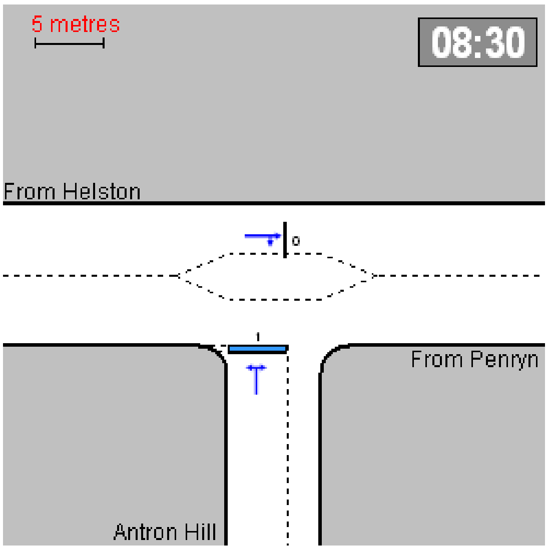
Queue Interval 1: 07:45-08:00



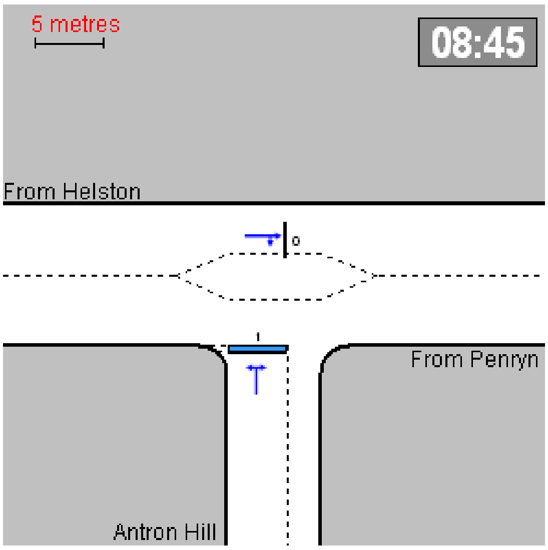
Queue Interval 2: 08:00-08:15



Queue Interval 3: 08:15-08:30

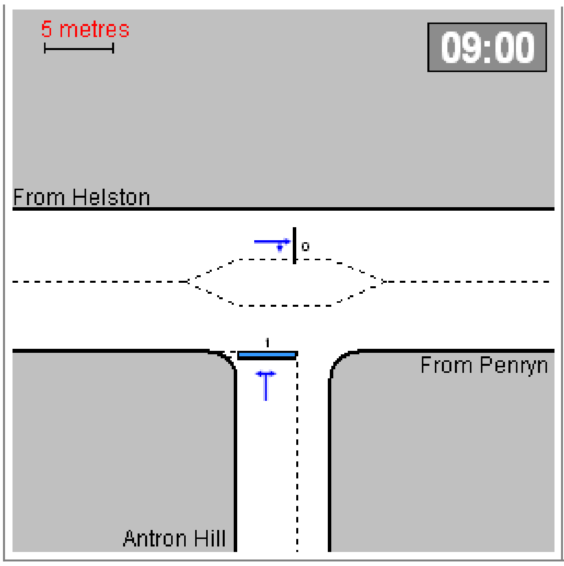


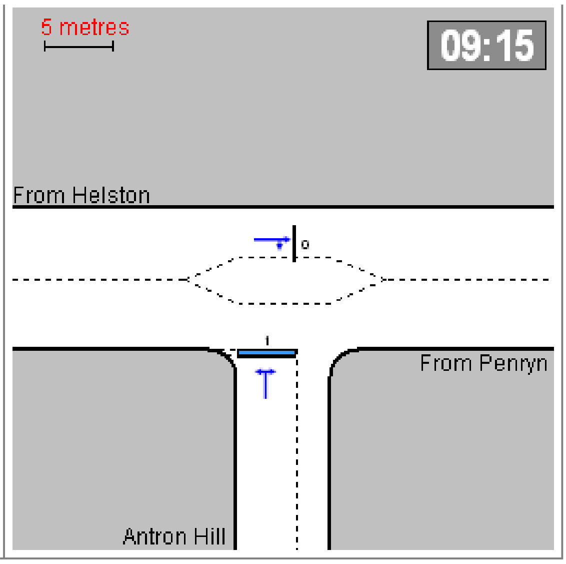
Queue Interval 4: 08:30-08:45



Queue Interval 5: 08:45-09:00

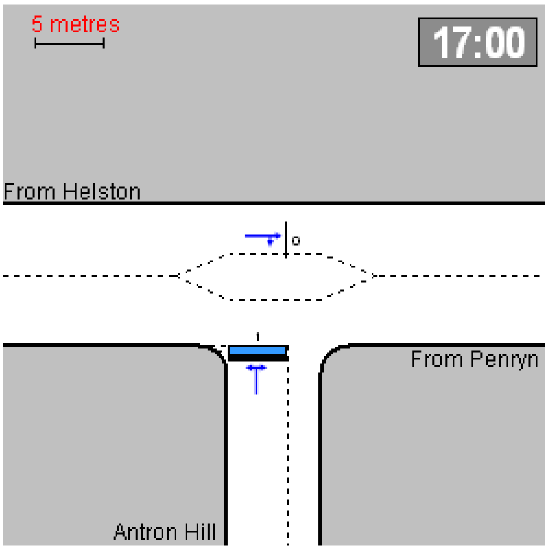
Queue Interval 6: 09:00-09:15


5 metres
09:00
From Helston
From Penryn
Antron Hill

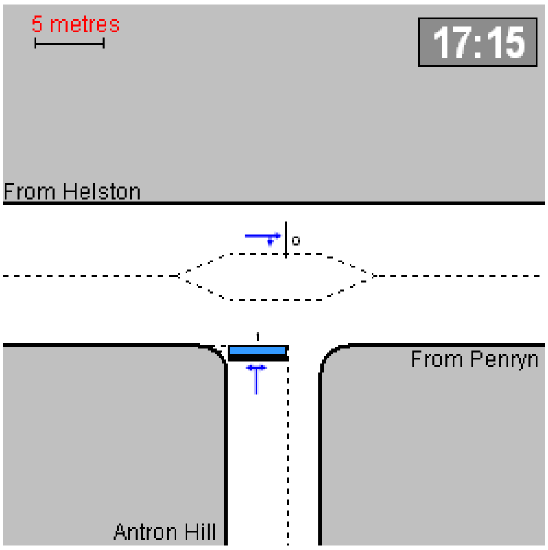

5 metres
09:15
From Helston
From Penryn
Antron Hill

Demand Set: Antron Hill / A384 Junction nr Longdowns Demand Set
Modelling Period: 16:45-18:15
View Extent: 40m

