

## PLYMOUTH CITY COUNCIL

**Subject:** Evaluation of East End Transport Scheme – Final Report  
**Committee:** Working Plymouth  
**Date:** 3 July 2013  
**Cabinet Member:** Councillor Coker  
**CMT Member:** Anthony Payne, Director for Place  
**Author:** Juli Wileman, Transport Projects Manager  
**Contact details** Tel: 01752 307703  
email: juli.wileman@plymouth.gov.uk  
**Ref:**  
**Key Decision:** No  
**Part:** I

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### **Purpose of the report:**

The purpose of this report is to update Members on the monitoring and evaluation work that has been undertaken in respect of the East End Transport Scheme (EETS), which became operational in November 2011. An initial report, which analysed the data available at the time, was presented to the Growth and Prosperity Overview and Scrutiny Panel in February 2013. This final report provides further information on all aspects of the scheme, some of which was not available at the time of the first report.

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### **Corporate Plan 2012-2015:**

Significant growth is proposed on the Eastern Corridor over the next fifteen years and improvements to the transport infrastructure along this corridor are required to enable these developments to come forward. These improvements will help create the conditions for investment in quality homes, jobs and infrastructure and they will benefit all road users, including bus passengers, cyclists and pedestrians. The East End Transport Scheme was the first phase of improvements along this corridor.

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### **Implications for Medium Term Financial Plan and Resource Implications: Including finance, human, IT and land**

None

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### **Other Implications: e.g. Child Poverty, Community Safety, Health and Safety and Risk Management:**

None

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### **Equality and Diversity**

Has an Equality Impact Assessment been undertaken? No

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**Recommendations and Reasons for recommended action:**

Members note the content of the report

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**Alternative options considered and rejected:**

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**Published work / information:**

**Background papers:**

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**Sign off:**

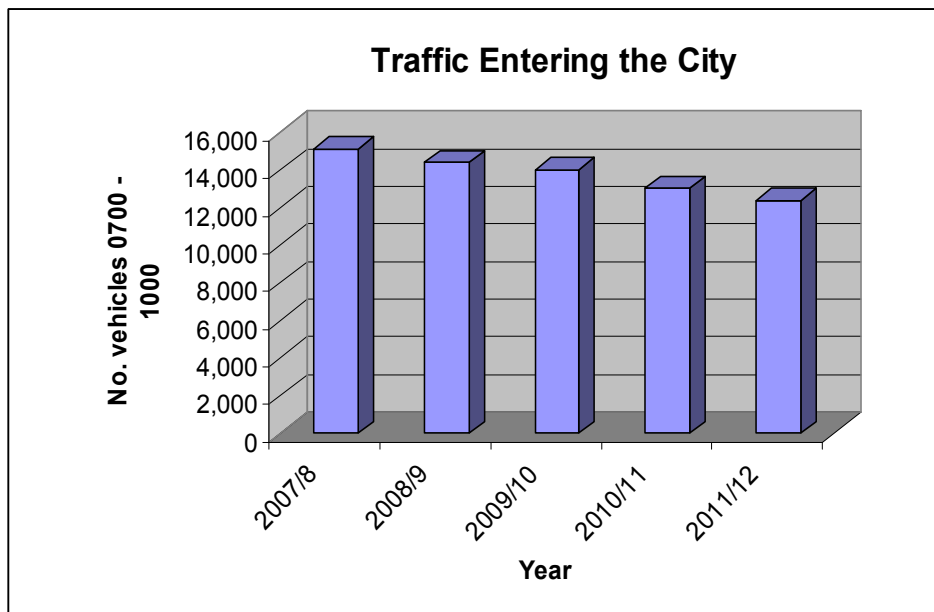
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Originating SMT Member:													
Has the Cabinet Member(s) agreed the contents of the report? Yes													

## **1.0 Background**

- 1.1 As part of the East End Transport Scheme (EETS), which became operational in November 2011, an Evaluation and Monitoring programme was developed in order to measure the anticipated outcomes of the scheme.
- 1.2 The expected outcomes of the scheme included:
- Improved journey times for all traffic
  - Improved bus journey times relative to car journey times
  - Improved bus service reliability and punctuality
  - Increase in number of pedestrians and cyclists
  - Reduced traffic on inappropriate roads
  - Reduced impact on community severance from existing major transport routes and future development traffic
  - Improved air quality
- 1.3 Whilst “before” data exists for all of the above outcomes, “after” data in respect of car journey times is not yet available. The car journey times are collected from DfT’s Strat-e-gis data, which is provided to Plymouth City Council on an annual basis and the data from 2012 has not yet been received. It had been anticipated the data would be available in early 2013 but we have recently been advised that it won’t be available until early 2014. Once this data is available it will be analysed to understand how car journey times have changed as a result of the scheme and how they compare to bus journey times.
- 1.4 This report provides information on traffic flows including pedestrian and cyclists, bus journey times and reliability, accidents, air quality and noise levels.

