national highways

A556 Knutsford to Bowdon improvement

One-year post-opening project evaluation

Foreword

National Highways – previously known as Highways England when the A556 Knutsford to Bowdon project was delivered – is the Government-owned company that operates, maintains and improves England's motorway and long-distance trunk road network. This project was delivered as part of the government's first, five-year Roads Investment Strategy (RIS 1) to improve the safety and reliability of our network for the millions who depend on it daily.

This report gives an indication of how the A556 Knutsford to Bowdon project performed during its first year of operation and will form part of a longer-term evaluation of the project. The A556 Knutsford to Bowdon project's performance will be reviewed again after five years. Reports like this allow us to show how effective our improvements have been for our customers and compared to other projects.

The A556 Knutsford to Bowdon opened in March 2017. It is a 4 mile (6.5km) dual carriageway road from M6 Junction 19 at Knutsford to M56 Junction 7 at Bowdon.

The improvement scheme was carried out to ease congestion and improve the environment for the communities in Mere and Bucklow Hill along the A556. This route was previously a two-lane single carriageway that passed right through the heart of these communities bringing a large amount of traffic to and from the M6 motorway.

Our one-year evaluation showed that journey times along the A556 had improved, and journeys were more reliable after the project opened to traffic. This indicates that the project had achieved its objective to improve customer journeys. Our analysis exploring changes in the number of road users was limited due to the construction of the nearby M6 improvements at junctions 16 to 19. The works meant traffic levels were lower than predicted in pre-construction modelling so this will be revisited at the five-year mark to give a more accurate picture.

Safety is our top priority, and we are committed to reducing the number of road users killed or seriously injured on our roads by the end of 2025, with a vision of zero harm by 2040. In the first year of the A556 dual carriageway being operational, there was a reduction in the rate and number of personal injury collisions, compared with the annual average for the five years before the project opened.

Most of the environmental and social impacts at the one-year mark were broadly as expected. The bypass alleviated traffic in Mere and Bucklow Hill and a new footpath cycleway was provided. A new green bridge designed to link wildlife habitats that were originally severed by the project had also been constructed. Air quality had improved along the B5569 (former A556), but it was too soon, at the time this report was compiled, to draw firm conclusions on the project's impact along the M56.

Since this report was written, work has been ongoing to assess the air quality in the area and in the future, it is possible that the current 60mph speed limit along the A556 may be increased to 70mph.

We have increased drainage capacity at Chapel Lane, after potential flooding issues were identified at this location and have also continued work to help

landscape mitigation planting establish. The outcome of this work will inform our planned project evaluation at five-years after.

Elliot Shaw

Chief Customer and Strategy Officer

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1. Executive summary

1.1. Background

This report evaluates the impacts of the A556 Knutsford to Bowdon improvement project against impacts forecast at its appraisal at one-year after opening.

The original route was a two-lane single carriage that was subject to severe delays and congestion. This was in part due to the route having to accommodate the needs of both local and strategic road users and the influence of the minor roads, signalised junctions, residential and farm accesses along the route. The project was designed to address this congestion and improve the environment for the communities the A556 passed through in Mere and Bucklow Hill.

Construction of the new bypass started in November 2014 and opened to traffic in March 2017. At opening, the speed limit on the new dual carriageway was restricted to 60mph. This was to reflect a condition in the project Development Consent Order[1] (DCO). This speed restriction is required to remain in place until the results of air quality monitoring indicate that air quality had improved sufficiently to allow 70mph operation.

1.2. Evaluation findings

1.2.1. Customer journeys

Journey times along the A556 had improved and journeys were also more reliable, therefore the project had achieved this key objective of improved customer journeys.

The ability to assess changes in the number of road users was limited due to the construction of the nearby M6 junctions 16 to 19 smart motorway. The smart motorway suppressed traffic volumes on the project section and so we will revisit this assessment in the five-years after evaluation in order to isolate the impact of the project.

Data from prior to construction implies that the modelling used to support the business case did not accurately predict what the traffic levels would be like without the project. Traffic levels forecast for 2017 without the improvement were lower than those observed in 2014. The pattern of traffic on local roads also seems to have been impacted differently than anticipated in the modelling, but this will need to be verified in a further study because local travel patterns could potentially have also been impacted by the construction of the smart motorway.

1.2.2. Safety

The safety objective for this project was to reduce accidents by removing conflicting movements between strategic and local traffic. In the first year of the dual carriageway being operational, there was a reduction in the rate and number of personal injury collisions compared with the annual average for the five years before the project was built.

[1] Consent to construct the project was granted by the Secretary of State in August 2014 under a development consent order issued under the Planning Act 2008

The early indications were that the safety objective was on track to be achieved. The analysis will need to be revisited in later years before we can confirm that the change is significant. It will require a longer timeframe to determine if these initial positive findings are a real trend or natural fluctuation.

1.2.3. Environment

Most of the environmental and society impacts at one year after were broadly as expected. The bypass had removed strategic road users from the communities of Mere and Bucklow Hill and a new footpath cycleway had been provided. The proposed mitigation including the new green bridge designed to link wildlife habitats severed by the project had also been constructed. New and replacement planting was also in place, however effective maintenance during the project aftercare period will be essential in ensuring that long term outcomes continue to be met. This will be reviewed during the five-years after evaluation.

It was too early to say whether the design year outcomes would be met for biodiversity and the water environment. This was because, for biodiversity, the success of the project was dependent on the outcome of the aftercare species monitoring which was on going at one-year after. This will be reviewed at five-years after. For the water environment the impacts and mitigation were broadly as expected, however at one-year after, flooding incidents on Chapel Lane near the A556 were being investigated to understand if the project was a contributory factor. The outcome of these investigation will be reviewed at five-years after.

Improving the environment for the communities along the A556 was a key aim of the project. The project had moved strategic traffic away from these communities and the removal of the air quality management area by Cheshire East Council[2] confirmed that air quality had improved.

The project was predicted to improve journeys along the A556 but would also increase traffic flows onwards along the M56 towards Manchester. To avoid significant air quality effects along the M56, which was already an area of poor air quality, a 60mph speed limit was implemented along the A556. This was designed to manage the growth in traffic and was anticipated to remain in place until air quality had improved sufficiently along the M56 to allow the speed limit to be raised to 70mph. At one-year after, it was not possible to draw firm conclusions on air quality impacts of the project along the M56 based on traffic comparisons alone because of the uncertainty between the forecast and observed traffic data. However, air quality work required by the DCO consent to investigate when the 60mph limit could be lifted had commenced. This work will provide insight into the air quality performance of the project and will be used to inform our evaluation at five-years after.

1.2.4. Value for money

This report documents the findings of the evaluation of the project after the first year of its operation (2018). This initial assessment forms part of a longer-term evaluation to review performance over time as the benefits mature. One-year after evaluations are not intended to provide conclusive evidence about a project's

[2] https://www.cheshireeast.gov.uk/business/environmental_health/local_air_quality/local_air_quality.aspx

benefits nor to consider value for money, but to give an early indication about whether it is heading in the right direction. This helps to identify areas to focus efforts to optimise the benefits of the project. Value for money will be considered at five-years after.

2. Introduction

2.1. What was the project and what was it designed to achieve?

This report evaluates the impacts of the A556 Knutsford to Bowdon improvement project against impacts forecast at its appraisal at one-year after opening.

The A556 is a key corridor linking road users from Birmingham and the South of England with Manchester, Manchester Airport and the North of England. The original A556 was a two-lane single carriage that was subject to severe delays and congestion. This was in part due to the route having to balance the needs of local and strategic road users and impacts caused by the minor roads, signalised junctions, residential and farm accesses along the route. The project was designed to address this congestion, improve journeys, and improve the environment for the communities the A556 passed through in Mere and Bucklow Hill.

The project involved the construction of a new two-lane dual carriageway between junction eight of the M56 and junction 19 of the M6. It consisted of approximately 4.6 miles (7.5km) of offline and online improvements and included the de-trunking[3] of parts of the original A556, now called the B5569, which have been bypassed by the new route.

The project also included the construction of two new junctions, one with the A50 and another at Over Tabley and the realignment of the existing junction with the M56 at Bowdon. The project provided new overbridges to carry local traffic over the bypass and to provide farm access. A new underpass for pedestrians, cyclists and equestrians at Over Tabley was also built. A new “green bridge” has also been provided to link wildlife habitats severed by the project. Improvements have been made to B5569 including new signalised crossing and a new segregated cycleway/footpath along much of its length.

An environmental assessment was undertaken to support the Development Consent Order (DCO) for the project. The assessment predicted that by improving journeys and reducing congestion on the A556, the project would increase the number of road users on the A556 and M56. As a result, the project was designed to include measures to mitigate any potentially adverse air quality impacts. These measures involved reducing the speed limit on the A556 from 70mph to 60mph to manage the increase in traffic until air quality had improved sufficiently along the M56 to allow the speed limit to be raised to 70mph. It was anticipated that the mitigation measure would be in place for between 2- 5 years.

Construction of the project started in November 2014 and opened to traffic in March 2017. On opening, the project operated with the 60mph speed limit in place.