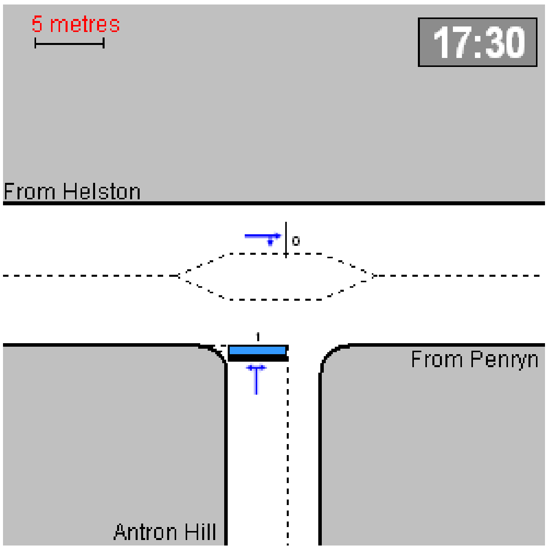
Queue Interval 1: 16:45-17:00



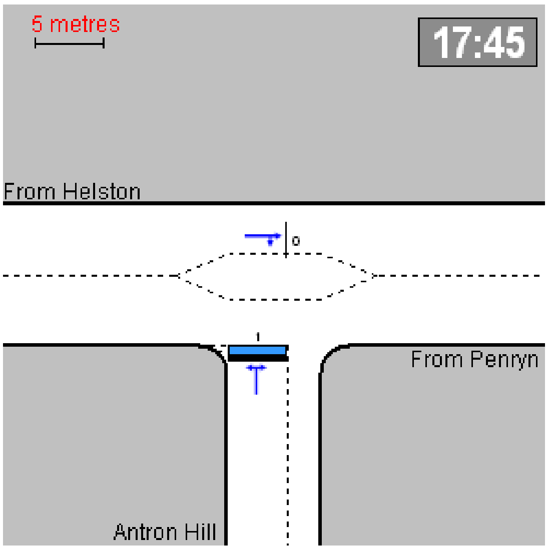
Queue Interval 2: 17:00-17:15



Queue Interval 3: 17:15-17:30

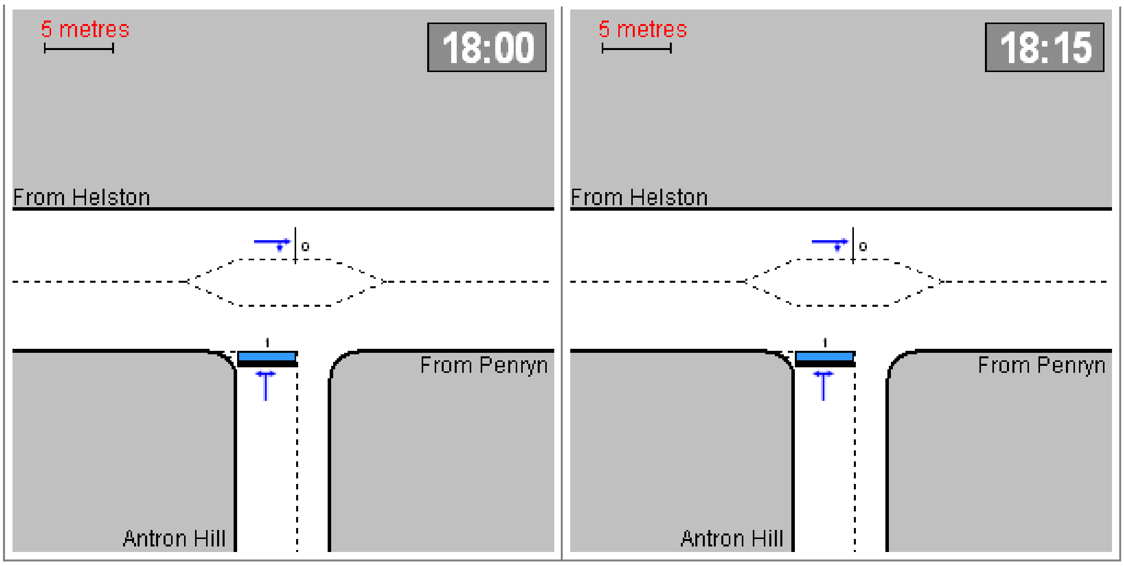


Queue Interval 4: 17:30-17:45



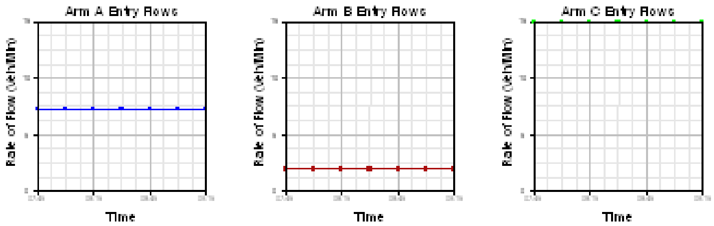
Queue Interval 5: 17:45-18:00

Queue Interval 6: 18:00-18:15

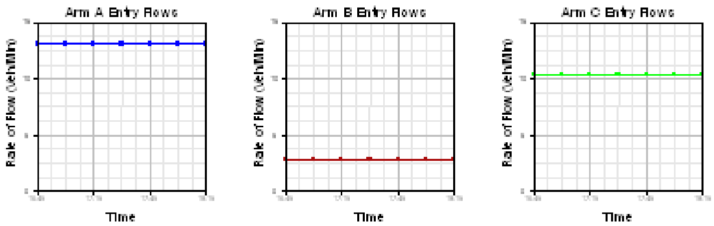

5 metres
18:00
From Helston
From Penryn
Antron Hill
5 metres
18:15
From Helston
From Penryn
Antron Hill

Demand Data Graph

Demand Set: Antron Hill / A384 Junction nr Longdowns
Modelling Period: 07:45-09:15

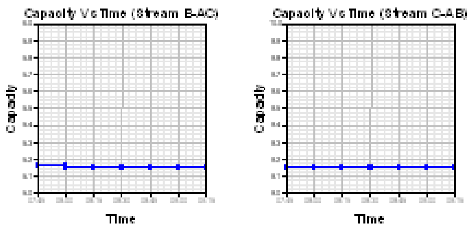


Demand Set: Antron Hill / A384 Junction nr Longdowns Demand Set
Modelling Period: 16:45-18:15

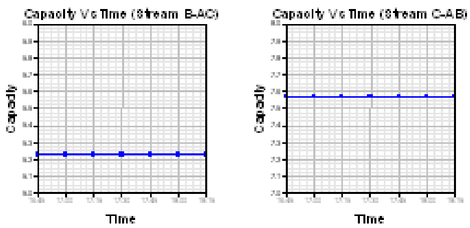


Capacity Graph

Demand Set: Antron Hill / A384 Junction nr Longdowns
Modelling Period: 07:45-09:15