## **2.0 Traffic Flows Trends Across the City**

- 2.1 Before an analysis of traffic flows within the East End is undertaken it is important to understand any background changes in traffic on the Eastern Corridor and across the City as a whole as these may account for some of the background changes in traffic levels within the East End.
- 2.2 The graph below shows the level of traffic entering the City in the morning peak, for the years 2007 through to 2011. It includes the four main entry points: Mutley Plain; Union Street; Exeter Street and Saltash Road. It shows that there has been a year on year decline, with an overall reduction of 18% between 2007 and 2011, from 15,121 vehicles to 12,366.



### 3.0 Traffic flows on Strategic Roads within the East End

3.1 “Before” data for the strategic roads in the East End was collected at two different times. A traffic count was undertaken, by survey company Count-On-Us, at various junctions within the East End on the 3<sup>rd</sup> March 2010 and this has been used for most of the analysis below. Some of the data, however, in respect of Heles Terrace, Laira Bridge Road and Finnigan Road was collected by Count-On-Us through an Origin-Destination survey on 14<sup>th</sup> May 2009.

3.2 “After” data was collected by survey company Intelligent Data on 27<sup>th</sup> November 2012.

3.3 All figures reported are for the twelve hour period 7am to 7pm.

3.4 Figure 1 provides a map of the area covered by the East End Transport Scheme.

### 3.5 Cattedown Roundabout

3.6 There has been a 17% reduction in traffic travelling through Cattedown Roundabout, from 50,477 vehicles to 42,068. This is between 2010 and 2012, so is not directly comparable with the 18% reduction across the city experienced between 2007 and 2011, however it suggests that the reduction in traffic in the East End is partly attributable to background decline and partly due to people finding alternative routes.

### 3.7 Embankment Road

3.8 One of the objectives of the scheme was to reduce traffic levels along Embankment Road, both outside the shops and alongside Prince Rock School. In the outbound direction this was to be achieved through relocating Plympton traffic from Embankment Road onto the new outbound lane on Gdynia Way. This has resulted in a 55% reduction in outbound traffic between Cattedown Roundabout and Elliott Road, from 21,176 to 9,506 vehicles.



**Figure 1: Area covered by the East End Transport Scheme**

- 3.9 On the approach to Prince Rock School, just after the bus gate on Embankment Road, there has been a 95% reduction in traffic, from 11,847 to 651. The majority of this traffic is buses, motorcyclists, cyclists or taxis however there are still a small number of non-authorized vehicles using the bus gate.
- 3.10 In the inbound direction the relocation of southbound traffic from Heles Terrace, with the exception of buses, has meant that people travelling into the city are no longer able to rat run along Embankment Road rather than use Gdynia Way. This has resulted in a 44% reduction in inbound traffic on Embankment Road, from 4,486 to 2,529 vehicles.

### **3.11 Heles Terrace**

- 3.12 Another objective of the scheme was to reduce traffic on Heles Terrace, which was to be achieved through relocating southbound traffic travelling towards Plymstock onto the new Embankment Lane.
- 3.13 There has been a 47% reduction in traffic on Heles Terrace, from 14,424 vehicles to 7,624. This comprises a 92% reduction in southbound traffic, as the road is only used by buses and for local access, and a 2% increase in northbound traffic.

### **3.14 Gdynia Way**

- 3.15 Prior to the scheme Gdynia Way was a two lane carriageway, accommodating inbound traffic from Plymstock and Plympton. The scheme introduced a third lane to accommodate outbound traffic to Plympton.
- 3.16.1 At the top end of Gdynia Way, between Barbican Approach and Cattedown Roundabout there has been an 11% reduction in traffic travelling inbound on Gdynia Way, from 21,326 to 19,069 vehicles. There has been a similar reduction on the section between Barbican Approach and Elliot Road Bridge.
- 3.17 7,026 vehicles use the new outbound lane on Gdynia Way.

### **3.18 Embankment Lane**

- 3.19 Embankment Lane was built to accommodate traffic travelling between Plympton and Plymstock, relocating it from Heles Terrace. The new Embankment Lane is used by 6,689 vehicles a day, of which 6,530, 98%, are travelling in the southbound direction. There has been a reduction of 6,971 southbound vehicles on Heles Terrace, so this demonstrates that the majority of them have relocated to Embankment Lane.

## **4.0 Local Roads within the East End**

### **4.1 Florence Place**

- 4.2 Prior to the scheme Florence Place was two way; it is now one way northbound.
- 4.2 Traffic flow has increased along Florence Place, from 186 vehicles to 1,138. Whilst some of this increase can be attributed to the change in the one-way system on Langham Place and Cathcart Avenue, i.e. Florence Place is now the main entry point into Grenville Road, it does suggest that there are a significant number of people who are still choosing to use Embankment Road, rather than Gdynia Way, to travel out towards Marsh Mills.

4.3 A survey undertaken in March 2013 shows that 54% of the 1,138 vehicles on Florence Place are using it to access the local area, 24% are vehicles from Elliott Road heading toward Marsh Mills and 22% are vehicles from Embankment Road heading towards Marsh Mills. It is those that are travelling from Embankment Road, 247 vehicles, who could be classed as “rat runners”.

#### **4.4 Grenville Road**

4.5 Prior to the scheme traffic could not exit Grenville Road onto Embankment Road, but this was opened up as part of the scheme.