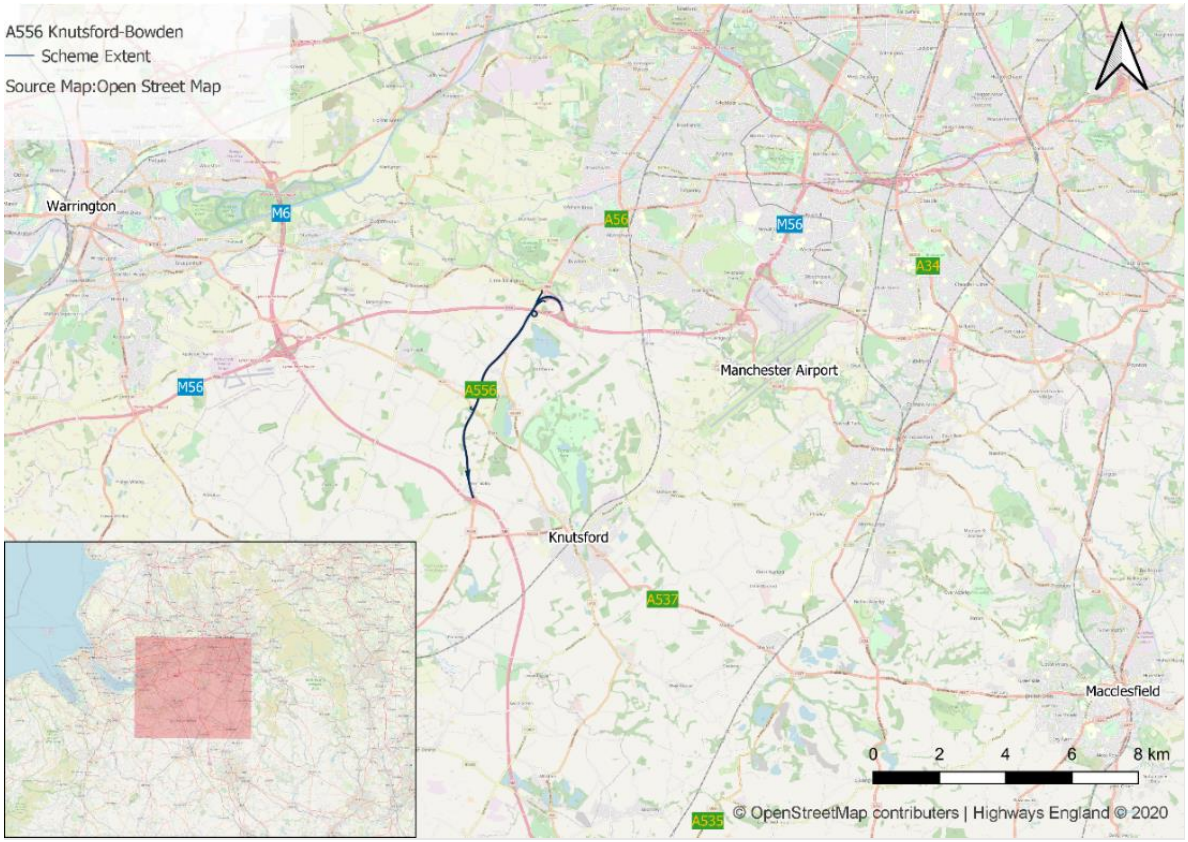
2.2. Project location

The A556 is a strategic route in England linking the M6 at junction 19 with the M56 at junction 8. The route enables traffic to flow to and from the M6 and the Greater

[3] De-trunking is a term used to describe the process of transferring control of a strategic road from National Highways to the local highways authority.

Manchester conurbation and then onwards along the M62 towards Yorkshire and the Northeast. Figure 1 shows the project's location.

Figure 1 Location of project



Source: National Highways and OpenStreetMap contributors

2.3. How was the project evaluated?

This report evaluates the impacts of the A556 Knutsford to Bowdon improvement project against impacts forecast at its appraisal at one-year after opening. Post-opening project evaluations are carried out for major projects to validate the accuracy of estimated project impacts which were agreed as part of the business case for investment, and to measure whether the expected benefits are likely to be realised. This provides lessons learned to improve future project appraisals and business cases.

The evaluation is also important for transparency and accountability of public expenditure by assessing whether projects are on track to deliver the anticipated value for money.

A post-opening project evaluation compares changes in key impact areas by observing trends on the route before the project was constructed (baseline) and tracking these after the opening of the project to traffic. The outturn impacts of the project are evaluated against the expected impacts of the project (presented in the forecasts made during the project planning process) to review the project's performance.

For more details of the evaluation methods used in this study please refer to the post-opening project evaluation (POPE) methodology manual. This can be located on National Highways website.

3. Delivering against objectives

3.1. How did the project perform against objectives?

All National Highways major schemes have specific objectives which are defined early in the business case when project options are being identified. These benefits are appraised to be realised over 60 years. The one-year evaluation provides early indication of progress, followed by the five-years after evaluation which gives a more detailed insight. The objectives for the A556 project are shown in Table 1:

Table 1 Objectives and Evaluation summary

Objective	One-year evaluation
Reducing journey times and improving journey time reliability along a key corridor linking Birmingham and the South of England with Manchester, Manchester Airport and the North of England, and thus opening up the area to new economic opportunities	Average journey times along the new A556 were between one and two minutes quicker than they were along the former A556 The route was no longer congested, and journey times should be more reliable
Reducing accidents by removing conflicting movements between strategic and local traffic at Bucklow Hill and Mere junctions and by removing numerous direct residential and farm access from the strategic road network between the M6 and the M56	The new bypass removed conflicts between strategic and local traffic at Bucklow Hill and Mere Junctions. The rate and number of personal injury collisions reduced in the first year compared to pre-scheme. There was also a reduction in the severity of collisions. Data over a longer period is required before this reduction can be confirmed as significant.
Reducing the environmental impact to the communities of Bucklow Hill and Mere through the provision of a by-pass to reduce congestion	The bypass removed strategic traffic from Bucklow Hill and Mere and air quality had improved. The air quality management area along this route was to be revoked by Cheshire East.
Mitigating the environmental impact of the scheme through the provision of effective mitigation	Mitigation of the environmental impacts was largely in place as expected however the effectiveness could not be determined until all the required monitoring had been undertaken. Air quality had improved along the B5569 but it was too soon to comment on the impacts in the wider study area.

4. Customer journeys

4.1. Summary

Traffic evaluation was undertaken to understand the impact of the project on people's journeys. We compared data from prior to the start of construction (2014) and one year after opening (2018).

Journey times along the A556 had improved and journeys were also more reliable, therefore the project was on track to achieve one of its key objectives.

At this stage of the evaluation, it was not possible to conclude whether the change in the number of road users was in line with the predictions set out in the business case. This was due to construction works on a nearby section of the strategic road network, M6 junctions 16 to 19[4] which suppressed traffic on the route.

Data from prior to construction implied that the modelling used to support the business case did not accurately forecast what the traffic levels would be like without the project. The pattern of traffic on local roads also seems to have been impacted differently than anticipated in the modelling, but this will need to be verified in a further study because local travel patterns could potentially have also been impacted by the construction of the smart motorway.

4.2. How have traffic levels changed?

This section examines the change in traffic flow along both the project extent and within its vicinity. We compared these with the observed national, regional and local trends. Finally, we compared the observed and forecast traffic flows to understand to what extent the forecast flows were realised.

4.2.1. National and regional

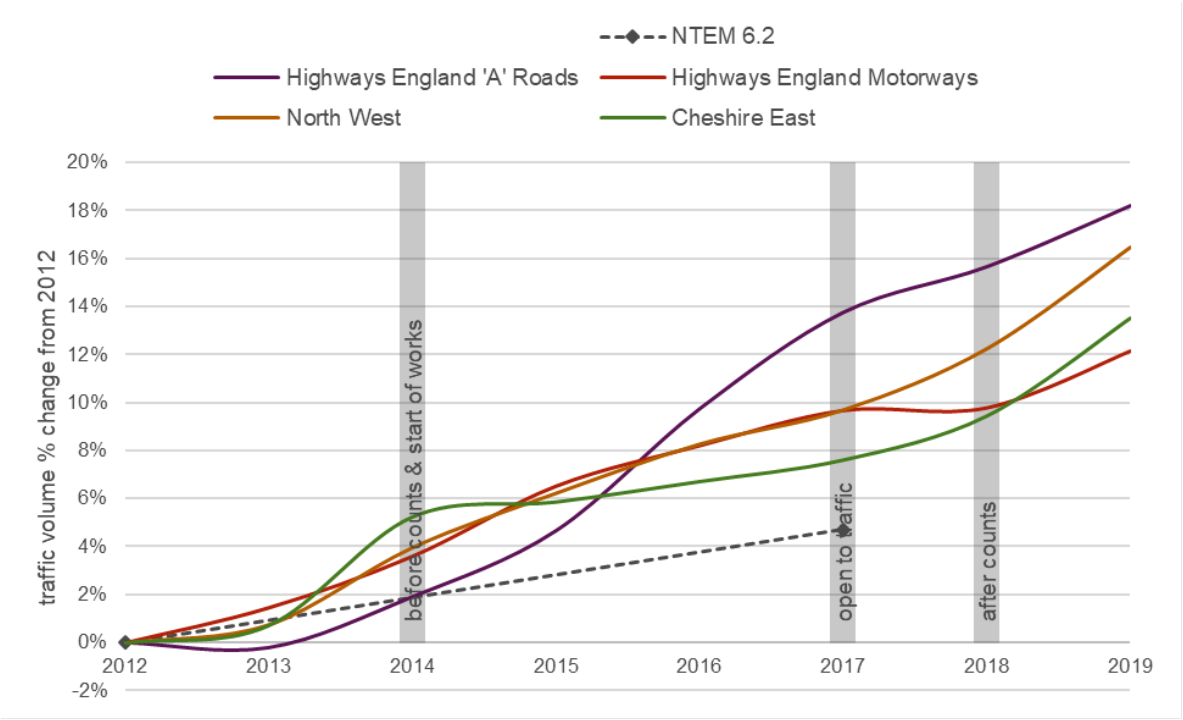
To assess the impact of the project on traffic levels, it is useful to understand the changes within the context of national and regional traffic (Figure 2).

Regional trends were lower than the national trends for motorways or A roads, however around four percent growth might be expected to have occurred between 2014 and 2018 regardless of the project being implemented. The analysis in the following sections should be considered in this context as no adjustments have been made to take account of background traffic growth

The forecasting for this project assumed that there would be some background growth and used NTEM 6.2 to estimate this. The NTEM 6.2 growth rate[5] is included on the graph below for comparison. It anticipated growth of around three percent between start of works and project opening. This estimate compared well to the observation of around 4% background growth.