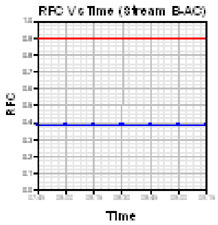


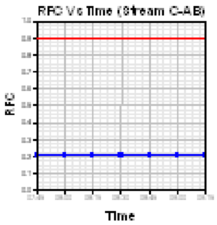
Demand Set: Antron Hill / A384 Junction nr Longdowns Demand Set
Modelling Period: 16:45-18:15



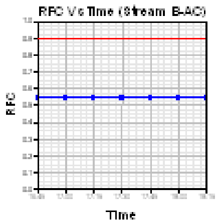
RFC Graph

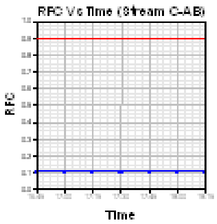
Demand Set: Antron Hill / A384 Junction nr Longdowns
Modelling Period: 07:45-09:15





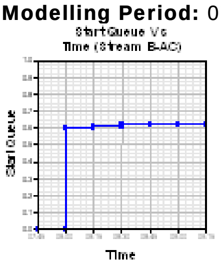
Demand Set: Antron Hill / A384 Junction nr Longdowns Demand Set
Modelling Period: 16:45-18:15

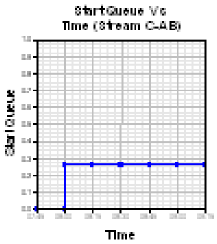




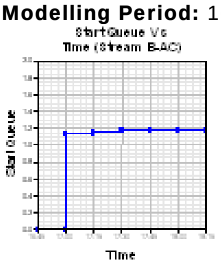
Start Queue Graph

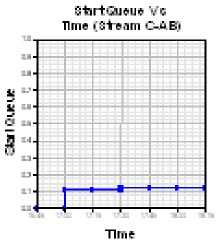
Demand Set: Antron Hill / A384 Junction nr Longdowns
Modelling Period: 07:45-09:15





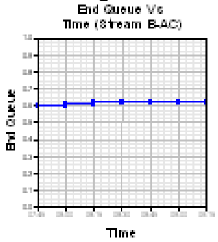
Demand Set: Antron Hill / A384 Junction nr Longdowns Demand Set
Modelling Period: 16:45-18:15