4.6 Traffic at the eastern end of Grenville Road travelling towards Embankment Road has increased significantly from 191 to 1,252. This increase is as a result of improved local access but is also partly due to the Florence Place “rat runners” outlined above.

#### **4.7 Langham Place**

4.8 Prior to the scheme Langham Place was two way; it is now one way southbound.

4.9 Traffic has reduced by 69% from 810 vehicles to 249.

#### **4.10 Cathcart Avenue**

4.11 Prior to the scheme Cathcart Avenue was two way; it is now one way southbound.

4.12 “After” data for Cathcart Avenue is currently being collected; it is anticipated that a verbal update can be provided at the meeting.

4.13 Traffic on Cathcart Avenue has increased by 58% from 93 vehicles to 147 vehicles.

#### **4.14 Elliott Road**

4.15 Whilst no changes have been made to Elliott Road itself it was anticipated it would accommodate additional traffic. This was due both to the No-Entry introduced at the top end of Tintern Avenue, which meant that traffic could no longer exit onto Embankment Road but would need to use Elliott Road instead and the introduction of the right turn into Embankment Road from Elliott Road which could not be done previously.

4.16 Northbound traffic on Elliott Road, on the section between Mainstone Avenue and Cotehele Avenue has decreased by 22%, from 2,599 to 2022. The northbound flow at the junction of Embankment Road is 2,222 so it seems that the anticipated increase in traffic on Elliott Road has not materialised. Southbound traffic has reduced by 58% from 592 vehicles to 251 vehicles, possibly due to the removal of southbound through traffic from Heles Terrace.

### **5.0 Cycling Trends**

5.1 The key changes made for cyclists under the East End Transport Scheme were:

- New off-road cycle link through Junction Gardens, linking to existing facilities at Lucas terrace;
- Removal of the poor quality on-road cycle lane on Gdynia Way (due to above provision);

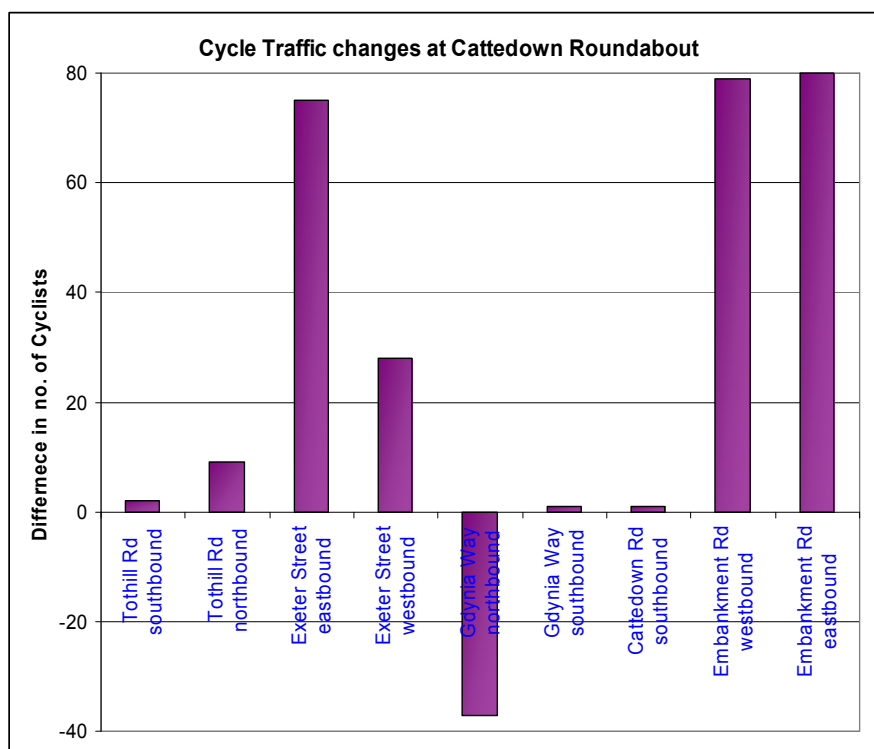
- New outbound shared bus and cycle lane on Embankment Road and Laira Bridge Road;
- Inbound 'Quiet Route' identified;
- New advance cycle stop lines (ACSLs) provided at traffic signals;
- New pedestrian and cycle crossing facilities along Embankment Road, Laira Bridge Road and at Cattedown Roundabout;
- New on-road cycle lanes on Laira Bridge Road
- New shared use pedestrian and cycle footway on Exeter Street (north side).

5.2 The above improvements have contributed to new routes becoming more attractive to cyclists and have therefore encouraged greater accessibility and improved safety and perception of safety on key routes into and out of the city centre.

5.3 Figure 2 below shows the difference in the numbers of on-road cyclists between March 2010 and November 2012 for key routes through the East End.

5.4 It can be seen from Figure 2 that there has been a significant drop in cyclists using Gdynia Way, following the removal of the cycle lane, and who now appear to be favouring alternative routes along Embankment Road. This is consistent with the new facilities provided under the scheme, most notably from the Plymstock direction, which include the new cycle lane on Laira Bridge Road to help cyclists negotiate the Gdynia Way slip lane and the removal of traffic rat running along Embankment Road from Heles Terrace who were previously avoiding Gdynia Way.

