Post Opening Project Evaluation

A38 Dobwalls Bypass - Five Years After Opening Study

July 2015

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Executive summary

Scheme description

The A38 Dobwalls Bypass in Cornwall is a Highways England (formerly Highways Agency) scheme which opened 19 December 2008, and replaced the single carriageway through the village of Dobwalls with a dual carriageway to the north of the village. The key additional features of this scheme are:

- A 2 mile long dual carriageway bypass.
- A new roundabout at the western end of the bypass to link with the A390.
- A new 0.6 mile link road for the A390 to join with the new roundabout, including a new bridge over the London-Penzance railway line.
- Provision of three bridges to carry local roads over/under the bypass.
- Two junctions to allow access to and from the bypass at its eastern end.
- Environmental mitigation measures, including three bat 'bridge' structures across the bypass.

This document summarises the findings of the five years after post opening evaluation study.

Objectives

Objectives (Public Inquiry Statement of Case 2003)	Objective Achieved?
To provide additional capacity and reduce congestion.	✓
To enhance road safety.	✓
To improve the environment of the village by removing through traffic.	✓

Summary of Scheme Impacts

Key Findings

- Average journey times have reduced for traffic using the bypass, particularly in the peak periods where journey time savings of up to 44% are seen.
- Post opening, average weekday traffic flows have reduced through the village of Dobwalls by over 80%.
- The number of collisions observed on the new bypass and former A38 route through Dobwalls have reduced by 53% (an average of 5.8 collisions per year), slightly lower than was forecast.
- Collision severity has reduced post opening.
- Monetary benefits are lower than expected, primarily due to journey time and collision savings being lower than forecast.

Traffic

- Post opening, the bypass carries 21,250 vehicles per day.
- Average weekday traffic flows have reduced on the former A38 by over 80%, the equivalent of 19,400 fewer vehicles per day.
- Observed traffic flows are lower than forecast on all links except the former A38 through the village of Dobwalls, which saw traffic flows of 50% more than forecast at five years after (FYA) opening on the westbound route, and 21% more for the eastbound route. However, there has still been a significant reduction on the former A38, since the new A38 bypass opened.
- Average journey times have reduced for traffic using the bypass, with greater savings seen in the peak periods, in particular the A38 westbound in the AM peak, which has experienced journey time savings of 44%.

Safety

- A 17% reduction in the number of collisions (an average of 5.8 per year) has been observed over the wider study area
- A 53% reduction (5.0 collisions per year) has been observed over the key links in the vicinity of the scheme which were directly affected by the scheme. This saving is slightly lower than the forecast of 68% less collisions a year.
- The observed saving over the key links is higher than seen over the wider study area, strongly suggesting that the scheme has had a direct impact on safety for the A38 improved section.
- Before scheme opening, there were collisions spread over the routes in the wider area, particularly along the A38 where side roads accessed the route. At FYA some clusters around junctions remain, but they have decreased in number, and additionally there are fewer collisions occurring along the former A38.
- The severity of collisions has reduced post opening (serious collisions reduced by 30%), and the collision rate (when changes in traffic flows is taken into account) for traffic using the trunk road has decreased by 54% post opening, slightly less than forecast.

Environment

- Noise and Air Quality impacts are better than expected for the bypass based on traffic flows being lower than predicted in the ES.
- The reduction in traffic flows has benefited walking and cycling through the village, however restricted use of a new footpath through Havett Farm requires clarification.
- The use of shillet (a gravel of crushed shale) in areas to be seeded with species rich grassland has resulted in growth targets for these areas not being met at FYA.
- Hedgerow and woodland plots have exceeded growth targets and this is assumed to be as a result of all topsoil generated by the scheme to be used for these plots. Conversely, Cornish Hedges have not reached growth levels expected of them at FYA, possibly due to insufficient soil within the stone walls, with an overall assessment of worse than expected for Landscape.
- The gateway in to Dobwalls from the west remains utilitarian despite some hard landscaping being undertaken within Dobwalls Roundabout since the one year after POPE report.
- Biodiversity habitat features have been monitored as required, with impacts as expected, although limited use of these features by the targeted species is noted at FYA.

Accessibility and Integration

- On the former A38 traffic has reduced by over 80% as the majority of traffic has transferred to the bypass, and hence severance is reduced.
- The scheme's objectives are in line with historical as well as current regional and local policies.

Summary of Scheme Economic Performance

		All figures in 2002 Prices discounted to 2002	
		Forecast	**Outturn**
Present Value Costs (PVC, investment cost)		**£30.49m**	**£46.70m**
Journey Time Benefit		£43.46m	£27.17m
Safety Benefits		£33.29m	£25.6m
Vehicle Operating Costs		-£10.67m	-£10.67m
Construction delay and maintenance		£1.53m	£1.53m
Present Value Benefits (PVB)		**£67.60m**	**£43.63m**
Indirect Tax impact		£8.09m	£8.09m
Indirect tax impact within costs	**PVC (incl. indirect tax as decrease)**	£22.4m	£38.61m
	BCR = PVB / PVC	**3.02**	**1.13**
Indirect tax impact within benefit	**PVB (incl. indirect tax as an increase)**	£75.69m	£51.72m
	BCR = PVB / PVC	**2.48**	**1.11**

- Overall the outturn PVB is lower than forecast.
- The outturn investment costs are higher than forecast.
- Safety benefits are 23% lower than forecast at £25.6m, though some of the difference can be attributed to taking account of the national background decline in collisions. The outturn safety benefits are lower than forecast, but they are still considerable.
- The journey time benefits are 37% lower than expected due to lower than forecast traffic volumes as well as a smaller appraisal area considered. The forecast journey time benefits were £43.46m, however, the outturn journey time saving is £27.17m.
- The outturn BCR (1.11) is lower than forecast (2.48) and represents 'low' value for money according to Department for Transport criteria.

1. Introduction

Background

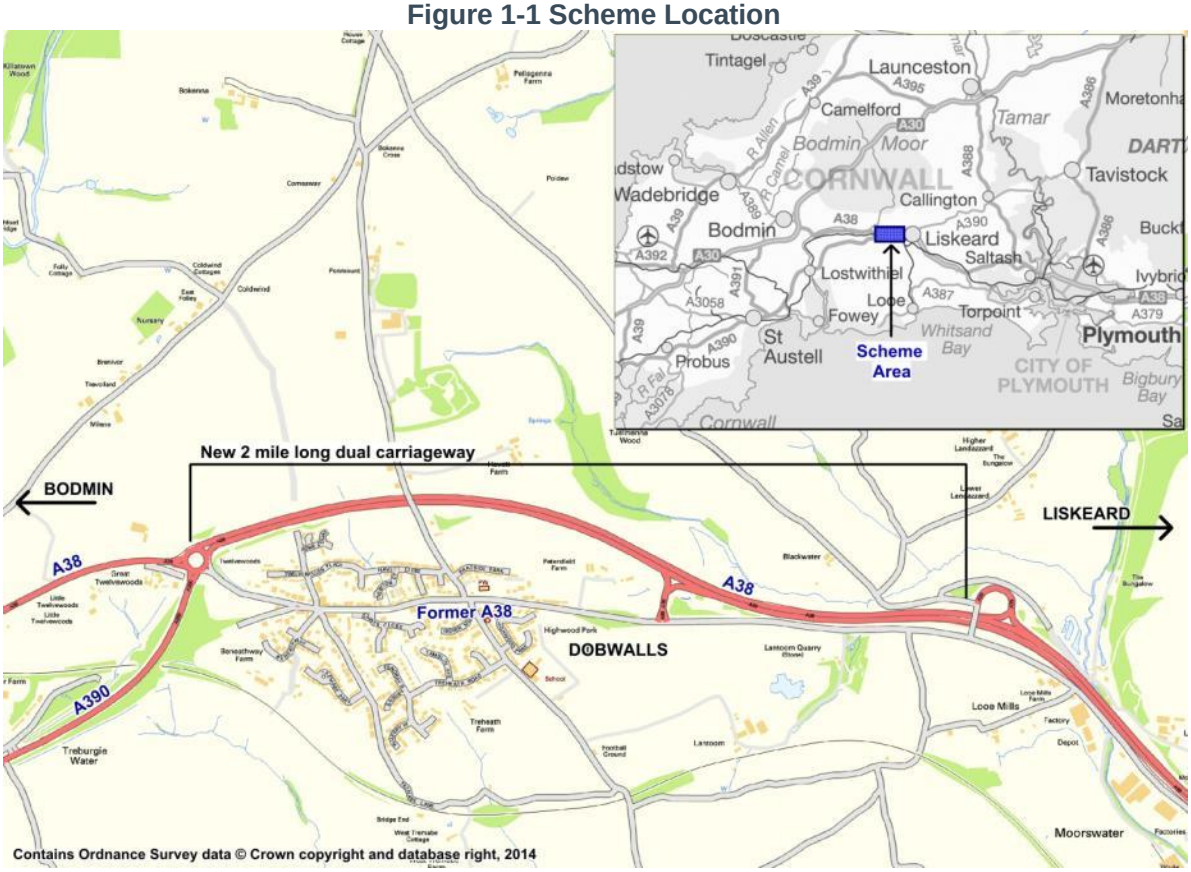
1.1 The A38 Dobwalls bypass is a major Highways England (formerly known as the Highways (HA)) scheme to improve the A38 trunk road through the village of Dobwalls in Cornwall. The scheme involved the construction of a 2 mile long dual carriageway bypass to the north of the village, along with some alterations to the A390 alignment to the west of the village and local access roads. The scheme opened to traffic on 19th December 2008, and this report is a Five Years After (FYA) evaluation of the emerging impacts of the scheme.

Scheme Context

1.2 Dobwalls is located on the A38 trunk road between the towns of Bodmin and Liskeard, and this section is a key link between Plymouth to the east and the rest of Cornwall, within the Area 1 Managing Agent Contractor area. ***Figure 1-1*** shows the regional location of the scheme. The A38 through Cornwall is an important route, particularly for holiday traffic as it provides one of only two trunk road routes to popular tourist destinations in Cornwall, although it performs a secondary role to the A30 to the north. The old road through the village of Dobwalls was detrunked in 2009 and responsibility for maintenance passed over to Cornwall Council.

1.3 The area is predominantly rural in nature, with many small hamlets and villages accessed by minor roads. The villages of Dobwalls, and neighbouring Doublebois have a combined population of approximately 1,750 people[1], although this does increase slightly in summer with a number of tourists staying in the area.

Figure 1-1 Scheme Location



[1] Office for National Statistics (ONS) 2011 Census data for output areas covering Dobwalls and Doublebois.

1.4 The need for the scheme was due to problems with congestion and safety through the village of Dobwalls. The majority of the A38 between Plymouth and Liskeard to the east of Dobwalls is dual carriageway, which then reduced to a single carriageway (with a short climbing lane section westbound) through the village of Dobwalls. This bottleneck effect at Dobwalls was accentuated at weekends and during the summer as the number of vehicles travelling along the route increased notably due to the A38 being a key holiday route to southern Cornwall.

1.5 Further to this, this section also had a number of substandard features, including at-grade junctions, and private accesses (both residential and commercial). The junction of the old A38 and the A390 was originally a signal controlled junction which contributed to the queuing often seen through Dobwalls.

Scheme Objectives

1.6 The 1997 Roads Review Assessment paper stated that the A38 Dobwalls bypass objectives were:

- **To provide additional capacity and reduce congestion.**
- **To enhance road safety.**
- **To improve the environment of the village by the removal of through traffic.**

1.7 The Secretary of State's specific objective for the scheme was cited as 'to resolve the congestion and accident problems in Dobwalls and work closely with key stakeholders to improve the environment within the village'.

1.8 The Environmental Statement (ES) added further detail to these core objectives, stating that the scheme would result in the removal of approximately 90% of traffic from the existing A38 at Dobwalls providing:

- Reduction in casualties due to accidents.
- Resolution of congestion, particularly associated with the peak holiday season, resulting in large beneficial effects predicted in terms of journey ambience (reduced driver stress for road users of the scheme; and reduced traveller stress for pedestrians and cyclists in Dobwalls).
- An improved environment for pedestrians, cyclists and other users of local roads in and around Dobwalls.
- Improved amenity for residents and visitors, including potential for a sense of place to be restored to benefit the townscape, resulting in a moderate beneficial predicted impact.

Scheme Description

1.9 The scheme consists of a 2 mile long dual carriageway which passes to the north of the village of Dobwalls. The scheme included the following key elements, the locations of which are shown in ***Figure 1-2***:

- New 0.6 mile A390 link road (joining to the new roundabout), with the closure of the old A390 link into Dobwalls.
- A new distributor road linking to the Moorswater Industrial Estate running parallel to the bypass for a short section east of Dobwalls.
- A roundabout at the junction of the A38 and A390, west of Dobwalls.

- Two new over bridges at junctions to link the bypass with the local roads, with Coldwind Lane severed.
- A new bridge to take the A390 over the London – Penzance railway line.
- Three bat 'bridge' structures over the bypass to maintain flight paths.
- Provision of 1.6km of new foot/cycle track, mainly to the west of Dobwalls and the A390.
- Further environmental mitigation measures including bat boxes, mammal tunnels and mammal fencing.

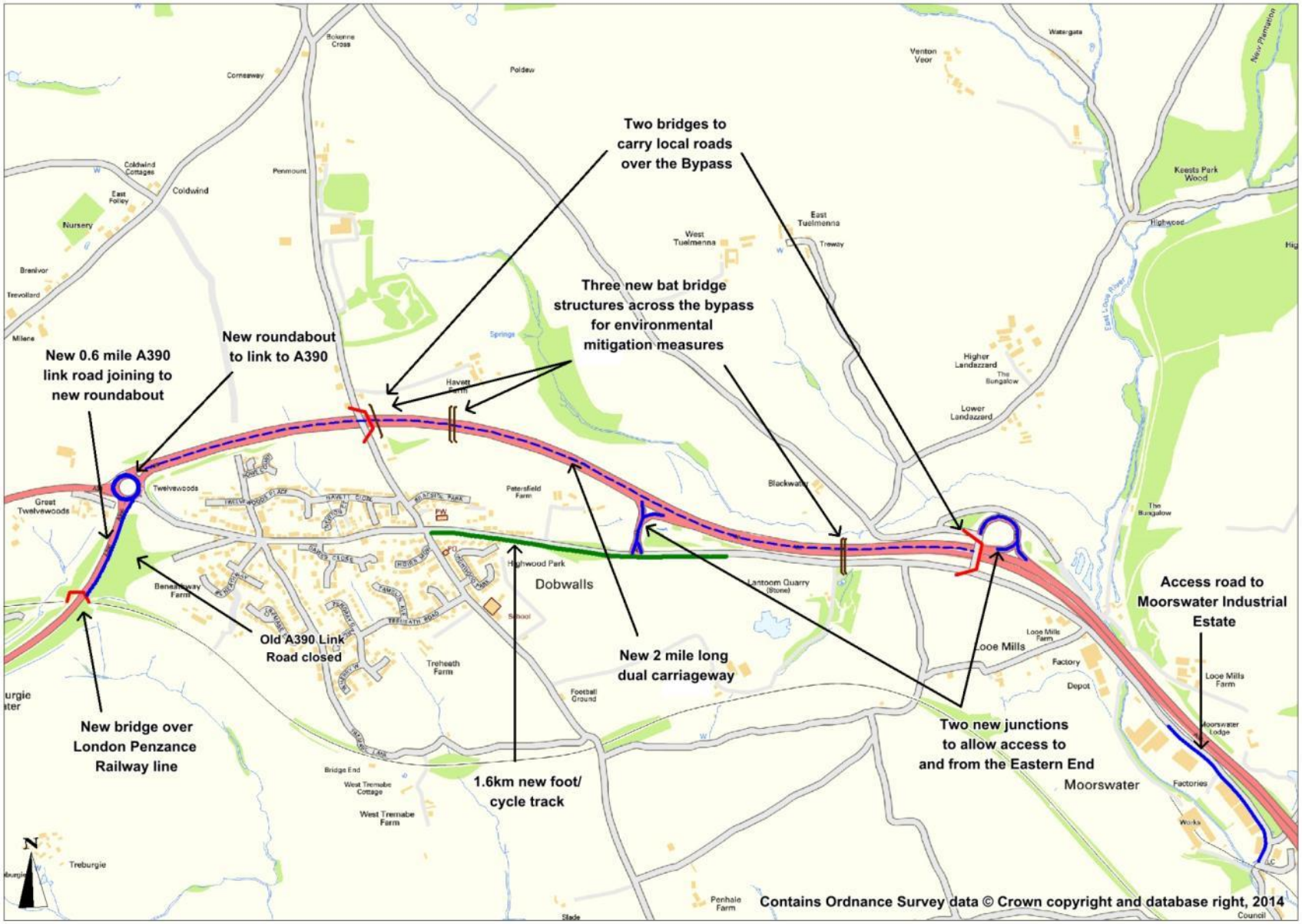
History

1.10 A summary of the key dates of the development of the scheme is given in ***Table 1-1***.

Table 1-1 Key Dates in Scheme Development

Date	Event
1973	A scheme to improve the trunk road between Liskeard and Bodmin included in Roads Programme. Scheme deferred before any public consultation took place.
1987	A scheme to improve the A38 between Liskeard and Bodmin was reintroduced into the programme.
1992	Preferred route announced for the A38 Liskeard to Bodmin improvement (eastern and western sections).
1994	Preferred route announced for the A38 Liskeard to Bodmin improvement (central section).
1995	Scheme split into two sections, the Dobwalls Bypass, and the Dobwalls to Bodmin Improvement. Dobwalls Bypass remained in the Roads Programme, and the Dobwalls to Bodmin Improvement placed in the longer term Programme.
1996	Dobwalls to Bodmin Improvement withdrawn from the Programme.
1997	Statutory Route Protection Plan issued to confirm the Preferred Route for Dobwalls bypass.
2001	Scheme added to the Targeted Programme of Improvement, and a review of the 1997 Preferred Route commenced.
2002	Review completed, resulting in a recommendation to retain the route with modifications at each end of the bypass.
2002-3	Public Consultation undertaken for the revised Preferred Route.
May 2003	Preferred Route announced.
2005	Draft Orders published.
February 2007	Construction Commenced.
September 2008	Bypass partially opened to traffic in each direction with traffic management.
December 2008	19th December, the bypass fully opened to traffic in both directions.
March 2009	A390 link road fully opened to traffic, scheme completed.
June 2011	POPE One Year After Report produced.
September 2014	Remedial works underway to rebuild carriageway to address drainage problems.

Figure 1-2 Scheme Key Features



Additional Issues

Environmental

1.11 This scheme included three bat bridges and a bat house to help maintain flight paths and roosts for bats. The monitoring of the success of this has been undertaken and is reported on further in the Environment section of this report.

Detrunking

1.12 Following opening, the former A38 through Dobwalls has been detrunked. As part of the detrunking works, a number of improvements were made by Cornwall Council to the old road (although partly funded by the Highways Agency (at the time) which was included in the predicted cost of the scheme). Improvements included narrowing the road with lining, introducing double mini roundabouts at the crossroads in Dobwalls and the removal of the signalised pedestrian crossing outside the pub in the village.

1.13 As part of the detrunking works, the speed limit through the village has been reduced from 40mph to 30mph post opening, with gateway signing.

1.14 Whilst the improvements help to reduce visual appearance of the 'trunk road' style of the road, it is noted that the route is still required to meet certain standards, as it is used as a diversion route in the event that the bypass is closed.

Congestion Management

1.15 Due to the problems with congestion, prior to the bypass, a one way system was implemented in summer peak times to try to reduce queuing through the village. The before scheme opening surveys undertaken for the traffic section were undertaken in a normal situation where the signalised junction with the A390 was fully operational. The signals were removed as part of the scheme, and therefore do not impact upon the after surveys.

1.16 A climbing lane was also in place on the westbound approach to Dobwalls, however its effectiveness was being hindered due to queuing on the approach to the A390 junction often extended to the climbing lane therefore not allowing this facility to be utilised effectively.

Remedial works in 2014-15

1.17 Since the A38 Dobwalls bypass was completed in 2008, problems with surface water have developed resulting in lanes having to be closed during cold weather due to the risk of ice forming. Investigations into the causes have been ongoing and as a result Highways England are now reconstructing just under a one mile section of the bypass to rectify the problem, thought to be a construction issue. No further information has been made available regarding the length or frequency of closures. This is considered further in the Environment Chapter of this report.

Residents Survey

1.18 At the OYA stage a consultation was undertaken including a residents survey to address local residents' opinions relating to severance, accessibility, environmental impact and quality of life. As there have been no changes to the scheme or the villages as a result of the scheme since the survey was undertaken, where relevant, the results have been incorporated throughout this report to represent public perception on a number of the sub-objectives evaluated.

Overview of Post Opening Project Evaluation (POPE)

1.19 Highways England is responsible for improving the strategic highway network (motorways and trunk roads) by delivering the Major Schemes programme. At each key decision stage

through the planning process, schemes are subject to a rigorous appraisal process to provide a justification for the project's continued development. When submitting a proposal for a major transport scheme, the Department for Transport (DfT) specifies that an Appraisal Summary Table (AST) is produced which records the degree to which five objectives[2] (Environment, Safety, Economy, Accessibility and Integration) have been achieved. The AST for this scheme is presented in Table A.1 of this report.

1.20 POPE studies are undertaken for all Major Schemes to evaluate the strengths and weaknesses in the techniques used for appraising schemes, so that improvements can be made in the future. For POPE, this is achieved by comparing information collected before and after the opening of the scheme to traffic, against predictions made during the planning process. The outturn impacts of a scheme are summarised in an Evaluation Summary Table (EST) which summarises the extent to which the objectives of a scheme have been achieved. The EST for this scheme can be found in Table A.2 of this report.

1.21 POPE of Major Schemes goes beyond monitoring progress against the targets set beforehand. It also provides the opportunity to study which aspects of the intervention and appraisal tools used to evaluate it are performing better or worse than expected, and how they can be made more effective. More specifically the objectives of POPE evaluation reports are to:

- Provide a quantitative and qualitative analysis of scheme impacts consistent with national transport appraisal guidance (Web TAG) and scheme specific objectives.
- Identify and describe discrepancies between forecast and outturn impacts.
- Provide explanations of reasons for differences between forecast and outturn impacts.
- Identify key issues relating to appraisal methods that will assist Highways England in ongoing improvement of appraisal approaches and tools used for Major Schemes.

Contents of this Report

1.22 The remainder of this report is structured as follows:

- **Chapter 3** – Traffic Impact Analysis
- **Chapter 4** – Safety
- **Chapter 5** – Economy
- **Chapter 6** – Environment
- **Chapter 7** – Accessibility and Integration
- **Chapter 8** – Conclusions
- **Appendix A** – Appraisal Summary Table and Evaluation Summary Table
- **Appendix B –** Information requested for Environment Section
- **Appendix C** – ES and FYA comparison viewpoints
- **Appendix D** – Glossary

[2] As of August 2011, this approach has been revised. However, POPE is concerned with evaluation against the appraisal and as such follows the objectives used at that time.

2. Traffic Impact Analysis

Introduction

2.1 This section considers before and after opening traffic data from a number of sources to provide an after opening comparison and to provide pre and after scheme journey times on key links around the scheme. It also considers changes in traffic flows and journey times on the new A390 link road, the former A38 route through the village of Dobwalls and the surrounding roads.

2.2 This chapter includes the following:

- A description of national, regional and local background traffic trends.
- A summary of the sources used to compile data for this evaluation.
- A detailed comparison of pre scheme and FYA traffic flows and journey times on the key routes in the study area likely to be affected by the scheme.
- An evaluation of the key differences between forecast and outturn impacts of the scheme in terms of traffic flows and journey times.

Background Changes in Traffic

2.3 Historically in POPE scheme evaluations, the 'before scheme' counts have often been factored to take account of background traffic growth so that they are directly comparable with the 'after' counts. However, in light of the recent economic climate which has coincided with a widespread reduction in motor vehicle travel in the United Kingdom as a whole since 2008, it is no longer deemed appropriate to use this method of factoring to reflect background changes in traffic. Rather, recent POPE studies have taken a more studied approach in order to assess changes in the vicinity of the scheme, within the context of national, regional and local trends in traffic flows.

National Trends

2.4 The Department for Transport (DfT) produces observed annual statistics for all motor vehicles in terms of distances travelled (billion vehicle kilometres, bvkm). These are reported by road types[3] for Great Britain and by region[4]. At present, this data is available up to 2013. Here we present the proportional changes by year since scheme construction in 2008, for:

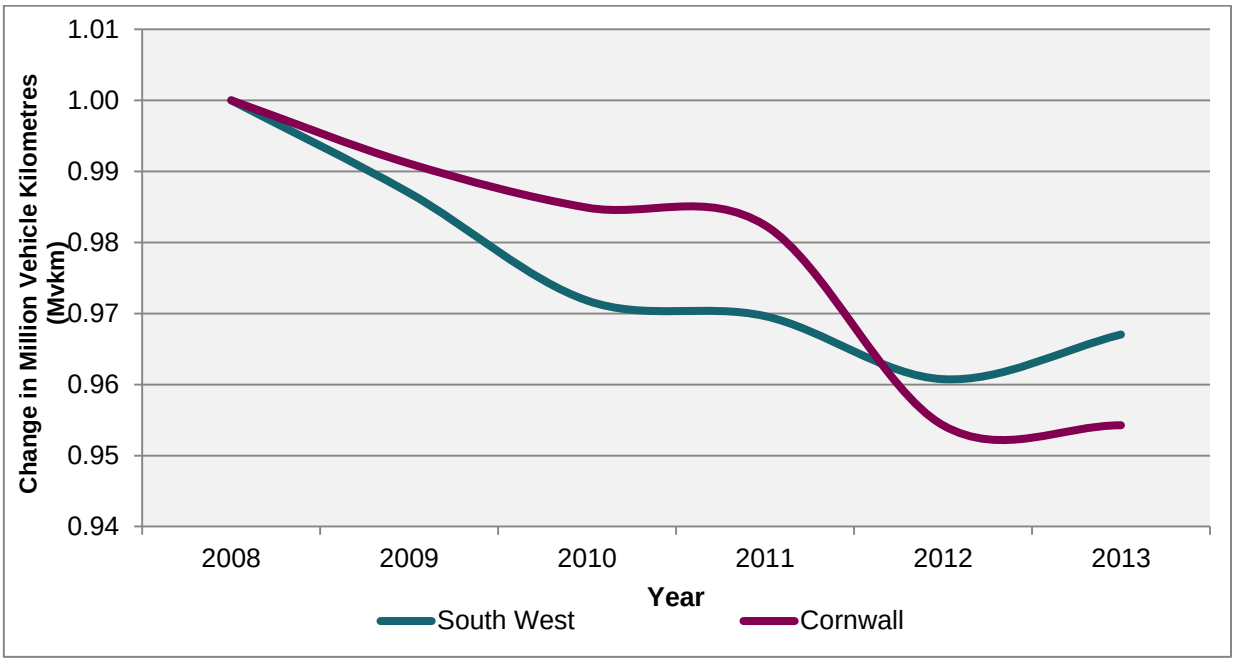
- Regional data for the area covering the scheme (South West England).
- Local data (Cornwall).
- National data for rural A roads and minor roads.

2.5 Regional and local traffic trends are shown in ***Figure 2-1***, with national trends by road type shown in ***Figure 2-2***.