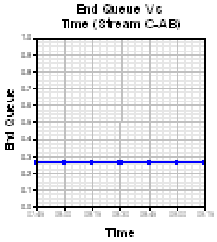




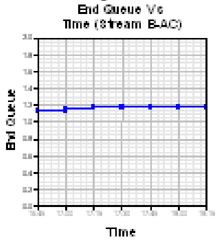
End Queue Graph

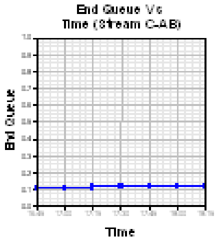
Demand Set: Antron Hill / A384 Junction nr Longdowns
Modelling Period: 07:45-09:15





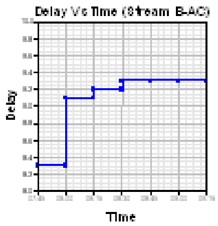
Demand Set: Antron Hill / A384 Junction nr Longdowns Demand Set
Modelling Period: 16:45-18:15

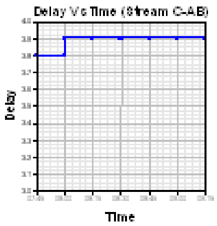




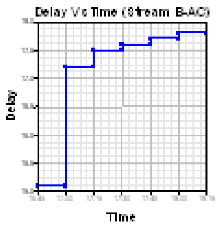
Delay Graph

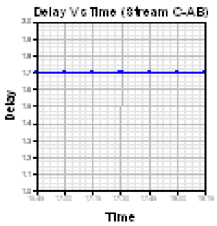
Demand Set: Antron Hill / A384 Junction nr Longdowns
Modelling Period: 07:45-09:15





Demand Set: Antron Hill / A384 Junction nr Longdowns Demand Set
Modelling Period: 16:45-18:15





Queues & Delays

Demand Set: Antron Hill / A384 Junction nr Longdowns
Modelling Period: 07:45-09:15

Segment	Stream	Demand (veh / min)	Capacity (veh / min)	RFC	Ped. Flow (ped / min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min / segment)	Delay (veh.min / segment)	Mean Arriving Vehicle Delay (min)
07:45-08:00	B-AC	1.98	5.16	0.384	-	0.00	0.60	-	8.3	0.31
	C-AB	1.88	9.15	0.206	-	0.00	0.26	-	3.8	0.14
	C-A	-	-	-	-	-	-	-	-	-
	A-B	0.92	-	-	-	-	-	-	-	-
	A-C	6.33	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh / min)	Capacity (veh / min)	RFC	Ped. Flow (ped / min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min / segment)	Delay (veh.min / segment)	Mean Arriving Vehicle Delay (min)
08:00-08:15	B-AC	1.98	5.15	0.384	-	0.60	0.61	-	9.1	0.31
	C-AB	1.88	9.15	0.206	-	0.26	0.26	-	3.9	0.14
	C-A	-	-	-	-	-	-	-	-	-
	A-B	0.92	-	-	-	-	-	-	-	-
	A-C	6.33	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh / min)	Capacity (veh / min)	RFC	Ped. Flow (ped / min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min / segment)	Delay (veh.min / segment)	Mean Arriving Vehicle Delay (min)
08:15-08:30	B-AC	1.98	5.15	0.384	-	0.61	0.62	-	9.2	0.32
	C-AB	1.88	9.15	0.206	-	0.26	0.26	-	3.9	0.14
	C-A	-	-	-	-	-	-	-	-	-
	A-B	0.92	-	-	-	-	-	-	-	-
	A-C	6.33	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh / min)	Capacity (veh / min)	RFC	Ped. Flow (ped / min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min / segment)	Delay (veh.min / segment)	Mean Arriving Vehicle Delay (min)
08:30-08:45	B-AC	1.98	5.15	0.384	-	0.62	0.62	-	9.3	0.32
	C-AB	1.88	9.15	0.206	-	0.26	0.26	-	3.9	0.14
	C-A	-	-	-	-	-	-	-	-	-
	A-B	0.92	-	-	-	-	-	-	-	-
	A-C	6.33	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/segment)	Delay (veh.min/segment)	Mean Arriving Vehicle Delay (min)
08:45-09:00	B-AC	1.98	5.15	0.384	-	0.62	0.62	-	9.3	0.32
	C-AB	1.88	9.15	0.206	-	0.26	0.26	-	3.9	0.14
	C-A	-	-	-	-	-	-	-	-	-
	A-B	0.92	-	-	-	-	-	-	-	-
	A-C	6.33	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/segment)	Delay (veh.min/segment)	Mean Arriving Vehicle Delay (min)
09:00-09:15	B-AC	1.98	5.15	0.384	-	0.62	0.62	-	9.3	0.32
	C-AB	1.88	9.15	0.206	-	0.26	0.26	-	3.9	0.14
	C-A	-	-	-	-	-	-	-	-	-
	A-B	0.92	-	-	-	-	-	-	-	-
	A-C	6.33	-	-	-	-	-	-	-	-

Demand Set: Antron Hill / A384 Junction nr Longdowns Demand Set
Modelling Period: 16:45-18:15