5.5 Figure 2 identifies an increase in the number of cyclists using Embankment Road, which corresponds to the new shared bus and cycle lane facilities provided under the scheme. The bus and cycle lane now continue along Embankment Road into Laira Bridge Road, avoiding the previous conflict with traffic continuing along Embankment Road past Prince Rock School and cyclists who wished to filter right onto Laira Bridge Road towards Plymstock. It is thought that cyclists may now be re-routing to these facilities as they offer more direct and safer routes than before the scheme was implemented.



**Figure 2 East End Cycle Traffic Trends**



5.6 Overall the number of cyclists travelling through Cattedown Roundabout has increased by 52%, from 227 to 346.

## 6.0 Pedestrian Trends

6.1 One of the objectives of the EETS was to reduce severance and improve the environment in the local shopping area of Embankment Road. The aim was to improve pedestrian links across Embankment Road to encourage more people to walk to access local services.

6.2 These aims were achieved through the removal of the guard rail along the central reservation on Embankment Road to create informal crossing opportunities along with the introduction of new signal controlled crossing points.

6.3 A survey was undertaken in 2010 to establish pedestrian patterns on Embankment Road and Laira Bridge Road prior to the start of the scheme. The survey was repeated in 2013 following completion of the EETS. The data collected in both years was between 7am and 7pm.

6.4 Overall the number of pedestrians crossing in the East End area has increased by 4%, from 4,726 to 4,919. However the surveys have shown that there have also been significant changes in the location of where people choose to cross so the results of the surveys have been considered in sections and summarised below.

### 6.4 *Embankment Road (Cattedown Roundabout to Langham Place)*

6.5 This section of Embankment Road previously had two signal controlled crossing points with further crossing opportunities prevented by guard rail along the central reservation. The 2010 count shows that pedestrian movements were obviously heavily concentrated at the two formal crossing points with the exception of a small number of pedestrians jumping over the railing to cross the road.

6.6 Following the completion of the EETS, the number of signal controlled crossing points has been increased to four on this section and the removal of the guard railing means that pedestrians can cross to the central reservation at any point. The 2013 survey shows a 39% increase in the overall number of pedestrians crossing the road on this section of Embankment Road compared to 2010. (Figure 3)

6.7 26.7% of pedestrians crossing Embankment Road are now doing so away from the formal crossing points. This indicates that the removal of the long section of guard railing provides more convenient opportunities to cross for those that are able.

	2010	2013	% diff
On crossing	1,786	1,895	6.1%
Off crossing	69	692	902.9%
<b>Total</b>	<b>1,855</b>	<b>2,587</b>	<b>39.5%</b>

**Figure 3: Changes in Pedestrian Behaviour at Embankment Rd (Cattedown Roundabout to Langham Place)**

6.8 *Embankment Road (Langham Place to Stenlake Terrace)*

- 6.9 This section of Embankment Road previously had two signal controlled crossing points and operated with single lane traffic enabling pedestrians to cross informally when traffic conditions allowed. Prince Rock Primary School is located on the southern side of this section.
- 6.10 The EETS sought to improve the pedestrian environment on this section, particularly given the proximity of Prince Rock Primary School. The carriageway has been narrowed to facilitate the widening of the footway and the section between Florence Place and Wentworth Place is now only open to buses, taxis and motorcycles.
- 6.11 The 2013 survey shows that crossing movements along this section have increased by just over 4%. The most notable change is the increase in the number of people choosing to cross away from the signalised crossing points which has increased by over 92% compared to 2010. Only 16.2% of pedestrians now use the signalised crossings – compared to 54.4% in 2010. (Figure 4)

	2010	2013	% diff
On crossing	712	221	-69.0%
Off crossing	596	1,147	92.4%
<b>Total</b>	<b>1,308</b>	<b>1,368</b>	<b>4.6%</b>

**Figure 4: Changes in Pedestrian Behaviour at Embankment Rd (Langham Place to Stenlake Terrace)**

6.12 *Laira Bridge Road (between Embankment Road and Heles Terrace)*

- 6.13 Laira Bridge Road could previously be crossed using a footbridge or two signal controlled crossing points, one at the Embankment Road end and one close to Heles Terrace. The footbridge has no ramp and is therefore only accessible to those who can use the steps. The EETS replaced the signalised crossing at the Embankment Road end with a long section of island to allow people to cross informally here and introduced a new signalised crossing close to the location of the footbridge. This crossing provides surface level access and marks a significant improvement for those with mobility problems, push chairs etc. The footbridge remains available to those who wish to use it.
- 6.14 The 2010 survey suggests that there has been a significant reduction, 49%, in the number of people crossing Laira Bridge Road overall. Further analysis shows that the majority of this reduction is at the western end of Laira Bridge Road, between Goad Avenue and Williams Avenue. When considered alongside the increases in pedestrians crossing on Embankment Road this reduction could be because people walking towards the city have chosen to cross elsewhere now that the central guard rails have been removed and additional crossings have been put in place. (Figure 5)