[4] Start of works October 2015 and open to traffic March 2019
[5] national figure used

Figure 2 - National and regional percentage traffic volume changes



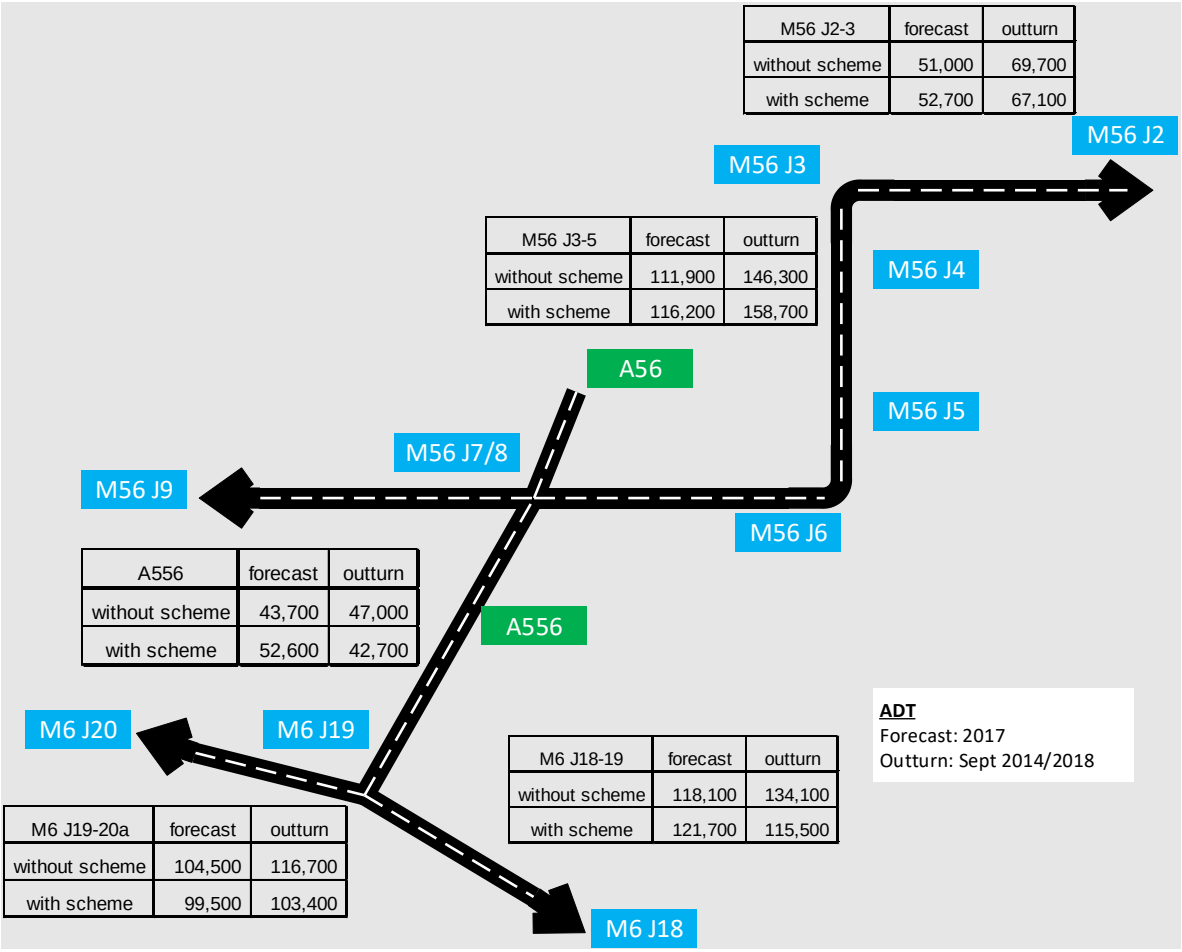
4.2.2. How did traffic volumes change on the strategic road network?

Traffic volume data[6] for September 2014, prior to construction was compared against data for September 2018, after the scheme was completed. These observations were also compared to the forecast volumes[7] which formed part of the business case for the improvement. The findings are summarised in Figure 3

In September 2018 the A556 was supporting an average of 42,700 vehicles per day, this was lower than the average observed prior to construction (47,000 vehicles per day). It is likely that this was due to the impact from the construction of the smart motorway on the M6 junctions 16-19 which occurred during this time. This was contrary to the predicted growth within the business case, which did not account for the M6 project within the forecast growth estimates. Data from 2019[8] showed that traffic volumes had increased on the road by 38% once construction on the M6 had completed.

[6] Extracted from National Highways' Road Information Framework
[7] We compare against the forecast for the 60mph scenario that was built, not the original forecast that went to DCO
[8] Available in annex A

Figure 3 - Changes in average daily traffic (ADT)



Source: HATRIS & NTIS data for Sept 2014 & Sept 2018; forecasts from Environmental Statement Second Addendum, Revision 1, Appendix 6.4, table 4.

The business case for the project underestimated the volume of traffic using the unimproved A556. It estimated that without the project, by 2017 the road would have supported an average of 43,700 vehicles per day. However, this figure was lower than the actual usage observed in 2014 of 47,000 vehicles per day. This indicates that the traffic model was not very accurate in how it represented the road network without the improvement in place[9].

Of particular relevance to the project was the impact on the M56 junctions 2 to 5. The original project design had forecast a reduction in the air quality of communities in this area. To mitigate against this, the project was revised with a 60mph speed limit included on the A556. Our traffic modelling suggested that this would reduce the amount of traffic drawn to the scheme and keep the traffic increase between junctions 2 and 5 on the M56 to an acceptable level. Our evaluation observed that there had been a four percent reduction in the volume of road users between junctions 2 and 3 and an eight percent increase between junction 3 and 5. However, along both sections the actual volume of road users was higher than predicted in the forecasts due to the underestimation of the baseline traffic volumes. As we observed both increases and decreases along this section it was difficult for our evaluation to draw firm conclusions on the cumulative

[9] This is also known as the 'do-minimum' scenario

effect for air quality based on the observed traffic changes alone. However, at one-year after, an air quality study had commenced which will examine the air quality performance of the project. The outcome of this work will inform our evaluation at five-years after.

4.2.3. Impact on heavy goods vehicles

Heavy goods vehicles (HGVs) have a larger impact on air quality, noise and carbon emissions than cars. Therefore, it's helpful to understand what proportion of the flow is HGVs and whether this proportion had changed as a result of the project. Table 2 shows that the proportion of HGVs had not changed significantly since the implementation of the project.

Table 2 - Observed HGV proportions

Road	% HGVs (2 way)	
	Before	After
A556	11%	11%
M6 J18-19	20%	-
M6 J19-20A	22%	24%
M56 J2-3	10%	-
M56 J3-5	8%	10%

Note: data not available for M6 J18-19 and M56 J23
Source: HATRIS & NTIS ADT data for Sept 2014 & Sept 2018

This aligns with the forecast in Table 3 which did not expect much change in the proportion of HGVs. However, it is interesting to note that the model under-represented the proportions of HGVs on the M6 in both the Do Minimum[10] and Do Something scenario[11], despite being more accurate in other locations.

Table 3 - Forecast HGV proportions for opening year

Road	Forecast % HGV	
	DM	DS
A556	9%	9%
M6 J18-19	10%	10%
M6 J19-20A	11%	12%
M56 J2-3	13%	13%
M56 J3-5	10%	10%

Source: Environmental Statement Second Addendum, Revision 1, Appendix 6.4, table 4

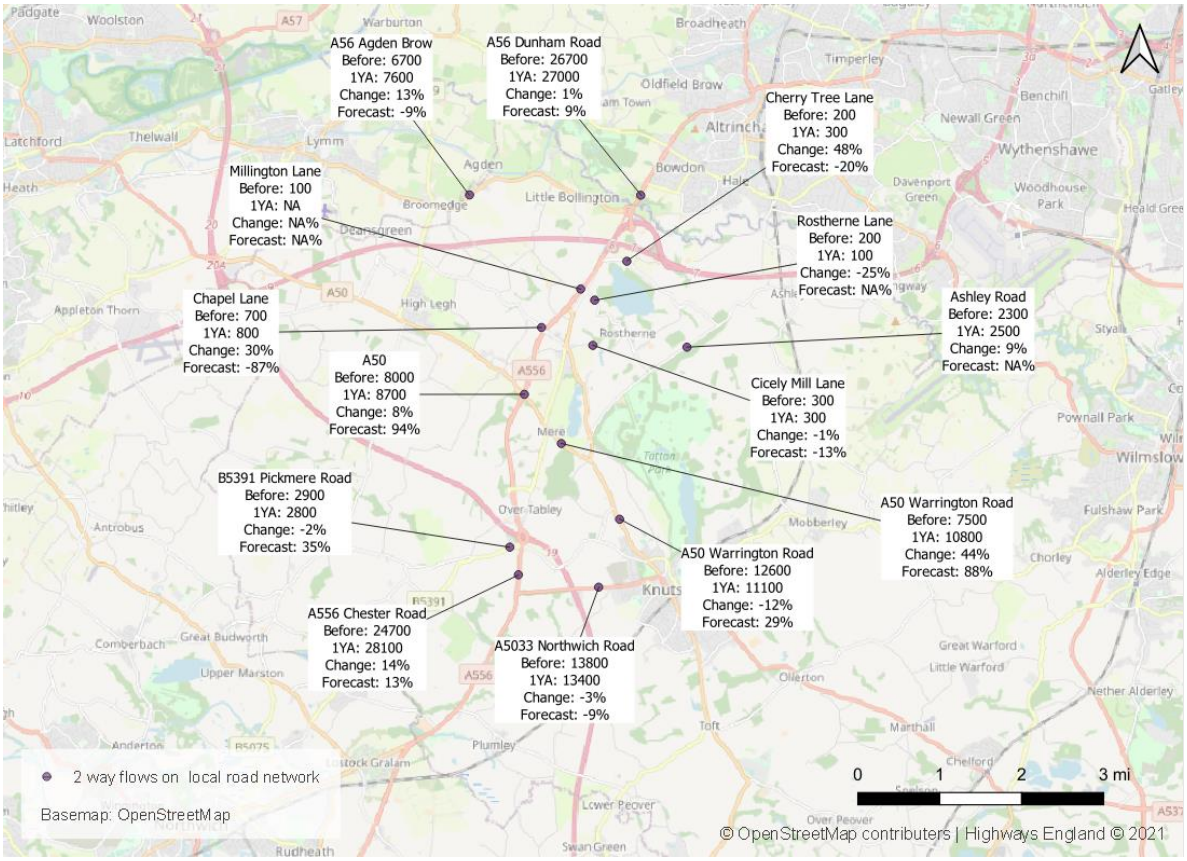
4.2.4. Numbers of road users on the local road network

The improvement of the A556 was expected to impact on other roads in the vicinity. For roads that enabled access to the improved A556 (such as the A50, B5391, A556 Chester Road and A56 Dunham) increased traffic levels were expected. Other roads in the area were expected to have reductions in traffic as road users altered their routes in response to the improvement. The expected

[10] DM – Do Minimum ie the forecast of how the road network would perform if the project wasn't constructed
[11] DS – Do Something ie the forecast of how the road network would perform if the project is constructed.

pattern had not materialised at one year after, perhaps partly because of the nearby construction of the M6 junctions 16 to 19 smart motorway impacting travel choice or perhaps the travel responses were more complex than those modelled. Figure 4 below shows the expected and actual change on nearby local roads.