[3] Road traffic by road class (www.gov.uk/government/organisations/department-for-transport/series/road-traffic-statistics) Table TRA0202. Motor vehicle traffic (vehicle kilometres) by road class, annual from 1993-2013

[4] Road Traffic and Speeds (http://www.dft.gov.uk/pgr/statistics/datatablespublications/roads/traffic) Table TRA8904b. Motor vehicle traffic (vehicle kilometres) by local authority in the South West of England, annual from 1993 to 2013

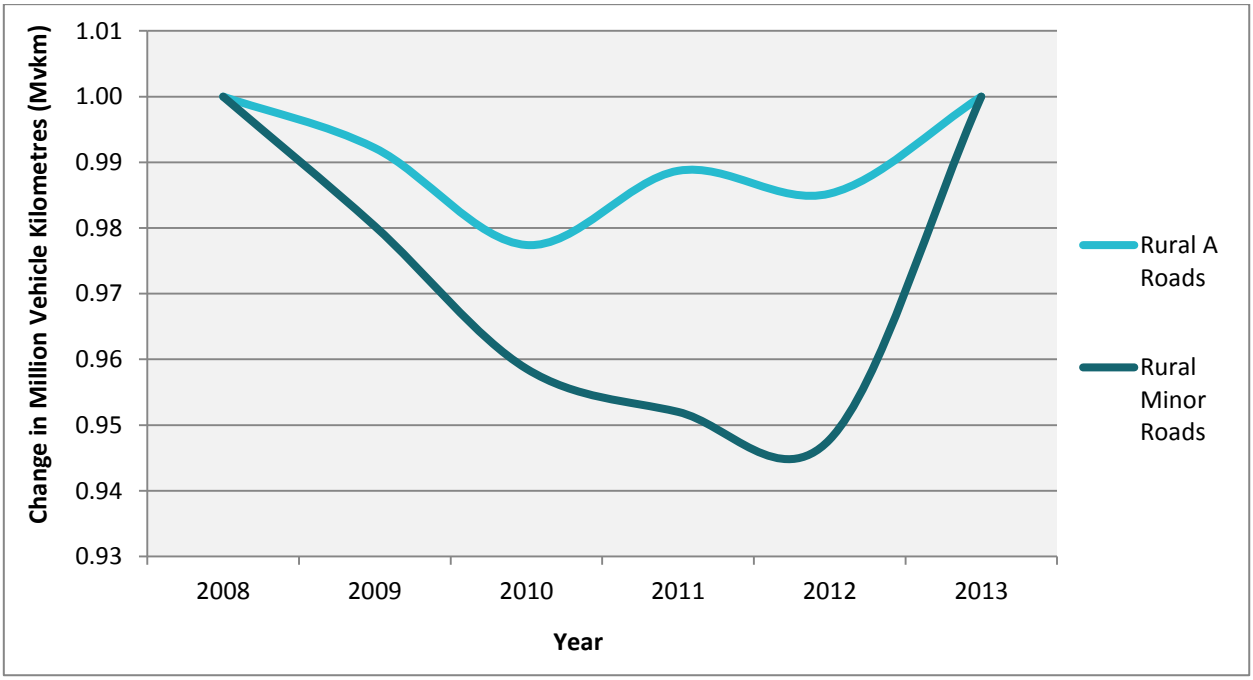
Figure 2-1 Regional and Local Trends



2.6 It can be seen from ***Figure 2-1*** that:

- During 2009, after the scheme opened, traffic levels were decreasing both regionally and in Cornwall, a trend that continued until 2012.
- Traffic flows in Cornwall decreased by almost 5% between 2008 and 2012. A slight upward turn is seen between 2012 and 2013.
- Flows in the South West also decreased although to a lesser extent to Cornwall, with an overall decrease of 4% between 2008 and 2012, and a slight rise was observed into 2013.
- Overall traffic flows between 2008 and 2013 have decreased by between 3-4.5%.

Figure 2-2 Nationally observed trends by road type



2.7 It can be seen from ***Figure 2-2*** that:

- Traffic flows on rural A roads decreased slightly (2%) between the 2008 and 2010. Small fluctuations of approximately 1% are seen between 2011 and 2012, with a return to 2008 levels observed by 2013.
- Traffic flows on minor rural roads decreased sharply from 2008, with total vehicle kilometres travelled in 2012 approximately 5.5% lower than in 2008. However, by 2013 flows returned to the same level seen in 2008.

2.8 This information should be kept in mind when assessing the changes in traffic volumes in and around the scheme, as it is important to determine whether changes have occurred due to the scheme, or national traffic trends. No factors have been applied to flows throughout this chapter.

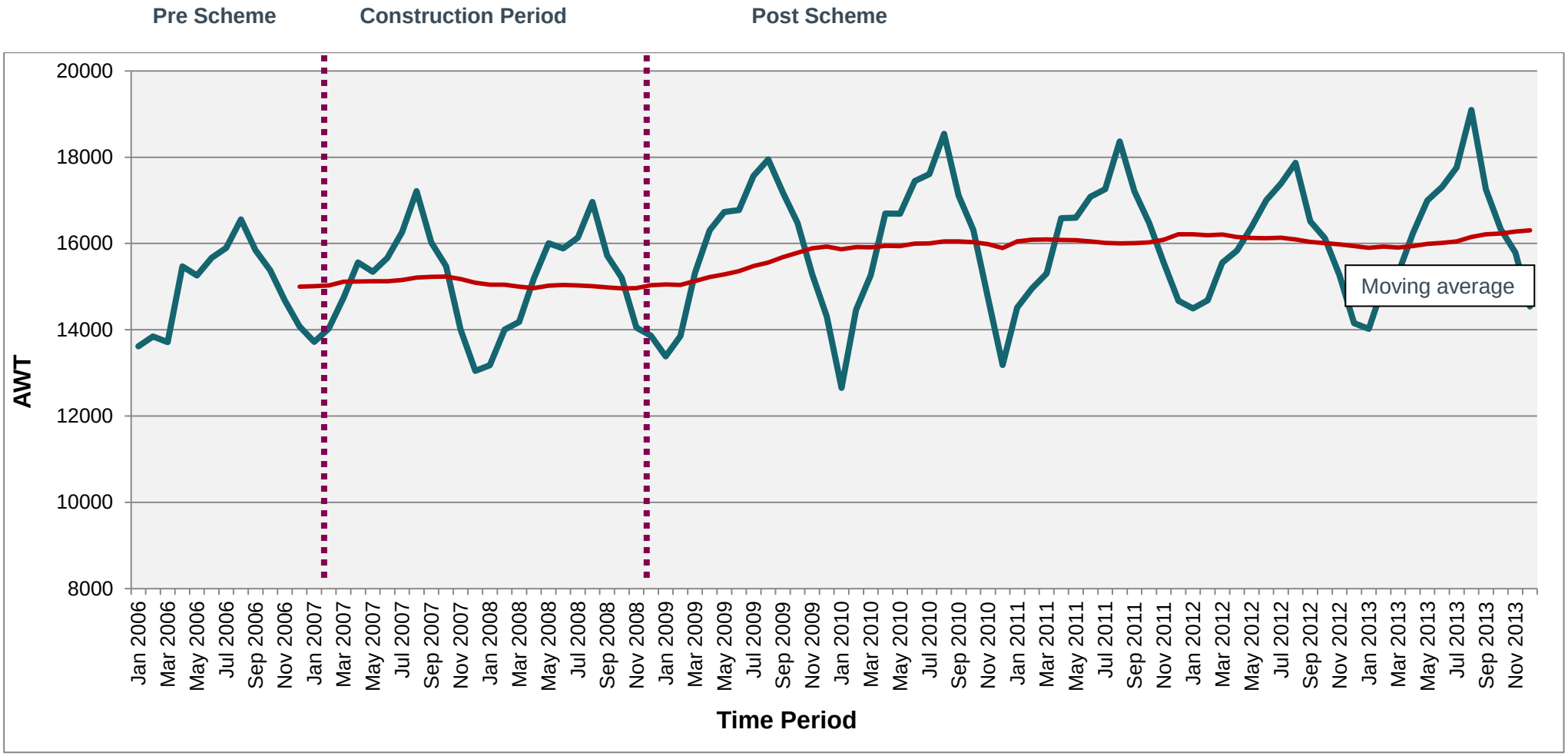
Long Term Traffic Trends on the A38

2.9 In order to get a greater understanding of the historical fluctuations of annual traffic flows, ***Figure 2-3*** shows the traffic flow trends (average weekday traffic, AWT) on the A38 in the vicinity of the improvements. These trends have been presented from before scheme construction, through construction and post scheme opening.

2.10 The following observations can be made from ***Figure 2-3***:

- Since the bypass fully opened to traffic in December 2008, the A38 Dobwalls bypass has witnessed a steady increase in traffic volumes which continued to the end of 2013, of approximately 1,300 vehicles a day (6%).
- This stretch of the A38, which runs past the northern side of Dobwalls, experiences very strong seasonality in traffic volumes. The lowest traffic volumes are observed between November and January, whilst July to September represents the peaks. This is the same trend shown before and post scheme, but it is slightly more amplified post scheme construction.

Figure 2-3 Historic Profile of AWT at A38 Dobwalls



Data Sources

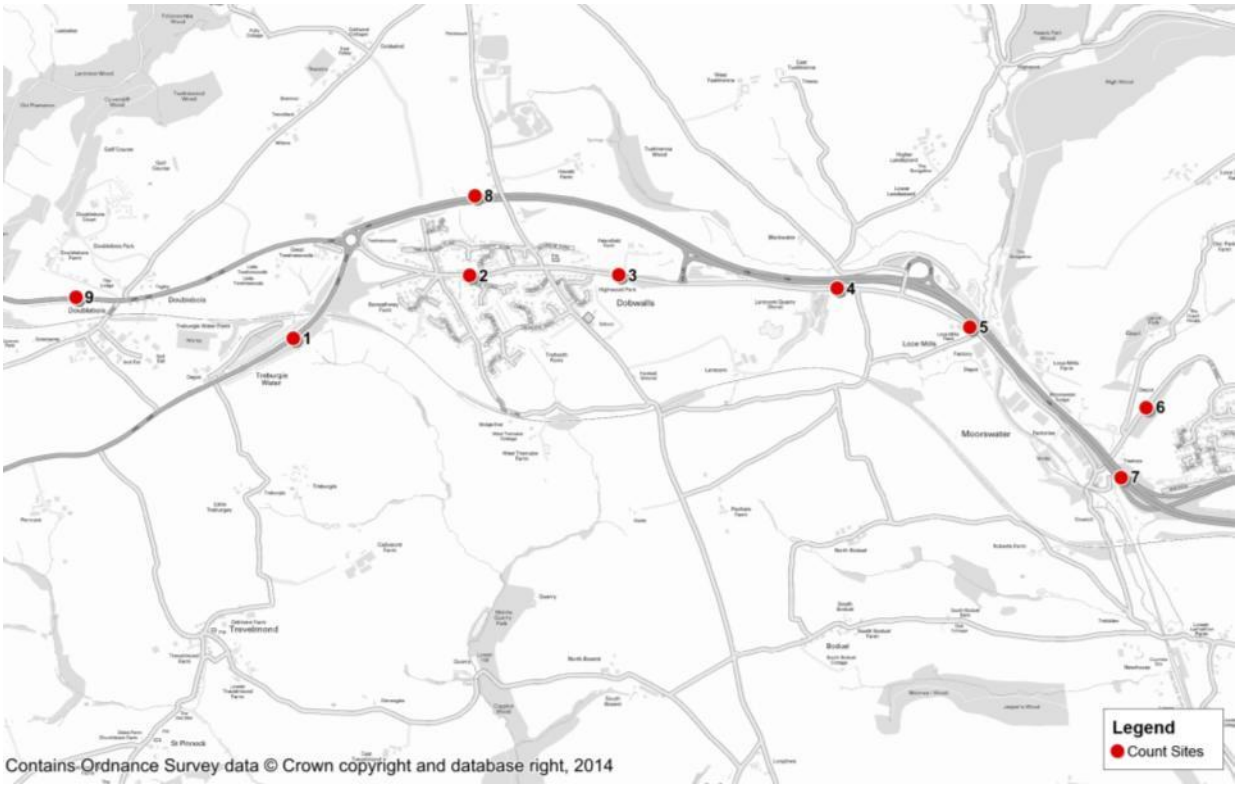
2.11 For the purposes of this evaluation, the main sources of traffic data include:

- Permanent traffic count data obtained from sites (TRADS) on Highways England network.
- Cornwall Council (CC), which has been used for before scheme opening and OYA.
- Count data at sites commissioned specifically for use on this evaluation at FYA.

2.12 Counts were undertaken before scheme, OYA and FYA opening for the locations shown in ***Figure 2-4***. Traffic data was collected at the following intervals:

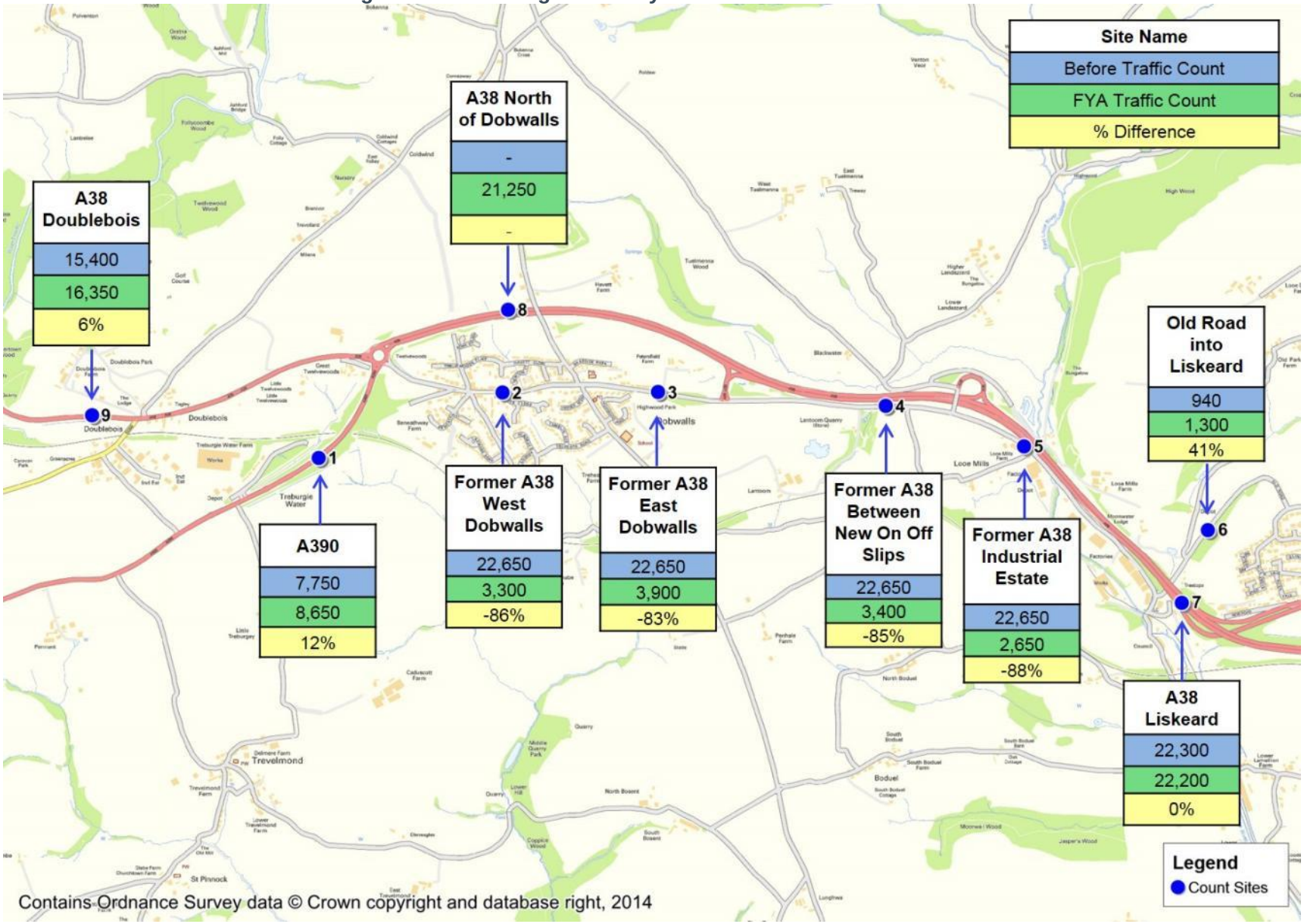
- October 2006 (before scheme opening)
- October 2009 (OYA opening)
- June/July 2014 (FYA opening)

Figure 2-4 Traffic Count Locations



Site	Description	Site	Description
1	A390	6	Old Road into Liskeard
2	Former A38 West Dobwalls	7	A38 Liskeard
3	Former A38 East Dobwalls	8	A38 North of Dobwalls (FYA only)
4	Former A38 between new on off slips	9	A38 Doublebois
5	Former A38 next to Industrial Estate		

Figure 2-5 Average Weekday traffic flows for Scheme Area



Traffic Volume Analysis

2.13 This section of the report uses data from the sources described earlier to inform the before and after scheme analysis of changes in traffic volumes and journey times for the scheme.

Observed Flows

2.14 A comparison of before scheme and post-opening average weekday traffic (AWT) flows are presented in ***Figure 2-5***. It should be noted that all flows are 2-way 24 hour flows.

2.15 The main findings from ***Figure 2-5*** include:

- The old A38 through the village of Dobwalls has seen some of the most significant reductions in traffic. The western end of the village (site 2) has seen an 86% drop (-19,400 vehicles) whilst the eastern side of the village (site 3) has seen a drop of 83% in traffic post opening. This is because through traffic is now using the bypass to the north of Dobwalls, rather than travelling through the centre of the village.
- The western end of the bypass (site 8) carries 21,250 vehicles on an average weekday, showing that a large proportion of traffic has transferred to the new road.
- Site 5 outside the Moorswater Industrial Estate has seen the largest percentage decrease in traffic, with a reduction of 88% since scheme implementation. This is due to the main A38 through traffic now bypassing this section of road, and vehicles accessing Dobwalls no longer needing to travel down this section of road.
- Site 1 on the A390 to the west of Dobwalls has seen a slight increase in traffic of 12%, equating to approximately 900 vehicles on an average weekday.
- Traffic using the A38 to the west of the scheme has increased slightly, as at Doublebois (site 9) there has been a 6% increase in traffic, which equates to an additional 950 vehicles per day.
- Site 7 to the east of Dobwalls, at Liskeard has seen a negligible change in flow.
- Site 6, the minor road know as 'Old Road' leading to the west of Liskeard has experienced the highest percentage increase in traffic of 41%, although this only equates to 380 vehicles on an average weekday. Further analysis of the data indicated that 95% of all traffic using this route used it between 6am and 7pm. This suggests that the increase in traffic is from Liskeard residents using this route to access the A38, probably to avoid congestion in Liskeard on route to the alternative accesses to the A38.

Heavy Goods Vehicles (HGV)

2.16 The Stage 3 Scheme Assessment Report (February 2005) for this scheme stated that the AADT for this scheme in 2003 was 20,700 with approximately 9% (1,870) HGVs. No information is available to indicate which location this is, so it could be towards the Moorswater Industrial estate, which may explain the post opening findings below.

2.17 Classified ATC on the old A38 through Dobwalls was not available pre scheme, however post opening data shows that the percentage of HGVs using the old route has reduced to 3.3% (<100 vpd). Post opening the bypass carries approximately 19,750 ADT, of which 7.6% (1,500) are HGVs. Over the corridor, a slight reduction in HGV usage is seen which is likely not to be directly linked to the scheme.

Forecast Traffic Flows

2.18 The pre scheme appraisal process for the A38 Dobwalls Bypass scheme involved the forecasting of traffic flows for Do Minimum (DM) and Do Something (DS) scenarios. The DS

scenario includes the scheme whilst the DM scenario does not. This section compares modelled flows with observed flows to ascertain the accuracy of the original predictions.

2.19 Traffic forecasts are taken from the A38 Dobwalls Forecasting Report (2004).

Forecasting Assumptions

2.20 In order to understand the differences between the forecast and actual traffic impacts, it is first necessary to develop an understanding of how the scheme was appraised and the key assumptions used. This may then assist in explaining any differences observed.

2.21 The forecasts were based on a planned opening year of 2008 and design year of 2023, and are based on the scheme that was constructed, as detailed in the introduction of this report. A low growth scenario was generated based on TEMPRO and NRTF growth figures.

2.22 Base traffic flows for 2003 were used in the appraisal, and factored up to represent the forecast opening year of 2008 using an estimated average increase in traffic of just over 5% between 2003 and 2008 for low growth. Flows were modelled using SATURN (Simulation and Assignment of Traffic to Urban Road Networks) modelling software, and assumed a small element of new development trips and induced trips. The SATURN network was relatively compact, encompassing the A38 between Doublebois and Liskeard, a short section of the A390, and the town of Liskeard. Variable demand modelling was used, and elastic assignment.

2.23 The forecast FYA flows and the FYA observed average daily traffic flows (ADT) are compared in ***Table 2-1***. Low growth has been used as comparison, as the analysis shown earlier in this section shows that there has been limited growth since opening.

Table 2-1 Forecast DS vs FYA Observed flows (ADT)

Site	Location	Predicted ADT Do-Something (2013)	Observed FYA Flow (2014)	% Difference
1	A390	8,700	8,100	-7%
2	Former A38 West Dobwalls	2,000	3,000	50%
3	Former A38 East Dobwalls	2,900	3,500	21%
4	Former A38 between new on off slips	3,000	3,000	0%
5	Former A38 Industrial Estate	2,300	2,200	-4 %
7	A38 Liskeard	21,600	24,100	12%
8	A38 bypass North of Dobwalls	20,800	19,800	-5%
9	A38 Doublebois	15,000	15,200	1%

2.24 The key points shown from this comparison are:

- Observed traffic is lower than forecast for most locations, except for the former A38 through Dobwalls, and the A38 at Doublebois.
- There is 50% more (additional 1,000 vehicles) traffic than was forecast through the western side of Dobwalls village, and 21% more traffic than forecast to the eastern site of Dobwalls.

- The traffic on the former A38 between the new on and off slips is in line with predicted.
- Bypass traffic is slightly lower than forecast, as are the A390 and the A38 access to the industrial estate, in line with the background trends shown previously.
- Traffic on the A38 at Doublebois is experiencing 1% more traffic than forecast, this equates to approximately 200 more vehicles on an average day.
- The A38 Liskeard is experiencing 12% more traffic than was predicted.

2.25 A comparison has also been made to consider whether the observed change in traffic flows follows a similar pattern to that forecast. This is shown in ***Table 2-2***.

Table 2-2 Forecast changes vs Observed Traffic change comparison (ADT)

Site	Location	Predicted ADT (Low Growth) DM (2008)	Predicted ADT (Low Growth) DS (2013)	DM and DS % Difference	Observed Before Flow (2006)	Observed FYA Flow (2013)	Before and FYA % Dif
1	A390	8,900	8,700	-2%	7,400	8,100	10%
2	Former A38 West Dobwalls	23,400	2,000	-91%	21,500	3,000	-86%
3	Former A38 East Dobwalls	23,600	2,900	-88%	21,500	3,500	-84%
4	Former A38 between new on off slips	24,300	3,000	-88%	21,500	3,000	-86%
5	Former A38 Industrial Estate	24,700	2,300	-91 %	21,500	2,200	-90%
7	A38 Liskeard	25,000	23,300	-7%	23,700	24,100	1%
8	A38 North of Dobwalls (Bypass)	n/a	20,800	n/a	n/a	19,800	n/a
9	A38 Doublebois	15,400	15,000	-3%	14,300	15,200	6%

2.26 The key points shown from this comparison are:

- The A390, A38 Liskeard and A38 Doublebois were expected to only experience small changes in traffic as a result of the scheme, these were slightly lower in the observed before and FYA traffic flows.
- The former A38 was predicted to experience traffic flow decreases between 88% and 91%, the decreases observed at FYA were not as large as predicted, but were still comparable to those predicted. This indicates that there is a possible underestimation of the level of village traffic which still requires access to the village itself, and therefore would not be transferring to the bypass.
- Traffic on the A38 to the west of the scheme in Doublebois was not expected to change significantly. Observed traffic at FYA had increased by 6%, but the volume of traffic at FYA was in line with forecast.
- Overall observed traffic flows pre scheme were slightly below the DM forecasts.

Journey Time Analysis

2.27 One of the objectives of this bypass scheme was to reduce delays on the old A38 route through Dobwalls. In order to assess the scheme's success against this objective, journey times along the former A38 route and the new bypass have been compared before and after scheme construction, during the following time periods:

- AM Peak (08:00 to 09:00)
- Inter-Peak (10:00 to 15:00)
- PM Peak (17:00 to 18:00)

2.28 The journey times for the former route of the A38 through Dobwalls has not been measured at FYA opening, as flows through the village have seen little change since those observed at OYA.

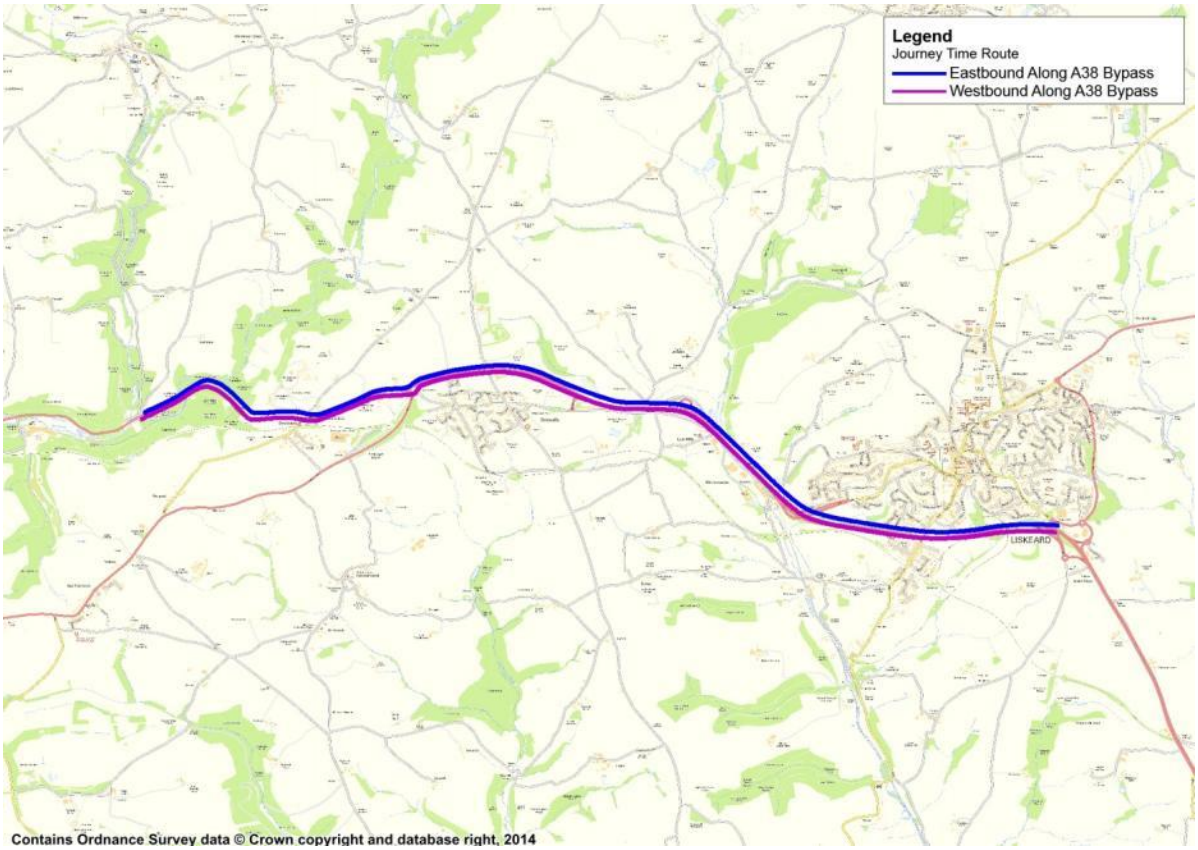
2.29 In order to evaluate the changes in journey time seen as a result of the scheme, data from satellite navigation devices (during October 2013) has been used to derive FYA opening journey times on the A38 between Liskeard to the east and Doublebois to the west (detailed in ***Figure 2-6***). These journey times have been measured for the same time periods as the before scheme surveys. Motorists who use satellite navigation devices have the option to voluntarily allow anonymous data about their journeys to be collected and used to provide a range of services, including the analysis of historic journey times along specific routes.

2.30 The journey time data was collected along the following routes, shown in ***Figure 2-6***:

- **Before opening**
  - Route 1. Along the former A38 route, between the St Neot Road junction to the west of the scheme, to the junction with the B3254 at Liskeard. In both eastbound and westbound directions
- **FYA opening**
  - Route 2. A38 between the St Neot Road junction, then using the bypass to the junction with the B3254 at Liskeard. In both eastbound and westbound directions.

2.31 The bypass layout has affected the eastern end of the former A38, and therefore vehicles requiring access to and from Dobwalls village are now required to use part of the new bypass at the eastern end of the route. The bypass operates at a higher speed than the former A38, although there are now more junctions to negotiate in the new layout for traffic using the old road through Dobwalls. In addition, the speed limit through the village of Dobwalls has been reduced post opening from 40mph to 30mph, resulting in a slightly slower free-flow journey time on the old road than in the before scheme situation.

Figure 2-6 Journey time routes



2.32 The before scheme and FYA journey times have been analysed in ***Table 2-3*** for the eastbound and westbound routes respectively.

Table 2-3 Journey Times using the A38 Bypass compared to the former A38 route

Route Direction	Time Period	Journey Time (minutes : seconds)			
		Before	FYA	Saving between before and FYA (minutes : seconds)	% Difference
Eastbound Route	AM Peak	07:04	06:00	01:04	-15%
	Inter Peak	06:43	06:13	00:30	-7%
	PM Peak	07:04	06:01	01:03	-15%
Westbound Route	AM Peak	10:56	06:05	04:51	-44%
	Inter Peak	06:26	06:17	00:09	-2%
	PM Peak	08:11	06:04	02:07	-26%

2.33 The key points regarding journey time savings for traffic on the A38 route are:

- Journey time savings were experienced during the AM peak, the PM peak and the inter peak, along the A38 bypass in both directions, in comparison to the journey times pre scheme on the former A38 route through Dobwalls.
- Journey time savings were greater in the westbound direction, particularly during the AM peak, where the journey time has decreased by almost five minutes. During the PM peak the westbound route journey time has decreased by two minutes and seven seconds.
- The smallest journey time savings are apparent during the inter peaks in both directions, as these were less congested prior to scheme construction.
- Journey time savings on the westbound route have ranged from nine seconds to four minutes 51 seconds.
- Journey time savings on the eastbound route have ranged from 30 seconds to one minute and four seconds.