	2010	2013	% diff
On crossing	986	213	-78.4%
Off crossing	312	553	77.2%
On footbridge	265	198	-25.3%
<b>Total</b>	<b>1563</b>	<b>964</b>	<b>-38.3%</b>

**Figure 5: Changes in Pedestrian Behaviour at Laira Bridge Road (Embankment Road and Heles Terrace).**

## 7 Bus Journey Times and Reliability

- 7.1 An analysis of the data captured through Plymouth's Real Time Passenger Information (RTPI) system has been undertaken to understand the impact of EETS on bus journey times. The 2008 "before" data is taken directly from the original Community Infrastructure Funding (CIF) Bid and the "after" data is taken from March 2013, with the exception of the outbound journeys to Plympton where there was not sufficient RTPI data and November 2012 data was used instead.
- 7.2 It can be seen from Figure 6 that outbound bus journey times have decreased, by approximately 28 seconds for buses towards Plympton in the evening peak and 49 seconds for buses towards Plymstock. This reduction in journey times can be explained by the fact that from Charles Cross through to Heles Terrace there is a continuous bus lane, so buses are completely removed from any congestion experienced by general traffic.
- 7.3 In the inbound direction, however, bus journey times have increased, by approximately 17 seconds from Plympton in the morning peak and 45 seconds from Plymstock. This additional journey time can be explained by the additional pedestrian crossings that have been introduced along Heles Terrace and Embankment Road and the fact that buses do not have a continuous bus lane in the inbound direction. The additional pedestrian crossings will lead to increased journey times to all traffic, however in the outbound direction this is offset for buses by the continuous bus lane.

	AM Peak	Interpeak	PM Peak
<b>Floors to Go to Stanley Place</b>			
Spring 2008	05:13	05:22	05:58
Nov-12	05:11	05:00	05:30
<b>Morley Arms to Jurys Inn</b>			
Spring 2008	05:42	05:18	04:58
Mar-13	05:59	06:21	06:20
<b>Floors to Go to Sugar Mill</b>			
Spring 2008	06:33	06:46	07:07
Mar-13	06:04	05:46	06:18
<b>Lanhydrock Rd to Jurys Inn</b>			
Spring 2008	06:47	06:11	06:15
Mar-13	07:22	07:09	07:21

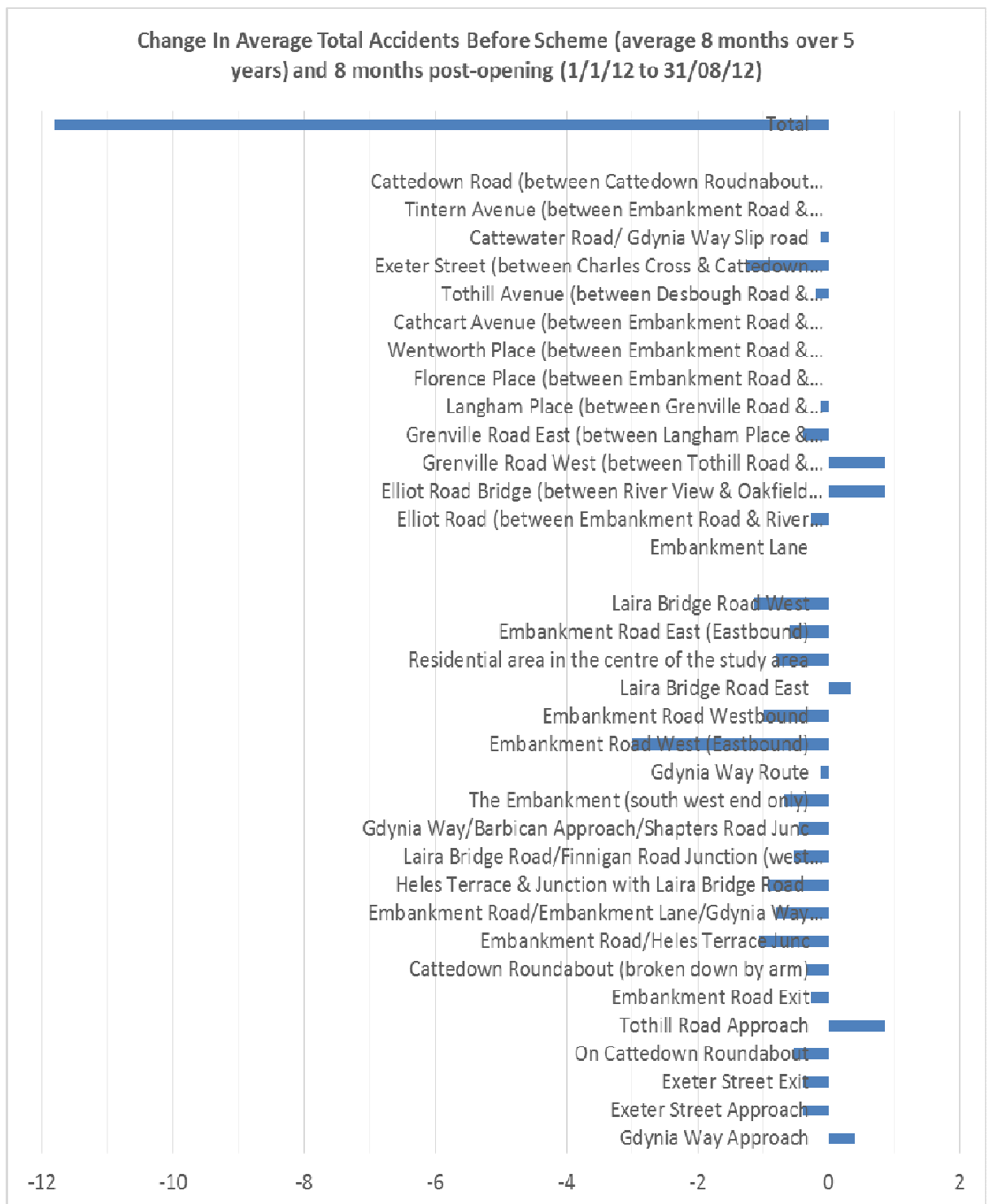
**Figure 6: Bus Journey Times, 2008 and 2013, (Minutes and Seconds)**