Figure 4 - changes in numbers of road users on the local road network



Source: short term automatic traffic counts undertaken in October 2014 (before) and November 2018 (1YA)

When considering changes in flow, it's necessary to remember that about 4% of the change could be due to background traffic changes in the period 2014-18[12]. It is also important to remember that the data will have been impacted by the construction of the M6 junctions 16 to 19 smart motorway.

The project was expected to increase flows on the A556 south of the M6 (Chester Road) and this had occurred. For the small road (B5391) that also joins that junction, an increase in flow was expected, but in the first year this had not materialised. Likewise, with the increase forecast at the northern end of the project, north of M56 (A56 Dunham Road).

The A50 is a key route on the local road network and it was forecast that the project would cause large increases on this road. Increases were seen on the A50 near the project section, but not to the extent anticipated. Further from the project towards Knutsford, there was a reduction on the A50, which was not anticipated,

[12] The data was obtained from 2-week traffic surveys carried out in October 2014 and November 2018, therefore it wasn't possible to consider 2019 data to understand any impact of the M6 junctions 16 to 19 smart motorway construction. This smart motorway project wasn't accounted for in forecasting for the A556 project.

perhaps indicating that the re-routing of road users in response to the project was more complex than expected.

There are several other small roads in the area where traffic forecasts and outturn traffic information were available, but on roads with small flows, the model has struggled to forecast the percentage change accurately. Ideally, screenline analysis[13] would be carried out to look at the impact across the A556 corridor, combining the new road and the old road, which it bypassed. This wasn't possible as there was no after data available for the B5569.[14] This could be considered as part of the planned five years after evaluation.

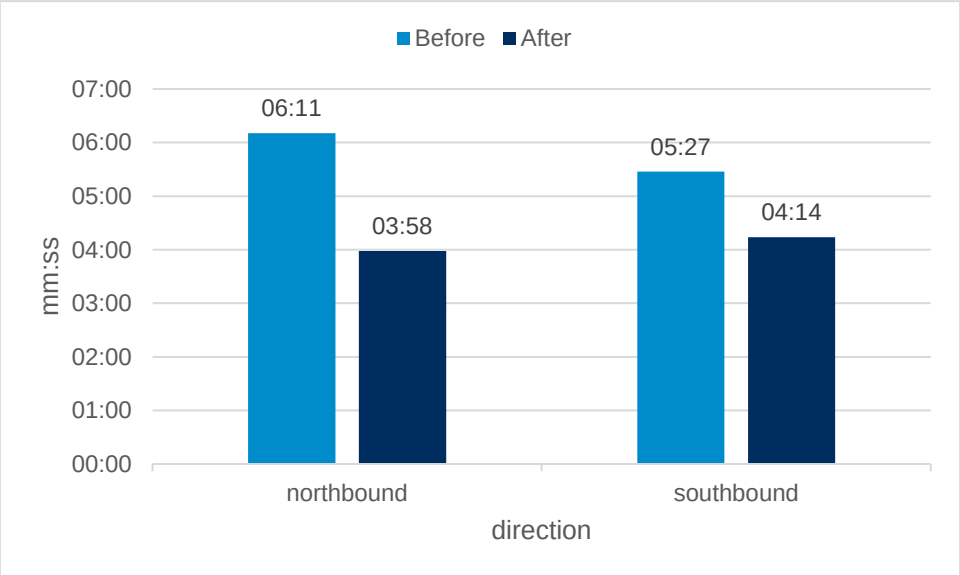
4.3. Relieving congestion and making journeys more reliable

One of the objectives of this project was to reduce journey times and improve journey time reliability along this key corridor. It was expected that by improving the links from Birmingham and the South of England to Manchester, Manchester Airport and the North of England, it would open the area to new economic opportunities.

4.3.1. Did the project deliver journey time savings?

Average journey times for the old A556 alignment in September 2014 were compared with data for the new alignment in September 2018. This showed that journey time benefits were on track, especially in the northbound direction where journeys were over two minutes quicker.

Figure 5 - Journey times (all day average)



Source: Teletrac Navman data[15] (Sept 2014 and Sept 2018)

[13] Screenline analysis is where traffic volumes on several parallel routes are considered together to understand the traffic impact at a corridor level.
[14] It was planned to rectify this by undertaking a count in Spring 2020 but this was cancelled due to the impact of the COVID19 Pandemic
[15] Teletrac Navman data was sourced from the Department for Transport. This originates from in-vehicle monitors.

4.3.2. Were journey time savings in line with forecast?

It was not possible to compare the journey time data above to that forecast in the appraisal. When the benefits were recalculated for the version of the project which was constructed (i.e. with a 60mph speed limit in place to mitigate against air quality issues), the expected journey times on the individual roads was not reported.

4.3.3. Did the project make journeys more reliable?

Journey time reliability is impacted by the amount of congestion. If the time taken to travel the same journey each day varies, journey times are unreliable, and the road user is less confident in planning how long their journey will take them. If journey times do not vary, the road user can be more confident in the time their journey will take and allow a smaller window of time to make that journey.

We calculated the 'route stress' metric for the periods before and after the project's construction to understand its impact on journey time reliability. The route stress metric uses the percentage of road capacity that is being used to assess whether congestion is likely to impact on journey time reliability. A value of 100% means that the road is at full capacity. The reduction in route stress in Table 4 indicates that the route was not congested and that journeys got more reliable as a result of the project.

Table 4 - route stress measure of reliability

	Route stress
Before (based on old road)	83%
After (new road)	75%

5. Safety Evaluation

5.1. Summary

The safety objective for this project was to reduce personal injury collisions by removing conflicting movements between strategic and local traffic. In the first year of the dual carriageway being operational, there had been a reduction in the rate and number of personal injury collisions compared with the annual average for the five years before the project was built.

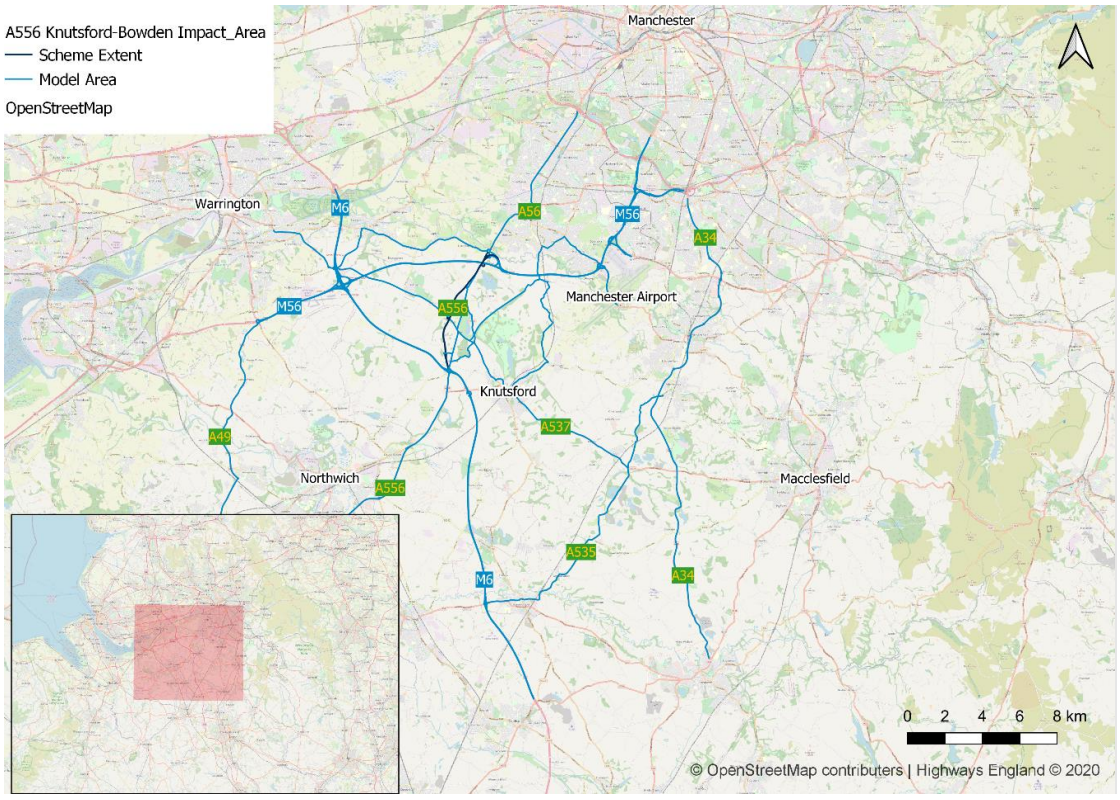
During the first 12 months of the dual carriageway being open there were six personal injury collisions compared with an average of 11 per year in the five years before the project was constructed. If the new dual carriageway had not been constructed, we estimate that the number of personal injury collisions would have ranged between four and 23 per year. The number of personal injury collisions was also lower than forecast within the business case.

Our analysis showed that the safety objective was on track to be achieved. However, the analysis will need to be revisited in later years before we can confirm that the change is significant and to determine if these initial positive findings are a real trend or natural fluctuation.

5.2. Safety study area

The safety study area is shown in Figure 6. This is a wider area encapsulating both strategic and local roads surrounding the scheme.

Figure 6 Safety study area



Source: National Highways and OpenStreetMap contributors.

This area was assessed in the appraisal supporting the business case for the project. This information is then used with other predictions around the potential impact of the project such as by how much traffic may grow. We have therefore replicated the appraisal study area to understand the emerging safety trends.

5.3. What were the emerging safety trends within the first 12 months of the project?

Safety data for this evaluation was obtained from Department for Transport Road Safety Data. This records incidents on public roads that are reported to the police. This evaluation only considered collisions that resulted in personal injury.