Forecast vs. Outturn Journey Times

2.34 The AST for this scheme states that a total of 210,000 (Low Growth) or 270,000 (High Growth) vehicle hours would be saved per year. The AST also notes a saving of 1.4/1.7 minutes in the peak hours, and 1.1/1.2 minutes in the off peak as a result of the scheme. No details are available to indicate what these savings represent in terms of direction and route length.

2.35 The monetised forecast journey time benefits for this scheme were generated through the TUBA programme, which uses origin destination data rather than pure journey times, therefore the information provided in the AST is the only mention of time savings known.

2.36 For the purposes of this report it is not considered possible to make any comparisons between the observed and forecast journey time savings due to the lack of clarity regarding what the forecast saving represents. Journey time benefits of the scheme are discussed later in the Economy section.

2.37 Feedback from the residents survey undertaken at the OYA stage indicated that the majority of respondents felt that congestion and journey times had improved during both the summer tourist and off season periods.

Reliability

Assessment of reliability using route stress

2.38 The only forecast for the reliability impact of this scheme is within the AST and is based on the route stress metric which is defined in DMRB[5]. This gives figures for stress based on the ratio of traffic flow to road capacity. The net change in stress is then used to give a qualitative assessment.

2.39 The AST forecast a slight beneficial impact as the route stress was expected to be improved due to the improved standard of road provided as shown in ***Table*** 2-4.

2.40 Table 2-4DfT[6] guidance states that only values between 75% - 125% should be considered and anything outside this range should be adjusted up or down to 75% or 125%, hence the adjusted stress figures are included in brackets. The table also shows outturn stress before and FYA scheme opening.

[5] Design Manual for Roads and Bridges (DMRB) Volume 5 section 1 part 3
[6] http://www.dft.gov.uk/pgr/economics/

Table 2-4 Route Stress

	Forecast (AST)		Calculated Outturn 'Stress' (Adjusted stress in brackets)	
	Do Minimum LG/HG	Do Something LG/HG	Before	FYA
Former A38	87/96%	-	91%	15% (75%)
New A38 Bypass	-	11/12%	-	24% (75%)

2.41 The following observations can be made regarding changes to route stress on the A38:

- Stress on the former A38 has reduced from 91% to 15% (75%) which is a significant improvement on the before situation.
- It can be seen that the new bypass after scheme opening is at 24% stress, higher than the forecast of 11/12%, however this is still low and represents good reliability. Based on the adjusted stress methodology, both would be adjusted to 75%, and therefore shows that the forecast is accurate for the bypass.
- It should be noted however that these calculations do not represent the stress experienced in peak holiday periods.

Key Points – Traffic Impacts

Traffic Flow impacts

Traffic on the former A38 between the west of Dobwalls and Moorswater Industrial Estate has reduced significantly since the new A38 bypass has opened. The traffic has decreased by an average of 86% on the former A38 through the village, which equates to an average of 19,300 vehicles less on an average weekday. This decrease is accounted for within the 21,300 vehicles that can now be observed on the new bypass, on an average weekday.

The largest decrease in traffic was on the former A38 link that provides access for Moorswater Industrial Estate.

Traffic Forecasts

Observed traffic is lower than forecast for all roads, except for the former A38 through Dobwalls and the A38 at Doublebois.

The traffic reductions on the former A38 are not as forecast, particularly in the westbound direction where flows have been 50% higher than predicted.

Overall, the forecast traffic for FYA do something for all locations was in line with the observed FYA traffic.

Journey Times

Journey time savings were experienced during the AM, PM and inter peak periods, for both the A38 eastbound and westbound directions on the bypass.

The largest savings were observed on the westbound route during the AM peak, where journey times at FYA opening are four minutes 51 seconds quicker than before scheme.

The inter peak periods had the smallest decreases in journey time in both directions.

The A38 bypass has made journey times shorter, particularly during the peak hours when traffic flows are at their highest.

Journey Time Forecasting

For the purposes of this report it was not considered possible to make any comparisons between the observed and forecast journey time savings, due to the lack of clarity regarding what the forecast saving represents.

Reliability

Stress on the former A38 has reduced from 91% to 15% (75%), which is a significant improvement. The increase in capacity means that post opening, stress on the new bypass is 11/12% adjusted to 75%.

3. Safety

Introduction

3.1 This section of the report examines how successful the scheme has been in addressing the objective of improving safety. The focus of this objective is to reduce the loss of life, injuries and damage to property resulting from transport collisions and crime. This is assessed by analysing the changes in Personal Injury Collisions (PICs) occurring in the five years pre scheme and five years post opening. The safety benefits arising from collision savings have been based on the low traffic growth scenario.

3.2 The safety objective consists of two sub-objectives:

- To reduce collisions
- To improve security

Sources

Forecasts

3.3 For the purposes of assessing the safety of the scheme, forecasts were produced for the number of collisions the scheme was expected to save, together with the associated numbers of casualties and the monetary benefit of the savings. Forecasts of the impact of the A38 Dobwalls bypass have been obtained from the scheme COBA model.

3.4 This section of the study concerns collision numbers; the economic impact of changes in collisions are evaluated in the Economy chapter of this report. The forecast impact on safety is expressed in terms of numbers of PICs saved with the associated numbers of casualties and the economic benefit of the saving over 60 years.

Observed Data

3.5 Collisions, by their nature, include a random element and are somewhat unpredictable events, therefore to ensure that the scheme is the only known change in the appraisal area, collision data has been obtained for the most recent five years prior to construction rather than using the more outdated data used in the appraisal. This data has been obtained from Cornwall Council and it covers the following time periods:

- Before scheme: January 2002 to December 2006
- Post scheme: January 2009 to December 2013

3.6 The PIC data has been assessed at both a wider scheme area level and also at a key links level. The wider PIC area has been based on the COBA area, which can be seen in ***Figure 3-2***, which shows the key links analysis includes the roads within the vicinity of the scheme, including the A38, the A390, and the former A38 through Dobwalls. The collision data obtained is based on PIC records (i.e. collisions that may involve injuries to one or more persons) recorded as STATS19 data, which has been collected by the police when attending collisions. Collisions that do not result in injury are not included in this dataset, therefore are not used in this evaluation.

3.7 It should be noted that at this stage the collision data has not yet been validated by the Department for Transport (DfT). The requirement for up to date and site specific information necessitated the use of invalidated data sourced from the local authority. The data is judged to be sufficiently robust for use in this study, but it may be subject to change. However, it is not anticipated that this would be significant in terms of the analysis of collision numbers presented in this report.

Collision Numbers

3.8 This section analyses the observed changes in PICs following the implementation of the scheme. One of the stated objectives of the scheme was to improve road safety on the A38. This section includes an investigation into the changes in the number of collisions and associated casualties as well as whether there have been any changes in the relative severity. This section first considers the impact on the wider area and then further detail is provided about the impacts on just the key links of the scheme.

Background Collision Reduction

3.9 It is widely recognised that, for over a decade, there has been a year-on-year reduction in the number of personal injury collisions on the roads, even against a trend of increasing traffic volumes during much of that period. The reasons for the reduction are considered to be wide ranging and include improved safety measures in vehicles and reduced numbers of younger drivers. This background trend needs to be taken into account when considering the changes in collision numbers in the scheme area in the before and after periods. If the scheme had not been built, collision numbers in the area are still likely to have been influenced by wider trends and reduced.

3.10 When the number of collisions in this area in the years before and after the scheme was built is compared, and associate the net change primarily with the scheme, the background reduction needs to be taken into account. The best way to do this is to assume that, if the scheme had not been built, the number of collisions on the roads in the study area here would have dropped at the same rate as they did nationally during the same time period[7]. This gives what is known as a counterfactual scenario. This is then compared for the counterfactual 'without scheme' scenario on a like-for-like basis with the observed post opening data which is the 'with scheme' scenario.

3.11 The difference between the numbers of collisions in these two scenarios can then be attributed to the scheme rather than the wider national trends. This result will inform the calculation of monetised safety benefits achieved by the scheme as discussed in the economy chapter of this report.

COBA Modelled Area

Evaluation of Collision Numbers and Severity

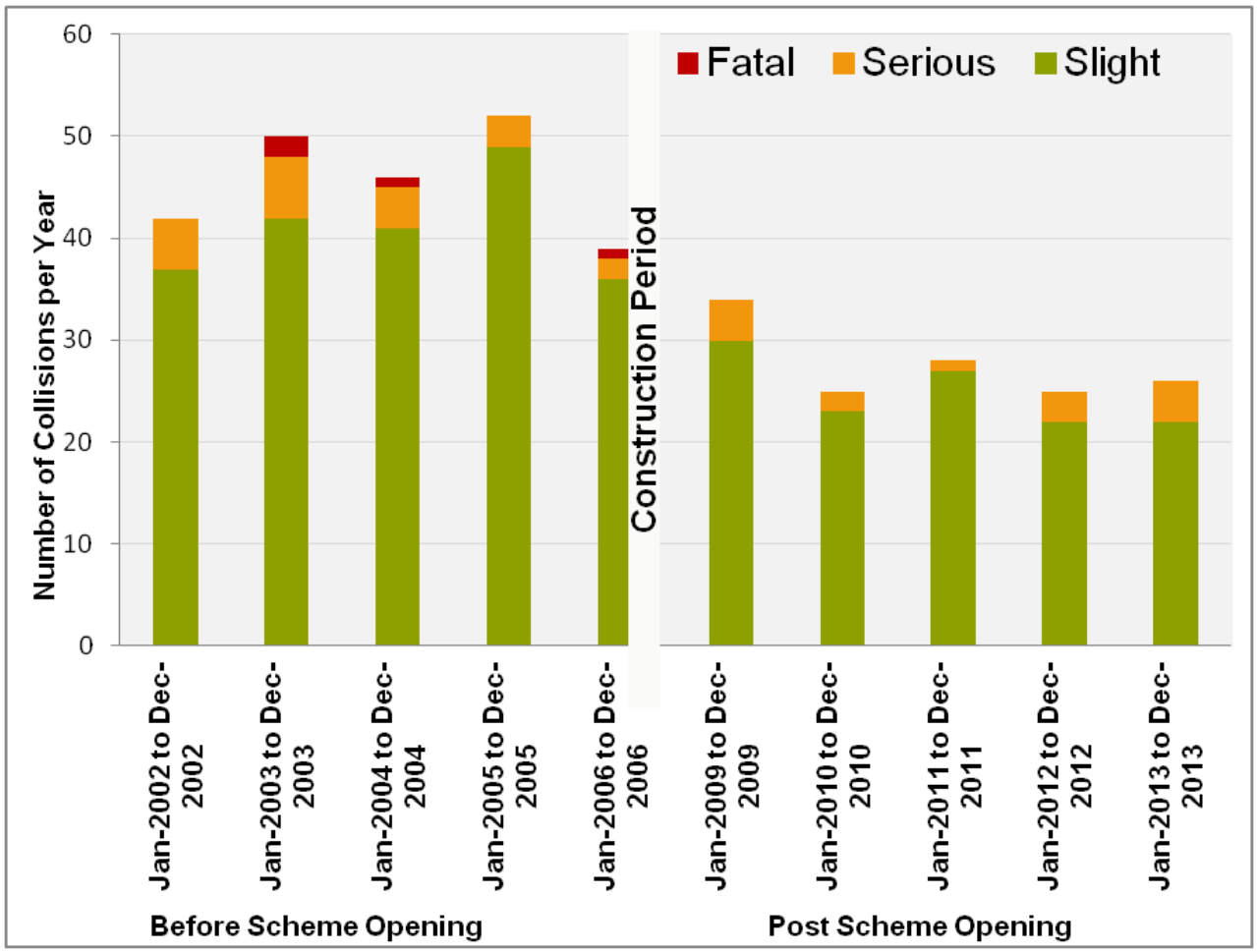
3.12 An evaluation of the before and after collision numbers by year for the wider area (see ***Figure 3-4)*** is shown in ***Table 3-1*****.** This enables a direct comparison between the observed collisions and those stated in the forecasting report. The severity of a collision is defined by the most serious injury incurred.

[7] National trend data is sourced from DfT table RAS10002

Table 3-1 Number of Collisions by Severity in the Wider Area

Period	Time Period		Number of Collisions by Severity			Total	Annual Average
	From	To	Fatal	Serious	Slight		All
Before	Jan/2002	Dec/2002	0	5	37	42	45.8
	Jan/2003	Dec/2003	2	6	42	50	
	Jan/2004	Dec/2004	1	4	41	46	
	Jan/2005	Dec/2005	0	3	49	52	
	Jan/2006	Dec/2006	1	2	36	39	
Without Scheme Counterfactual (adjusted for background reduction)[8]							33.4
Post-Opening	Jan/2009	Dec/2009	0	4	30	34	27.6
	Jan/2010	Dec/2010	0	2	23	25	
	Jan/2011	Dec/2011	0	1	27	28	
	Jan/2012	Dec/2012	0	3	22	25	
	Jan/2013	Dec/2013	0	4	22	26	

Figure 3-1 Number of collisions on year by year basis for the wider area



[8] Background factor in collision numbers for rural A roads 2004-2013 was 0.70

3.13 From ***Table 3-1*** it can be seen that:

- The total number of collisions recorded over the post opening period was 138, and an average of 27.6 per year. This represents a 17% (5.8 collisions) decrease per year when compared to the counterfactual without scheme value (taking the background reduction in collisions into account). This change over the wider area is not seen to be statistically significant.
- Post opening, no fatal collisions have been recorded, compared to an average of 0.8 per year pre scheme.
- The annual average number of serious collisions has reduced by 30%, from an average of 4.0 per year to an average of 2.8 per year.
- The annual average number of slight collisions has reduced by 41%, from an average of 41.0 to 24.8 per year.

A38 Dobwalls Bypass Key Links Section

Evaluation of Collsion Numbers and Severity

3.14 An analysis of the PIC records for the local scheme area (illustrated in ***Figure 3-2***) has been undertaken to investigate the impact of the scheme on collisions, along the A38 bypass, the former A38 through Dobwalls, and the A390 to the west of Dobwalls.

Figure 3-2 Key Links Collision Appraisal Area

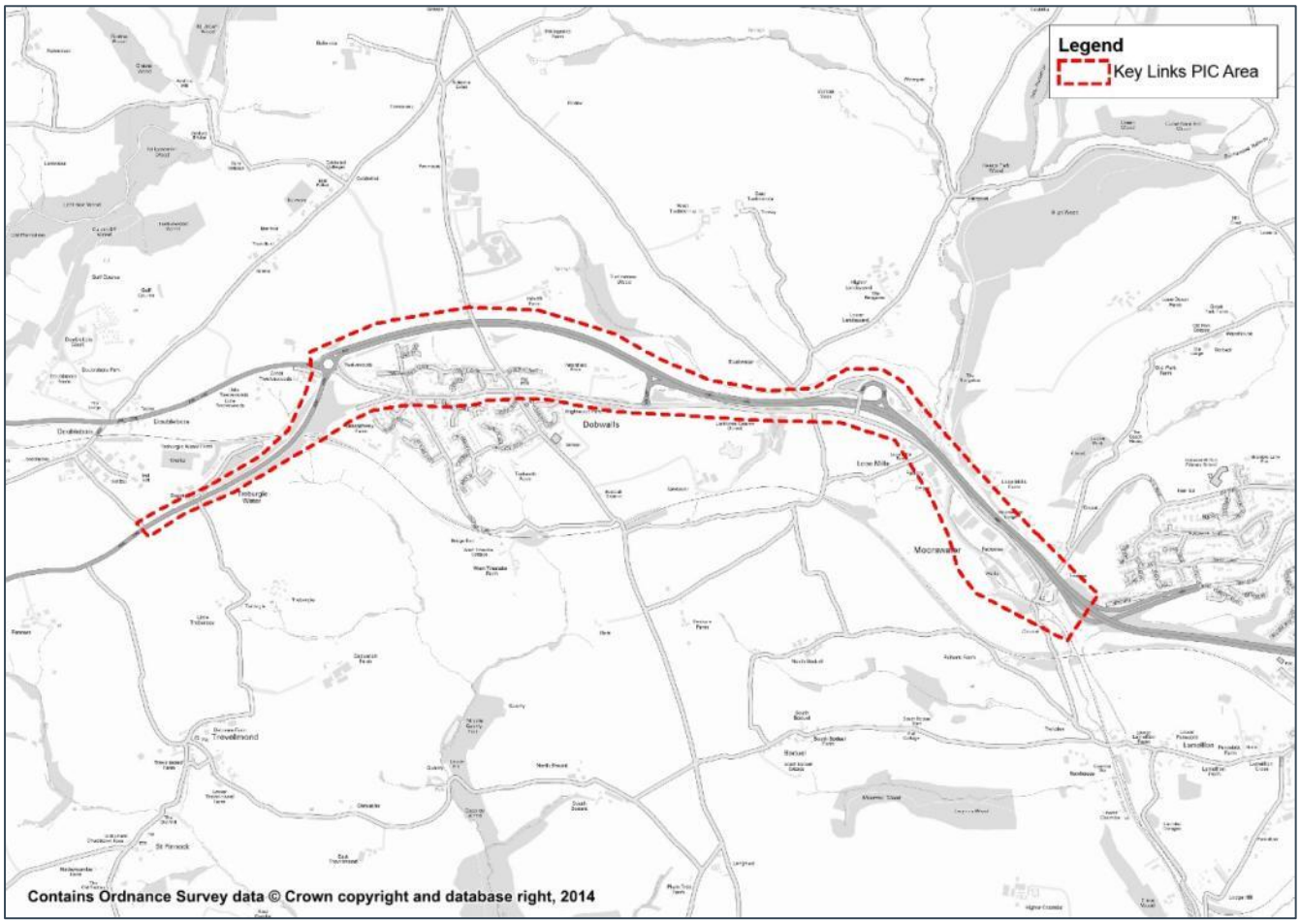
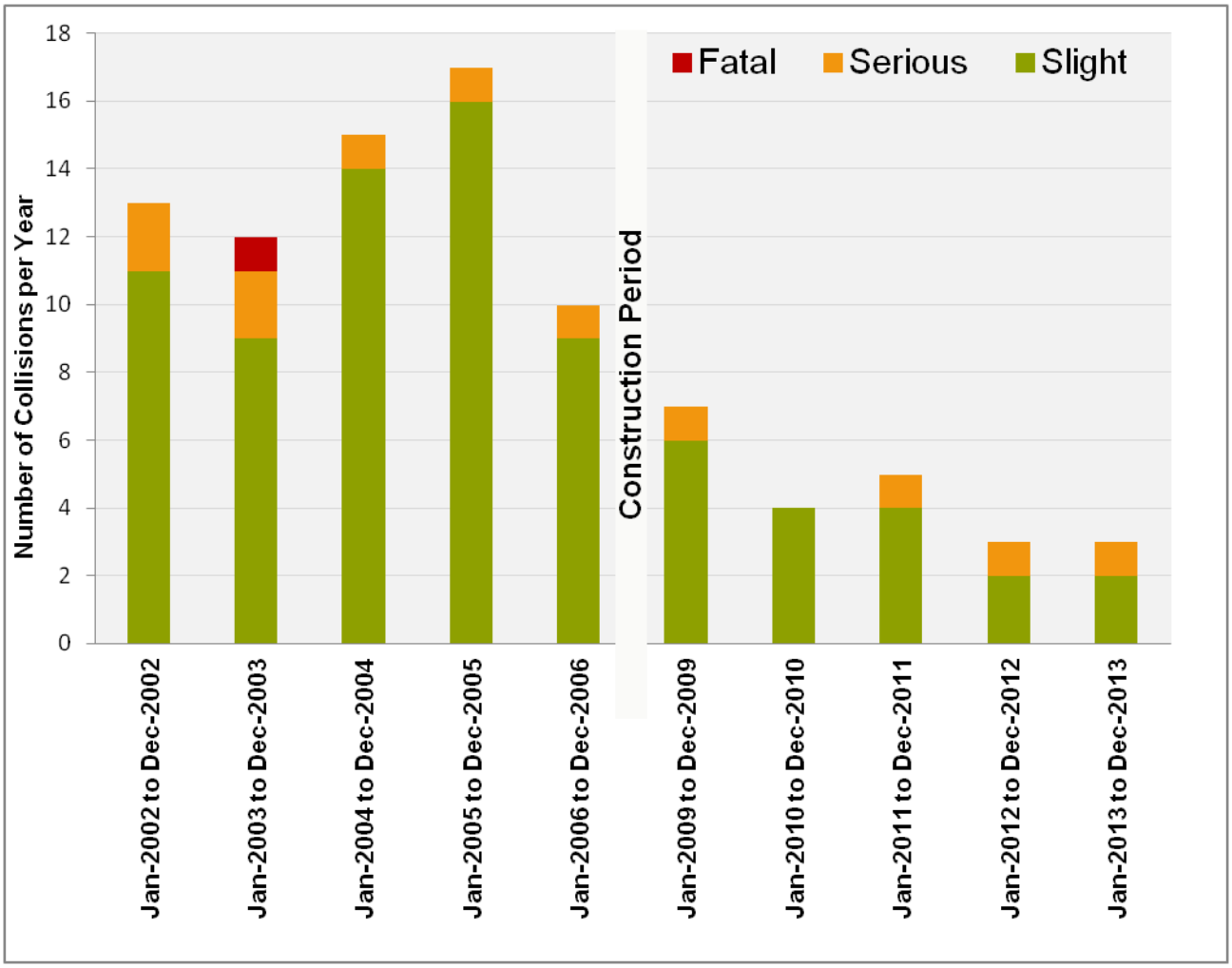


Table 3-2 Number of Collisions by Severity on Key Links

Period	Time Period		Number of Collisions by Severity			Total	Annual Average
	From	To	Fatal	Serious	Slight		All
Before	Jan/2002	Dec/2002	0	2	11	13	13.4
	Jan/2003	Dec/2003	1	2	9	12	
	Jan/2004	Dec/2004	0	1	14	15	
	Jan/2005	Dec/2005	0	1	16	17	
	Jan/2006	Dec/2006	0	1	9	10	
Without Scheme Counterfactual (adjusted for background reduction) [9]							9.4
Post-Opening	Jan/2009	Dec/2009	0	1	6	7	4.4
	Jan/2010	Dec/2010	0	0	4	4	
	Jan/2011	Dec/2011	0	1	4	5	
	Jan/2012	Dec/2012	0	1	2	3	
	Jan/2013	Dec/2013	0	1	2	3	

Figure 3-3 Number of collisions on year by year basis for the scheme Key Links



[9] Background factor in collision numbers for rural A roads 2004-2013 was 0.70

3.15 From ***Table 3-2*** and ***Figure 3-3*** it can be seen that:

- The total number of collisions recorded over the post opening period was 22, and an average of 4.4 per year. This represents a 53% (5 collisions) decrease when compared to the without scheme counterfactual figure, when background collision reduction is taken into account. This change is statistically significant and therefore likely to be directly linked to the scheme. This is considered further later in this chapter.
- No fatal collisions have been recorded over the key links, compared to an average of 0.2 per year before construction, although no firm conclusions can be drawn due to the very small numbers.
- The annual average number of serious collisions has reduced by 43%, from an average of 1.4 per year to an average of 0.8 per year.
- The annual average number of slight collisions has reduced by 70%, from an average of 11.8 to 3.6 per year.

Evaluation of Collision Severity Index

3.16 The collision severity index is the ratio of the number of collisions classed as serious or fatal compared to the total number of collisions. A summary of the before and after opening collision severity indices for the whole of the COBA modelled area, and the A38 scheme key links is shown in Table 3–3.

Table 3–3 – Collision Severity Index

	COBA Area	Key Links
Period	**Collision Severity Index**	**Collision Severity Index**
Pre Scheme	**0.11**	**0.12**
Post Opening	**0.10**	**0.18**

3.17 The collision severity index has reduced slightly over the COBA wider area, however an increase is seen over the scheme key links. As previously noted, there has been a decrease in serious and fatal collisions over both areas. It is therefore likely that the increase in the severity index is mainly due to a higher reduction in slight collisions than was seen for serious or fatal severity collisions.

Location of Collisions

3.18 The location of collisions over the COBA area (see ***Figure 3-4***) for the five years pre scheme, and the five years post opening periods are shown in ***Figure 3-5*** for the wider area, and in ***Figure 3-6*** for the key links.

Figure 3-4 COBA Collision Appraisal Area

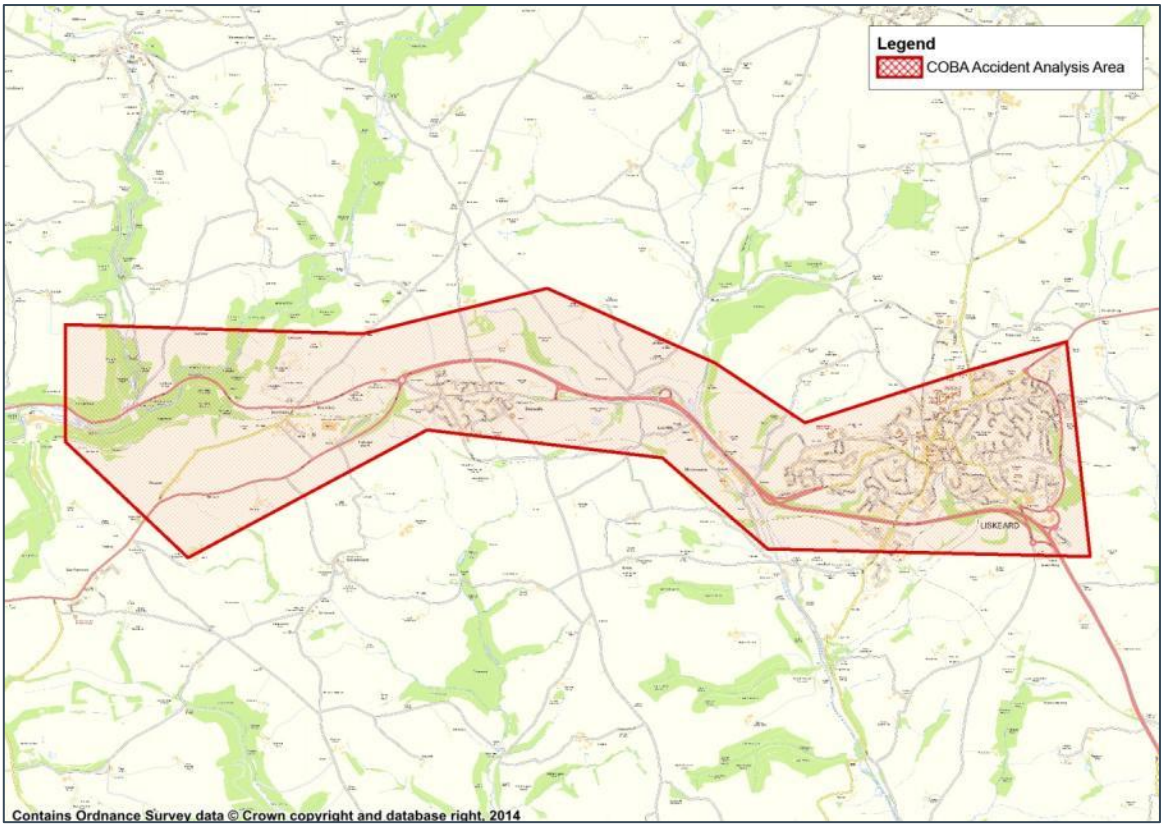
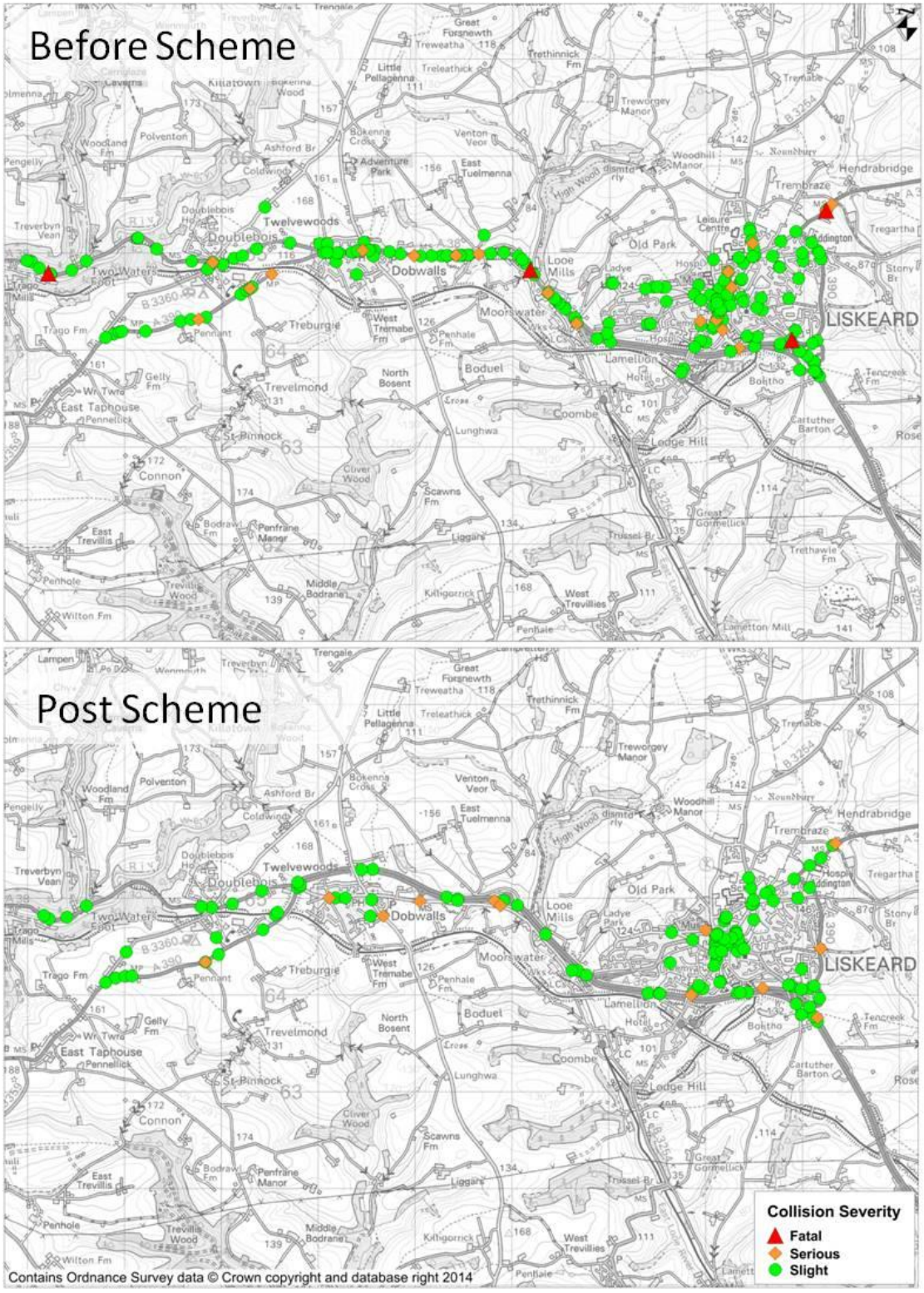