- 7.4 Bus operators were asked for their views on the impact of the scheme and Plymouth Citybus reported that since the introduction of the EETS there have been some very noticeable improvements to services that operate through the East End. Whilst the scheme has not generated an overall reduction in journey times it has significantly improved the reliability of their services, with 95% of services operating on time in January 2013. They have also reported a 25% increase in passengers on services that travel through the East End, which they attribute largely to the EETS.
- 7.5 First, however, did report improvements to their journey times, which resulted in them reducing the running times in their timetables for services 2, 6 and 7 in March 2013.
- 7.6 A bus passenger survey was undertaken on 7<sup>th</sup> February 2013 to understand passenger views on whether the EETS had improved bus services in their area. 1,221 passengers were interviewed of which 60% were female and 40% were male. 33% of passengers thought their journey time was quicker as a consequence of the scheme and 30% felt their bus service was

more reliable. 39% of passengers said that they used the bus more often than they did three years ago.

## **8 Accidents**

- 8.1 The accidents occurring within the East End Transport Scheme area have been studied for both before the scheme opened and after. In order to prevent the data being skewed by the Laira Road Bridge waterproofing maintenance scheme, which took place between September 2012 and November 2012, the 'after' data used did not extend past 31<sup>st</sup> August 2012. Furthermore to prevent the data being skewed by significant changes brought about by the scheme opening in November 2011, the period immediately after was also excluded. This is to allow the scheme to settle down and allow users to get used to the new layout and routes.
- 8.2 The 'before' data used is the same as that submitted for the original CIF bid, in order that a comparison can be made with the assumptions contained within the bid document. The 'before' data used in the CIF bid document covered a five year period between January 2003 to December 2007. However, due to the constraints on available good quality data post scheme opening an average eight months was taken over the 5 years to enable a fair comparison. (It is suggested that the scheme will be further monitored with more data in 2-3 years).
- 8.3 The change between before and after the scheme opening can be found in Figure 7 below, which shows that in the first eight months of opening generally accidents have been reduced when compared to an average eight months for the five years between 1 January 2003 to December 2007. All but 5 of the 28 roads assessed have either remained the same or have reduced in the average number of accidents. The five roads which have a marginally increased average are Grenville Road (West); Elliott Road Bridge, Laira Bridge Road East; Tothill Road approach (to Cattedown Roundabout) and Gdynia Way Approach (to Cattedown Roundabout).
- 8.4 The biggest reduction in the average total number of accidents has occurred on Embankment Road eastbound with other noteworthy reductions on Exeter Street (between Charles Cross and Cattedown Roundabout); Laira Bridge Road (West) and Heles Terrace.



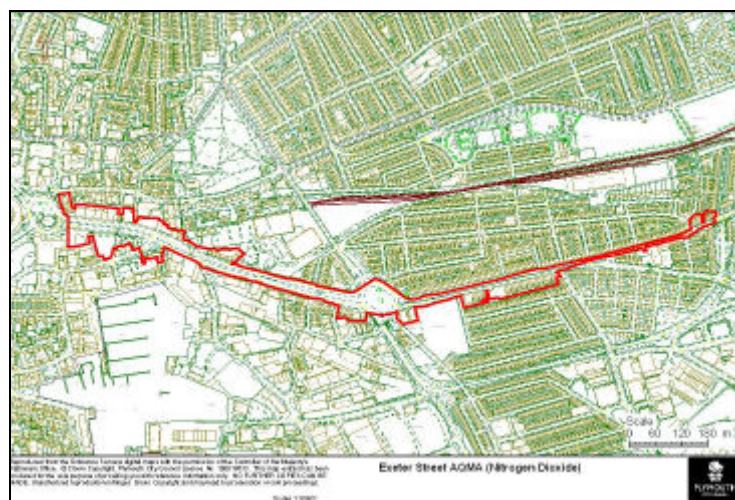
**Figure 7 Change In accidents before and after scheme opening**

8.5 A Stage 4 Road Safety Audit was undertaken in January 2013 and this analysed the accidents that had occurred in the East End area between January 2012 and January 2013. It showed that the accidents have predominantly concentrated at Cattedown Roundabout, Gdynia Way and in the vicinity of the pedestrian crossings on Embankment Road. The location, type and frequency of accidents at these locations are similar to the records for the three year period before the road layouts were changed, except for the junction of Shapters Road and Gdynia Way. Previously at this junction there was a record of shunt accidents but in the 12 month period monitored after the scheme there has only been one recorded shunt accident.