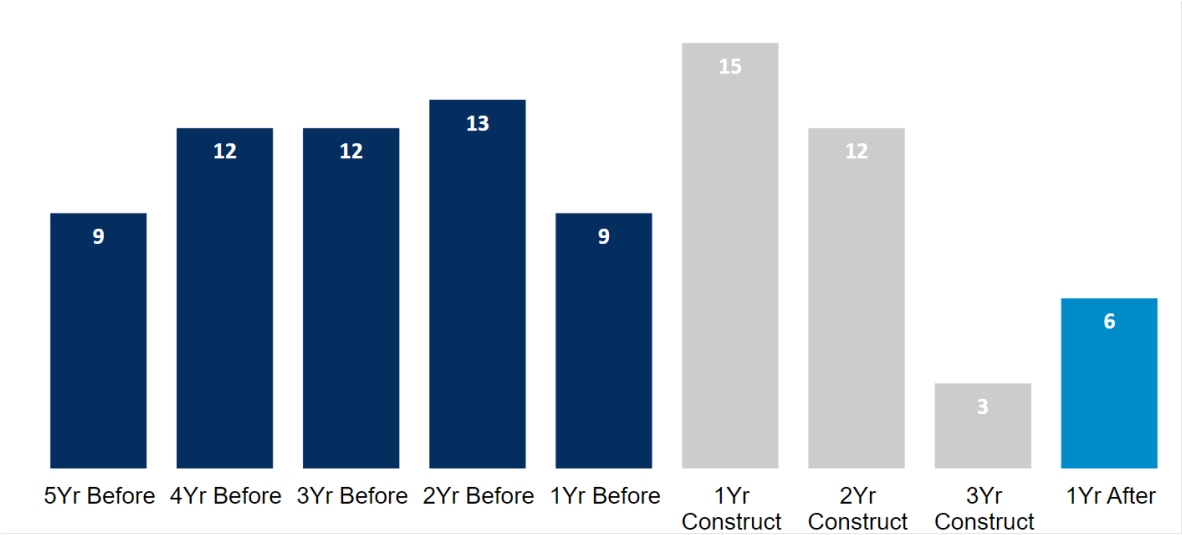
The safety analysis was undertaken to assess changes over time. It looked at the trends in the five years before the project was constructed to provide an annual average. We then assessed the trends from the first 12 months after the dual carriageway was operational and open for road users. As noted, this provided an early indication of safety trends, but this will be monitored over a longer timeframe before conclusions can be drawn about the safety impact of the project.

The analysis drew on the following data collection periods:

- Pre-construction: 10 November 2009 to 9 November 2014;
- Construction: 10 November 2014 to 30 March 2017;
- Post-opening: 31 March 2017 to 30 March 2018

The early indications were that the number of personal injury collisions for the first year of the project were lower than the period before construction began. The number of personal injury collisions had reduced from an annual average of 11 to six personal injury collisions during the first 12 months of the project being open for road users. Safety trends can vary each year and we will monitor this trend over a longer timeframe before drawing conclusions about the safety impact of the dual carriageway.

Figure 7 Annual Personal Injury Collisions

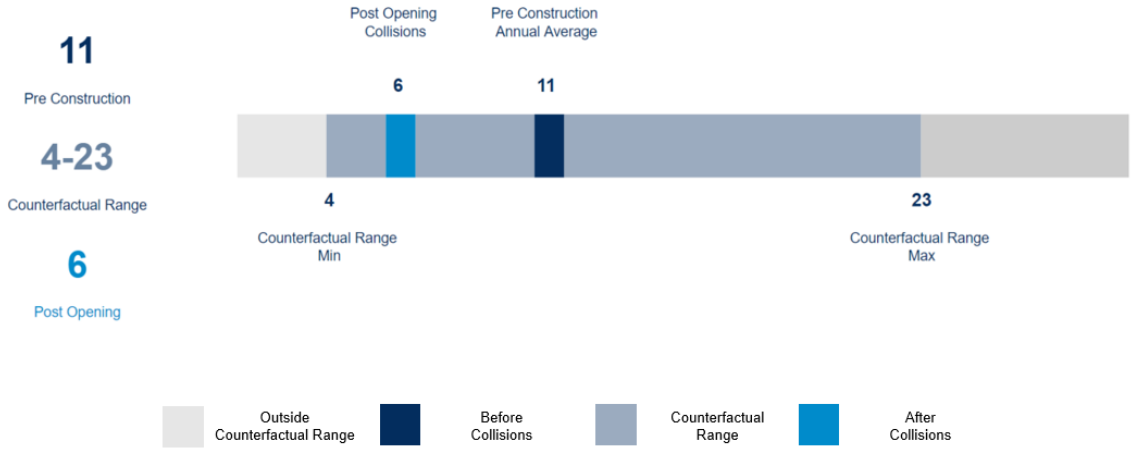


Source: STATS19 10th November 2009 – 30th March 2018

As part of the safety evaluation, we looked to assess what changes in personal injury collisions might have occurred due to factors external to the project over this timeframe. To do this we estimated the trend in personal injury collisions which might have occurred if the new dual carriageway had not been constructed (this is referred to as a counterfactual). This is based on changes in regional safety trends for A Roads with a high volume of roads users. This helped us to estimate how the pre-construction safety levels would have changed over the evaluation period if the road had remained unchanged.

Based on this assessment we estimated that if the road had not been converted to a dual carriageway the trend in the number of personal injury collisions would have changed over time period to between four and 23 (Figure 8). So, with the observed number of collisions appearing within the lower end of the range, it indicated that the dual carriageway was on its way to achieving the objective to maintain, and where possible, improve safety standards. Another study will be conducted after the dual carriageway has been open for a longer timeframe, allowing a more representative time-period, to determine if the safety objective has been achieved.

Figure 8 Annual average number of personal injury collisions on the project



Source: STATS19 1st July 2009 – 30th June 2018

5.4. How had traffic flow impacted on collision rates?

It is important to contextualise any incidents that occur with the volume of traffic seen on this stretch. To do so a collision rate is calculated: the number of collisions per annual hundred million vehicle miles (hmvm).

The collision rate had decreased to six collisions per hundred million vehicle miles – this equates to travelling almost 16 million vehicle miles before seeing an incident. Before the project the annual average was 16 collisions per hundred million vehicle miles, this equates to travelling just over six million vehicle miles before seeing an incident.

If the bypass had not been constructed the collision rate would have remained fairly consistent with the pre-construction average (estimated to have been 16

collisions per hundred million vehicle miles); above that of the first year after opening of the project.

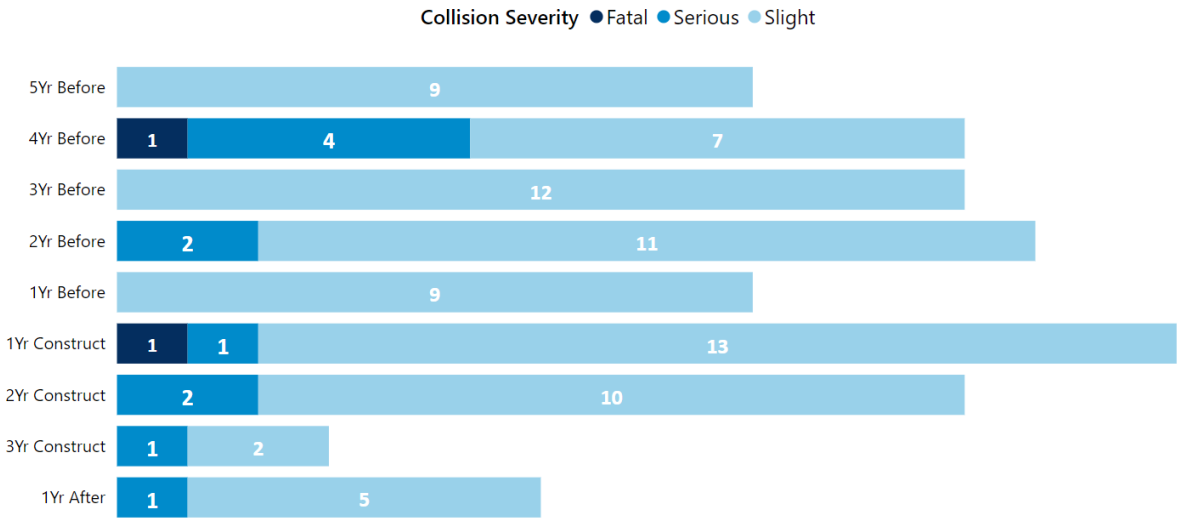
This was a positive initial indication: even though traffic levels had increased, collisions had reduced. As these were the first year's results, however, we weren't confident yet that these initial indications were enough to form a trend. An evaluation will be conducted at five-years after opening to establish if the early positive findings have continued.

5.4.1. What impact did the project have on the severity of collisions?

Collisions which result in injury are recorded by severity as either fatal, severe or slight. Police forces are transitioning to a new method in how severity of incidents is recorded.

There had been no fatal incidents reported during the first year after the project opened. The evaluation found that during the first 12 months of operation there were an average of five fewer collisions resulting in slight injuries (the annual average before the project was 10, compared to five after), a slight reduction in collisions resulting in serious injury per year (with two before and to one after). Figure 9**Error! Reference source not found.** shows the severity of personal injury collisions.

Figure 9 Severity of personal injury collisions within the project extent



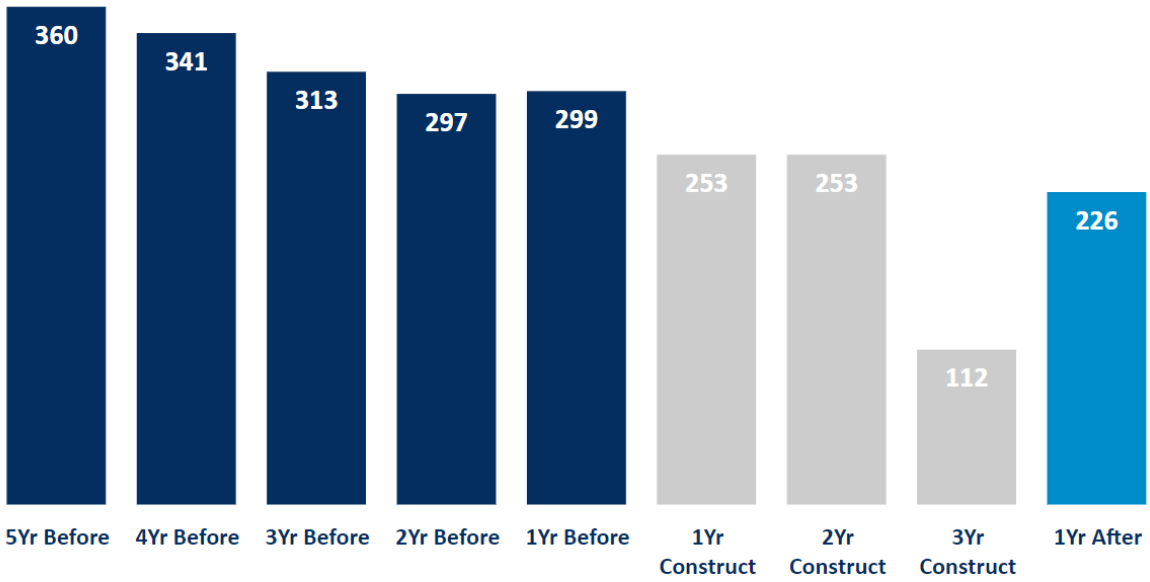
Source: STATS19 10th November 2009 – 30th March 2018

5.5. How had safety trends changed on other parts of the strategic and local road network

Changes in personal injury collisions in the wider impact area were analysed. The area was defined in the project's appraisal – where the evidence for the value of a project is assessed ahead of a decision to deliver an intervention. More detail on the study area can be found in section 5.2.