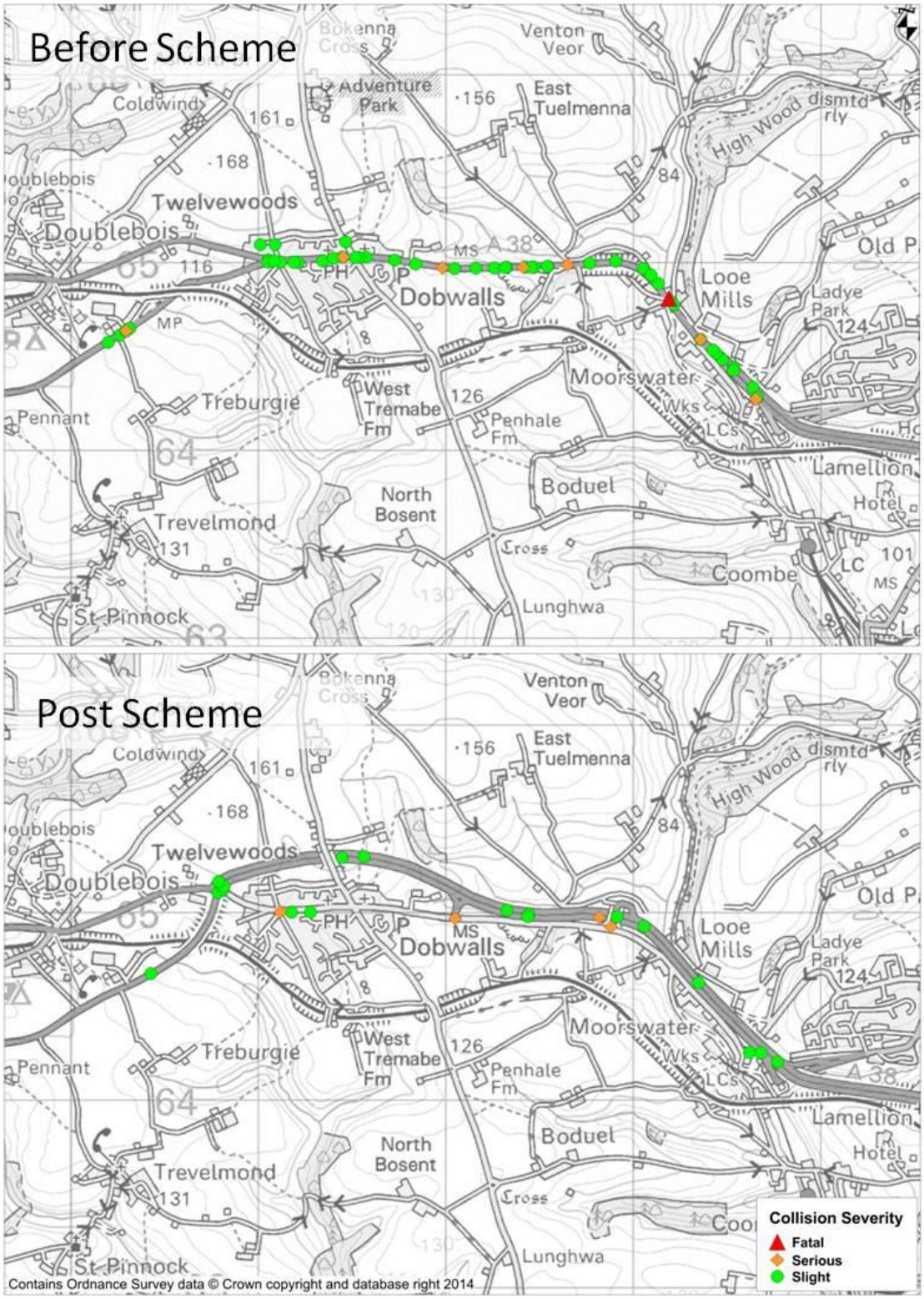
Figure 3-5 COBA Area Collision Locations – 5 years before scheme (top), 5 years post scheme (bottom)



3.19 ***Figure 3-5*** shows that before scheme opening, collisions were spread across the scheme area and Liskeard. Post opening, collisions are still well spread across the scheme, however a reduction can be seen in the vicinity of the village of Dobwalls. There were also collisions occurring along Old Road and at numerous locations throughout Liskeard. In comparison the post scheme opening shows a decrease in collisions, particularly along the former A38 and in Liskeard. A more detailed distribution of the collisions occurring in the scheme vicinity can be

seen in ***Figure 3-6***, which shows collisions occurring on scheme key links, before and post scheme opening.

Figure 3-6 Key Links Area Collision Locations – 5 years before scheme (top), 5 years post scheme (bottom)



3.20 It can be seen in ***Figure 3-6*** before scheme opening collisions were occurring along the length of the former A38, with particular clusters apparent at the A390 junction, the crossroads in the

centre of Dobwalls and near the access to Moorswater Industrial Estate, where local traffic needed to interact with through traffic.

3.21 Post opening, collisions have occurred on the A38 bypass, with clusters at the A390 junction and the on off slips to the east of Dobwalls. However, there are significantly fewer collisions evident on the new A38 route, than those experienced on the former A38 before scheme opening.

3.22 It can be seen from ***Figure 3-6*** that there has been a large reduction in collisions along the scheme key links post scheme opening. Clusters are still apparent at the main junctions, but both frequency and severity have decreased.

3.23 A number of comments were noted from respondents to the residents survey at OYA suggesting that there were perceived safety issues with the mini roundabouts in the centre of Dobwalls. At the OYA stage there was no evidence of collisions at that location.

3.24 At FYA, further examination of collision locations do not show any recorded collisions at these mini roundabouts, although it is noted that there may have been damage only incidents that have not been recorded.

Road Safety Audit

3.25 The A38 Dobwalls bypass RSA4 36 month montitoring report was published in June 2014, and focuses just on the A38 bypass. This report built on the findings of the RSA4 (12 month) report published in 2012 which indentified two issues; a possible overshooting issue at the roundabout from the bypass, and poor lane discipline on approaches, and through the roundabout.

3.26 The RSA covers the period from July 2009 to June 2012 and only considers the bypass route.

3.27 The RSA4 indicates that between 2009-2013 91% (10 collisions) of collisions on the A38 along the scheme section were attributed to dry conditions. The RSA report does not make mention of any problems due to possible freezing issues, and therefore it is likely that the closures in cold weather are precautionary rather than in response to a particular observed safety issue.

3.28 No remaining concerns were noted in the audit, as it concludes that there is no pattern in collsions regarding poor lane discipline or overshooting.

Evaluation of Casualty Numbers and Severity

3.29 Casualty data was unavailable for the full FYA period for comparison, therefore a casualty analysis cannot be undertaken. In addition, this means that no Fatal Weighted Injuries metric can be calculated.

Statistical Significance

3.30 In order to determine whether the changes in collision numbers observed pre and post opening are statistically significant, Chi-Square tests have been undertaken. This test uses the before (counterfactual) and post scheme opening numbers of collisions to establish whether the changes are significant or likely to have occurred by chance. This test has been undertaken over the scheme key links and the wider COBA area.

3.31 The result found that the observed changes over the key links area are statistically significant, and therefore that the reduction in the number of collisions over the key links area is likely to be directly linked to the scheme.

3.32 The same test over the wider COBA area shows that the changes seen are not statistically significant, due to the wider area covered which was not directly impacted by the scheme.

Forecast vs. Outturn Collision Numbers

3.33 The extent of the COBA model area is shown in ***Figure 3-4***, this covers the links directly affected by the scheme, as well as the main routes in the immediate and wider vicinity of the scheme where changes in traffic and hence changes in collisions may occur. In order to ensure a like-for-like comparison between the predicted and observed collision changes, the overall geographical area of analysis used for this study is the same area covered by the COBA model.

3.34 The forecast impact on safety is expressed in terms of numbers of PICs saved with the associated numbers of casualties and the economic benefit of the saving over 60 years. It was predicted that the scheme would, over the 60 year appraisal period, save 530 collisions (low growth scenario) for the area covered in the COBA model and illustrated in ***Figure 3-4.***

3.35 This section compares the number of observed collisions discussed earlier with those predicted to occur. The predictions have been obtained from the COBA model for this scheme and cover the whole of the modelled area (previously shown in ***Figure 3-4***). For the outturn collisions, the annual average before and post opening are used for the same area used in the COBA appraisal.

Table 3-4 Comparison of forecast and outturn collisions across the COBA area

		Annual Collisions
Forecast Opening Year	Do Minimum (without scheme)	37.6
	Do Something (with scheme)	28.6
	Forecast Saving	**9.0 (24%)**
Outturn Annual Average	Before Opening Observed	45.8
	Without scheme (counterfactual for same period as after data)	33.4
	After Opening Observed	27.6
	Observed Saving	**5.8 (17%)**

3.36 ***Table 3-4*** shows:

- The COBA model for the scheme predicted a saving of 9.0 collisions (24%) in the opening year based on the low growth scenario. The vast majority of this saving was forecast to occur at junctions, due to the addition of two new junctions to the east and west of Dobwalls.
- Post opening, the number of collisions over the same area has reduced by 5.8 collisions (17%), lower than forecast, but a saving nonetheless.

3.37 The nature of the scheme means that the majority of the savings (93%) were forecast to occur on the links directly affected by the scheme. ***Table 3-5*** illustrates the same comparison, but over the smaller area.

Table 3-5 Comparison of forecast and outturn collisions across the Key Links area

		Annual Collisions
Forecast Opening Year	Do Minimum (without scheme)	12.4
	Do Something (with scheme)	4.0
	Forecast Saving	**8.4 (68%)**
Outturn Annual Average	Before Opening Observed	13.4
	Without scheme (counterfactual for same period as after data)	9.4
	After Opening Observed	4.4
	Observed Saving	**5.0 (53%)**

3.38 This table shows that a 68% reduction in the number of collisions was forecast to occur, equating to a reduction of 8.4 collisions per year. The observed data shows that, even when the background collision reduction is taken into account a slightly lower percent saving is observed of 53%, this equates to an average of 5.0 collisions.

Collision Rates

3.39 The number of collisions along a length of road used, together with the AADT for the same section can be used calculate a collision rate, known as the number of personal injury collisions by the number of million vehicle kilometres (PIC/mvkm).

3.40 In this section, combined observed collision rates during the before and post scheme periods for the key links improved by the scheme are compared with the forecasts (from COBA) for the same links and junctions. ***Table 3-6*** shows the collision rate calculated for the A38 Dobwalls bypass key links pre and post opening.

Table 3-6 Forecast vs. Observed Collision rates (PIC/mvkm) for Scheme Key Links

Predicted (opening year)	Do Minimum (without scheme)	0.36
	Do Something (with scheme)	0.12
	Forecast Saving	**0.24 (66%)**
Observed (pre scheme vs. Post opening collision rates	Before Opening Observed	0.50
	Without scheme (counterfactual for same period as after data) [10]	0.35
	After Opening Observed	0.16
	Observed Saving	**0.19 (54%)**

3.41 It can be seen in ***Table 3-6*** that the observed reduction in collision rate across the scheme key links is lower than expected, with a saving of 0.19 PIC/mvkm compared to a forecast reduction of 0.24 PIC/mvkm. This is due to taking the background reduction into account. A saving is still observed, hence it can be considered that the scheme has successfully reduced the rate of collisions for the key links affected by the scheme.

[10] Counterfactual without scheme is the observed rate in the before period multiplied by the national reduction in collisions rate per mvkm during the comparable period, for the middle year of the data collection periods, in this case 2004 for the before period and 2010 for the post opening period. The reduction factor in collision rate per mvkm for all road types was 0.732.

Personal Security

3.42 The aim of this sub-objective is to reflect both changes in security and the likely number of users affected. In terms of roads, security includes the perception of risk from personal injury, damage to or theft of vehicles, and theft of property for individuals or from vehicles.

3.43 For highway schemes, security issues may arise from the following:

- On the road itself (e.g. being attacked whilst broken down).
- In service areas, car parks, and so on (e.g. vehicle damage while parked at a service station, being attacked while walking to a parked car).
- At junctions (e.g. smash and grab incidents while queuing at lights).

3.44 The primary indicators for roads include surveillance, landscaping, lighting and visibility, emergency call facilities and pedestrian and cyclist facilities.

Forecast

3.45 The scheme AST states in terms of security, 'less queues reduce driver vulnerability'. As such the scheme forecast a slight beneficial impact on security.

Evaluation

3.46 A simple qualitative assessment of the scheme was undertaken, based on observations made during the site visit, which found the following:

- The A38 bypass has reduced traffic on the former A38 through Dobwalls, which has also reduced delays as a consequence. This has led to free flowing traffic, which is less conducive to the possibility of smash and grab incidents (although in a semi-rural location, this is considered to be of low risk).
- There is good visibility for users of the shared use footpath/cycleway running along the former A38 route, due to the local landscape making this route exposed.
- There is modern lighting provided on the approach to the roundabout, and a CCTV camera has been installed on the west side of the roundabout.
- It is noted however that there are no lay-bys along the length of the scheme and no emergency call facilities.

3.47 In summary, the outturn evaluation is **slight beneficial** as forecast in the AST.

Key Points – Safety

Collisions

- Analysis of the data over the wider COBA area shows a reduction of 5.8 collisions per year, a reduction of 17% when background collision reduction is considered.
- During FYA opening over the wider COBA network there have been no fatal collisions and the number of serious collisions has decreased by 30%.
- Analysis of observed collision data for the scheme key links which were directly affected by the scheme shows an average reduction of 5 collisions a year (a reduction of 53%). This is higher than the wider COBA area, strongly suggesting that the scheme has had a direct impact for safety on the A38 Dobwalls bypass.
- In addition, over the key links there have been no fatal collisions during the FYA opening period, and the average number of serious collisions has reduced by 31%.

Forecast vs. Outturn Collision Savings

- The majority of savings were forecast and experienced over the scheme key links area. The FYA observed collision reduction was 53%, slightly below the forecast reduction of 68% for the key links area.
- There was a reduction in collision rate (when traffic flows are taken into account) over the key links area (54%), but again, not to the level forecast (66% reduction).

Location of Collisions

- Before scheme opening, collisions were distributed over the COBA area, with particular clusters apparent at the A390 junction, the crossroads in the centre of Dobwalls and near the access to Moorswater Industrial Estate and along the length of the former A38 Dobwalls.
- During the FYA opening there have been much fewer collisions evident on the new A38 route and the former A38 route combined, than those experienced on the former A38 before scheme opening.
- There has been a large reduction in collisions on the scheme key links at the FYA stage, although small collision clusters still remain around the A38 junctions, both the roundabout and Looe Mills junction.

Security

- The scheme has led to faster traffic times and consequently reduced delays, this freer flowing traffic will be less conducive to the possibility of smash and grab incidents. There is good visibility for the users of the shared use cycle footway and new lighting on the approach to the roundabout.
- In summary, it is likely that this sub-objective could be scored as slight beneficial as the reduction in queuing traffic will have reduced driver vulnerability, as expected.

4. Economy

Introduction

4.1 This section presents an evaluation of how the scheme is performing against the economy objective, which consists of the following sub objectives:

- Achieve good value for money in relation to impacts on public accounts.
- Improve transport economic efficiency for business users, consumer users and transport providers.
- Improve reliability (already covered in Chapter 2).
- Provide beneficial wider economic impacts.

4.2 When a scheme is appraised, an economic assessment is used to determine the scheme's value for money. This assessment is based on an estimation of costs and benefits from different sources:

- Transport economy efficiency (TEE) benefits (savings related to travel times, vehicle operating costs and user charges).
- Safety (savings related to numbers and severity level of collisions).
- Costs to users due to construction and maintenance.
- Cost to Highways England of building the scheme.

4.3 This section provides a comparison between the outturn costs and benefits and the forecast economic impacts. Consideration is also given to the schemes wider economic impact. Outturn journey time and safety economic impacts are based on the observed results reported in previous chapters of this report and reforecast to a 60 year appraisal period.

Sources

4.4 The Economic Assessment presented in this section is based on the following data sources:

- Economic Assessment Report (2004)
- AST (2005)
- COBA model (2004)
- Outturn costs from HA (at time of request) Regional Finance Manager (2014)

Forecast Impacts

4.5 A summary of the predicted scheme impacts from the Economic Assessment Report is shown in ***Table 5.1***. This shows that over the 60 year appraisal period the scheme was predicted to generate £67.6 million benefits with the most resulting from journey time benefits, with a lower proportion from safety benefits. A summary of the benefits which will be considered in this post opening evaluation (is also shown as marked with ✓), and those which have been excluded (i.e. assumed same as forecast and marked with ×). As detailed in the traffic section, the observed growth in traffic is more in line with the low growth scenario, and hence outturn economic calculations are compared to the low growth forecasts here.

Table 4-1 – Economic Impact of Scheme

	Predicted Impact (low growth)		Evaluation	
	£m	%	Re calculated	Reasons
Journey Times	£43.46m	64%	✓	Represents a considerable proportion of the overall scheme benefits; and Relatively straightforward to measure outturn impacts in opening year.
Safety	£33.3m	49%	✓	Represents a considerable proportion of the overall scheme benefits and it is relatively straightforward to measure outturn impacts.
Vehicle Operating Costs	-£10.7m	-16%	✗	Moderate proportion of overall scheme benefits; however forecast information does not allow POPE to evaluate this. However, used in calculation of BCR assuming as forecast.
Construction/ Future Maintenance Delay	£1.53m	2%	✗	Construction delay is a small proportion of overall benefits, and outside of the remit of POPE as cannot be evaluated due to a lack of information available during construction and therefore not included in this evaluation and assumed as forecast. Maintenance (including future maintenance) delay has still not be realised and therefore assumed as forecast for this evaluation.
Indirect Tax Revenues	£8.09m	11%	✗	Moderate proportion of overall scheme impacts; however forecast information available does not allow POPE to evaluate this for this scheme. However, used in calculation of BCR assuming as forecast.

Scheme costs

Investment Costs

4.6 This section compares the forecast investment cost of the scheme with the outturn cost as of 2014. The last published predicted costs (prior to scheme construction) of £29.59m (2002 prices) were contained in the Economic Appraisal Report (EAR) published in 2004. However, at the OYA stage, the HA (as was in place at the time) project manager provided a more up to date pre construction figure (no date available) which has been used in the table below.

4.7 The outturn spend profile for this scheme was obtained from the HA (at the time) Regional Finance Manager (in July 2014) for the purpose of this study. The as spent figures have been converted to 2002 prices so that they can be compared with the forecast cost on a comparable basis.

Table 4-2 Investment Costs in 2002 prices

	Forecast Cost	Outturn Cost	Difference
Construction	£28.31m	£45.66m	29%
Supervision	£1.99m		
Preparation	£2.28m		
Land	£2.83m		
Total	£35.42m		

4.8 The overall outturn cost is 29% higher than the forecast cost, at £45.66m.

Present Value Costs (PVC)

4.9 Cost benefit of a major scheme requires the costs to be considered for the whole of the appraisal period and they need to be expressed on a like-for-like basis with the benefits. This basis is termed Present Value. Present value is the value today of an amount of money in the future. In cost-benefit analysis, values in differing years are converted to a standard base year by the process of discounting giving a present value.

4.10 For consistency with the published Benefit Cost Ratio (BCR) detailed in the EAR (2004) the forecast costs shown here, and used in the BCR calculation are based on the figures in the EAR, rather than the revised cost shown in the previous table, and hence the forecast PVC is shown as lower than the investment cost in 2002 prices.

Table 4-3 Investment costs as present value

Costs in 2002 market prices, discounted	Forecast	Outturn
Investment cost	£30.49m	£46.70m

Indirect Tax

4.11 Indirect tax revenue is the expected change in indirect tax revenue to the Government due to changes in the transport sector as a result of the scheme over the appraisal period. For the highway scheme in this study, the tax impact is derived primarily from the monetisation of forecast of the changes in fuel consumption over the 60 years period. A scheme may result in changed fuel consumption due to:

- Changes in speeds resulting in greater or lesser fuel efficiency for the same trips.
- Changes in distance travelled.
- Increased road use through induced traffic or the reduction of trip suppression.

4.12 Note that at the time this scheme was originally appraised, costs were initially taken for the wider costs to public accounts and thus the impact of the scheme on indirect tax was considered within these wider costs. The current guidance[11] (AMCB, Analysis of Monetised Costs and Benefits) considers the costs in terms of the 'broad transport budget' i.e. costs and revenues which directly affect the public budget available for transport, and instead the indirect tax impact is covered within the benefits.

4.13 Forecasting of the impact of the scheme on indirect tax was done within the TUBA modelling and was based on the whole study area. This showed that the scheme was expected to increase tax revenue over the 60 years appraisal period mainly due to the higher speeds on the bypass compared to the former A38 route, and some (limited) induced traffic. The length of the new bypass is almost identical to the length of the former route.

4.14 In scheme appraisal, this net tax revenue is forecast for the whole 60 year appraisal period of a scheme. In the case of this scheme the indirect tax is included as a negative cost, this means that the revenue forecast to be raised as a result of the scheme is subtracted from the scheme cost.

4.15 For this evaluation, the 60 year impact of indirect tax has not been recalculated due to multiple issues. These include:

- The difficulty in replicating the fuel consumption impact of the climbing lane on the former A38 (especially on HGVs), i.e. slow moving/stop start traffic and the resulting impacts it also has on overall traffic flow.

[11] TAG UNIT A1.1 Cost-Benefit Analysis, October 2013

- The lack of a detailed breakdown in pre scheme traffic composition.
- The lack of detailed spot speeds along the former A38 in the pre scheme situation, and a lack of forecast speeds.
- Detailed speeds and traffic flow data are only available for the main A38 corridor in the post scheme situation, therefore the benefits outside of this area could not be replicated, representing an underestimate of the impacts if calculated just using those.

4.16 Therefore, for the purpose of this evaluation report, the forecast indirect tax benefits have been assumed to be relevant for the five years after opening evaluation and more accurate than a recalculation of the figure given the above limitations, and due to the following reasons:

- Observed traffic flows across the corridor are generally in line with that forecast.
- Observed journey times have significantly improved since the bypass opened, although the performance against predicted changes is difficult to quantify as limited details are available. It is likely that, as traffic is free flowing at five years after opening, the detailed calculations of indirect tax still stand.
- The as built scheme is as detailed in the appraisal documents.

4.17 As such, the forecast indirect tax impact of £8.09 million raised has been included in the both the forecast and observed scenarios to calculate the Benefit Cost Ratio (BCR).

4.18 The full PVC is made up of the following costs converted to present value:

- Investment costs, as above.
- Indirect Tax Revenues during the lifetime of the scheme.

4.19 The final PVC presented in the EAR was £22.4m (low growth), but this was based on an older version of the cost forecast. As the treatment of indirect tax has changed since the time of appraisal, the investment costs and indirect tax in present values are presented in ***Table 4-6*** separately.

Monetised Journey Time Benefits

4.20 TUBA (Transport Users Benefit Appraisal) was used to forecast the economic benefits of the scheme and is based on the change in annual vehicle hours over a wide network (including the A38 key links).

Forecast Journey Time benefits

4.21 The TUBA model forecast total 60 year journey time benefits of £43.46m (LG) and £84.71m (HG), due to this bypass scheme. The EAR also details these figures, but there is insufficient information in the appraisal documentation to relate the monetised impact with the journey time reductions for the A38 forecast reported in the AST (1.1-1.7 mins: 0.21m-0.27m vehicle hours per year). It is unclear whether the values included in the AST are an annual average saving, or a summer season maximum benefit.

Outturn Journey Time benefits

4.22 It is not possible to use TUBA outputs to create a comparable forecast based on the impacts on the A38 scheme only as TUBA is matrix based and its output does not give any breakdown of the impacts by link or area. Therefore POPE methodology has been applied. This is a comparison of the predicted opening year vehicle hour saving and the observed journey times before and five years after opening (used to calculate an empirically based observed vehicle hour saving). Savings have been calculated for vehicles using the A38 improved section

between Liskeard and Doublebois, as well as a short section of the A390 where it joins the new roundabout on the A38.

4.23 In line with the appraisal, savings are considered for weekdays, some weekend hours and during holiday periods. No benefits have been calculated for off peak periods in order to align with the appraisal, which stated that benefits for traffic in the off peak periods was likely to be minimal.

4.24 The following assumptions have been made:

- The majority of benefits will be enjoyed by traffic using the main through route of the A38, and on the A390 where it joins the A38 in Dobwalls. Therefore journey time and traffic flow changes on the A38 and A390 have been used.
- The evaluation excludes any potential journey time impacts in Liskeard.
- The evaluation is based on evidence from pre and post journey time surveys and traffic counts in neutral months in 2006 and 2013. As such, although some adjustments have been made for summer/tourism traffic (using the method prescribed in the appraisal), this estimate is likely to be conservative.
- Vehicle hours saved in the opening year have been calculated and extrapolated to a full year. Additional benefits for weekend have been accounted for by applying the off peak and peak journey times from weekdays to weekend flows (where similar traffic flows are seen).

4.25 The outturn monetary benefits for the 60 year scheme life period have then been calculated using the proportion assumed in the low growth scenario as this is more reflective of the changes in observed traffic flows after opening. ***Table 4-4*** shows the predicted and outturn vehicle hour savings for the A38 bypass scheme.

Table 4-4 Forecast vs. outturn journey time benefits

Costs in 2002 market prices, discounted	Forecast (Low Growth)	Outturn
Vehicle Hours Saving (in opening year)	210,000	131,303
Journey time benefit over 60 years (PVB from TUBA)	£43.46m	£27.17m

4.26 The observed saving is 37% lower than forecast. This is mainly due to the slightly lower than forecast level of traffic using the bypass, and no vehicle hour saving benefits being taken into account for traffic in Liskeard. It is also noted that pre scheme observed data is taken from a neutral month, which is representative of most of the year, however this evaluation has only proxied the likely extent of the summer journey time savings and therefore may have underestimated the overall benefits. This reforecast is likely to be an underestimate.

Vehicle Operating Costs (VOC)

4.27 For most highway schemes including this one, the VOC and indirect tax impacts are both closely linked to changes in fuel consumption particularly changes in speed. In economic terms this has similar magnitude of impacts, but from opposite sides of the benefits balance. That is, if there increased fuel consumption, VOC will be a disbenefit due to users paying more for fuel and thus more indirect tax will be collected by the treasury.

4.28 It has not been possible to undertake an accurate reforecast of vehicle operating costs for the outturn situation, as there is a lack of information available relating to forecast speeds etc. For the purpose of considering the outturn BCR, the forecasts made in the low growth

scenario for the levels of VOC and construction/maintenance delay have been included in the outturn economy benefits.

Evaluation of Safety Benefits

Forecast Safety Benefits

4.29 The forecast safety benefits for this scheme were derived from the COBA model (which also monetised the benefits), with the findings detailed in the scheme AST. A 60 year scheme saving of 530 collisions was forecast, with a corresponding 60 year monetary benefit of £33.3m (2002 prices discounted to 2002). This represents 49% of total scheme benefits. These figures were based on a low growth forecast. A high growth scenario was also forecast, however it has not been used here as observed traffic flows are more in line with low growth traffic flows.