- 8.6 There is no pattern to the accidents at Cattedown Roundabout, a mixture of shunts and one collision, whereas the ones on Gdynia Way are either accidents due to people changing lanes or shunts.
- 8.7 There have been five pedestrian accidents along Embankment Road and the police reports indicate that pedestrians were either using the crossings but crossed against the 'red man' or stepped into the carriageway without looking.
- 8.8 Further monitoring over a longer period will confirm any longer term trends in accidents and whether and further remedial works may be required at a later date

## 9 Air Quality

- 9.1 A detailed dispersion air quality modelling report was completed in 2009. The purpose of the report was to estimate the effects of the EETS, particularly the resulting changes in vehicular emissions on the local road network, principally as a result of the addition of a third vehicular lane on Gdynia Way.
- 9.2 The EETS included roads that form part of the Exeter Street Air Quality Management Area (AQMA) declared for Nitrogen dioxide (NO<sub>2</sub>), namely Exeter Street and Embankment Road to Heles Terrace. The remainder of the scheme is in close proximity to the AQMA and it was therefore agreed that monitoring of air quality would be undertaken. The area of the Exeter Street AQMA is shown in Figure 3 below.
- 9.3 Monitoring of the Exeter Street AQMA has been ongoing since 2007 through the use of diffusion tubes and a real-time pollution analyser. Diffusion tubes measure ambient concentrations of NO<sub>2</sub> and a number of additional tubes were positioned at various locations around the EETS area to collect air quality data.
- 9.4 The assessment undertaken prior to the start of the scheme predicted that it would bring significant benefits within the Exeter Street AQMA through the reduction of traffic on Embankment Road. The assessment indicated that Nitrogen dioxide concentrations would decrease along Embankment Road and might increase along Gdynia Way in 2012 following the implementation of the East End Transport Scheme. Any increases in NO<sub>2</sub> were considered likely to remain below the UK air quality objective level of 40  $\mu\text{g}/\text{m}^3$  (annual average).



**Figure 3: Map of Exeter Street AQMA boundary**

- 9.5 The results of the air quality diffusion tube monitoring undertaken as part of the EETS are shown in Table I below. Gdynia Way was closed to traffic for six months from June 2010 so a comparison of the data from January to June for 2009, 2010 and 2012 has been undertaken. Significant highway works on Laira Bridge during the second half of 2012 further supports the approach to focus on data from January to June for the purposes of comparison. Data from 2011 has not been considered due to the nature of the construction works being undertaken.
- 9.6 As Table I shows all of the sites except Nomony Children's Centre, fall within the air quality objective level. The 2012 Air Quality Updating and Screening Assessment prepared by Plymouth City Council's Public Protection Service explains that the tube at Nomony Children's Centre does not represent relevant exposure, due to its location being outside the boundary wall and in a place where people are unlikely to be regularly present, and consequently this led to the introduction of a new tube at Nomony Playground in 2010. This tube shows a significant reduction in NO<sub>2</sub> at a relevant exposure location with readings at this location shown to be comfortably within the objective level, as shown in Table I.
- 9.7 A review of the 2012 data indicates that there has been an improvement in air quality on Embankment Road and Heles Terrace which is likely to be associated with the significant reduction of traffic on these roads. The air quality improvements within the AQMA are particularly important given the proximity to sensitive receptors including Prince Rock Primary School. The air quality objective level was exceeded at both monitoring sites on Embankment Rd in 2010, but the implementation of the EETS has seen these sites brought under the UK objective Level most notable at 211 Embankment Road.
- 9.8 Despite a reduction in air quality following the delivery of the EETS at 68 Mainstone Avenue, 8a River View and Nomony Playground (which are sites that are adjacent to Gdynia Way), all sites at relevant exposure locations remain within safe limits for NO<sub>2</sub>.
- 9.9 The Council will continue to monitor air quality in the East End. There are no major works planned for 2013 which should provide the first full 12 months worth of data not influenced by highway works since 2009.

Period	48 Embankment Road	68 Mainstone Avenue	8a River View	7a River View	Nomany Children's Centre*	Nomany Playground	East End Resource Centre	62 Laira Bridge Road	211 Embankment Road	41 Heles Terrace
<b>UK Air Quality Objective Level 40 µg/m<sup>3</sup></b>										
<b>2012</b>	34.78 (-9.14)	34.43 (+6.22)	36.36 (+8.9)	29.93 (-0.71)	48.22 (-4)	27.05 (+4.96)	30.58 (-2.16)	25.6 (-6.02)	26.6 (-16.57)	25.36 (-7.14)
<b>2011</b>	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction	Construction
<b>2010</b>	43.92 (+2.07)	28.21 (-3.09)	27.46 (-0.95)	30.64 (-1.32)	52.22 (+9.17)	22.09	32.74 (+2.23)	31.62	43.17 (+4.45)	32.5
<b>2009</b>	41.85	31.30	28.41	31.96	43.05	No data	30.51	No data	38.72	No data