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/segment)	Delay (veh.min/segment)	Mean Arriving Vehicle Delay (min)
16:45-17:00	B-AC	2.85	5.23	0.545	-	0.00	1.13	-	15.1	0.40
	C-AB	0.78	7.57	0.104	-	0.00	0.11	-	1.7	0.15
	C-A	-	-	-	-	-	-	-	-	-
	A-B	1.00	-	-	-	-	-	-	-	-
	A-C	12.06	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh/min)	Capacity (veh/min)	RFC	Ped. Flow (ped/min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min/segment)	Delay (veh.min/segment)	Mean Arriving Vehicle Delay (min)
17:00-17:15	B-AC	2.85	5.23	0.545	-	1.13	1.16	-	17.2	0.42
	C-AB	0.78	7.57	0.104	-	0.11	0.11	-	1.7	0.15
	C-A	-	-	-	-	-	-	-	-	-
	A-B	1.00	-	-	-	-	-	-	-	-
	A-C	12.06	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh / min)	Capacity (veh / min)	RFC	Ped. Flow (ped / min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min / segment)	Delay (veh.min / segment)	Mean Arriving Vehicle Delay (min)
17:15-17:30	B-AC	2.85	5.23	0.545	-	1.16	1.17	-	17.5	0.42
	C-AB	0.78	7.57	0.104	-	0.11	0.12	-	1.7	0.15
	C-A	-	-	-	-	-	-	-	-	-
	A-B	1.00	-	-	-	-	-	-	-	-
	A-C	12.06	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh / min)	Capacity (veh / min)	RFC	Ped. Flow (ped / min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min / segment)	Delay (veh.min / segment)	Mean Arriving Vehicle Delay (min)
17:30-17:45	B-AC	2.85	5.23	0.545	-	1.17	1.18	-	17.6	0.42
	C-AB	0.78	7.57	0.104	-	0.12	0.12	-	1.7	0.15
	C-A	-	-	-	-	-	-	-	-	-
	A-B	1.00	-	-	-	-	-	-	-	-
	A-C	12.06	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh / min)	Capacity (veh / min)	RFC	Ped. Flow (ped / min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min / segment)	Delay (veh.min / segment)	Mean Arriving Vehicle Delay (min)
17:45-18:00	B-AC	2.85	5.23	0.545	-	1.18	1.18	-	17.7	0.42
	C-AB	0.78	7.57	0.104	-	0.12	0.12	-	1.7	0.15
	C-A	-	-	-	-	-	-	-	-	-
	A-B	1.00	-	-	-	-	-	-	-	-
	A-C	12.06	-	-	-	-	-	-	-	-

Segment	Stream	Demand (veh / min)	Capacity (veh / min)	RFC	Ped. Flow (ped / min)	Start Queue (veh)	End Queue (veh)	Geometric Delay (veh.min / segment)	Delay (veh.min / segment)	Mean Arriving Vehicle Delay (min)
18:00-18:15	B-AC	2.85	5.23	0.545	-	1.18	1.18	-	17.8	0.42
	C-AB	0.78	7.57	0.104	-	0.12	0.12	-	1.7	0.15
	C-A	-	-	-	-	-	-	-	-	-
	A-B	1.00	-	-	-	-	-	-	-	-
	A-C	12.06	-	-	-	-	-	-	-	-

Entry capacities marked with an '(X)' are dominated by a pedestrian crossing in that time segment.
In time segments marked with a '(B)', traffic leaving the junction may block back from a crossing so impairing normal operation of the junction.
Delays marked with '##' could not be calculated.

Overall Queues & Delays

Queueing Delay Information Over Whole Period

Demand Set: Antron Hill / A384 Junction nr Longdowns
Modelling Period: 07:45-09:15

Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	178.2	118.8	54.5	0.3	54.6	0.3
C-AB	169.5	113.0	23.2	0.1	23.2	0.1
C-A	-	-	-	-	-	-
A-B	82.5	55.0	-	-	-	-
A-C	570.0	380.0	-	-	-	-
All	**2173.5**	**1449.0**	**77.8**	**0.0**	**77.8**	**0.0**

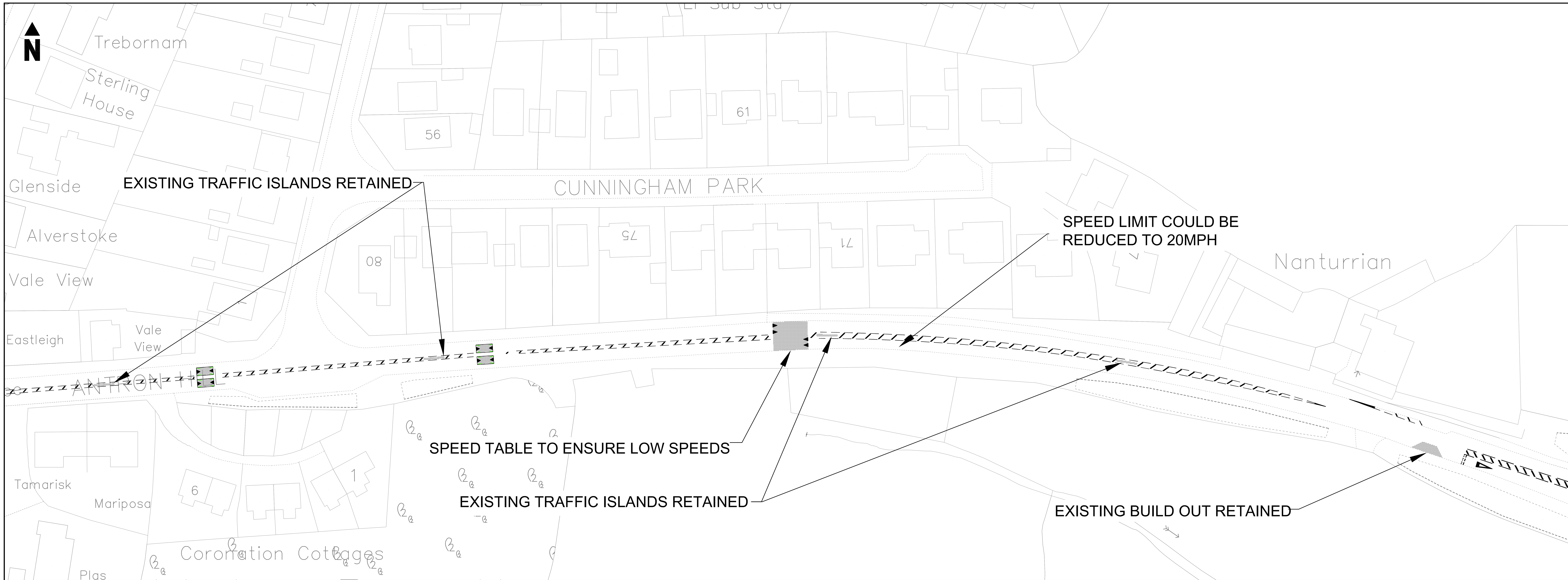
Demand Set: Antron Hill / A384 Junction nr Longdowns Demand Set
Modelling Period: 16:45-18:15