Monetised Safety Benefits

4.30 The POPE methodology for the evaluation of the outturn of the economic benefit value arising from safety improvements is based on the comparison of observed and forecast collision changes at the evaluation stage (in this case five years after opening, and using the pre scheme counterfactual scenario to take background decline in collisions into account). This is then combined with the assumption that the observed safety impact reported in Chapter 3 at this stage can be taken as indicative of that over the whole 60 year appraisal period.

4.31 Monetisation of these savings is calculated by:

- Calculating the net difference between the forecast opening year saving and the observed annual average collision savings in the COBA study area over the first five years, as shown in Chapter 3).
- Monetising the net difference using the PAR method which values collisions by road type and enables capitalisation over 60 years based on expected traffic growth.
- Calculating the 60 year outturn benefits for the whole area by combining the forecast from COBA (for the whole study area) with the outturn assessment of the net difference.

4.32 The evaluation of the monetary safety benefits is shown in ***Table 4-5***. All values are in 2002 prices discounted to 2002.

Table 4-5 Forecast vs. outturn collision benefits

Forecast (COBA area)	Forecast Collision Saving (Opening Year)	(a)	9.0
	Low growth forecast (60 years)	(b)	£33.3m
Observed COBA area	Average Annual Collision Saving in Post-Opening Period (based on adjusted counterfactual)	(c)	5.8
	Net difference between forecast and observed	(d) = (c) – (a)	-3.2
	Monetisation of net difference for opening year	(e)	-£0.23m
	Capitalisation of (d) into 60 year impact of net difference between forecast and observed (using PAR 3.3 guidance)	(f)	-£7.7m
	Outturn 60-year benefit	**(b) + (f)**	**£25.6m**

4.33 ***Table 4-5*** demonstrates that the re-forecast 60 year monetary safety benefits for the COBA are 23% lower than originally forecast at £25.6m saving over 60 years.

Benefit Cost Ratio

4.34 The Benefit Cost Ratio (BCR) is used as an indicator of the overall value for money of the scheme. It is the comparison of the benefits (PVB) and costs (PVC) expressed in terms of present value.

4.35 At the time of scheme appraisal, Treasury guidance was to include indirect tax as a cost. However, the most recent guidance on indirect tax impacts is to include these as a benefit, rather than a reduction in cost. This means that when a scheme leads to increase fuel consumption and hence increased tax revenue, the PVB is increased rather than the PVC being decreased.

4.36 ***Table 4-6*** presents the BCR of the scheme, with indirect tax included as both a cost and a benefit. All figures are presented in 2002 prices discounted to 2002.

Table 4-6 Forecast vs. Outturn Re-forecast Benefit Cost Ratio

All in 2002 prices, discounted to 2002		Forecast Low Growth (£m)	Outturn (£m)
Costs	Investment Cost	£30.49m	£46.70m
Benefits	Journey time benefits	£43.46m	£27.17m
	Vehicle operating costs	-£10.67m	-£10.67m[12]
	Safety benefits	£33.29m	£25.6m
	Construction delay and maintenance	£1.53m	£1.53m[13]
	PVB subtotal	**£67.60m**	**£43.63m**
	Indirect tax	£8.09m	£8.09m[14]
BCR (with indirect tax in PVC)		3.02	1.13
BCR (with indirect tax in PVB)		2.48	1.11

4.37 Overall, the outturn BCR of 1.11 is lower than the forecast 2.48, representing low value for money.

4.38 This BCR is likely to be a *conservative* estimate due to the following assumptions:

- The outturn journey time PVB has been calculated using traffic on the main A38 route, and does not account for benefits accrued on non trunk roads in the area including those in Liskeard.

[12] Assumed as forecast in appraisal.
[13] Assumed as forecast in appraisal
[14] Assumed as forecast.

- The outturn economy PVB does not necessarily take into account the full benefit achieved in the peak tourist season, when traffic flows and journey times are at their peak.

4.39 It should be noted that the BCR ignores non monetised impacts. Guidance states that the impacts on wider objectives must be assessed but are not monetised. The evaluations of the wider economic impacts, environmental, accessibility and integration objectives are covered in the following sections of this report.

Wider Economic Impacts

4.40 The AST for this scheme forecast a neutral impact in terms of wider economic impacts, as no significant change was expected.

4.41 No development in the area was dependent on the scheme, however the Cornwall Local Transport Plan (LTP) states that they aimed to provide an integrated transport network that contributes towards the development of a vibrant and successful Cornish economy. By removing the bottleneck on the A38 and congestion in Dobwalls, this scheme is in line with this policy however, no development was dependent on the scheme.

4.42 It has been concluded that at this five years after stage, the bypass has had a neutral impact on the wider economy, although it has benefited the local businesses in Moorswater in terms of access to their premises.

Key Points – Economy

Benefits

- Outturn journey time benefits of £27.17m are lower than the forecast of £43.46m. This is due to a combination of slightly lower than forecast flows on the bypass, and an underestimation of the impact of summer peak flows in the pre scheme scenario.
- The outturn safety benefits are calculated to be £25.6m, 23% lower than the forecast of £33.3m. This difference is partly due to taking account of the national background decline in collisions seen between the appraisal period and the post opening period.
- Overall including both journey time and safety, the outturn PVB is 35% lower than forecast.

Costs

- Outturn investment costs were 29% higher than forecast at £45.66m in 2002 prices.

Benefit Cost Ratio

Using the reforecast benefits, the scheme achieves a BCR of 1.11 which shows the scheme has delivered low value for money.

Wider Economic Impacts

- At five years after opening, the bypass has had a neutral impact on the wider economy, although local businesses in Moorswater have improved access to their premises.

5. Environment

Scheme Environment Objectives:

- **Reduce the overall effect of traffic on properties**
- **Improve the overall water quality after scheme completion**
- **Enhance visual screening to reduce the impact of traffic using the scheme and its associated slip roads and link roads**

5.1 The Environmental Statement (ES, January 2005) stated that the scheme would result in the removal of approximately 90% of traffic from the existing A38 at Dobwalls providing:

- Reduction in casualties due to accidents.
- Resolution of congestion, particularly associated with the peak tourist season, resulting in large beneficial effects predicted in terms of Journey Ambience (reduced driver stress for road users using the Scheme; and reduced traveller stress for pedestrians and cyclists in Dobwalls).
- An improved environment for pedestrians, cyclists and other users of local roads in and around Dobwalls.
- Improved amenity for residents and visitors, including potential for a sense of place to be restored to benefit the Townscape, resulting in a moderate beneficial predicted impact.

5.2 The main environmental disadvantages of the scheme were linked to a predicted moderate adverse impact on biodiversity. The ES attributed this prediction to severance of the hedgerow network, including some Cornish Hedges; predicted impacts on the East and West Looe tributaries; and disturbance to the local bat populations.

Introduction

5.3 This section documents the evaluation of the environmental sub-objectives, focussing on those aspects not fully evaluated at the One Year After (OYA) stage or where suggestions were made for further study.

Summary of OYA Evaluation Recommendations

The OYA evaluation identified a number of areas where further analysis was required at the Five Year After (FYA) stage to confirm the longer term impacts of the scheme on the surrounding environment, these are summarised as follows:

Landscape – With specific reference to the Dobwalls Roundabout, in the context of the size of the space and the choice of seeding into shillet (a gravel of crushed shale) across the embankments and roundabout, resulting in slow establishment of grasses and an absence of greening at the time of the OYA site visit, new seeding and planting had yet to make much impact visually. The roundabout lacked visual interest; and planting had yet to establish. However, it was too early to assess whether the planting would provide a 'gateway' feature as it matures and this should be reviewed at FYA.

Given the decision to use shillet in place of topsoil as a means of encouraging more effective colonisation of species rich grassland and restrict weed inundation, verges, roundabouts and 'gateway' areas were expected to be amenity grass which would usually be sown onto topsoil for quick establishment and a green appearance and these areas of seeding could be considered marginally worse than expected for this element of the overall landscape proposals at the OYA evaluation. The ongoing establishment of the grassland areas should be considered at FYA.

It was too soon to be able to evaluate the overall effectiveness of the landscape planting and this should be reviewed at the FYA stage, and by which time it was expected that the Handover Environmental Management Plan (HEMP) would be available. Some plots, particularly the Cornish Hedges along the more exposed northern ridge at the western approach to the Dobwalls Roundabout, were less well advanced than others. The shillet had not aided early establishment of grass, albeit that it also appeared to have been effective in controlling weeds.

Heritage of Historical Resources - Details of the finds were reported to be contained within the archive – the ES indicated that this was to be prepared for deposition in an approved local museum; however, the February 2010 report did not confirm the final location. This should be confirmed as part of the FYA evaluation.

Biodiversity - It was too soon to be able to evaluate fully the effectiveness of the mitigation measures which should be considered further at FYA, including re-consulting with Natural England and extending consultation to include the local Wildlife Trust. The Construction Environment Management Plan (CEMP) indicated that monitoring data should be available at FYA for bats, dormice and reptiles/amphibians

Water Quality - The OYA site visit confirmed that drainage had been installed throughout the scheme as expected. No comments had been received to suggest there have been any pollution issues – this will require review at FYA. Those aspects of the drainage mitigation measures where access was not possible at OYA will be considered at FYA including re-consulting with EA and extending consultation to include the Fowey Rivers Association.

Journey Ambience – Moorswater Collector/Distributor Road (MCDR): It was expected that as planting matured, this route would become more attractive and better reflect the rural landscape character. This aspect would be confirmed at FYA;

5.4 A key location plan is provided overleaf which serves to identify locations of sites mentioned within this chapter. (***Figure 5.1***).

Figure 5.1 – Key Location Plan – Scheme locations referenced in Environment Chapter

5.5 The following environmental sub-objectives were appraised in the ES and in the Appraisal Assessment Table (AST) according to guidance at that time (2008):

- Noise
- Local Air Quality
- Greenhouse Gases
- Heritage
- Landscape & Townscape
- Biodiversity
- Water Environment
- Physical fitness
- Journey Ambience

5.6 For each of these environmental sub-objectives, the evaluation in this Section assesses the environmental impacts predicted in the scheme's AST and ES against those observed five years after opening.

5.7 In the context of the findings from the OYA evaluation and using new evidence collected five years after opening, this section presents:

- An evaluation of the ongoing effectiveness of the mitigation measures implemented as part of the scheme.
- An updated summary of key impacts against all of the nine environment sub objectives, with particular focus on assessment of sub-objectives where it was too early to conclude at the OYA evaluation stage.
- Additional analysis relevant to close out issues/ areas for further study as identified at the OYA stage for consideration at the FYA stage.

Methodology

5.8 This section focuses on those aspects not fully evaluated at OYA, or where at OYA, suggestions were made for further study and also any issues that have arisen since the OYA evaluation. The detail of the OYA study is not repeated here, and reference is made to the OYA report where required, although key points are incorporated into this FYA report where appropriate to provide contextual understanding.

5.9 No new modelling or environmental survey work has been undertaken for this FYA environmental evaluation.

Data Collection

5.10 The following documents have been used in the compilation of this section of the report:

- A38 Dobwalls Bypass Environmental Statement (ES) January 2005 including Volume 1 (Main Text), appendices, figures and Non-Technical Summary.
- Stage 3 Scheme Assessment Report, 2005.
- Appraisal Summary Table (AST) 2005.
- Scheme drawings including:
  - Published Scheme Proposals, Landscape Designs, Existing Wooded Vegetation lost to scheme, Cultural Heritage Features, Water Quality, Drainage and Hydrology Proposed Drainage, Proposed Rights of Way, Mitigation and Bat Crossing Points, Planting plans and detrunking works details.
  - Construction Environmental Management Plan (CEMP) version 3, dated 2007.
- Draft Landscape and Ecology Management Plan, May 2010.
- Archaeological excavation and observation on the route of the Dobwalls bypass, Dobwalls & Trewidland Parish, near Liskeard, Cornwall 2006-2007 Publication report text for submission to Cornish Archaeology (produced by AC Archaeology, February 2010).
- A38 Dobwalls Bypass Bat Mitigation Monitoring June and October 2008 P0s/60-1B Final Report May 2009.
- Scheme newsletters and publicity material.

5.11 The OYA reported noted that the Handover Environmental Management Plan (HEMP) was anticipated to be completed in 2014 and should be provided to POPE as part of the FYA evaluation.

5.12 A full list of the background information requested and received to help with the compilation of this chapter of the report is included in ***Appendix A*** .

Site Visit

5.13 As part of the FYA evaluation, a site visit was undertaken in August 2014. This included the taking of photographs to provide comparison views with selected ES photomontages and OYA photographs. These are shown in ***Appendix C***.

Consultation

5.14 Three statutory environmental organisations (Natural England, English Heritage and the Environment Agency), Cornwall Council, West Country Rivers Trust, Foweys River Trust and the Dobwalls and Trewidland Parish Council were contacted as part of the OYA and FYA evaluations regarding their views on the impacts they perceive the road has had on the environment as shown in ***Table 5.1***.

Table 5.1 – Summary of Environmental Consultation Responses

Organisation	Field of Interest	OYA Comments	FYA Comments
Natural England	Biodiversity & Landscape	Declined to comment as NE has not undertaken any review of the works or seen the results of any post project monitoring of biodiversity mitigation measures	No further contact made at FYA
English Heritage	Heritage	No response	No further contact made at FYA
Environment Agency	Water	Expressed willingness to comment but no response received	No response
Cornwall Council	General	Commented on air quality (not aware of any complaints), landscape (generally considered 'worse' than expected), biodiversity (would need to see monitoring data to be able to comment. Supportive of use of dormouse nest boxes), heritage (as expected) and access generally as expected	No response
Dobwalls and Trewidland Parish Council	General	No response	Concern expressed over additional construction works affecting the scheme – response included in the Water Quality and Drainage section.
West Country Rivers Trust	Water	As the Trust has not undertaken any survey work it felt unable to comment objectively	No response
	Heritage	Several concerns	No response
	Biodiversity	No response	No response
Fowey Rivers Association	Fisheries	Not contacted at OYA	Replied that they were unable to provide a response and would require equipment and training which were not available to them.
Wildlife Trust	Biodiversity	Not contacted at OYA	No response

5.15 The Area 1 Managing Agent Contractor (MAC) has also been consulted with regard to animal mortality figures which have been made available both pre and post scheme. These figures are discussed in the biodiversity chapter.

Traffic Forecast Evaluation

5.16 Three of the environmental sub-objectives (noise, local air quality and greenhouse gases) are directly related to traffic flows. No new noise or air quality surveys are undertaken for POPE and an assumption is made that the level of traffic and the level of traffic noise and local air quality are related.

5.17 The ES stated that without the scheme, traffic levels through the centre of the village would rise from 20,700 vehicles per day to between 21,700 (low traffic growth) and 24,100 (high traffic growth) in 2008.

5.18 The ES contains forecast HGV numbers for the old road through the village, and on the bypass. However, POPE believes that these are not accurate, as it was forecast that 7.5% of traffic using the old road through the village would be HGV's. This equates to around 165 HGVs per day, which is artificially high for this type of scheme. For this reason, HGVs are not considered as part of this appraisal.

Table 5.2 – ES Forecasts vs Observed Traffic AADT Flow

Location	2006 base observed	2014 ES forecast low growth	2014 ES forecast high growth	Actual FYA	Flow change compared to low growth forecast (%)	Flow change compared to high growth forecast (%)
A38 West of Doublebois crossroads	14,300	15,000	17,400	**15,200**	200 (1%)	-2,200 (-13%)
A390	7,400	8,700	10,100	**8,100**	-600 (-7%)	-2,000 (-20%)
Former A38 through Dobwalls, west of crossroads in village	21,500	2,200	2,600	**3,000**	800 (36%)	400 (15%)
Former A38 east of crossroads	21,500	2,900	3,400	**3,500**	600 (21%)	100 (3%)
Former A38, east of Looe Mills junction	21,500	2,300	2,800	**2,200**	-100 (-4%)	-600 (-21%)
A38 Liskeard	23,700	23,300	27,400	**24,100**	800 (3.4%)	-3,300 (-12%)
Bypass - western end	n/a	20,800	24,000	**19,800**	-1,000 (-5%)	-4,200 (-18%)

Table 5.3 – ES Forecasts vs Observed Traffic Speeds along A38 Dobwalls Bypass

Direction	Period	Forecast Speed (kph)	Observed Average Speed (kph)	Kph change
A38 Eastbound	AM	104	94	-10
	IP		90	-14
	PM		94	-10
A38 Westbound	AM	104	91	-13
	IP		86	-18
	PM		88	-16

Five Years After Assessment

5.19 Included in this section is a brief summary of statements from the AST, ES and OYA evaluations (including close out/ key issues identified for further reporting at the FYA stage) which have been included to provide the context for the FYA evaluation.

Noise

Forecast

AST

5.20 The AST stated that the qualitative impacts of the scheme would be as follows: 'improvement within Dobwalls due to the removal of through traffic from village. Some localised adverse impacts along scheme corridor.' With the scheme, the number of people exposed to noise nuisance was expected to rise to 70 within 15 years, comparing favourably to the prediction of 124 people annoyed under the Do Minimum scenario. In conclusion, this was presented in the AST as a reduction in people annoyed by noise equating to 54.

Environmental Statement

5.21 The ES concluded that the overall noise experienced by residents along the existing A38 and in the settlement of Dobwalls would be reduced by construction of the bypass.

5.22 Several properties would experience a change of direction of the traffic noise source e.g. from the front to the back of the property. One property would qualify for insulation against noise;

- Meadowleigh due to façades facing the traffic.

5.23 The ES expected that the landscape proposals including earth mound screening, construction of Cornish Hedges; false cuttings containing the road to the north of Dobwalls; and low noise surfaces would provide some noise attenuation along the bypass and A390 route. However, two further properties were noted as having the potential to qualify for noise attenuation; Havett View; and Pilgrims.

5.24 It was expected that there would be an overall reduction in the number of properties experiencing substantial and major noise intrusion when comparing the Do Something to the Do Minimum scenarios. Impacts were described in the ES as follows:

"The proposed scheme would be beneficial in alleviating those properties currently exposed to high traffic noise levels of above 70dB(A). 33 properties currently experience noise levels in excess of 70dB(A). Within the published scheme, all of these properties would experience a decrease in traffic noise exposure to below 70dB(A) and no existing properties would experience an increase that would bring them into this high exposure level."

5.25 The ES included predictions relating to the potential for residents to experience 'bother'[15] from vibration, linked to projected noise levels. The statistics indicated that by 2023, 127 properties would experience a decrease in 'bother' under both the high and low growth scenarios, but that 122 properties would experience an increase in bother to 2023 in the Do Minimum, compared to 4 with the scheme (Do Something).

OYA

Conclusions

5.26 The OYA report noted that the HA (at the time) had confirmed that one property, Meadowleigh, was eligible for noise insulation.

5.27 Traffic flows had significantly reduced along the old A38 as a result of the bypass and noise due to traffic would have reduced for properties adjacent to the old road within Dobwalls.

[15] 'bother' refers to the nuisance from noise experienced by residents.

5.28 Traffic flows for all links surveyed through Dobwalls were showing a change in flows of less than 25% over the predicted high growth forecast; although, flows on the former A38 East of Looe Mills Junction were 25% lower than the high growth forecast (13% lower than the low growth forecast), which indicated a greater benefit than expected for this section of the scheme.

5.29 As expected the bypass had moved traffic closer to a previously quiet rural location and noise would have increased for properties north of Dobwalls accessed from Havett Road (e.g. Meadowleigh, Pilgrims, Havett View, Havett Farm, Toll House and outlying properties). Traffic flows on the bypass were broadly in line with expectations

5.30 The reduction in HGVs along the old road (from 1,900 per day to approx 130 per day) was likely to have helped to reduce the noise levels along the former A38 route.

EST

5.31 The OYA EST noted that reductions in through traffic suggested that there would have been an improvement in the local noise environment adjacent to the old A38 through Dobwalls. It concluded that traffic on the bypass was in line with expectations i.e. traffic had been relocated to a previously quiet rural area and there would have been a worsening of the local noise climate for properties nearer to the new bypass.

FYA Consultation

5.32 No consultation responses for noise and vibration were received by POPE.

FYA Evaluation

5.33 Calculations of noise based on the traffic data in Table 5.2, and Table 5.3 have been undertaken in line with POPE methodology. The ES has recorded forecast speeds for the bypass and these are used for comparison with observed speeds when assessing differences with observed speeds for the post scheme situation

5.34 This assessment for POPE shows that changes in noise on the A38 outside of the Scheme area and the A390 were forecast to be minor increases, and these have become negligible changes based on the observed traffic flows. It is concluded that these sections are '**slightly better than expected**' for noise.

5.35 The assessment also showed that major reductions in noise were forecast on the now former A38, with reductions of around 7-9dB forecast. Using FYA observed traffic flows these reductions remain broadly the same. It is concluded that the impact is "**as expected**" on these sections for noise.

5.36 As POPE methodology assumes that the impact on noise as a result of traffic flows is required to be 20% less to result in a better than expected assessment, observed traffic flow for the bypass is therefore considered to be **as expected** when compared with those predicted for both low and high growth scenarios

5.37 A comparison of observed speeds against forecast speeds for the bypass shows that the observed speeds are lower than the forecast speeds, giving rise to lower noise levels. It is concluded that the bypass is "slightly better than expected" for noise, however, it is noted that observed speeds have taken in to account journey times averages through the bypass rather than single locations as appears to have been undertaken in the ES. As such, it is assumed that noise is **as expected** based on speed.

Mitigation Works

5.38 Mitigation works installed to reduce noise levels at receptors include:

- Incorporation of roadside mounds along the A390 Link Road.
- Construction of Cornish hedges at numerous locations along the route.

- Creation of false cuttings where the route passes to the north of Dobwalls.
- Roadside mounds adjacent to Petersfields in order to limit the number of properties that would experience the highest changes in noise levels.

Figure 5.2 – False cutting (left of view) and roadside mound along A390 Link road

Figure 5.3 – Roadside mounding adjacent to Petersfield properties

Table 5.4 – Noise at FYA

Sub-Objective	AST	FYA
Noise	Net population annoyed (Do Something – 15th year): -54	As expected

Local Air Quality

Forecast

AST

5.39 The AST stated that 'the scheme would provide a beneficial air quality effect to the majority of residential properties in the study area. However, there would be an increase of 1.10µg/m³ (16) in annual mean particulate matter (PM10) levels at 20metres from the road centre in the eastern sections of the scheme.'

Environmental Statement

5.40 The ES stated that residents of 490 properties along the existing road would benefit, while a smaller number (117) close to the bypass would experience deterioration in air quality. Overall, this resulted in an assessment of improvement in the number of receptors experiencing particulates and/or nitrogen dioxide (NO2) pollutants.

5.41 There was not a pre-existing air quality problem in the area, although Dobwalls was identified as a 'traffic related air pollution hotspot' in the Cornwall Air Quality Strategy, December 2004,

[16] Micrograms per Cubic Metre of Air

meaning that nitrogen dioxide concentrations were close to exceeding the air quality objectives. The ES noted that the scheme implementation had the potential to improve local air quality through the village.

5.42 The ES identified two sensitive receptors:

- Havett View residential centre for autistic people.
- Manuscript Building – with a day nursery to the rear.

5.43 The ES concluded that:

"The total assessment values for both NO_2 and PM_{10} are negative which indicates a decrease in pollution exposure and therefore a beneficial effect on the community as a whole. The majority of residential properties within 200m of the existing highway network would experience a decrease in PM_{10} and NO_2 concentrations and therefore an improvement in local air quality. This is directly related to the fact that traffic currently travelling through the centre of Dobwalls and therefore affecting the majority of the residential properties within the study area would be removed to the scheme to the north of the village."

Regional Air Quality

5.44 The AST stated that total NOx[17] emissions (regional air quality indicator) predicted with the scheme (Do Something) were higher than those predicted under the Do Minimum scenario, resulting in an overall negative assessment of predicted effects. The ES summarised this negative assessment as negligible at the national scale:

"The changes in total emissions predicted with the published scheme in 2008 and 2023 represent a negligible change in comparison with the UK total quantity of emissions from road traffic sources for 2002. The effect of the published scheme at national level is therefore considered to be neutral."

OYA

Conclusions

5.45 The OYA noted that the traffic had significantly reduced on the old A38 since the opening of the bypass and that it was likely that residents would have benefited from improved air quality as expected. Traffic on the bypass was lower than the high growth forecasts (-12% and -10 %) although broadly in line with the low growth forecasts, however, properties near to the bypass would still experience a deterioration in air quality as expected. The OYA report noted that overall traffic flows combining the bypass with the old A38 were generally lower than those forecast, with transport related emissions of NOx likely to be lower than expected.

EST

5.46 The OYA report stated that residents of properties along the old A38 would have benefited from improved air quality due to the 83-88% reduction in traffic with properties nearer to the bypass experiencing deterioration in air quality. It noted that observed traffic flows after opening were generally lower than the high growth forecasts and therefore, traffic based emissions were likely to be lower than predicted.

FYA Consultation

5.47 No consultation responses for air quality were received by POPE.

FYA Evaluation

5.48 The traffic flows provided in ***Table 2-1*** show that, along the A38 bypass east and west of Dobwalls, and on the A390, the observed flows are significantly lower than those forecast at high growth (less than 1000 AADT). Hence although properties near the bypass will still experience an increase in pollutant concentrations, the increase may not be as large as

[17] Generic term for the mono-nitrogen oxides NO and NO_2 (nitric oxide and nitrogen dioxide).

expected. Within Dobwalls, along the former A38, the observed daily traffic flows are higher than those forecast, but not by a significant amount (less than 1000 AADT). The observed flows are significantly lower than those in the base year of 2006, indicating that pollutant concentrations would have decreased as expected.

Traffic Speeds

5.49 Observed average traffic speeds along the A38 Bypass are between 10-18kph lower than predicted in both directions compared to the baseline spot speeds used in the ES. Lower speeds usually result in lower emissions of air pollutants, which should lead to lower pollutant concentrations at nearby properties.

Overall evaluation

5.50 The observed traffic flows are significantly lower than the high growth forecasts along the bypass, which indicates that any increase in pollutant concentrations as a result of the bypass may not be as high as initially expected. This is also supported by the observed speeds being lower than forecast. Along the former A38 through Dobwalls, observed traffic flows are not significantly higher than those forecast, but are still much lower than the base flows, indicating that pollutant concentrations would have decreased as expected. Overall, air quality is generally as expected at FYA, perhaps better than expected along the bypass.

Table 5.5 – Air quality at FYA

Sub-Objective	AST	FYA
Air Quality	PM_{10}: -1626.9 (improvement) NO_2: -2334.48 (improvement)	Bypass – Better than expected
		Old A38 – As expected

Greenhouse Gases

5.51 The assessment of the impacts of transport schemes on emissions of greenhouse gases is one of the environment sub-objectives. WebTAG notes that carbon dioxide (CO_2) is considered the most important greenhouse gas which is therefore used as the key indicator for the purposes of assessing the impacts of transport options on climate change. Changes in CO_2 levels are expressed in terms of equivalent tonnes of carbon released as a result of the scheme.

Forecast

5.52 The AST and ES both state that there would be a 12.5% (793 tonnes) increase in CO_2 in the opening year due to a slight increase in the overall length of the route and an increase in the speed of traffic with the scheme in place. This is equivalent to 216 tonnes of carbon. The methodology used to calculate this was DMRB for regional air quality modelling. This models fuel consumption related carbon emission rates and requires the following inputs:

- Annual average daily traffic flow (AADT) to include HGVs.
- Percentage of HGVs on each road.
- Average speed of vehicles.
- Assessment year.

FYA Evaluation

5.53 Using current guidance it has been possible to calculate pollutant emissions using observed traffic data. This calculation is based on information presented previously in this report, and relates to the new A38 bypass and former A38 route through the village of Dobwalls.

5.54 This allows for a proxy of the do minimum situation by using observed pre scheme traffic flows and speeds taken from journey time surveys undertaken for POPE. The post opening

situation is represented using observed flows and speeds from surveys undertaken for the FYA POPE.

5.55 A reforecast calculation has not been possible for this scheme due to the lack of detailed forecast speeds and HGVs for the study area. However it is felt that as the major changes as a result of the scheme are on the routes (former A38 and new bypass) that observed information is available for, the calculated observed figure can be compared with the forecast in the AST.

5.56 It can be seen that the scheme has had an estimated outturn impact of 198 additional tonnes of carbon per year after opening, slightly lower than forecast. This is likely to be due to the lower than expected number of HGVs in the corridor, and flows being between the high and low growth forecast, and it is likely that the forecast was based on high growth traffic flows. Overall, the impact of the scheme on greenhouse gases is considered to be **as expected**.