**Table 1 Air Quality diffusion tube monitoring results (January to June) showing change since previous year shown as µg/m<sup>3</sup>**

**\*Nomony Children's Centre tube not at relevant exposure location**

Period	48 Embankment Road	68 Mainstone Avenue	8a River View	7a River View	Nomany Children's Centre	Nomany Playground	East End Resource Centre	62 Laira Bridge Road	211 Embankment Road	41 Heles Terrace
<b>2010-2012</b>	-20.81%	+22.05%	+32.41%	-2.32%	-7.66%	+22.45%	-6.6%	-19.04%	-38.38%	-22%

**Table 2 Air Quality diffusion tube monitoring results (January to June) - Percentage change from 2010 to 2012**



## 10.0 Noise

- 10.1 A noise and vibration assessment was undertaken in September 2009 to assess the impact of the EETS and to determine whether any mitigation works might be required.
- 10.2 The report was undertaken by consultants Parsons Brinckerhoff to predict whether the noise and vibration levels generated during construction and operation of the Scheme would be likely to have a significant impact on sensitive receptors (to noise and vibration) located within the scheme area.
- 10.3 In order to determine the existing noise climate, noise monitoring was undertaken on Embankment Road and Gdynia Way in July 2009. The noise level on Embankment Road was averaged as 74.1 dB and for Gdynia Way was 80.2 dB.
- 10.4 The pre-scheme noise assessment concluded that in terms of traffic noise effects the EETS would bring benefits to the East End area.
- 10.5 From the outset it was assumed that Gdynia Way would be resurfaced using a material with noise-reducing properties and that the speed limit would be reduced from 40mph to 30mph. Both of these mitigation measures were delivered as part of the scheme. The carriageway was resurfaced using 10mm SMA surface course (noise level 3 properties) and the entire length of Gdynia Way is now 30 mph with the speed limit enforced with average speed cameras.
- 10.6 Resurfacing was also undertaken on Embankment Road, Heles Terrace, Laira Bridge Road and Embankment Lane., using a material with noise-reducing properties.
- 10.7 The EETS was opened to traffic on 1 November 2011. Following a twelve month period to allow traffic levels to stabilise the road side noise monitoring was repeated at Embankment Road and Gdynia Way. The results are shown in Table 3 and Table 4 below.

<b>Gdynia Way noise levels:</b>	
<b>2009</b>	80.2 dB
<b>2012</b>	74.2 dB

**Table 3 Ambient noise levels on Gdynia Way**

<b>Embankment Road noise levels:</b>	
<b>2009</b>	74.1 dB
<b>2012</b>	71.4 dB

**Table 4 Ambient noise levels on Embankment Road**

- 10.8 The traffic flow data on the day of the noise monitoring has been reviewed to ensure that the flows were representative of an average day. The Automatic Traffic Counter data shows that the traffic flow on Gdynia Way on the day of the monitoring was 25,151 vehicles and the daily average for May 2012 was 25,182.

10.9 The results of the roadside monitoring support the prediction in the 2009 noise assessment that noise levels have been reduced on both Gdynia Way and Embankment Road under the EETS. The most significant reduction has been on Gdynia Way which has experienced a 6 dB decrease in noise with a 2.7 dB decrease recorded on Embankment Rd. A key objective of the EETS was to improve the local environment for residents of the East End and the monitoring results demonstrate that the reductions in noise output have contributed to these improvements.

## **11.0 Conclusions**

11.1 Overall there has been a reduction in traffic travelling through the East End but this should be considered alongside the year on year reduction in traffic across the city as a whole since 2010.

11.2 There have been significant reductions in traffic on Embankment Road and Heles Terrace due to the relocation of traffic onto the new outbound lane on Gdynia Way and the new Embankment Lane.

11.3 This has led to significant improvements in air quality along Embankment Road and Heles Terrace. Unfortunately there has been a decline in air quality on some of the roads adjacent to Gdynia Way; however they still remain within safe limits.

11.4 There has been an increase in traffic on Florence Place and Grenville Road which is partly due to improved local access and partly due to a number of motorists using it as a rat run to travel towards Plympton and avoid Gdynia Way.

11.5 Noise levels along Gdynia Way and Embankment Road have reduced due to the new road surface having noise-reducing properties and the introduction of the 30mph speed limit on Gdynia Way.

11.6 There has been an approximate 50% increase in cyclists in the East End and a 4% increase in pedestrians. The introduction of additional pedestrian crossings and the removal of the pedestrian guard rails on Embankment Road have resulted in much greater permeability for pedestrians.

11.7 Bus journey times have decreased for outbound bus services but increased for inbound services. (Unfortunately, due to the unavailability of "after" car journey times a comparison of bus and general traffic journey times cannot be made at this stage. However, once the car journey time information is available in 2014 this analysis will be undertaken). Bus service reliability however has improved considerably, leading to increased passengers and changes to the bus operators' timetables.

11.8 A third of bus passengers feel their bus services are quicker and more reliable following the scheme and approximately 40% travel by bus more often.