There had been a reduction in the average number of personal injury collisions per year in the wider safety area, from 322 per year in the five years before the project to 226 in the first year after.

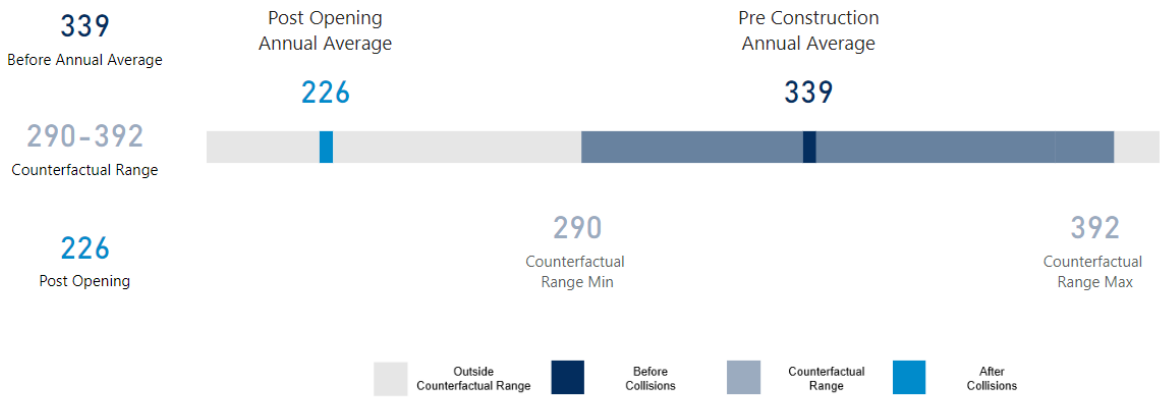
Figure 10 Annual average number of personal injury collisions



Source: STATS19 10th November 2009 – 30th March 2018

There were on average 96 fewer personal injury collisions per year in the wider safety area. It was estimated that if the route had remained a single carriageway the safety trends across the wider area would not have reduced to the extent observed with a range of 290-392 personal injury collisions on average within the first year.

Figure 11 Annual average number of personal injury collisions in Wider Area



Source: STATS19 10th November 2009 – 30th March 2018

5.6. How had the number of road users impacted collision rates on the wider impact area?

The average collision rate had decreased to 10 collisions per hundred million vehicle miles. Before the project this figure stood as 15 collisions per hundred million vehicle miles. The decrease observed in the first year was five collisions per hundred million vehicle miles. If the project had not been undertaken, the rate of collisions within the wider area would reduce slightly to 14 personal injury collisions per hundred million vehicle miles.

5.7. What impact did the project have on the severity of collisions in the wider impact area?

The evaluation found that during the first 12 months of operation there were an average of 78 fewer collisions resulting in slight injuries (the annual average before the scheme was 272, compared to 194 after), and a reduction in collisions resulting in killed or serious injury per year (with an average of 50 before and to 32 after).

5.8. How is the project performing against its safety objectives?

The safety objective was to reduce the number of collisions by removing conflict between movements of strategic and local traffic. The business case forecast a saving of 56 collisions over the 60-year appraisal period (an average of 1 personal injury collision saving per year). Early findings suggest a positive result in this direction, but further analysis is required over the next few years to confirm whether this trend will continue.

6. Environmental Evaluation

6.1. Summary

The evaluation of environmental impacts used information on the predicted impacts gathered from both the environmental appraisal within the business case and the Environmental Statement. This information was then compared with findings obtained one-year after the project opened for traffic. The observed impacts were determined during a site visit in July 2018 and supported by desktop research. The results of the evaluation are recorded against each of the environmental and society sub-objectives in the section to follow and summarised in Table 6.

Most of the environmental and society impacts at one year after were broadly as expected. The bypass had removed strategic road users from the communities of Mere and Bucklow Hill and a new footpath cycleway had been provided. The proposed mitigation including the new green bridge designed to link wildlife habitats severed by the project had also been constructed. New and replacement planting was also in place, however effective maintenance during the project aftercare period will be essential in ensuring that long term outcomes continue to be met. This will be reviewed during the five-years after evaluation.

It was too early to say whether the design year outcomes would be met for biodiversity and the water environment. This was because, for biodiversity, the success of the project was dependent on the outcome of the aftercare species monitoring which was on going at one-year after. This will be reviewed at five-years after. For the water environment, the impacts and mitigation were broadly as expected however at one-year after, flooding incidents on Chapel Lane near the A556 were being investigated to understand if the project was a contributory factor. The outcome of these investigation will be reviewed at five-years after.

Improving the environment for the communities along the A556 was a key aim of the project. The project had moved strategic traffic away from these communities and the removal of the air quality management area by Cheshire East Council[16] confirmed that air quality had improved.

The project was predicted to improve journeys along the A556 but would also increase traffic flows onwards along the M56 towards Manchester. To avoid significant air quality effects along the M56, which was already an area of poor air quality, a 60mph speed limit was implemented along the A556. This was designed to manage the growth in traffic and was anticipated to remain in place until air quality had improved sufficiently along the M56 to allow the speed limit to be raised to 70mph. At one-year after, it was not possible to draw firm conclusions on air quality impacts of the project along the M56 based on traffic comparisons alone because of the uncertainty between the forecast and observed traffic data. However, air quality work required by the DCO consent to investigate when the 60mph limit could be lifted had commenced. This work will provide insight into the air quality performance of the project and will be used to inform our evaluation at five-years after.

16 https://www.cheshireeast.gov.uk/environment/environmental_health/local_air_quality/local_air_quality.aspx

6.2. Noise

The environmental assessment predicted that properties along the B5569 would experience improvements in noise with the opening of the project. This was because strategic traffic would no longer pass in front of their houses but would, instead, use the new A556 bypass. The evaluation confirmed that the old A556 (B5569) had been detrunked and strategic traffic had been moved away from the properties in Over Tabley, Mere, Bucklow Hill and Millington and now used the new bypass. Therefore, reducing the existing noise impacts for these communities.

The project was expected to bring the new A556 bypass closer to a small number of properties and therefore mitigation was implemented to reduce the noise impacts on these properties. This included using a low noise surface along the bypass and a combination of timber noise barriers and noise attenuation earth bunds at various locations along the route.

The assessment predicted that the project would, overall, have a beneficial noise effect for properties affected by the project. Based on our evaluation of the mitigation provided and the observed traffic flows along the A556 after the first year, this impact was broadly as expected.

6.3. Air quality

The environmental assessment reported that improving air quality in the communities along the A556 was one of the key objectives of the project. Moving the traffic away from the existing A556 (now the B5569) onto the new road alignment would move the main source of air pollution further from most residential properties. This would improve air quality around most of these properties, so that concentrations of pollutants would fall below the air quality thresholds set by the UK Government. This would provide significant benefits for properties in Mere and Bucklow Hill, and the south end of Millington.

It was predicted that the project would attract more traffic than the existing A556 and would change traffic flows on other roads in the wider surrounding area including along the M56. Air pollution at some properties along the M56 into Manchester would increase to concentrations above the air quality thresholds as a result of this project. This was predicted to be a particular issue for properties close to the M56 Junctions 2-5 near Wythenshawe. Overall whilst the project would improve air quality along the old A556 (B5569), mitigation measures were required to avoid significant air quality effects occurring along the M56. These measures involved reducing the speed limit on the A556 from 70mph to 60mph until air quality had improved sufficiently to allow the speed limit to be raised to 70mph. Adverse air quality impacts were still predicted but with the speed limit in place, the impacts would not be significant. It was anticipated that the mitigation measure would be in place for between two and five years

No air quality monitoring was undertaken as part of our evaluation process and so the evaluation was based on documentary evidence and monitoring data available elsewhere. A comparison of the forecast traffic data used in the Environmental Statement against the observed traffic data was also undertaken.

Our evaluation confirmed that after the A556 project was built, more strategic traffic was using the new bypass and so had been moved away from the properties in Over Tabley, Mere, Bucklow Hill and Millington. The 2020 Air Quality Annual

Status Report published by Cheshire East Council[17] indicated that air quality monitoring undertaken within the Air Quality Management Area[18] (AQMA) along the B5569 had been consistently below the air quality objective and no exceedances had been recorded since 2016. As air quality had improved, the Council revoked the AQMA[19].

As part of our evaluation, we also looked at forecast and observed opening year traffic data along both the A556 and along the M56 near Wythenshawe. Observed flows along the A556 were lower than forecast however flows along the M56 between junctions 2 to 5 were higher than forecast.

Further analysis was done to explore the potential air quality impacts of these difference in forecast and observed traffic flows. This showed that the traffic model underestimated the do minimum[20] traffic flows on both the A556 and the M56. For both the A556 and M56 junction 2 to 3 the do minimum flows in 2014, immediately before construction started, were also higher than the observed flows after the project opened in 2017. This suggested that flows fell after the project opened. However, for the M56 junction 3 to 5 the flows increased. It was uncertain what was the cause of the differences identified. However, along both sections the actual volume of road users was higher than predicted in the forecasts due to the underestimation of the baseline traffic volumes. Changes to traffic patterns across the local and strategic network and possibly the construction of M6 junction 16 to 19 smart motorway may have also had a role.

At one-year after, it was not possible to draw firm conclusions on air quality impacts of the project along the M56 because of the uncertainty between the forecast and observed traffic data. However, as part of fulfilling the project's DCO commitments, further air quality monitoring and assessment was taking place and the outcome of this more detailed work should be available to support our five-year after evaluation.

At one-year after, air quality had improved along the B5569 as expected and the air quality management area was revoked. However, it was considered too soon to comment on the impacts of the project along the M56 and this will be revisited when further information is available at five-years after.

6.4. Greenhouse gases

The environmental assessment work reported that the project would cause an increase in carbon emissions. This was because the project was expected to increase flows of vehicles across the project study area.