Table 5.6 – Greenhouse gases at FYA

Sub-Objective	AST	FYA
Greenhouse Gases	Increase of 216 tonnes Carbon (12.5%)	Increase of 198 tonnes of Carbon (11%) As expected

Landscape & Townscape

Forecast

AST

5.57 For Landscape, the AST stated that the 'scheme avoids AGLV[18] but does not quite fit the scale of landscape. Locality already affected by existing A38 and light industry.' Overall the impact was assessed as **slight adverse.**

5.58 For Townscape, the AST stated that the scheme would result in removal of through traffic from Dobwalls village, thus benefiting human interaction and enabling a sense of place[19] to be restored. The impact overall was assessed as **moderate beneficial.**

Environment Statement

5.59 The ES noted that the alignment avoided crossing steep sided valleys, instead was routed through more open landforms; and that the principal cutting had been 'tucked into' the lower slopes of the rolling ridge to the north of the bypass route in order to minimise visual effects. The scheme was designed to avoid the Caradon Hill AGLV and Looe and Seaton Valley AGLV.

5.60 The ES stated that the loss of Cornish Hedges and hedgerows would be partially mitigated by new replacement planting; but that the most significant gains would relate to the creation of new woodland planting and scrub.

5.61 The ES confirmed that the overall visual impact of the scheme was assessed as **moderate** to **slight adverse** for properties to the north of Dobwalls and **slight adverse** for the majority of footpaths.

5.62 The ES indicated that the earthworks would go beyond basic engineering in order to harmonise with the local topography as far as possible and that the A390 embankments would be blended into the landscape to return much of the temporarily disturbed land to agriculture. Additionally, the landscape design sought to retain mature trees and watercourses where appropriate, for example within the Blackwater Valley. New planting was also designed to

[18] AGLV – Area of Great Landscape Value – this refers to the Caradon Hill Area of Great Landscape Value

[19] sense of place Either the intrinsic character of a place, or the meaning people give to it, but, more often, a mixture of both.

reflect the locally indigenous species and/or long-established species: woodland planting was designed to mimic the proportions and distribution of species found locally; open glades were to be left in woodland and woodland edges were designed to be planted with shrub species including Hawthorn, Blackthorn, Hazel and Dog Rose.

5.63 Where permanent dense screens were considered desirable, a similar species mix was identified, also incorporating Field Maple; and Cornish Hedges were specified along highway boundaries wherever appropriate to link with existing hedge banks and reinstate local landscape character. It was intended that grassland on cutting slopes would be seeded to create species-rich swards; attenuation ponds would be planted with rushes; and lighting would be restricted to the minimum commensurate with road safety using white light and cut-off luminaries at the Dobwalls Roundabout only.

5.64 At the western end, the A390 approach to the Dobwalls Roundabout and Bypass would be elevated to pass over the Penzance to London Paddington Railway line; where the route passes to the north of Dobwalls it would be in cutting, extending to Tuelmenna Woods; and then raised on embankment when passing adjacent to the Moorswater Industrial Estate.

5.65 For Townscape, the ES noted that significant development in the town of Dobwalls only really started in the late 20th century. The historical development was evident in the townscape of the village today with a few stone cottages, a public house, St Peters church and a Methodist chapel, all of which appear to have originated in the 18th or 19th centuries. Interspersed between these are late 20th century dwellings and a filling station. The village hinterland to the north and south of the A38 comprises late 20th century houses and bungalows, mainly rendered, which lack local identity. No prediction of the scheme on the town is reflected in the ES.

OYA

Conclusions

5.66 The OYA report noted that the removal of significant volumes of traffic from Dobwalls Village had improved the local landscape/townscape character and increased footpath widths. It was noted that additional works had been undertaken by the Cornwall Council along the former A38 route.

5.67 With reference to comments received from Cornwall Council at the time, it was noted that the Dobwalls Roundabout, in the context of the size of the space and the choice of seeding into shillet across the embankments and roundabout which resulted in slow establishment of grasses had yet to make much impact visually. It was noted that the roundabout lacked visual interest with planting yet to establish.

5.68 The report noted that the scheme had followed an alignment sympathetic to the AGLV designation and where cuttings were used; they were effective in minimising overall visibility. Cornish Hedges included at various points along the length of the scheme provided a locally distinctive feature. It was also noted that the embankment over the railway was particularly prominent in longer distance views, especially from the west; and the overall lack of greening at OYA emphasised this effect. It was stated that the lack of greening on the slopes along the length of the bypass made the route feel somewhat barren, drawing the eye to the hard engineering, of which several areas appeared to have been poorly finished as opposed to showcasing the more vernacular features within the design such as the Cornish Hedges.

5.69 Given the decision to use shillet as a means of encouraging more effective colonisation of species rich grassland and restrict weed inundation, it was concluded that the overall appearance of the scheme, although somewhat bare, was broadly as would be expected at OYA for this type of approach. However, verges, roundabouts and ‘gateway’ areas were expected to be amenity grass in the ES which would usually be sown onto topsoil for quick establishment and a green appearance.

5.70 It was concluded that it was too soon to evaluate the overall effectiveness of the landscape planting which should be reviewed at the FYA stage although it was noted that a significant proportion of planting appeared to be establishing well with good levels of growth over tubes and spiral guards noted along the length of the scheme. Some plots, particularly the Cornish Hedges along the more exposed northern ridge at the western approach to the Dobwalls Roundabout were less well advanced than others. The use of shillet had not aided early establishment of grass.

EST (Landscape)

5.71 The OYA EST stated that the bypass avoided the AGLV and the gently curving alignment reflected common landforms in the locale, aided by the careful use of a cutting to the north of Dobwalls. Embankments at the western end and adjacent to the MCDR, coupled with steep cutting through the Blackwater Valley, created prominent and incongruent features in the wider landscape. The slow growth of grasses and subsequent lack of greening to the scheme at OYA increased the dominance of the engineering in the landscape, to the detriment of delivering integration to the landscape.

EST (Townscape)

5.72 The OYA EST stated that the old A38 had experienced a reduction in flows of 83-88% post opening. Detrunking works had included widening of verges and pavements allowing for the installation of a combined footway/cycleway with verges and localised pavement widening. These elements had combined to improve visual amenity, create a road more suited to village character and improve the safety and segregation of NMU routes between Dobwalls and settlements to the east. The EST further stated that the bypass did pass close to Dobwalls as expected, but was not visible from within the village centre.

FYA Consultation

5.73 No consultation responses for Landscape or Townscape were received by POPE.

FYA Landscape Evaluation

5.74 Comparison views with selected ES photomontages and FYA photographs are shown in Appendix C.

5.75 It was noted at OYA with reference to the Construction Environmental Management Plan (CEMP), that ongoing aftercare of all planting, seeding and environmental areas would be undertaken, with areas maintained as part of the aftercare contract for 5 years following completion of the planting works.

5.76 The CEMP noted that during construction the majority of the existing vegetation within the footprint of the scheme would be removed. It confirmed that material from the ancient hedgerows would be used to reinstate new hedgerows where it was of benefit to protected species present on the site. The CEMP noted that topsoil removed from species rich grassland plots during construction would be retained, stored and then re-used to provide an additional seed source for areas of species-rich grassland.

5.77 In contradiction to this the draft Landscape and Ecology Management Plan notes that topsoil was used for planting areas only and that no topsoil was placed on slopes steeper than 1:2 due to potential stability problems and health and safety issues. For grassland areas instead of topsoil, weathered shillet containing a reasonable proportion of fines was specified on all verges and embankment slopes. At both OYA and at FYA it is noted that shillet has been placed in all areas to be seeded which has proven unsuccessful in providing a suitable medium for growth. ***Figure 5.4*** demonstrates this lack of success and confirms the OYA statement that the lack of greening on the slopes along the length of the bypass made the route feel somewhat barren, drawing the eye to the hard engineering. Despite having fines added to it, it is apparent that the shillet areas will remain susceptible to drought due to its lack of ability to retain moisture for any length of time.

Figure 5.4 – FYA view of the cutting slopes – view taken from the Havett Road Overbridge looking east

Figure 5.5 – Limited growth is evident on the large embankment south of the A390 railway bridge

5.78 Growth is mixed on the earth mound between the A390 and the A38 West Link with trees planted as standards[20] are showing mixed results with some maturing as expected, whilst others have perished and not been replaced. Grass seeded areas are showing success or failure based on the presence or lack of topsoil.

Figure 5.6 – Earth mound between A390 and A38 West Link

5.79 It is noted at FYA that some grass growth has begun to colonise areas of shillet near the Dobwalls roundabout but areas in cutting have remained mostly devoid of vegetation. It is assumed that flatter areas are able to retain the fines within the shillet to support some growth whilst the fines appear to have been washed out of steeper areas. Grass areas were originally hydroseeded with low-grow/low-maintenance seed mixes which was adopted to encourage a more diverse sward to establish and reduce long term maintenance requirements. New cutting slopes were left to colonise naturally. It is noted at FYA that no diverse sward has developed so far and very little colonisation has occurred. No monitoring reports were made available to POPE to assess whether the species mix proposed in the landscape and ecology as built drawings had originally germinated as expected. POPE does

[20] Trees are listed in a variety of sizes in the landscape and ecology drawings. Standards generally have a clear stem of 1.8 metres and are classified according to the stem circumference 1 metre above ground level.

not assess the scheme at Design Year, only the expectations for the Design Year of growth observed at FYA.

5.80 In direct conflict to the apparent failure of the use of shillet for Species Rich Grassland (SRG) plots, most planting plots within the scheme are progressing well and are expected to meet their screening, integration and habitat replacement objectives by the Design Year. A few plots are progressing slowly, but these are on cutting slopes where topsoil appears to have been placed over the compacted subsoil. These plots may not reach their growth targets by the design year. Off site planting is progressing well and it is expected to reach its visual screening, habitat connectivity and landscape integration functions by the design year.

Figure 5.7 – Planting approaching Dobwalls Roundabout along the A390

Figure 5.8 – Planting along A38 showing distinct growth/colonisation differences between SRG plots and tree and shrub planting plots

Figure 5.9 – Planting near Havett Road over bridge

5.81 The HEMP records that chemical control of thistles, brambles, docks and gorse was undertaken from 2009 to 2012. ***Figure 5.10*** demonstrates this control although it appears that emerging gorse will need to be controlled for some time to come as there is evidence of young plants emerging in areas where gorse has been previously sprayed. The HEMP notes that Japanese knotweed located on site has been treated in a number of locations since 2009. It was encountered on the south side of the railway embankment on the planned route of the A390 which was buried beneath the embankment. It has also been treated on the north side of the A390 south of the railway where it had spread out into the planting areas by the cycleway. Japanese knotweed has also been treated in the verge of the A38 opposite

Lantoom Quarry. Ragwort has been hand pulled since 2011 with all arisings being covered and left to decompose onsite.

Figure 5.10 – Dobwalls East Junction – gorse has been chemically controlled, with evidence of continued emergence in this area

5.82 During the FYA site visit, post-opening maintenance of planting plots and grass cutting was not evident including some areas where the level of growth indicates that it has not been the subject of control for at least one growing season. It is noted that Gorse is an opportunist species that is adapted to growing in disturbed landscapes with low fertility making it a higher threat in areas where shillet has been placed as it will become the dominant species to the exclusion of others.

Figure 5.11 – Dobwalls Roundabout – gorse has not been subject to control for at least one growing season

Figure 5.12 – Gorse encroaching on areas identified for species rich grassland along the A390

5.83 Cornish hedges along the scheme are showing mixed growth achievements and most are not at the growth expectations for FYA. The only satisfactory growth of the hedges is noted to the north west of Dobwalls Roundabout (A38) along the crest of the cut slope as seen in ***Figure 5.13***. It is observed however just to the north east of the roundabout along the same ridgeline, growth reduces significantly (see ***Figure 5.14***).

Figure 5.13 – Cornish hedge North West of Dobwalls Roundabout (A38)

Figure 5.14 – Cornish hedge north east of Dobwalls Roundabout (A38 bypass)

5.84 It would appear that limited, if any, maintenance is being undertaken to ensure the successful establishment of Cornish Hedges despite the importance placed on their inclusion within the scheme in the ES. The lack of success of the Cornish Hedge to the north east of Dobwalls roundabout may be partially attributed to exposure, although based on the lack of success throughout the scheme it appears that original soils used may be the underlying concern. It was noted during the site visit that the Cornish hedge adjacent to the new Public Right of Way (PROW) through Havett Farm appears to have been sprayed with a non-selective herbicide which has caused a high proportion of plants within the hedge to die back (third view in ***Figure 5.15***).

Figure 5.15 – Cornish hedges near the Havett road over bridge

5.85 During the site visit it was noted that tree shelters have been removed from trees and shrubs, although they have been stockpiled in three areas along the scheme. It is presumed they are to be collected as a part of the aftercare maintenance completion although based on the apparent lack of recent maintenance this may be required to be confirmed.

Figure 5.16 – Tree shelters stockpiled on site

5.86 The HEMP noted that after a joint inspection in September remedial works identified during this inspection commenced promptly, including the clearance of drainage ditches and extensive weed control measures. A small amount of replacement tree and shrub planting was programmed for the winter 2013/2014. Condition ratings for each planting plot were recorded by the MAC and these show some plots not in an ideal condition to achieve their environmental functions.

5.87 Overall, the current coverage, establishment, and condition of the plant stock indicate that the visual screening and landscape integration functions of the mitigation measures are developing well. However, it is concluded that the intended functions of establishment and habitat enhancement for SRG will not be realised by the Design Year for this scheme without active intervention to ensure colonisation of the required species mix and control of currently invading gorse species. It is noted that there are some well performing plots.

5.88 It is therefore concluded that the effects of the scheme on the landscape are **worse than expected**.

Table 5.7 – Landscape at FYA

Sub-Objective	AST	FYA
Landscape	Slight Adverse	Worse than expected (with some exceptions)

FYA Townscape Evaluation

5.89 The removal of significant volumes of traffic from Dobwalls Village noted at OYA and in the AST is still evident at FYA. During the FYA site visit, the limited traffic flows noted appeared to mostly have local destinations. The AST impact assessment noted that the removal of traffic would enable a sense of place to be restored which has been confirmed at FYA.

Figure 5.17 – View from the western edge of Dobwalls

5.90 At OYA it was noted that additional works had been undertaken by the Cornwall Council along the former A38 route. At FYA a further change is noted with amendments to the hard landscaping at Dobwalls Roundabout in the form of shaped gravel beds and large, strategically placed rocks (see ***Figure 5.18***) has occurred. Work was undertaken by the Managing Agent Contractor (MAC) to a design by the Cornwall Council. These features enhance the roundabout and provide a ‘gateway’. It will be important to maintain the edges weed free to avoid detraction from the hard landscape detail.

5.91 Dobwalls roundabout showing the OYA view and FYA view below it demonstrating the inclusion of gravel and large rocks

Figure 5.18 – OYA view of Dobwalls Roundabout

Figure 5.19 – FYA view of Dobwalls Roundabout

5.92 Overall the effect on Townscape within the town of Dobwalls is **as expected**, although the 'gateway' entrance to the town from the west remains bleak despite the added feature at the Dobwalls Roundabout.

Table 5.8 – Townscape at FYA

Sub-Objective	AST	FYA
Townscape	Moderate Beneficial	As expected

Heritage of Historic Resources

Forecast

AST

5.93 The AST stated that there would be an adverse impact on the medieval landscape as a result of the scheme, also noting that the scheme would pass close to the Grade II Listed Building of Toll House (as did the existing A38). No impact on historic interest was predicted at Moorswater. The overall impact was assessed as **slight adverse.**

Environmental Statement

5.94 The ES noted the following as features that would potentially be affected by the scheme:

- Historically important archaeological features (medieval origins) formed by the combination of field patterns and Cornish Hedges – severance and loss.
- Grade II Listed Toll House at Looe Mills – proximity of the bypass and impact on setting.
- Grade II Listed Milestone (1761) – requirement for relocation and impact on setting.
- Grade II* Listed St Peter's Church in Dobwalls village – potential benefits arising from reduced traffic flow and impact on setting.

5.95 The ES presented a mitigation strategy comprising a geophysical survey, guiding the locations for a programme of rapid open area excavations (ROAE) and recording of historic field boundaries prior to construction, supported by an archaeological watching brief throughout the contractor's groundworks. The ES stated that the work undertaken as part of the mitigation programme would form an archive for ultimate deposition in an approved local museum and, where results warranted it, a summary would be published in the local country archaeological journal entitled 'Cornish Archaeology', or other publication as appropriate. It is understood that this strategy was approved by Cornwall Council officers in November 2006 and executed shortly thereafter.

5.96 The Grade II* Listed Milestone was also included in the mitigation strategy – it was to be removed during construction and re-sited near to the East Attenuation Pond, visible from the Moorswater Collector /Distributor Road (MCDR) near Dobwalls East Junction.

5.97 The ES noted that the permanent effects of the Published Scheme on archaeology and cultural heritage, after mitigation, would be as follows:

- Breaches in the historically important hedgerows and the dislocation of the historic landscape would constitute a Minor Adverse Effect on heritage features of Moderate Importance.
- A substantial reduction in traffic flows through Dobwalls would lead to a Minor Beneficial Effect on the setting of one heritage feature of High Importance (St Peter's Church). No permanent effects had been identified.
- There would be a loss of former boundary ditches and other potential archaeological features located by geophysical survey which would constitute a Minor Adverse Effect on heritage features of Low Importance.

OYA

Conclusions

Listed Buildings and Structures

5.98 The OYA report stated that the impacts on listed buildings were considered to be generally as expected. The report noted that impacts on the grade II* listed Toll House were predicted as being neutral as the old A38 already passed very close to the building and the bypass would increase the separation distance only marginally. The evaluation concurred with the resultant effects being as expected. For the grade II* listed milestone, the removal off-site and reinstatement upon completion was confirmed, including that the milestone had been refurbished prior to reinstatement. The reduced traffic along the old A38 was confirmed at OYA which resulted in impacts being as predicted in the ES for the grade II* Listed St Peter's Church in Dobwalls.

Archaeology

5.99 The OYA report concluded that, based on the Archaeology Report (2010), no significant (i.e. medieval or earlier) archaeological features or deposits were identified within the scheme. Subsoil features that were identified (pit/ditches) were all undated or of modern origin and the small quantity of artefacts that were recovered suggest only very sporadic activity dating from the Mesolithic (late hunter-gatherer) period onwards.

5.100 The OYA report noted that details of the finds were reported to be contained within the archive (the ES indicated that this was to be prepared for deposition in an approved local museum). The February 2010 report did not confirm the final location of the archive which should be confirmed at FYA.

EST

5.101 In the OYA EST it was noted that the Cornwall Council considered that the impact on the heritage of historic resources was as expected and was not aware that there have been any unforeseen impacts. It considered that the execution and reporting of archaeological works was as expected; that the relocation and reinstatement of the Grade II* Listed Milestone went well; that Cornish Hedge replacement had been well received generally; and that the overall impact of the Scheme on the setting of Listed Buildings and Structures had been as expected. The mitigation strategy indicated that an archive should be prepared for deposition in an approved local museum.

FYA Consultation

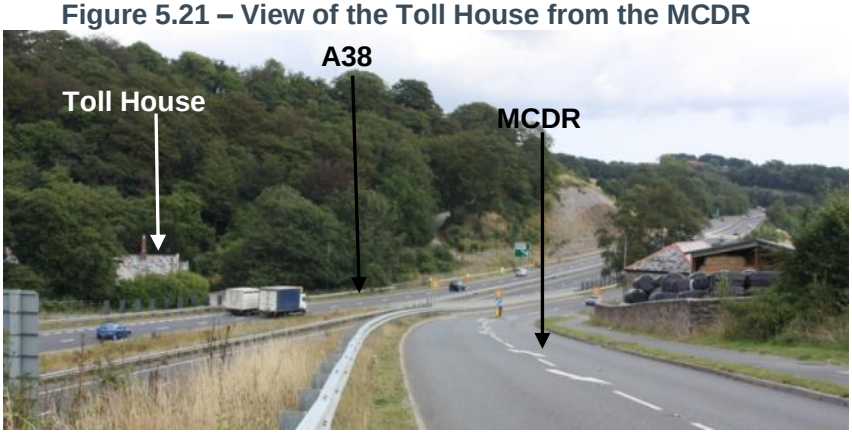
5.102 No consultation responses for heritage of historical resources were received by POPE.

FYA Evaluation

5.103 During the FYA site visit, the grade II* Toll House was visited to assess the impact of the scheme on its setting. ***Figure 5.20*** and ***Figure 5.21*** illustrate the scheme location in relation to the Toll House and the visibility from the Moorswater Collector/Distributor Road (MCDR). It is noted that the Toll House remains impacted upon by the scheme as it was with the old A38.

Figure 5.20 – View of the toll House with the A38 adjacent showing an anti-dazzle screen installed to separate the local access road and the A38

Figure 5.21 – View of the Toll House from the MCDR



5.104 The effect on the setting of the grade II St Peters Church in Dobwalls remains as expected (Minor Beneficial) at FYA (see ***Figure 5.22***) due to the significant reduction in traffic along the old A38.

Figure 5.22 – View of St Peters Church along the former A38 through Dobwalls

5.105 With regard to archaeology, POPE methodology assumes that by the FYA evaluation, all archaeological reports should have been published and deposited with the archaeological finds in the agreed archive for future reference. No confirmation of the location of or deposition of the finds and final report has been confirmed, however, archaeology is only one aspect of the cultural heritage sub-objective and the effects of the scheme on built heritage are as expected.

5.106 It is therefore concluded that the effects of the scheme on the overall heritage resource are generally **as expected**, but the deposition of the project archive is not confirmed.

Table 5.9 – Heritage of Historic Resources at FYA

Sub-Objective	AST	FYA
Heritage of Historic Resources	Slight Adverse	As expected

Biodiversity

Forecast

AST

5.107 The AST stated that there would be adverse impacts on the hedgerow network, the East Looe and West Looe tributaries and the bat populations within the study area. It was also noted that woodland planting and new Cornish hedges would provide additional habitats and that other protected species would be accommodated within the scheme design. Overall the scheme would have a **Moderate Adverse** effect on Biodiversity.

Environment Statement

5.108 The ES noted that there were no statutory designations of nature conservation interest within 2km of the scheme and that most of the fields through which the route passed were of low ecological value as a result of agricultural improvement works over several decades. Tuelmenna Wood and High Wood lie to the north of the scheme and include plants associated with ancient woodland, rendering them of ecological value. In addition, the traditional Cornish hedge field boundaries and networks of streams were assessed as being of considerable ecological interest.

5.109 The ES highlighted that the principal impact on fauna would relate to the loss of bat roosts and disturbance/severance of bat flight paths. In addition, a need was identified for reptile translocation and habitat creation; and mitigation for interference with otter movement corridors.

5.110 In brief, the mitigation proposed for the scheme included the following:

- Sensitive construction activities to take account of nesting birds and breeding seasons.
- Reptile translocation and exclusion during construction works.
- Licensed removal of bat roosts and closure of badger setts.
- Habitat creation within the landscape design to include new Cornish hedges, woodland planting, diverted open streams at East and West Looe tributaries and provision of wetland habitat aimed specifically at foraging bats.
- Provision of safe bat, otter and badger crossing points and wildlife fencing to prevent animal casualties on the new road.

OYA

Conclusions

5.111 The OYA report noted that Cornish Hedges and hedgerows had been created and planted, largely in accordance with the Proposed Scheme drawings included in the ES. It was stated that plants were showing good signs of vigour with growth often extending beyond the spiral guards. The report noted that hydro-seeding of shillet had occurred consistently along the length of the Scheme using a mix of grass species and at the OYA stage grass growth was slow (as would be expected on low fertility substrate) and areas had yet to green up. Where it was possible to obtain a vantage point, the Site visit confirmed that the attenuation ponds included marginal planting with some bulrushes, which should help to increase ecological diversity.

Bats

5.112 The Scheme Monitoring Report noted that 96 Bat boxes were specified for erection in a number of locations in and around Tuelmenna Wood. The report indicated that 79 of the 96 boxes were found to be in place with one containing a pair of pipistrelle bats; and seven others containing bat droppings. The three hibernation boxes showed no bat activity, but had all been used by birds. Recommendations were made for ongoing annual monitoring and the location/replacement of lost boxes – two were noted as damaged and in need of replacement; and two were suspected to have been sited on felled trees and therefore in need of replacement. Bat crossings 1 and 2 appeared to have been effectively executed with a good level of vegetation tie in to the north and south of the bypass. It was concluded that bat crossing 3 would benefit from more mature planting at the southernmost tie-in to aid in guidance as noted in the monitoring report. Specifically, the monitoring report noted that the position of the foundations for the crossing had precluded planting at the ideal locations.

5.113 The report noted that bat monitoring was programmed for annual survey for a period of 5 years following completion of the mitigation measures. In general terms, the report noted that there was evidence of continuing presence of a range of bats species in the vicinity of the Bypass – Brown Long Eared, Serotine and Whiskered/Brandt's Bats which were generally considered to be of particular rarity – and usage of mitigation measures installed as part of the Scheme.

Dormice

5.114 During vegetation clearance suitable for Dormouse habitat, no animals were found and the only evidence was two nests located in the Cornish Hedgebank on Coldwind Lane. It is noted that the installation of 5 Dormouse nest boxes within the hedge west of Coldwind Lane and 15 at the margins of Tuelmenna Wood was undertaken.

Otters

5.115 The OYA report noted that otter had been identified on the East Looe upstream and downstream of the existing A38 crossing and on the Blackwater Tributary. It noted that activity on the West Looe Rivers and tributaries was confined to south of the railway. It stated that an otter ledge has been provided in the East Looe Culvert and fencing to prevent otters

accessing the road. Fencing has also been provided at the attenuation ponds on the West Looe to prevent otters accessing the A390.

Reptiles

5.116 On completion of the scheme the fencing was removed and reptiles were allowed to re-colonise the area. The ecological mitigation area incorporated suitable habitat and scrub planting had also been included as a planting type within the new highway planting areas.

Amphibians

5.117 New attenuation ponds with marginal planting had been provided. No information was made available to POPE at the time which would confirm whether amphibians had moved into these areas.

EST

5.118 The OYA EST stated that mitigation measures incorporated into the scheme were as expected. It noted that HA (as active at the time) monitoring was in place to establish the effectiveness of measures for bats, dormice and translocated reptiles/amphibians and that further study would be required to evaluate effectiveness of other measures. It concluded that biodiversity was to be considered further at FYA and should include areas of new planting and the ecological mitigation areas.

FYA Consultation

5.119 No consultation responses for biodiversity were received by POPE.

FYA Evaluation

5.120 Updated monitoring reports for bats and dormice have been made available to POPE and information contained therein is used in this evaluation as well as site visit observations. The final Handover Environmental Management Plan (HEMP) confirms that there are no requirements for future monitoring of protected species require to be undertaken as a part of the scheme apart from Bats and Dormice. This includes Badgers, Reptiles and Otters.

5.121 Extracts from the scheme monitoring reports are included below:

Dormice

5.122 Pre-scheme survey work identified the presence of Dormice in the hedgerow network within the footprint of the scheme. During construction five Dormouse nest boxes were located in the hedge on the west of Havett Road and fifteen in the margins of Tuelmenna Wood to enhance the area for Dormice. These were checked for the presence of dormice in October 2010 (1 old Dormouse nest located). Within the FYA period up to 2012, monitoring results show that nesting boxes have mostly been occupied by birds. The HEMP indicated that monitoring should have occurred in 2014 although results have not been received by POPE.

Bats

5.123 Pre-scheme bat surveys identified bat roosts, foraging areas and commuting routes, which would be affected by the scheme. Mitigation to reduce the impacts of the scheme on bats was proposed and licences were obtained from DEFRA to allow for the destruction or disturbance of the roosts. Subsequent to this and due to a change in the proposed mitigation an amended licence was granted by Natural England. Roosts covered by the licence included low numbers of Common Pipistrelle bats, Long-eared bats and Lesser Horseshoe bats in buildings. Five trees were also identified that potentially could be providing roosting sites for Common Pipistrelle bats, Long-eared bats, Whiskered / Brandt's bats, Daubenton's bats and Netterer's bats in 5 trees to be removed. A culvert and retaining wall associated with a railway embankment was also identified as providing a roosting location for Common Pipistrelle bats, Long-eared bats, Lesser Horseshoe bats, Natterer's bats and Daubenton's bats. As part of the mitigation for the severance of 3 of the most important commuting routes, artificial bat crossing structures were installed. Ninety six Swegler bat boxes were erected on trees prior to

the commencement of work and a replacement roost building (bat house) was erected at the eastern end of the scheme. Monitoring of the bat boxes and bat house occurred in 2011 and 2012.

Bat House

5.124 In 2011, the bat house was surveyed and no bats were found within the bat house but the following evidence was noted.

- Within the cellar, approximately 50 droppings, possibly of long-eared bats Plecotus sp. were found scattered throughout the floor. Additionally there were two small concentrations of longeared droppings in the central and western areas of the cellar.
- Within the ground floor section, roughly 50 droppings, potentially of long-eared bats, were found on the wall of the western gable end near the apex. Again a sample of these droppings was collected. Approximately 500 droppings were found scattered throughout the floor, the majority of which were long-eared droppings with some pipistrelle bat Pipistrellus sp. droppings also present.
- In the upper, eastern level, approximately 200 long-eared droppings were identified scattered on the floor, in addition to approximately 20, smaller droppings believed to be from pipistrelle bats.
- Barn owl Tyto alba evidence was also found within the bat house. Fourteen pellets were found on the ground floor, with three additional pellets and droppings found on the upper eastern level. All of the pellets were reasonably fresh and suggest recent use by a roosting (but not nesting) Barn Owl.