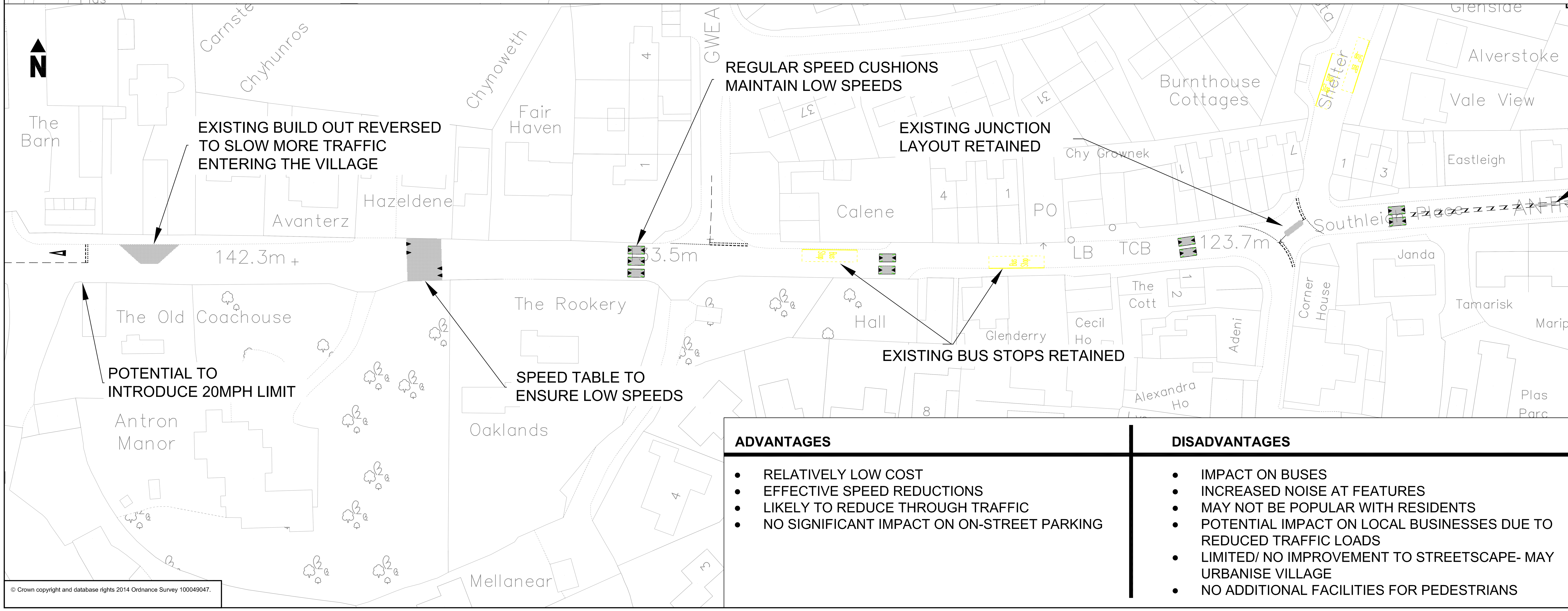
Stream	Total Demand (veh)	Total Demand (veh/h)	Queueing Delay (min)	Queueing Delay (min/veh)	Inclusive Delay (min)	Inclusive Delay (min/veh)
B-AC	256.5	171.0	102.9	0.4	103.1	0.4
C-AB	70.5	47.0	10.3	0.1	10.3	0.1
C-A	-	-	-	-	-	-
A-B	90.0	60.0	-	-	-	-
A-C	1085.4	723.6	-	-	-	-
All	**2367.0**	**1578.0**	**113.3**	**0.0**	**113.4**	**0.0**

Delay is that occurring only within the time period.
Inclusive delay includes delay suffered by vehicles which are still queuing after the end of the time period.
These will only be significantly different if there is a large queue remaining at the end of the time period.