The POPE methodology manual sets out an approach for evaluating the carbon emissions along the projects. It recognises that it is not possible to make a direct comparison between the emission predicted in the appraisal and those observed on opening. This is because the appraisal is based on the entire modelled area over 60 years whereas at evaluation, traffic information for the whole study area is

[17] https://www.cheshireeast.gov.uk/environment/environmental_health/local_air_quality/local_air_quality.aspx

[18] AQMA are locations identified by local authorities as having poor air quality. https://uk-air.defra.gov.uk/aqma/

[19] Chester Road AQMA revoked on 26/1/2021 https://uk-air.defra.gov.uk/aqma/revoked

[20] Do minimum – the scenario without the project.

not usually available. Instead, we used the 2018 forecast and observed traffic data that we had to calculate a reforecast and an observed 2018 carbon emission just for the A566 bypass extent. This is shown in Table 5 below. The Defra emission factor toolkit v10.1 was used.

Table 5 Re-forecast and observed carbon dioxide emission

	Reforecast DS (CO_2 tonnes)	Observed (CO_2 tonnes)
A556	25,064	23,060

Source: Observed traffic data from traffic counters and forecast data from Environmental Statement Second Addendum, Revision 1, Appendix 6.4, table 4

This approach has limitations as it doesn't consider traffic changes and the emission changes that would result along the wider network and so can be affected by issues such as reassignment. Whilst it generates a CO_2 figure, this figure cannot be compared against the appraisal but can give some indication of the accuracy of the forecast along this particular section of the appraised project.

From the available traffic data and the calculated emissions, we concluded that observed emissions along the A556 were lower (8%) than forecast due to the lower than forecast traffic flows in the first year.

6.5. Landscape

The environmental assessment predicted that the construction of the project would have an adverse impact on the gently rolling fields that it would pass through. The road would create a new linear feature in the landscape impacting on field patterns in the area and would result in the loss of small sections of hedgerows, woodlands and ponds along its route. The project would introduce new features into the landscape including bridges and signs which would have an adverse impact on views from the small number of properties along its route. Traffic would also affect local tranquillity.

New woodland and hedgerow planting was proposed to help integrate the project into the landscape and to reduce the visual impacts. Earthworks would also be provided along sections of the project which would help screen views of traffic although the earthworks themselves would be new features in the landscape. Lighting would be limited to the approach to junction 19 of the M6 and the realigned Bowdon junction. Overall, once the mitigation planting had established it was predicted that the impact of the project would be slight adverse.

Our evaluation considered the predicted impacts of the project and confirmed that the local landscape particularly its field patterns had been affected by the project. Agricultural land and hedgerows that formed field boundaries and woodlands along its route had been impacted. Earth embankments were created either side of the A556 to help screen it from views from outside the highway boundary. This had helped minimised the visual impact of traffic. However, at one-year after, the tops of high side vehicles were still visible as were some of the new road signs. The embankment that forms the sides of the cutting had created a new linear feature within the landscape. This change had adversely affected the views of the isolated properties it passes. The cultural connection between Over Tabley Hall and the local landscape had been affected and new infrastructure including the new

overbridges were, in places, prominent new features. Whilst the existing M6, A556 and M56 already affected the tranquillity in the general area, the new road had impacted new areas not previously affect by road traffic.

Figure 10 Traffic on A556 screened by earthworks near Chapel Lane

Source: Evaluation site visit July 2018

Landscape mitigation had been implemented and the cuttings did largely screen the traffic. Tree and shrub planting was in place which should, overtime, as it establishes reduce the impacts of traffic and infrastructure as expected in the Environmental Statement. However, many of the standard trees especially on local roads had, at one-year after, died and will need to be replaced as part of the aftercare maintenance programme.

Landscape management was taking place and evidence of grass cutting was seen and some dead trees had been marked up for replacement. However, at time of writing, the Handover Environmental Management Plan[21] had not been completed and no landscape monitoring reports were available

[21] A document that provides details of the project and how the environmental mitigation should be managed and maintained.

Figure 11 Dead mitigation planting at Millington Lane

Source: Evaluation site visit July 2018

Overall, the impacts of the project were largely as expected. At one year after it was too soon to be confident that the mitigation planting would establish and achieve the desire level of mitigation. We will reconsider this issue during our five-years after evaluation

6.6. Townscape

The environmental assessment reported that traffic travelling along the original route of the A556 through the communities of Bucklow Hill and Mere was having an adverse impact on the local townscape of the area. The assessment predicted that the construction of the project would however remove much of this traffic which would benefit these communities and their local townscape. The original route, now the B5569, would be detrunked, reduced to a single lane in each direction and a new combined footpath cycleway would be constructed. The removal of some of the signage and lighting columns would also help reduce the overall dominance of the road within the townscape and improve tranquillity. Some properties to the west of the B5569 would have glimpsed views towards the new A556 but overall, the impacts were predicted to be moderate beneficial.

Our evaluation showed that with the construction of the new A556, traffic on the now detrunked B5569 had reduced. The road had been narrowed with the conversion of the north bound carriageway into a new NMU[22] route. Apart from the junctions in Mere and Bucklow Hill, much of the street lighting had been removed from along the route. The project had reduced the dominance of the road within the townscape and improved tranquillity.

It was not possible to consider specific views from private properties along the B5569, but the site visit did provide an appreciation of the general views and overall effects. Although the detrunking and removal of lighting and some of the signage had improved views from properties along the B5569, it was likely that distant views across the agricultural fields towards the new A556 would be possible. However as predicted in the Environmental Statement many of these

[22] NMU: non-motorised users. This includes pedestrians, cyclists and equestrians.

views were limited to glimpses of moving traffic through existing vegetation or over the top of the new earth embankments along the bypass. As the mitigation planting along the project establishes the impacts are likely to reduce.

Whilst much of the landscaping along the route was provided there were several locations where grass seeding along verges was poor or, in places, had failed. Remedial works will be required to ensure the full benefits are realised and this should be reconsidered during the five-year after evaluation. Overall, the impacts were as expected.

6.7. Heritage of historic resources

The environmental assessment predicted that the project would have an adverse impact on cultural heritage along its route. This would include adverse impacts on the setting of listed buildings such as Over Tabley Hall and Denfield Cottage as the road would be brought closer to them. New woodland planting and earth embankments would be provided to help minimise the visual impacts on them. There would also be some beneficial impacts to some listed buildings along the B5569 such as Church Cottage and the Langford Brooke Monument as disturbance from strategic traffic would be removed which would improve their settings. The assessment identified that the project would also have physical impacts on buried archaeology within the footprint of the route. Archaeological investigations would be undertaken before construction works started to determine the nature of any impacts including to any previously unknown archaeology and to decide what approach to mitigation should be taken. Overall, it was predicted that the impact of the project would be moderate adverse.

Our evaluation confirmed that archaeological investigations were undertaken as expected and were used to inform the project mitigation. Details of the investigations were published[23] and further reports were proposed. The outcome of this further work will be revisited during our five-years after evaluation.

The adverse impacts to Over Tabley Hall and Denfield Cottage were largely as expected. The A556 and its earthworks had created a new intrusive feature that has had an impact on their settings. At one-year after it was too early to comment on how effect the mitigation planting will be. This should be reviewed again when the planting has had more time to establish.

Strategic traffic now follows the new A556 bypass and this had improved the tranquillity along the B5569. This had provided beneficial impacts to the setting of historic buildings along its route. Our site visit did identify some areas of verge planting that required attention which if not addressed could limit the overall beneficial outcomes expected. This should be revisited again when the aftercare works should have remedied the problems.

Overall, the impacts were as expected.

6.8. Biodiversity

The environmental assessment predicted that the project would not have any significant adverse effects on statutorily designated wildlife sites although it would impact on a range of other habitats along its route. The project would include a

[23] https://www.wessexarch.co.uk/our-work/a556-knutsford-bowdon-improvement

new drainage system which was predicted to improve the quality of routine road runoff into nearby streams. These streams flow into the internationally important meres at Little Mere and Rostherne Mere but the benefits were not predicted to be significant. The habitats affected included the loss of parts of woodlands such as Tableypipe wood and Belt wood, hedgerows and a range of improved and semi-improved grasslands and ponds. The project was predicted to impact on a range of species living along the route of the project and would fragment the habitats they used for foraging. This would include great crested newts, bats, badgers and birds.

The design of the project included a range of measures designed to minimise the impacts. This included new habitats such a species-rich grasslands and great crested newt ponds and new tree and shrub planting. Specific measures were incorporated to reduce the fragmentation caused and this included mammal tunnels and an overbridge at Belt Wood specially adapted to form a “Green Bridge” to encourage wildlife to use it to cross the road safely. Overall, once the mitigation had established, the impacts were predicted to be neutral.

Our evaluation site visit confirmed that species mitigation had been installed broadly as expected and examples of mammal tunnels, badger fencing, bat hop overs, great crested newt ponds and foraging habitats were all seen. The new green bridge was in place and the planting along it was beginning to establish. Several issues were identified with the mitigation including poor fencing design, a water-logged mammal tunnel and inappropriate pond planting such as the presence of typha latifolia and weeds within the grasslands. However, with appropriate maintenance and remedial works during the aftercare period, these issues should not affect the overall design outcome.

The environmental statement set out a programme of environmental monitoring for the post opening phase which, provided it is undertaken correctly, was designed to ensure long term impacts are understood. Examples of monitoring surveys undertaken by the time of the visit suggested badger mitigation had been successful but data from future bat monitoring will be required before the success of bat mitigation can be evaluated. Work had begun to determine great crested newt populations however not all ponds had yet been surveyed. No information had been provided on the required wintering bird surveys. We will consider these outstanding issues as part of our follow up evaluation at five-years after. Overall, it was considered that in the absence of all the monitoring information, it was too early say whether impacts were as expected.

6.9. Water environment

The environmental assessment work identified that the project had the potential to affect water resources in the area. This included changes to water quality caused by changes to the quality and volume of surface water running off the road surface. Structures could impact on the conveyance of flood waters and there could be changes to the risk of pollution from accidental spillages following traffic accidents. The project design incorporated a new drainage system to improve the management of road run off. This including wetlands and balancing ponds to manage the flow of road runoff and improve its quality. New pollution control equipment was proposed to reduce the risk of accidental spillage entering local watercourses. Drainage from the original road flowed into tributaries of Rostherne Brook which in turn flowed into the international recognised water bodies at Mere,

Little Mere and Rostherne Mere. The new drainage system would direct runoff from the new A556 away from these sensitive sites and, combined with lower traffic flows along the B5569, it was predicted to provide a benefit to the Meres although not a significant one. Overall, the impacts of the project were predicted to be slight positive.