5.125 In 2012, the bat house was surveyed and no bats were found to be roosting within the bat house at the time of inspection and no new droppings were noted. Barn Owl pellets were noted at ground floor level beneath a tie beam, and 2 Barn Owl pellets were noted on the upper level beneath the horseshoe bat entrance. Barn Owl droppings were present on the lower lip of the horseshoe bat entrance and floor below.

Bat Boxes

Surveys of bat boxes revealed the use of 15 boxes in 2011 and 9 in 2012. In 2012, all damaged and missing bat boxes were repaired or replaced which may account for the lower occupancy in 2012 than 2011. As of the 29th June 2012, there were 96 functional bat boxes across the site.

Bat Crossing 1

5.126 Monitoring reports note that no bats were recorded using Road Crossing 1 in 2009 or in 2007, whilst in 2008, use by both Pipistrelle bats and Long-eared bats was recorded. Therefore, the efficiency of the raised horse parapet in reducing the impact of headlights on the bridge (and thus on commuting bats is difficult to assess accurately.

Bat crossings 2 and 3

5.127 In both 2009 and 2008, both Pipistrelle and Long-eared bats were detected crossing the bypass very close to both bat crossings 1 and 2 whilst in 2007, no bats were recorded using the crossing. In 2009 a single Serotine and a bat of Myotis species were recorded using crossing 2, the first species other than Common Pipistrelle and Long-eared bats to be confirmed as using the crossings. In 2009, crossing 3 was used to cross the bypass by a single Common Pipistrelle bat. In both 2008 and 2007, a small number of both Common Pipistrelle and Long-eared bats were recorded flying near the crossing.

Figure 5.23 – Bat crossing 1: parapets beneath Havett Road Bridge including OYA comparison view demonstrating lack of success of SRG seeding

Figure 5.24 – Bat crossing 2 shown from the Havett Road Overbridge looking east

Figure 5.25 – Bat crossing 3 shown from the Moorswater Collector/Distributor Road with the A38 to the left of the view

Site visit observations

5.128 Site Observations are listed below:

- Hedgerows through the site are establishing well and are expected to meet their establishment requirements by the Design Year.
- Species Rich Grassland sown throughout the site is showing limited signs of growth which is a concern as the ES required colonisation to ensure the impact upon grasslands for the scheme remained Neutral.
- Cornish Hedges are showing some growth but appear to not have received establishment maintenance or sufficient growing medium within the stonewall which may restrict their growth and habitat connectivity targets.

- Several injurious weeds were noted on site including spear thistle, field thistle and broad-leaved dock. There is a requirement on the landowner to control these weeds and control their spread. Whilst on site, a Holly Blue butterfly was noted on a thistle.

Figure 5.26 – Representative views of site observations listed above

5.129 Mortality figures received from the MAC show little variation pre and post scheme and as such it is concluded that the effect of the scheme has had no impact on localised animal mortality.

Table 5.10 – Pre and post opening animal mortality figures

Year	Location	Species
2002	Dobwalls / Liskeard	Badger (1)
2005	Lantoon Hill - Dobwalls	Badger (1)
2007	Dobwalls (outside of village)	Deer (2)
2008	Dobwalls Bypass	Deer (1)
2010	Dobwalls Bypass	Badger (2)
2012	Dobwalls Bypass (near Havett Road)	Fox (1)
2012	Dobwalls Bypass (near Dobwalls Easy junction)	Fox 1)

5.130 Overall the FYA site visit ascertained that the bat crossing points are in good condition. The success of the replacement habitat is mixed, with hedgerows, shrub and tree planting generally establishing well. However, the lack of establishment of the SRG at FYA remains a concern. Bat boxes, the bat house and dormice nests appear to mostly not be occupied by target species. It is concluded that biodiversity is **as expected** at FYA.

Table 5.11 – Biodiversity at FYA

Sub-Objective	AST	FYA
Biodiversity	Slight Adverse	As expected

Water Quality and Drainage

Forecast

AST

5.131 The AST stated that the route alignment reduced the number of watercourse crossings to the minimum but that the western end would cross the headwater of West Looe River. Watercourse crossings reduced to minimum. The overall impact was assessed as **slight adverse**.

Environmental Statement

5.132 The ES noted that construction of the route would involve crossing two main watercourses and a number of tributaries. Measures were designed to deliver appropriate drainage and, where possible, incorporated ecological mitigation and included:

- The provision of new highway drainage which would avoid any direct discharge to the rivers.
- Culverts designed to be self-cleaning at high velocities and allow fish passage at low flows.
- Development of three lined attenuation ponds designed for 100 year storm events, fed by lined interception ponds planted with reeds and kept permanently wet.
- A retention tank comprising an oversized storm water pipe discharging a distance of 400-500m downstream of salmonid spawning areas.
- Relocation of the pond at Lantoom Quarry to retain its role as an interception pond for stormwater run-off from quarry operations.
- The creation of a new wet grassland area and replacement riparian habitat to compensate for the loss of 200m of open watercourse (as a result of being culverted) associated with the West Looe tributaries.
- Diversion of the East Looe Tributaries to create a open watercourse to the east of Petersfield, connecting Tuelmenna Wood to Blackwater Stream.
- The extension of the East Looe River culvert and addition of 600mm gravel bed to benefit fish species.
- Seeding of embankment slopes in the interests of stability.

OYA Evaluation

5.133 The OYA report noted that there was no evidence of undue pooling of water or overflow during the site visit which was during a period of sustained high rainfall. It was noted that this suggested that culverts had been installed to be effective at conveyance of high velocity flow. The report stated that there was no information indicating whether the culverts facilitated fish migration at low flows as required by the ES.

5.134 It was noted that at OYA that embankment seeding had been undertaken although the landscape planting had yet to become well-established and, consequently, the drainage associated with the scheme formed a prominent feature throughout. In addition to this, the site visit identified several locations where vegetation had established within the drainage channels which may result in an adverse effect on the free conveyance of water.

5.135 The OYA report noted that it had not been possible to conduct an evaluation of several mitigation areas including a retention tank comprising an oversized storm water pipe

discharging a distance of 400-500m downstream of salmonid[21] spawning areas; relocation of the pond at Lantoom Quarry to retain its role as an interception pond for stormwater run-off from quarry operations; mitigation measures within the Ecological Mitigation Area –which included the creation of a new wet grassland area and replacement riparian habitat to compensate for the loss of 200m of open watercourse associated with the West Looe tributaries; diversion of the East Looe Tributaries to create a open watercourse to the east of Petersfield, connecting Tuelmenna Wood to Blackwater Stream and the extension of the East Looe River culvert and addition of 600mm gravel bed to benefit fish species.

5.136 The OYA report also noted that no ongoing monitoring of water quality was included in the contract. Without monitoring information it would not be possible to evaluate the impact the scheme might have on the water environment including fish. It recommended that those aspects of the drainage mitigation measures where access was not possible be considered at FYA including re-consulting with EA and extending consultation to include the Fowey Rivers Association.

FYA Consultation

5.137 A consultation response from the Dobwalls and Trewidland Parish Council was received outlining their concern that construction works were underway soon after the five year scheme opening anniversary.

FYA Evaluation

5.138 Further to the concern raised by the Dobwalls and Trewidland Parish Council, it is confirmed by POPE that the works underway (commenced Septemberangecthin the scheme boundaries relate to surface water. It is noted that:

- Since the A38 Dobwalls bypass was completed in 2008 problems with surface water have developed meaning lanes having to be closed during cold weather due to the risk of ice forming. Investigations into the causes have been ongoing and as a result Highways England are reconstructing just under a one mile section of the bypass, including extra drainage measures to rectify the problem. It is understood that this is likely due to an issue with construction, rather than the original design.

5.139 Attenuation ponds ‘west’, ‘central’ and ‘east’ were located during the FYA site visit. No post opening monitoring reports have been received by POPE to assess whether drainage features are operating as intended. No access to pond sites was available. However, based on the site visit, an assumption of the success of vegetation planted as a part of the scheme is assessed with reference to the landscape as built drawings.

Attenuation Pond West

5.140 Attenuation pond west appeared fully vegetated with species rich grassland and marginal plants. As built landscape drawings show the planting of Phragmites australis (common reed) which is not confirmed as successful in ***Figure 5.28***.

[21] Salmonid: ‘of, belonging to, or characteristic of the family Salmonidae, which includes the salmon, trout, and whitefish’.

Figure 5.27 – Attenuation Pond West

Attenuation Pond Central

5.141 Attenuation pond central shows that the interceptor pond shown towards the top of the view has been colonised by common reed as required. However, the reed beds planted to colonise the middle section of the pond are absent with only Typha species (bulrush) present in a small area of the pond. The remainder of the surrounds are establishing as required with woodland and grass species.

Figure 5.28 – Attenuation Pond Central

Attenuation Pond East

5.142 Attenuation pond east appears to be designed as a 'wet' pond due to the presence of water within a channel through the middle of the basin. It is noted that bulrushes are present in the interceptor pond when the as built drawing indicates the common reed should have been planted and there are no common reeds in the rest of the pond area as required. Brambles have begun colonising along the outer edges of the pond which will make future access and maintenance difficult.

Figure 5.29 – Attenuation Pond East

5.143 The comparison OYA/FYA views in ***Figure 5.30*** for the confluence of the west railway culvert and Treburgie culvert demonstrate a lack of regular maintenance with concrete channels being overgrown. It is noted that the draft Landscape and Ecology Maintenance Plan requires

all open drainage ditches to be treated to maintain in an unimpeded condition – this does not appear to be currently undertaken.

Figure 5.30 – Confluence of west railway culvert and Treburgie culvert

OYA view **FYA view**

5.144 No further information regarding the drainage system has been made available for this report. Without monitoring reports, an assessment cannot be made of the effect of the scheme on water quality. Based on the observations made at FYA for the drainage features located during the site visit, it is likely that although the system may be operating as required, the planting as shown on the as built drawings has not been implemented as required and is not receiving regular maintenance. It is not immediately apparent whether they are performing as required. Without further information it is concluded that the overall the effect of the scheme on water quality and drainage is likely to be as **expected**.

Table 5.12 – Water Quality and Drainage at FYA

Sub-Objective	AST	FYA
Water Quality and Drainage	Slight Adverse	As expected

Physical Fitness

Forecast

AST

5.145 The AST stated that there would be improved conditions in the village of Dobwalls following completion of the scheme, The AST also noted additional pedestrian/cyclist facilities, but indicated that journey times changes would be insignificant.

Environmental Statement

5.146 The scheme required the stopping up of three side roads. As part of the mitigation, the ES identified additional pedestrian and cyclist provision as follows:

- New combined footway and cycle track between Treburgie Water and Dobwalls via the redundant A390 and A38.
- Coldwind Lane severed and stopped up – diversions via new footpaths between Coldwind Land and Havett Road to connect to the new Havett Road bridge on each side.
- new footpath along the north of the Scheme to connect the two footpaths to Havett Road.

- New combined footway and cycle track on the northern side of the Moorswater Collector /Distributor Road (MCDR), extended across the proposed bridge at Looe Mills to connect to Toll House.

5.147 The ES summarised the impacts of the scheme as follows:

"Pedestrian and cyclist routes would be improved by the Published Scheme with the provision of 2.5km of new combined footway/cycle track, including links from Treburgie Water, Doublebois and Moorswater to Dobwalls…loss of visual amenity on existing footpaths would be partly mitigated by landscape planting…local access to Moorswater Industrial Estate would be improved for all highway users with the completion of the new MCDR…

5.148 The overall impact was assessed in terms of the change in number of cyclist and pedestrian trips and the total number of people travelling by these modes – the impact was quantified as zero for all indicators. For the purposes of POPE, this is interpreted as a 'neutral' impact.

Variations to the Scheme

5.149 The OYA site visit revealed that since the bypass had opened, footpath no.33 running parallel to the westbound carriageway of the bypass in a westerly direction from Havett Road Bridge was extinguished due to construction of a new housing development. This footpath was originally provided as part of the scheme to compensate for the closure of Coldwind Lane. In extinguishing this footpath, this connection had temporarily been lost; however, on-site plans suggested that an alternative route (to the south of the new housing development) was to be provided.

OYA Evaluation

5.150 The OYA report stated that the scheme NMU Audit Report (April 2010) Completion of Construction Stage noted that 'there is anecdotal evidence of NMUs using the new and established routes to move between Liskeard, Dobwalls and Doublebois on a regular basis for social, domestic and pleasure purposes'. This report noted that traffic had significantly reduced on the old A38 and it was likely that this will have encouraged pedestrians and cyclists to take advantage of the quieter roads and improved the local environment.

5.151 The OYA noted that footpaths severed by the bypass had been maintained across the bypass via the over bridges and new links as expected. The proposed entrance to footpath No.33 was expected to be a style, it was actually delivered by a gate. Additionally, the combined foot and cycle tracks had been fitted with a range of different entrance markings and barriers – the treatment was not consistent throughout and in one location where the path approaches the Toll House access road on a relatively steep slope, barriers appeared to have been added post-construction.

Figure 5.31 – Looe Mill connecting to Toll House showing 3 different signs indicating the route was a PROW

5.152 The quality of surface treatments and finishing and the experience for pedestrians and cyclists using the new routes is addressed in the evaluation of Journey Ambience.

FYA Consultation

5.153 No consultation responses for physical fitness were received by POPE.

FYA Evaluation

5.154 At the time of the FYA site visit limited pedestrian and cyclist use of the various PROWs was noted although it is noted that POPE does not undertake surveys of PROW use. No horse riders were observed using bridleways. Pedestrian routes through Dobwalls were in use on the day of the site visit.

5.155 The ES stated that additional pedestrian and cyclist provision would form a part of the scheme. At FYA, PROWs noted in the ES were visited during the site visit. The points discussed below are reflected in figures:

- It is noted that the new combined footway and cycle track between Treburgie Water and Dobwalls via the redundant A390 and A38 appears to be in use with several pedestrians using the pathway at the time of the site visit (see ***Figure 5.32***).

Figure 5.32 – New combined footway and cycle track between Treburgie Water and Dobwalls

- The new footpath/cycleway to the north of the scheme, west of Havett Road appears maintained (see ***Figure 5.33***).

Figure 5.33 – New footpath/cycleway to the north of the scheme

- The new footpath connecting the Havett Road footpath through Havett farm appears to not be in use, possibly due to access through the farm being restricted by an electric livestock fence (see ***Figure 5.34***).

Figure 5.34 – New footpath connecting the Havett Road footpath

- The new footpath along the north of the Scheme connecting to Havett Road is in place including the link to the new combined footway and cycle track on the northern side of the Moorswater Collector /Distributor Road (MCDR) (see ***Figure 5.35***), extended across the proposed bridge at Looe Mills to connect to Toll House.

Figure 5.35 – Footway/cycletrack along MCDR

5.156 Although there is restricted access through Havett Farm, based on the information presented in this evaluation, it is concluded that the effects of the scheme on physical fitness are likely to remain **as expected**.

Table 5.13 – Physical fitness at FYA

Sub-Objective	AST	FYA
Physical Fitness	Change in total no people walking/cycling> 30mins:0	As expected

Journey Ambience

Forecast

AST

5.157 The AST stated that travellers would benefit from intermittent views and that driver stress would be reduced with the scheme. Additionally to this, the AST also predicted that traveller stress would be reduced for pedestrians and cyclists in Dobwalls. The overall impact was assessed as **large beneficial**.

Environmental Statement

5.158 The ES described the old A38 as severely congested to the point that a one way traffic diversion had previously been put in place on Saturdays during the summer months. The need for the scheme, as published on the Highways England website, also cited problems of above average accidents, high HGV percentages using the route and frequent congestion causing inconvenience, community severance, noise within the village of Dobwalls. The topography of the eastern approach to Dobwalls also necessitated the inclusion of a climbing lane.

5.159 In order to enhance the journey ambience, the ES identified that the scheme sought to provide a range of views for travellers on the bypass and the A390; and reduce driver stress by improving safety, reducing delays and improving journey time reliability. The ES suggested that particular consideration had been given to delivering views of the types of scenery or landscape character identified as characteristic of the locale, aided by the pattern of the planting and the ground shaping used along the route; and incorporating views of features of particular interest or prominence (e.g. the Moorswater Viaduct).

5.160 The ES summarised the overall impact of the scheme on driver stress as follows:

5.161 "The Published Scheme would provide a modern standard dual carriageway bypass of Dobwalls, together with improved sections of single carriageways west of Dobwalls on the A390 and A38 towards Doublebois. There would also be a separate Distributor Corridor Road to the Moorswater Industrial Estate. Whilst there is no specific mitigation included in the Scheme resulting from the assessment of impacts on driver stress, the Scheme itself would reduce driver frustration and mitigate the driver stress that would otherwise occur on the existing alignment."

5.162 The ES stated that the continuous belt of roadside planting along the western ridge would create an attractive corridor for the vehicle traveller, as well as largely concealing traffic from inward looking views. The reinstatement of Cornish hedges was considered particularly important, especially in making a large feature of Dobwalls roundabout. Additionally, the scheme specified the removal of traffic signage from within Dobwalls to de-clutter the street scene.

OYA Evaluation

Traveller Views

5.163 The OYA report noted earthworks had been used to retain an intermittent set of unfolding views to the north including the Moorswater Viaduct which was framed in views for drivers travelling east as the road dropped down to connect to the Liskeard bypass to the east.

Figure 5.36 – View along combined footway/cycleway near Looe Mills Farm looking along A38 towards the Moorswater Viaduct

5.164 The report noted that for the old A38, the aspect for travellers had altered significantly. The Moorswater Collector Distributor Road (MDCR) runs parallel to the bypass and was elevated on the approach to Dobwalls East junction. Consequently, drivers on the MCDR had views of

the bypass in the foreground of longer distance rural views; and anti-glare screens had been erected, to reduce the impact of headlight dazzle arising from inter-visibility of the two roads. These screens formed a prominent feature in views at this point of the route, detracting from enjoyment of the rural landscape beyond particularly for pedestrians and cyclists.

Figure 5.37 – Anti-glare screen installed along the MCDR to reduce the impact of headlight dazzle

Driver Stress

5.165 The report confirmed the findings of the ES in that the new bypass would significantly reduce driver stress over the former A38 through Dobwalls.

Traveller Care

5.166 The ES noted that the Scheme did not include any lay-bys or stopping points since it was not possible to achieve acceptable sightlines along the alignment. The OYA report noted that signage had been installed to direct drivers to Dobwalls for local services.

FYA Consultation

5.167 No consultation responses for journey ambience were received by POPE.

FYA Evaluation

5.168 No further evaluation has been undertaken as the OYA comprehensive review of shared use footway/cycle routes is very well considered and no changes regarding Journey Ambience have been identified during the FYA site visit.

5.169 Based on the information presented in this evaluation, it is concluded that the effects of the scheme on physical fitness are likely to remain **as expected**.

Table 5.14 – Travel factor evaluation

Traveller Factor	FYA Score	FYA evaluation
Views	As expected	Travellers views have remained essentially the same as reported at OYA, with some reduction in views due to vegetation growth outside of cut slope areas. The anti-dazzle screen reported in the OYA report along the MCDR remains visible to users of the road, but is now partially screened by vegetation planted adjacent to it.
Stress	As expected	The scheme has improved driver stress by the increased capacity of the road reducing congestion, traffic is free flowing and safe overtaking of slower vehicles is possible. The severity and number of collisions has reduced post opening and journey time reliability has increased which contributes towards the reduction in driver stress.
Care		No further comment at FYA.
Summary Score	**Large Beneficial**	**As expected**

Key Findings from Section 6: Environment

Noise & Vibration

- The assessment also showed that major reductions in noise were forecast on the now former A38, with reductions of around 7-9dB forecast. Using FYA observed traffic flows these reductions remain broadly the same. It is concluded that the impact is "as expected" on these sections for noise.
- A comparison of observed speeds against forecast speeds for the bypass shows that the observed speeds are lower than the forecast speeds, giving rise to lower noise levels, however, it is noted that observed speeds have taken in to account journey times averages through the bypass rather than single locations as appears to have been undertaken in the ES. As such, it is assumed that noise is as expected for speed.

Air Quality

- The observed traffic flows are significantly lower than the high growth forecasts along the bypass, which indicates that any increase in pollutant concentrations as a result of the bypass may not be as high as initially expected. This is also supported by the observed speeds being lower than forecast.
- Along the former A38 through Dobwalls, observed traffic flows are not significantly higher than those forecast, but are still much lower than the base flows, indicating that pollutant concentrations would have decreased as expected. Overall, air quality is generally as expected at FYA, perhaps better than expected along the bypass.

Greenhouse Gases

- An 11% net increase has been observed in carbon emissions for the scheme section, in line with a forecast 12.5% increase. The slight changes are likely to be due to the slight reduction in HGVs, and the likelihood that the forecast was based on high traffic growth, whereas observed flows are more in line with low growth forecasts.

Landscape & Townscape

- The use of shillet through the scheme has resulted in Species Rich Grassland (SRG) targets not being met at FYA. Trees, shrubs and hedgerows appear to have been planted in suitable growing mediums and are going to meet their design year growth targets for screening, landscape integration and habitat connectivity. Cornish hedge growth levels appear mixed with satisfactory growth to the west of Dobwalls bypass and poor growth elsewhere. This directly impacts on requirements in the ES.
- Gorse can be found throughout the scheme and appears to have been controlled throughout the aftercare period, but is emerging within the last growing season and will become more invasive if left uncontrolled.
- The road corridor generally remains free of noxious weeds, and planting within the scheme is progressing well. Grassland areas are free of significant scrub cover, and plant stock is generally healthy, established, and in good condition.
- The entrance to Dobwalls from the west remains utilitarian without the softening effects of shrubs and amenity grass planting. Dobwalls Roundabout has received post scheme opening hard landscaping, but the lack of softening vegetation would have complemented this effort to provide an entrance to the town.

Biodiversity

- Monitoring reports indicate that there is limited use of installed ecology features including the bat house, boxes and crossings and dormice nests by target species. Habitat connectivity through woodland hedgerow establishment is considered successful at FYA due to good growth rates. The lack of establishment of SRG at FYA is a concern as it is a requirement of the scheme to ensure successful establishment.

Cultural Heritage

- No confirmation has been received that that copies of the archaeological report and the project archive have been submitted to the County Museum.

Water

- Planting at the three scheme ponds does not appear the same as indicated on the as built drawings. No information has been made available to POPE which would indicate that the scheme drainage measures are performing other than as intended. Based on the FYA site visit, the Landscape As-Built drawings, and consultation comments received, it is likely that the overall effect of the scheme on water quality and drainage remains beneficial.

Physical Fitness

- POPE is not aware whether there have been any NMU audits or Vulnerable User Studies undertaken for this scheme, but footpaths and cycle ways viewed during the FYA site visit appeared to be capable of performing as expected.
- Although there is an apparent lack of provision of an alternative to footpath 33 and restricted access through Havett Farm, based on the information presented in this evaluation, it is concluded that the effects of the scheme on physical fitness are likely to remain as expected.

Journey Ambience

- Based on the Traffic and Safety chapters in this report it is noted that there is a reduction in collisions and reduced, more predictable journey times. This will reduce driver stress.
- The provision of the bypass and the removal of significant volumes of traffic from the old A38 has benefited journey ambience.

6. Accessibility and Integration

6.1 This chapter evaluates the impact of the scheme in terms of the accessibility and integration objectives, comparing qualitative forecast assessments from the scheme AST (shown in Table A.1) with post-opening findings and analysis of policy objectives.

Accessibility

6.2 The accessibility objective is concerned with how the scheme has affected the ability of people in different locations to reach different types of facility, using any mode of transport. The accessibility objective consists of three sub-objectives. These are:

- Option values
- Severance
- Access to the transport system

Option Values

6.3 The AST for the scheme predicted that there would be a neutral impact on public transport, as '*no new alternative modes of transport provided or change to bus and rail services envisaged'*.

6.4 Consultation with the main bus company in the area confirmed that there have been no changes to public transport services or infrastructure as a result of this scheme at the FYA stage, therefore, a suitable assessment for this scheme is considered to be neutral. However, it is noted that the reduction in congestion through the centre of Dobwalls had greatly increased the reliability of the current bus routes which pass through Dobwalls linking with Liskeard, Bodmin and St Austell. The impact on option values is therefore **neutral**, as expected.

Severance

6.5 The AST states that the '*relief of existing severance in Dobwalls improving accessibility for pedestrians, cyclists and equestrians outweighs slight negative/moderate negative severance at Treburgie Water and Coldwind'*, giving an overall assessment of Moderate Beneficial.

6.6 As previously shown in the traffic chapter, traffic has reduced on the A38 through the centre of Dobwalls, therefore suggesting that severance for local residents has been reduced. The bypass cut through two footpaths, although these have all been rerouted to cross the bypass using the over-bridges.

6.7 At OYA it was noted that the increase in parked cars along the route has led some respondents (as part of the residents survey) to perceive an increased risk of a collision. However, the collision rate on the former A38 through Dobwalls has decreased since scheme opening suggesting that safety has improved post opening, and the parked cars are not considered a hazard due to the low levels of traffic on the route anyway. Additionally, a number of dropped kerbs have been implemented, and the reduced traffic levels make it easier and safer to cross the road throughout the village. Improved pedestrian links have also been added around the western end of the bypass, and along the former route of the A390.

6.8 Additional improvements (outside of the bypass scheme) were noted at OYA, which included the provisions of a footway between Dobwalls and Doublebois as part of Highways England's Local Network Management Scheme (LNMS) process.

6.9 It is therefore concluded that the impact of the scheme on severance is **Moderate Beneficial**, as expected.

Access to the Transport System

Change in modes of transport after opening of bypass

6.10 The sub-objective assesses the access to the transport system based on two key variables; availability of a vehicle for private use and the proximity to a public transport service.

6.11 The AST gave a score of neutral, as the scheme would not change the proximity of residents to public transport services.

6.12 As part of the residents' survey at the OYA stage, residents were asked to state their most common mode of transport to travel around the local area, although a number of respondents ticked more than one option. From this it was apparent that there was an increase in people cycling, using public transport and walking. It is likely that this will have been maintained at the FYA stage.

6.13 Overall, the scheme has improved the environment for pedestrians and cyclists, but it has not introduced new or relocated public transport services, therefore the scheme impact on access to the transport system is **neutral**, as expected.

Integration

6.14 The integration objective is concerned with the following:

- Transport Interchange
- Land Use Policy
- Other Government Policies

Transport Interchange

6.15 The AST for this scheme states that the scheme would have 'no effect on passenger or freight interchange indicators' and gave an overall assessment of neutral.

6.16 The scheme has not resulted in any changes to public transport facilities in Dobwalls, and the reduced traffic flows through the village have facilitated easier movements for buses by removing through traffic. Additionally, the reduced traffic flows, and realignment of access to the Moorswater Industrial Estate have facilitated easier access for commercial vehicles using the industrial estate.

6.17 Any impacts on transport interchange are therefore not due to the direct improvement of facilities, but rather to the reduction in traffic on the old road.

6.18 A score of **neutral,** as expected for this sub objective is therefore considered to be representative of the situation.

Land Use Policy

6.19 This section of the report looks at the scheme in relation to national, regional and local land policies, and considers its effects on policy integration. The AST for this scheme states that 'the facilitation of national, regional and local transport and economic policies outweighs hindrance of regional and local policies on the protection of agricultural land, landscape and cultural heritage'. The scheme was expected to achieve a beneficial impact for this objective.

Evaluation

6.20 The relevant policies have been considered, and a summary evaluation is presented in ***Table 6.1***. The overall evaluation score is **beneficial**, as expected.