PICADY 5 Run Successful

Appendix E
Drawings





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ADVANTAGES	DISADVANTAGES
• RELATIVELY LOW COST • EFFECTIVE SPEED REDUCTIONS • LIKELY TO REDUCE THROUGH TRAFFIC • NO SIGNIFICANT IMPACT ON ON-STREET PARKING	• IMPACT ON BUSES • INCREASED NOISE AT FEATURES • MAY NOT BE POPULAR WITH RESIDENTS • POTENTIAL IMPACT ON LOCAL BUSINESSES DUE TO REDUCED TRAFFIC LOADS • LIMITED/ NO IMPROVEMENT TO STREETSCAPE- MAY URBANISE VILLAGE • NO ADDITIONAL FACILITIES FOR PEDESTRIANS

NOTES

REV	DATE	NATURE OF REVISION
-	04/12/2013	FIRST ISSUE

REVISIONS

CORNWALL COUNCIL

CORMAC SOLUTIONS
RADNOR ROAD
SCORRIER
CORNWALL TR16 5EH
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LOCATION: MABE

PROJECT: MABE TRANSPORT STRATEGY

DRAWING TITLE: OPTION A

PROJECT MANAGER: BSL

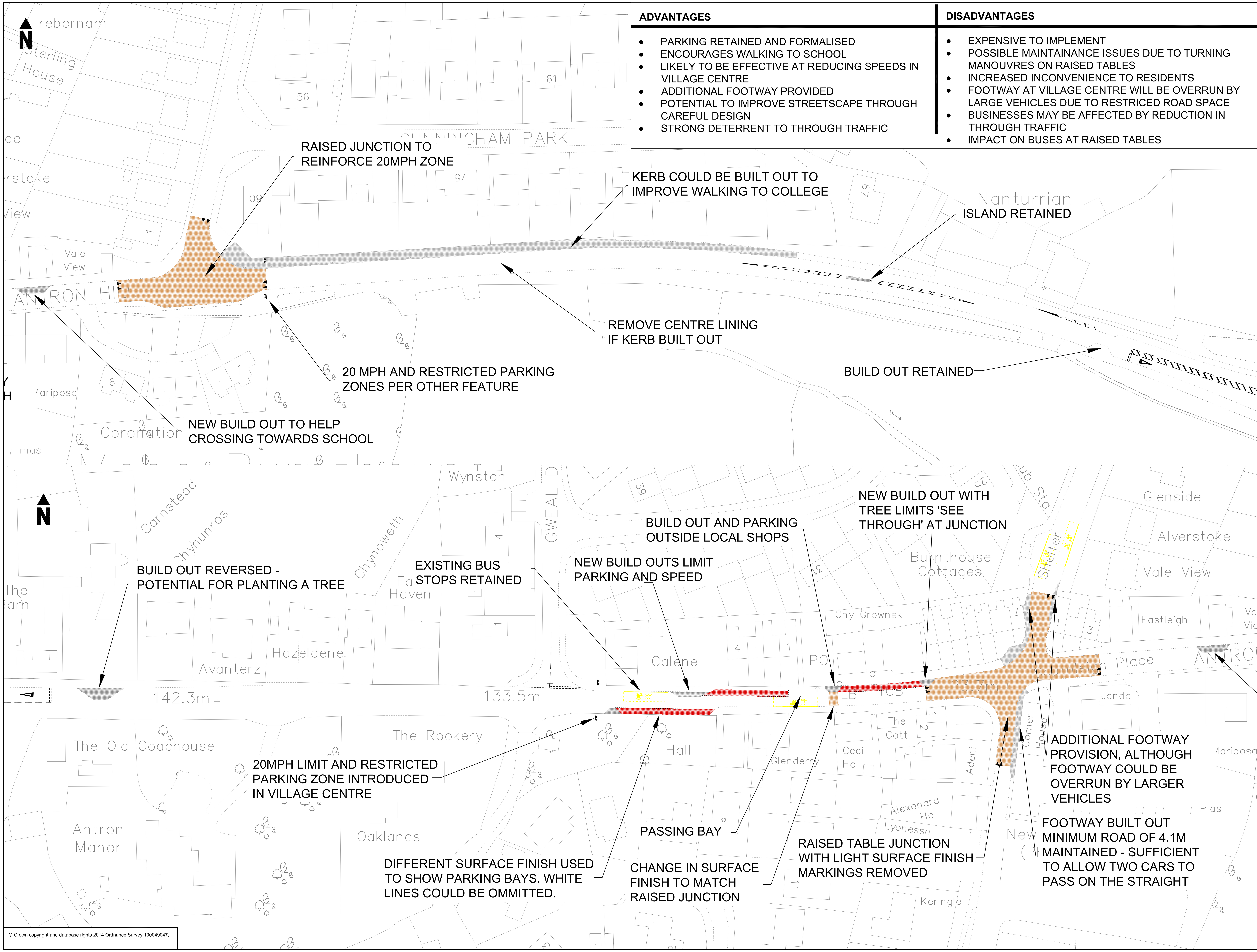
DRAWN BY: JF | CHECKED: AC | APPROVED:

SCALE: 1 : 500 SCALE @ A1

DRAWING NO: EDG0275_F_001

REVISION: -

ADVANTAGES	DISADVANTAGES
• PARKING RETAINED AND FORMALISED • ENCOURAGES WALKING TO SCHOOL • LIKELY TO BE EFFECTIVE AT REDUCING SPEEDS IN VILLAGE CENTRE • ADDITIONAL FOOTWAY PROVIDED • POTENTIAL TO IMPROVE STREETSCAPE THROUGH CAREFUL DESIGN • STRONG DETERRENT TO THROUGH TRAFFIC	• EXPENSIVE TO IMPLEMENT • POSSIBLE MAINTAINANCE ISSUES DUE TO TURNING MANOUVRES ON RAISED TABLES • INCREASED INCONVENIENCE TO RESIDENTS • FOOTWAY AT VILLAGE CENTRE WILL BE OVERRUN BY LARGE VEHICLES DUE TO RESTRICED ROAD SPACE • BUSINESSES MAY BE AFFECTED BY REDUCTION IN THROUGH TRAFFIC • IMPACT ON BUSES AT RAISED TABLES



NOTES

REV	DATE	NATURE OF REVISION
-	04/12/2013	FIRST ISSUE

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CORNWALL TR16 5EH
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LOCATION: MABE

PROJECT: MABE TRANSPORT STRATEGY

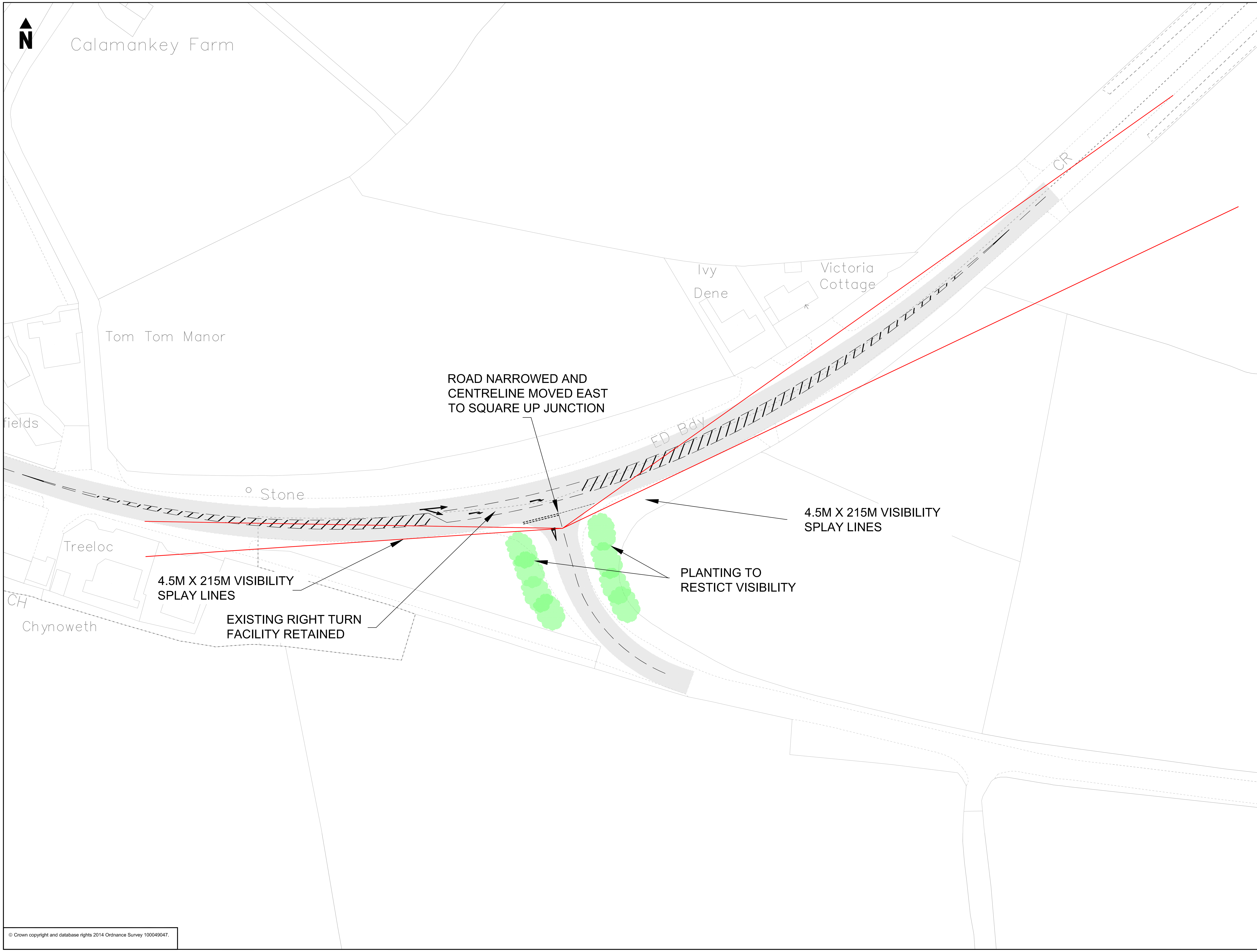
DRAWING TITLE: OPTION B

PROJECT MANAGER: BSL

DRAWN BY: JF | CHECKED: AC | APPROVED: AA

SCALE: 1:500 SCALE @ A1

DRAWING NO: EDG0275_F_002 REVISION: -



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REVISIONS

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LOCATION
MABE

PROJECT
MABE TRANSPORT STUDY

DRAWING TITLE
LONGDOWNS JUNCTION

PROJECT MANAGER BSL

DRAWN BY: JF | CHECKED: AC | APPROVED:

SCALE
1 : 500
SCALE @ A1

DRAWING NO EDG0275_F_003
REVISION -