Table 6.1 – Pre and Scheme Alignment with National Regional and Local Policy

	Policy/Document	Relevant Policy Objective	Relevant Scheme Impacts	Alignment
Local Policies	Cornwall Local Transport Plan 2 (2006-2011)	When the scheme opened, Cornwall's Local Transport Plan 2 was the local transport policy document. There were a number objectives in the plan relevant to the scheme, including: Improve access to key services and facilities in Cornwall. Improve local safety. Provide and maintain an integrated transport network that contributes towards the development of a vibrant and successful Cornish economy and regeneration. Reduce the growth of traffic congestion and transport related air pollution and improve public transport in Cornwall.	• Reduced journey times on the scheme section along with improved journey time variability. This improves access to services and facilities across Cornwall by improving the strategic road network in the county. • The scheme has had a directly improved safety along the route alignment. • By improving the strategic road network in the area, the scheme enhances the integrated transport network at both a local and regional level, supporting economic growth objectives. • Whilst there has been an increase in carbon as a result of the scheme, it is in line with forecasts.	✓
	Cornwall Local Transport Plan 3 - Connecting Cornwall 2030 (2011)	The Local Transport Plan 3, published following scheme opening, has a number of policies relevant to the scheme: Support economic prosperity. Improve road safety. Make the most of opportunities to protect and enhance the environment. Encourage healthy active lifestyles by providing people with the opportunity to walk and cycle.	• Reduced journey times and improved journey time reliability, supports business needs and economic growth, particularly for Cornwall's tourism industry. • The scheme has led to a reduction in road collisions.	✓
	Cornwall County Structure Plan (Saved Policies) (2004)	The Cornwall County Structure Plan sets out the long term development strategy for Cornwall. The plan draws out a number of transport policies which relate to the scheme: Support and fully integrate with the land use strategy. Seek to reduce the adverse effect of transport upon health and the natural and built environment. Support economic and social well-being. Maintain and enhance highway infrastructure to improve environmental conditions and road safety.	• Reduced effect of transport on health and the built environment by re-routing and enhancing the A38 route from Liskeard to Bodmin. • The scheme supports economic development objectives by improving the strategic road network, in particular by enhancing the journey to Cornwall, which is particularly important during summer months.	✓

	Policy/Document	Relevant Policy Objective	Relevant Scheme Impacts	Alignment
Regional Policy	South West Regional Transport Strategy (part of the draft Regional Spatial Strategy 2006-2026)	The purpose of the regional transport strategy is to consider the broader transport network with a view for economic development across the region. One of the objectives of the strategy is particularly relevant to the scheme: TR4 – The remainder of the trunk road network will be managed and investment targeted so as to ensure that it performs its strategic function. Measures should seek to maintain safe, efficient operation and reliability of journey times within, into and out of the region. Regional stakeholders will work with the Highways Agency to manage demand so as to avoid congestion compromising strategic funding.	• The safety of users along the A38 and in the wider geographical area has been improved, and journey time reliability along the route has also improved as a result of reduced congestion and higher capacity routes.	✓
National Policy	A New Deal for Trunk Roads in England (1998)	The Government's overarching objectives for transport at the time of the appraisals were set out in this document, and include policies to: Protect and enhance the built and natural environment. Improve safety for all travellers. Contribute to an efficient economy, and to support sustainable economic growth in appropriate locations Promote accessibility to everyday facilities for all, especially those without a car. Promote the integration of all forms of transport and land use planning, leading to a better, more efficient transport system.	• The scheme has improved journey times and journey time reliability for trunk road traffic. • By diverting the majority of traffic onto the new route, the scheme has enhanced the natural environment in the village of Dobwalls. • The scheme has contributed to a reduction in collisions.	✓
	Action for Roads - A network for the 21st century (July 2013)	Support the UK economy and drive growth into the future through provision of a well-connected road infrastructure with sufficient capacity; Push for greater safety, and avoid letting the improvements of recent years breed complacency; and Ensure transport plays its part in meeting carbon budgets and other environmental targets.	• Improved access along the A38 will be beneficial for seasonal holiday traffic travelling to Cornwall. • The scheme has resulted in an increase in carbon, however, this is in line with forecasts. .	✓

7. Conclusions

7.1 To conclude this report, this section summarises how the scheme is meeting its specified objectives.

Table 7.1 – Success against Scheme Objectives

Objective	Has the scheme objective been achieved?	
To provide additional capacity and reduce congestion.	Journey times have reduced for both the former route of the A38 through Dobwalls and the new A38 Bypass. The largest savings are experienced in the AM peak, where journey times are four minutes and 51 seconds shorter at FYA opening. Reliability has also improved post opening.	✓
To enhance road safety.	Collisions have decreased on both the wider COBA scheme area and the key links area. There has been a saving of 5.8 collisions per annum on the COBA area, although this is 3.2 collisions lower than the forecast saving of 9 collisions per annum. The scheme has improved safety by reducing collisions on the scheme key links by 5 per year, although this is lower than the forecast reduction of 8.4 collisions per annum. Collision rates have decreased on the key links from 0.50 per mvkm pre scheme to 0.19 FYA opening, slightly less than forecast.	✓
To improve the environment of the village by removing through traffic.	The removal of significant volumes of traffic from Dobwalls Village noted at OYA and in the AST is still evident at FYA. During the FYA site visit, the limited traffic flows noted appeared to mostly have local destinations. The AST impact assessment noted that the removal of traffic would enable a sense of place to be restored which has been confirmed at FYA. Additionally, the overall habitat establishment and maintenance is developed in line with ecological mitigation proposals as stated in the ES.	✓

Appendices

Appendix A. Appraisal Summary Table (AST) and Evaluation Summary Table (EST)

Table A.1 Appraisal Summary Table (AST)

Option: A38 Dobwalls Bypass		**Description: Dual carriageway bypass to the north of Dobwalls with a single carriageway link to the A390 passing over the railway**	**Problems: Congestion and accident problems in Dobwalls. Degraded environment in the village**	**PVC - £22.4m 2002**
OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE ASSESSMENT	ASSESSMENT
Environment	Noise	Improvement within Dobwalls due to removal of through traffic from village. Some localised adverse impacts along scheme corridor.	Estimated no. people likely to be annoyed: Do minimum: 124; Do something: 70	Net population annoyed (Do Something – 15th year): -54
	Local Air Quality	The Scheme would provide a beneficial air quality effect to the majority of the residential properties in the Study Area. However, there would be an increase of 1.10µg/m3 in annual mean PM10 levels at 20m from the road centre in the eastern section of the Scheme.	No. of properties with improved air quality: PM10: 490; NO2: 490 No. of properties with a deterioration in air quality: PM10: 117; NO2: 117	PM10: -1626.9 (improvement) NO2: -2334.48 (improvement)
	Regional Air Quality	For both 2008 and 2023 scenarios, the total NOx emissions predicted with the Scheme (Do Something) are higher than those predicted without the Scheme (Do Minimum). The effect of Scheme is therefore considered to be negative.	NOx – tonnes per year: Present (2003) = 38.56 DO MINIMUM: 2008 = 31.51; 2023 = 22.18 DO SOMETHING: 2008 = 35.17; 2023 = 25.19	Do Something (2008) compared with: Present: - 3.39 t/year Do Minimum (2008): + 3.66 t/year Do Something (2023) compared with: Present - 13.37 t/year Do-Minimum: (2023) + 3.01 t/year
	Greenhouse Gases	For both 2008 and 2023 scenarios, the total CO2 emissions predicted with the Scheme (Do Something) are higher than those predicted without the Scheme (Do Minimum). The effect of Scheme is therefore considered to be negative.	CO2 – tonnes per year: Present (2003) = 5,694 t/year DO MINIMUM 2008 = 6,335; 2023 = 7,875 DO SOMETHING 2008 = 7,128; 2023 = 8,738	DO SOMETHING (2008) as % of: Present Do Minimum (2003)= 125% Future Do Minimum (2008)= 112% DO SOMETHING (2023) as % of: Present Do Minimum (2003) = 153% Future Do Minimum (2023) = 111%
	Landscape	Scheme avoids AGLV but does not quite fit scale of landscape. Locality already affected by existing A38 and light industry.	-	Slight Adverse
	Townscape	Removal of through traffic from Dobwalls would benefit human interaction and enable a sense of place to be restored.	-	Moderate Beneficial
	Heritage of Historic Resources	Adverse impact on medieval landscape. Scheme close to Toll House (listed building) as does the existing A38. No impact on historic interest at Moorswater.	-	Slight Adverse
	Biodiversity	Adverse impact on the hedgerow network, the East Looe and West Looe tributaries and the bat populations within the study area. Woodland planting and new Cornish hedges provide additional habitats. Other protected species are accommodated within the Scheme design.	-	Moderate Adverse
	Water	Watercourse crossings reduced to minimum. Western end crosses headwater of West Looe river.	-	Slight Adverse
	Physical Fitness	Improved conditions in village. Additional pedestrian/cyclist facilities by journey times changes insignificant.	Change in no cyclist trips >30mins: 0 Change in no pedestrian trips >30mins: 0	Change in total no people waling/cycling> 30mins:0
	Journey Ambience	Travellers benefit from intermittent views. Reduced driver stress with Scheme. Reduced traveller stress for pedestrians and cyclists in Dobwalls.	-	Large Beneficial
Safety	Accidents	Removal of through traffic from Dobwalls, and construction of higher standard carriageway, improved safety	Savings in accidents: (Low growth/high growth over 60 year appraisal period) Fatal: 14.7/17.7; Serious: 100.8/121.2 Slight: 718.2/848.3. No. of PIAs 530.2/629.0	Present Value of Benefits: Links: £28.8m / £35.3m Junctions: £4.4m / £4.4m Low growth/high growth discounted 2002 values
	Security	Less Queues reduce driver vulnerability	-	Slight Beneficial
Economy	Public Accounts	Central Government costs	Central Government Present Value of Costs	£22.4m / £22.4m Low growth/high growth discounted 2002 values
	Business /Consumer Users	Reduced journey time for through and local traffic.	Veh Hrs Saved/year 0.21m/0.27m Peak time change 1.4/1.7mins Off Peak time change 1.1/1.2mins Opening year low growth/high growth	£20.3m / £47.2m Low growth/high growth discounted 2002 values £14.0m / £33.0m Low growth/high growth discounted 2002 values
Economy (cont.)	Reliability	Improved standard of road leads to improved reliability.	Route Stress: Before: 87% / 96% After: 11%/ 12% Opening year low growth/high growth	Slight Beneficial
	Wider Economic Impacts	No significant change.	-	Neutral
Accessibility	Option Values	No new alternative modes of transport provided or change to bus and rail services envisaged.	-	Neutral
	Severance	Relief of existing severance in Dobwalls improving accessibility for pedestrians, cyclists and equestrians outweighs slight negative / moderate negative severance at Treburgie Water and Coldwind.	-	Moderate Beneficial
	Access to the Transport System	No change to private car ownership or proximity to public transport services as a result of this scheme.	-	Neutral
Integration	Transport Interchange	No effect on passenger or freight interchange indicators	-	Neutral
	Land-use Policy	Facilitation of national, regional and local transport and economic policies outweighs hindrance of regional and local polices on protection of agricultural land, landscape and cultural heritage	-	Beneficial
	Other Government Policies	Complies with relevant Government policies.	-	Neutral

Table A-2 Evaluation Summary Table (EST)

OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE ASSESSMENT	ASSESSMENT
Environment	Noise	Changes in noise on the A38 outside of the Scheme area and the A390 were forecast to be minor increases, and these have become negligible changes based on the observed traffic flows. It is concluded that these sections are 'slightly better than expected' for noise. The assessment also shows that major reductions in noise were forecast on the now former A38, with reductions of around 7-9dB forecast. Using FYA observed traffic flows these reductions remain broadly the same. It is concluded that the impact is "as expected" on these sections for noise. A comparison of observed speeds against forecast speeds for the bypass shows that the observed speeds are lower than the forecast speeds, giving rise to lower noise levels, however, it is noted that observed speeds have taken in to account journey times averages through the bypass rather than single locations as appears to have been undertaken in the ES. As such, it is assumed that noise is as expected for speed.	Observed traffic flows reduced on average by between 83 and 88% on the old A38 through Dobwalls	As expected
	Local Air Quality	The observed traffic flows are significantly lower than the high growth forecasts along the bypass, which indicates that any increase in pollutant concentrations as a result of the bypass may not be as high as initially expected. This is also supported by the observed speeds being lower than forecast. Along the former A38 through Dobwalls, observed traffic flows are not significantly higher than those forecast, but are still much lower than the base flows, indicating that pollutant concentrations would have decreased as expected. Overall, air quality is generally as expected at FYA, perhaps better than expected along the bypass.	-	Better than Expected
	Greenhouse Gases	Net gain in tonnes of carbon is in line with forecasts.	Net gain in tonnes of Carbon added:198 (12.5%)	Likely to be As Expected
	Landscape	The use of shillet through the scheme has resulted in SRG targets not being met at FYA. Trees, shrubs and hedgerows appear to have been planted in suitable growing mediums and are predicted to meet their design year growth targets for screening, landscape integration and habitat connectivity. Cornish hedge growth levels appear mixed with satisfactory growth to the west of Dobwalls bypass and poor growth elsewhere. Gorse can be found throughout the scheme and appears to have been controlled throughout the aftercare period, but is emerging within the last growing season and will become more invasive if left uncontrolled.	-	Slight Adverse Worse than Expected
	Townscape	The entrance to Dobwalls from the west remains utilitarian without the softening effects of shrubs and amenity grass planting. Dobwalls Roundabout has received post scheme opening hard landscaping, but the lack of softening vegetation would have complemented this effort to provide an entrance to the town. The town has benefitted from the installation of a combined footway/cycleway with verges and localised pavement widening and continues to enjoy reduced traffic flows.	-	Moderate Beneficial As Expected
	Heritage of Historic Resources	CC considers that the impact on the heritage of historic resources is as expected and is not aware that there have been any unforeseen impacts. It considers that the execution and reporting of archaeological works is as expected; that the relocation and reinstatement of the Grade II* Listed Milestone went well; that Cornish Hedge replacement has been well received generally; and that the overall impact of the Scheme on the setting of Listed Buildings and Structures has been as expected. The mitigation strategy indicates that an archive should be prepared for deposition in an approved local museum.	-	Slight Adverse As Expected
	Biodiversity	Mitigation measures incorporated into the scheme as expected. Highways England monitoring in place to establish effectiveness of measures for bats, dormice and translocated reptiles/amphibians. Further study would be required to evaluate effectiveness of other measures.	-	Moderate Adverse As Expected
	Water	Mitigation measures have been incorporated into the scheme and there is no information suggesting that they are performing other than as expected. However, there appear to be some areas that may become blocked by vegetation in the absence of clearance works. Surface water issues due to construction errors are currently being rectified.	-	Slight Adverse As Expected
	Physical Fitness	Traffic has significantly reduced along the old A38 resulting in an improvement in local amenity. It is considered that connectivity has been retained across the bypass for NMUs and the scheme links into the wider PROW network. The bypass has introduced traffic noise into the previously quiet countryside	-	Neutral, As Expected
	Journey Ambience	The provision of the bypass and the removal of significant volumes of traffic from the old A38 has benefited journey ambience. However, provision for NMUs has created some isolated and exposed routes.	-	Large Beneficial As Expected
Safety	Collisions	The number of collisions saved in the opening year over the key links is statistically significant, but the 60 year reforecast is lower than originally envisioned.	Annual opening year collision saving: 5.8	Beneficial (as expected) £25.6m
	Security	Improved traffic flow on A38 and reduced congestion improves security.	-	Slight Beneficial (as expected)
Economy	TEE	Journey time benefits are seen on routes in the area. For the purposes of this report it is not considered possible to make any comparisons between the observed and forecast journey time savings due to the lack of clarity regarding what the forecast saving represents.	-	£27.17m (beneficial)
	Reliability	Reduction in traffic flows has improved journey time reliability.	Route stress reduced from 91% to 25%.	As expected (slight beneficial)
	Wider Economic Impacts	No development was dependent on the bypass, although access has been improved for commercial properties.	-	As Expected (neutral)
Accessibility	Option Values	The scheme did not change public transport options, although has improved the reliability of buses by removing traffic, and improved the waiting environment.	-	As Expected (neutral)
	Severance	Removal of traffic through Dobwalls has reduced severance.	-	As Expected (moderate beneficial)
	Access to the Transport System	No changes have been provided for access to the transport system as part of the scheme.	-	As Expected (neutral)
Integration	Transport Interchange	Not applicable for this scheme.	-	As Expected (neutral)
	Land-use Policy	Scheme aligns with local policies, mitigation assists with policies on protection of land.	-	As Expected (beneficial)

	Other Government Policies	Scheme aligns with regional and local transport strategy.	-	As Expected (beneficial)

Appendix B. Information requested for Environmental section

Environment Specific Requirements	OYA Response	FYA Response
Environment Statement (ES) or if not a scheme requirement the latest Scheme Assessment Report (SAR).	A38 Dobwalls Bypass Environmental Statement (ES) January 2005 including Volume 1 (Main Text), appendices, figures and Non-Technical Summary (NTS); Appraisal Summary Table (AST) 20/06/05.	As for OYA
Any amendments, updates or addendums to the ES/SAR or any relevant further studies or reports. Any significant changes to the scheme since the ES/SAR.	Stage 3 Scheme Assessment Report, 08/02/2005 (document ref: TUE 91061/ 70/ B)	As for OYA
As Built drawings for landscape/biodiversity/environmental mitigation measures/drainage/ fencing/ earthworks etc.	HHT91061BB/3000/016 – 020 Revision Z – Planting Plans Sheets 1 – 5 As Built (dated 02/02/20010)	As for OYA
Health & Safety File (info relevant to environment sub-objectives and may also included As Built drawings)	Not provided	As for OYA
Construction Environment Management Plan (CEMP)	Construction Environmental Management Plan version 3 (01/02/2007, document ref: MA87074), including appendices;	As for OYA
Landscape and Ecology Aftercare Plan (LEAP).	Draft Landscape and Ecology Management Plan, May 2010 (document ref: HHT91061BB/064)	No updates received at FYA
Handover Environmental Management Plan (HEMP).	This is due in 2014 and will be available for the FYA evaluation	Received, although some information appeared to reflect completion of some monitoring in the future?
Relevant Contact Names for: consultation		None received at FYA
Archaeological Reports (including any non-technical publications as well as the technical report).	Archaeological excavation and observation on the route of the Dobwalls bypass, Dobwalls & Trewidland Parish, near Liskeard, Cornwall 2006-2007 Publication report text for submission to Cornish Archaeology (produced by AC Archaeology, February 2010);	Awaiting confirmation
List of properties eligible for noise insulation. The insulation performance properties of any noise barriers installed (The BS EN 1794-2 result provided by the noise barrier manufacturer) The Road Surface Influence (RSI) value of any low noise surface installed	List of properties eligible for noise insulation received. No noise barriers installed on the scheme RSI not made available to POPE	As for OYA
List of Part 1 Claims regarding noise/air quality/lighting etc (obtained by POPE from HA (at the time) national part 1 team).	One successful claim at this OYA stage. Early in claims process and the Part 1 Team will be re-contacted at FYA	As for OYA
Reports/results for any pre and post construction survey and monitoring work e.g. for noise, biodiversity, water quality etc).	A38 Dobwalls Bypass Bat Mitigation Monitoring June and October 2008 P0s/60-1B Final Report May 2009; A38 Dobwalls Bypass Bat Mitigation Monitoring June 2009 – Summary Document.	No further updates received at FYA
Animal mortality data (pre and post opening)	Provided by the Managing Agent Contractor	Updated by MAC
Post opening Non-motorised User (NMU) Audit or Vulnerable User Survey	NMU Audit Report Completion of Construction Stage (April 2010)	As for OYA
Any information regarding environmental enhancements to streetscape/townscape e.g. for bypassed settlements.	YES HHT91061BB/1200/42 Revision E – Detrunking Works – Kerbs, Footways and Other Paved Areas, Road Markings and Traffic Sign Sheet 17 of 20 (dated 25/01/2007); HHT91061CC/DTW/001 and 002 – Detrunking Works – Kerbs, Footways and Other Paved Areas and Pavement Sheet 16(1) and 16(2) of 20 (dated 16/01/2009).	As for OYA
Employers Requirements Works Information – environment section	Not made available to POPE	As for OYA

Appendix C. ES and FYA Comparison Viewpoints

C.1. ES Photomontage Comparison Viewpoints

Selected views from the ES were taken during the August 2014 site visit. Not all views were available from the ES site locations plans

Figure C.1 – ES view 9 – Approaching Dobwalls along the A390 from the south-west, within the Western Ridge LCA

Figure C.2 – FYA view showing similar effect as ES

Figure C.3 – ES view 10 – Looking north-east at Treburgie Water, within the Western Ridge LCA

Figure C.4 – FYA view limited by agricultural crop

Figure C.5 – ES view 11 – View from Looe Mills Farm looking across the existing A38 at Moorswater

Figure C.6 – FYA view demonstrating loss of woodland screening on both sides of A38 Dobwalls Bypass. It was noted during the site visit that the access route to Looe Mills Farm was changed as a result of the scheme to allow safer access to the A38, including an improved farm access road.

C.2. OYA vs FYA Comparison Views

Figure C.7– Example of changes to townscape delivered by scheme

Figure C.8 – View across Dobwalls Roundabout towards the entrance to Dobwalls (in the right of frame)

OYA

FYA (slightly different viewpoint)

Figure C.9 – View of the bypass looking west from Havett Road Bridge

OYA

FYA

Figure C.10 – Confluence of west railway culvert and Treburgie culvert

OYA FYA

Figure C.11 – Shared use foot and cycle track connecting Treburgie Water to Dobwalls Roundabout – view looking south-west

OYA

Figure C.12 – Approach from shared use foot and cycle track to Dobwalls Roundabout

OYA FYA

Figure C.13 – Barriers installed on combined footway/cycle track approaching Toll House access road north of Looe Mills junction

OYA OYA FYA (similar position to 1st OYA view)

Figure C.14 – Views looking south-west along combined footway/cycle track towards Treburgie Water

OYA FYA (view taken looking north-east towards Treburgie culvert)

OYA FYA showing satisfactory hedgerow growth on the left of the view

Figure C.15 – Planting **on earth mound between the A38 West Link and the A390 Link road**

OYA (looking north from the A390 link road FYA (looking south from the A38 West Link)

Figure C.16 – View looking south-east along Moorswater Collector / Distributor Road towards bat crossing 3

Appendix D. Glossary

Term	Abbreviation	Description where appropriate
Annual Average Daily Traffic	**AADT**	Average of 24 hour flows, seven days a week, for all days within the year.
Annual Average Weekday Traffic	**AAWT**	As **AADT** but for five days, (Monday to Friday) only.
Accessibility	**-**	**Accessibility** can be defined as 'ease of reaching'. The accessibility objective is concerned with increasing the ability with which people in different locations, and with differing availability of transport, can reach different types of facility.
AM	**-**	Denoting the morning peak period
Appraisal Summary Table	**AST**	This records the impacts of the scheme according to the Government's five key objects for transport, as defined in **DfT** guidance contained on its **Transport Analysis Guidance** web pages, **WebTAG**
Automatic Traffic Count	**ATC**	An automated method of recording the volume (and sometimes classification) of vehicles passing a particular point on a road.
Average Weekday Traffic	**AWT**	Average of Monday to Friday 24 hour flows over a particular period.
Average Daily Traffic	**ADT**	Average of Monday to Sunday 24 hour flows over a particular period.
Area of Great Landscape Value	**AGLV**	An area of land in England which is considered to have a particular scenic value.
Benefit Cost Ratio	**BCR**	The ratio between the monetised benefits and costs of a scheme, used as a measure of value for money in economic terms.
Capacity	**-**	The maximum hourly lane throughput
Capitalisation	**-**	The process by which benefits for a scheme are factored to give an estimate for the appropriate appraisal period.
Chi-square	**-**	A statistical test to determine whether the observed values of a variable are significantly different from those expected on the basis of a null hypothesis. Variables are categorised to determine whether a distribution of scores is due to chance or experimental factors and tests whether one variable is independent of another.
Cornwall Council	**CC**	The unitary authority covering the county of Cornwall. Formerly known as Cornwall County Council.
Cost Benefit Analysis	**COBA**	A computer program which compares the costs of providing road schemes with the benefits derived by road users (in terms of time, vehicle operating costs and collisions), and expresses the results in terms of a monetary valuation. The **COBA** model uses the fixed trip matrix.
Congestion Reference Flow	**CRF**	An **AADT** flow estimate at which a road is likely to be congested in the peak periods on an average day.

Term	Abbreviation	Description where appropriate
Department for Transport	**DfT**	A Government department whose objective is to oversee the delivery of a reliable, safe and secure transport system that responds efficiently to the needs of individuals and business whilst safeguarding our environment.
Detrunking	**-**	Detrunking is a process where the management of non-core trunk roads is transferred from the Highways Agency/Highways England to the Local Highway Authority.
Discounting	**-**	A technique used to compare costs and benefits that occur in different time periods and is the process of adjusting future cash flows to their present values to reflect the time value of money, e.g. £1 worth of benefits now is worth more than £1 in the future. A standard base year needs to be used which is 2002 for the appraisal used in this report.
Design Manual for Roads and Bridges	**DMRB**	A comprehensive manual system which sets out current standards, Advice Notes and other published documents relating to Strategic Road works.
Dobwalls and Trewidland Council	**-**	Local Council covering Dobwalls village
Do-minimum	**DM**	In scheme modelling, this is the scenario which comprises the existing road network plus improvement schemes that have already been committed.
Do-something	**DS**	In scheme modelling, this is the scenario detailing the planned scheme.
Environment Agency	**EA**	An Executive Non departmental public body responsible to the Secretary of State for Environment, Food and Rural Affairs. Its principal aims are to protect and improve the environment and to promote sustainable development.
Environmental Statement	**ES**	This must be submitted with the initial planning application and covers all potential significant impacts that the road project may have on the environment.
Evaluation Summary Table	**EST**	In **POPE** studies, this is a summary of the evaluations of the **TAG** objectives using a similar format to the forecasts in the **AST.**
Five Years After	**FYA**	Relating to a POPE evaluation Five Years After scheme opening
Grade II Listed	**-**	A **listed building** in the United Kingdom is a building which has been placed on the **Statutory List of Buildings of Special Architectural or Historic Interest**.
Heavy Goods Vehicle	**HGV**	Goods-carrying vehicle over 3,500kg unladen weight.
Handover Environmental Management Plan	**HEMP**	Handover Environmental Management Plan
Highways Agency	**HA**	An Executive Agency of the Department for Transport **(DfT),** responsible for operating, maintaining and improving the strategic road network in England. As of April 2015 this is now Highways England and is not an agency of DfT

Term	Abbreviation	Description where appropriate
Induced trips	**-**	New trips that have been generated as a result of a scheme.
Inter Peak	**IP**	The time between the **AM** and **PM** peaks
Journey speeds	**-**	Speeds which are determined from the length of road and time taken to travel it.
Killed or Seriously Injured	**KSI**	A term used to describe the number of people killed or seriously injured as a result of **PIAs.**
Listed buildings	**-**	A building that is protected due to its age or of particular importance. Development is normally restricted in the vicinity of these buildings.
Major Schemes Road programme	**-**	The **HA**'s programme of investment in improvements to the Trunk road and Motorway road network comprised of a number of major schemes each costing more than £5m. Formerly known as **TPI.**
Million vehicle kilometres	**mvkm**	Million vehicle kilometres
Mph	**Mph**	Miles per hour
Natural England	**-**	The government's advisor on the natural environment, whose remit is to ensure sustainable stewardship of the land and sea so that people and nature can thrive.
Non-motorised User	**NMU**	A term used to describe pedestrians, cyclists and equestrians.
National Road Traffic Forecast.	**NRTF**	This document defines the latest forecasts produced by the Department of the Environment, Transport and the Regions of the growth in the volume of motor traffic. The most recent one is **NRTF07** and the one previous was **NRTF97**.
One Year After	**OYA**	Relating to a **POPE** study One Year After scheme opening.
Project Appraisal Report	**PAR**	The **PAR** is a key summary document in which the need for a project, its costs and benefits are appraised. Used for road scheme's less than £5m.
Personal Injury Collision	**PIC**	A term commonly used to refer to road collisions.
Personal Injury Collisions per million Vehicle kilometres	**PIC/mvkm**	A term used to express collision rates for a particular link on a road, i.e the number of collisions per million vehicle kilometres travelled.
PM peak	**-**	Evening peak period
Post Opening Project Evaluation	**POPE**	Before & after monitoring of all major highway schemes in England.
Present Value of Benefits	**PVB**	The value of the scheme's estimated benefits discounted back to a common base year.
Present Value of Costs	**PVC**	The value of the scheme's estimated costs discounted back to a common base year.

Term	Abbreviation	Description where appropriate
Public Rights of Way	**PROW**	Highways that allow the public right of passage through them.
'Route Stress'	**Stress**	Ratio of the AADT flow to the CRF. When the traffic flow on a particular link reaches the CRF it is considered to be at 100% Stress.
Single 2 lane	**S2**	A standard single carriageway with 1 lane in each direction
Screenline	**-**	An imaginary line intersecting routes on a map to allow easier analysis of vehicular movement across a corridor.
Security	**-**	In terms of the **NATA** sub-objective relating to the likelihood of crime or perception of likely crime.
Severance	**-**	Community **severance** is the separation of adjacent areas by road or heavy traffic, causing negative impact on non-motorised users, particularly pedestrians.
Shillet		Coarse soil with pieces of slate.
STATS19	**STATS19**	A database of injury collision statistics recorded by police officers attending collisions
Transport Analysis Guidance	**TAG**	**Transport Analysis Guidance** - as defined in **WebTAG**.
Trip End Model Program	**TEMPRO**	A program which provides access to the **DfT'**s national Trip End Model projections of growth in travel demand, and the underlying car ownership and planning data projections.
Traffic Database	**TRADs**	Traffic count database holding data from monitoring sites in England on Highways England roads.
Vehicle Operating Cost	**VOC**	Reflects fuel and other operating costs calculated from total distance travelled on affected links, also taking into account vehicle speeds.
webTAG	**webTAG**	Department for Transport's website for guidance on the conduct of transport studies at **http://www.webtag.org.uk/**