Our evaluation site visit involved a visual inspection of surface drainage features and was during a period of prolonged dry weather. No monitoring or inspection reports were available at the time of the visit. Our visit confirmed that the proposed mitigation was broadly as expected and with strategic traffic now using the A556, flows along the B5569 were reduced. The wetlands and balancing ponds appeared to be functioning correctly and pollution control devices were seen. Grasslands surround the balancing ponds were, in most cases, establishing but weeds such as ragwort and dock weeds were present. These weeds could reduce the additional benefits that the grasslands were expected to provide.

Figure 12 Balancing pond near the Bowdon junction

Source: Evaluation site visit July 2018

Some of the balancing ponds had Typha Latifolia present which wasn't on the planting mix. This species grows rapidly and if not managed correctly, can quickly swamp a pond and could affect drainage flows. Our visual inspection suggested that the drainage system was functioning as expected however several flooding incidents along Chapel Lane were being investigated.

Overall, the proposed mitigation had been constructed and provided the drainage system is maintained it should deliver its intended outcome. However, the flooding incidents were being investigated and so until these issues are resolved, it was considered that it was too early to say whether the impacts were as expected. This will be reviewed again as part of our five-years after evaluation.

6.10. Physical activity

The original A556 did not provide an attractive environment for NMUs[24] and in places acted as a barrier limiting the integration of the existing network. The

[24] Non-motorised users including pedestrians, cyclists and equestrians.

environmental assessment work identified that the new project would cause long term beneficial and adverse impacts on footpaths, bridleways and cycling routes (NMU network) in the area. Some routes such as those along Bucklow Hill lane and Millington Hall lane would be stopped up as they met the route of the new A556 bypass and other footpaths would be diverted. Those routes diverted would be directed towards safer crossing points including new bridges over the A556 and also a new underpass at Old Hall Lane. It was predicted that these changes would affect travel patterns and would both encourage and discourage use and physical activity. However, the detrunking of the B5569 included the conversion of parts of the original north bound carriageway into a new dedicated NMU route and this was expected to improve the NMU connectivity across the area. There would be some dis-benefits but it was expected that new safer crossing points and dedicated NMU provision would improve connectivity, safety and amenity for NMUs and encourage greater physical activity. Overall impacts were expected to be slight beneficial.

Improving physical activity was not a primary objective of the project and so, as there were no pre-project NMU surveys to compare against, no post project surveys were undertaken. Our evaluation however focussed on confirming that new NMU facilities were provided and to consider qualitatively if connectivity had improved. Our site visit confirmed that NMU routes had been stopped up and diverted as expected to safer crossing points such as at the new Old Hall lane underpass and new overbridges.

Figure 13 cyclist using the new combined footpath cycleway along the B5569

Source Evaluation site visit July 2018

No surveys were undertaken but during our site visit, cyclists and equestrians were seen using the new routes and the removal of strategic traffic from the B5569 had made it and the NMU network around it more attractive and safer for use. Overall, it was considered that the project had improved the NMU network locally and although it could not be quantified, had encouraged more NMUs and physical activity.

6.11. Journey quality

Journey quality[25] considers the impact of a project on traveller care, traveller views and traveller stress. These impacts are influenced by such issues as access to roadside services, congestion, fear of accidents and route uncertainty.

The environmental assessment identified that journey quality was poor along the A556. This was because the high volumes of traffic, conflicts between strategic and local traffic, vehicles entering and exiting farm access and residential properties caused driver frustration and fear of accidents. The Environmental Statement reported that once open the higher standard of the new A556 and the elimination of the conflict with local traffic would mean that stress would reduce for road users on the A556. While trunk road users would initially experience less varied views, this would improve as the landscaping works along the route matured. Travellers on the de-trunked B5569 Chester Road would experience improved journey quality due to lower levels of traffic. Overall large beneficial impacts were expected.

No surveys or quantitative studies were undertaken as part of our evaluation but, instead, a site visit was undertaken to provide qualitative observations on the impacts of the project on journey quality.

The evidence gathered suggested that whilst two local facilities (Little Chef and a petrol station) had closed overall the changes to traveller care were likely to be as expected.

The visit confirmed that the views of road users of the new A556 had experienced a significant change. The views were more restricted and less varied. However, as the vegetation establishes it was expected that users would get used to the change and the long-term impacts would be as predicted. For users of the B5569, the varied views had been maintained and with reduced traffic and improved local amenity the overall impact was beneficial.

Driver stress for users of both the A556 and the B5569 should reduce as driver frustration, fear of accidents and route uncertainty for most users had been improved. There was however some evidence that some route uncertainty existed specifically for users travelling between the A50 and the M6 however this may have been related to out-of-date satnavs. This will be considered again at five-years after.

Overall, the numbers of drivers who were likely to experience improvements to the quality of their journeys was expected to be beneficial and the observed outcome was as expected.

6.12. Severance

The environmental assessment work reported that communities along the existing A556 and the immediate surrounding area currently experience severance caused by heavy traffic on the trunk road. This included accessing services in Bucklow Hill (such as the pub and petrol station), Mere (such as the Golf Club) and Over Tabley (such as St Pauls Church). The heavy traffic also affected local residents' ability to travel within their local community. The new A556 bypass would add to this

[25] Definitions can be found at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/940958/tag-a4-1-social-impact-appraisal.pdf

severance as it would stop up and divert the footpaths, bridleways and local roads that it severed. However, these impacts would be partially mitigated by new overbridges. The B5569 would be detrunked and traffic flows would reduce as strategic traffic diverted on to the new A556 bypass. This would improve the amenity along the B5569 and with new signalised crossing points would make crossing the road safer, accessing local services easier and reduce severance. It was predicted that the increases in severance caused by the new bypass would be offset by decreases along the detrunked B5569 and overall, the impact would be neutral.

No surveys or quantitative studies were undertaken as part of our evaluation but, instead, a site visit was undertaken to provide qualitative observations on the impacts of the project on severance.

The new A556 had increased some journeys lengths to facilities in Bucklow Hill and Mere specifically those that used Bucklow Hill lane and Millington Hall lane. However, diversion routes over new overbridges were expected to reduce the slight increase in severance caused. The site visit confirmed that strategic traffic was using the A556 and the amenity of the B5569 had improved. The severance caused by traffic on the B5569 had been reduced improving access to local facilities although, as no surveys had been undertaken, it was not possible to quantify the improvement.

The demolition of Over Tabley Parish Hall had reduced access to local community facilities but many of the services it provided were available at Mere Hall at a new combined Mere and Tabley Community club. Although further away, improvements to the B5569 and the reduction in traffic had offset much of the severance increase caused.

Overall, based on the finding of the site visit, it was considered that the impacts of the project were as expected.

6.13. Overview

The results of the evaluation are summarised against each of the environmental sub-objectives and the three society objectives presented in Table 6Table 6. In the table we report the evaluation as expected if we believe that the observed impacts at one year after were as predicted in the appraisal. We report them as better or worse than expected if we feel the observed impacts were better or worse than expected. Finally, we report impacts as too soon to say if we feel that at one year after there was insufficient evidence to draw firm conclusions

Table 6 Environmental Impacts – A556 Knutsford to Bowdon

Sub Objective	Appraisal Score	One-year Evaluation	Summary
Noise	Net beneficial but not significant.	As expected	Strategic traffic now uses the new bypass and the old A556 has been detrunked. Mitigation including bunds and a low noise surface had been provided along the bypass as expected. Traffic flows on the bypass were lower than forecast but

			not by enough to change the predicted impacts significantly
Air quality	Significant adverse at 70mph. Not significant at 60mph	As expected along the B5569 but too soon to comment on the M56	Air quality for the communities along the former A556 had improved and the AQMA was revoked. Further information should be available at five-years after to enable comments on impacts along M56 to be made with more certainty.
Greenhouse gases	Increase in CO_2 emissions (746,000 tonnes over 60 years)	-	There was insufficient traffic data to evaluate the appraised greenhouse gas emissions of the project. For the A556 bypass, where data was available, the observed emissions were lower than predicted. The difference was likely to be influenced by the lower than predicted overall traffic flows.
Landscape	Slight adverse	As expected	The adverse effects on the landscape were as expected and the proposed mitigation was largely in place. The A556 did create a new linear feature that does change the original landscape pattern and tranquillity but provided the mitigation is maintained it should establish overtime helping the road to integrate. The outcome of the establishment planting should be revisited during the five-year after evaluation.
Townscape	Moderate beneficial	As expected	The new A556 bypass along with the narrowing of the Chester Road (B5569) had improved the appearance and layout. The new NMU provision was in place and should, over time encourage greater pedestrian movement. Whilst planting had been undertaken there were some locations where it was poor but with remedial work the full benefits should be realised. This should be reconsidered during the five-year after evaluation

Heritage of historic resource	Moderate adverse	As expected	The A556 had created a new prominent feature in the landscape and had adversely affected the setting of several historic buildings. Beneficial impacts had also arisen along the B5569. The effectiveness of the mitigation planting should be revisited again, and publication of the remaining archaeological reports should be confirmed.
Biodiversity	Neutral	Too early to say	Mitigation had been implemented to minimise severance impacts although some design issues were identified. Noxious weeds were an issue in many of the grassland plots which needed removing. Currently not all the requirements for great crested newt surveys were being met. All the commitments for long term monitoring and habitat management will need to be delivered if the design outcome is to be met
Water environment	Slight positive	Too early to say	Mitigation set out in the environmental statement had been provided and combined with reduced traffic flows on the B5569, the project should deliver its drainage objectives. Flooding issues on Chapel Lane were being investigated. Noxious weeds within landscape plots provided as part of the balancing ponds need removing if the additional biodiversity benefits are to be realised.
Physical activity	Slight beneficial	As expected	Traffic had been removed from the Chester Road and safe crossing points had been provided across the new A556. A new segregated NMU facility had been provided along the detrunked B5569 and there had been improvements to local amenity. Overall, the project had delivered the predicted beneficial effects.
Journey quality	Large beneficial	As expected	Qualitative evidence gathered as part of the evaluation site visit supported the overall predicted

			impacts in the appraisal. Some route uncertainty should be investigated again at five years after
Severance	Neutral	As expected	The site visit confirmed that the impacts of the project had led to increases and decrease in severance. However overall, with the improvements made to the B5569 and the diversion of traffic onto the new A556 the impacts were likely to be neutral

7. Value for money

7.1. Summary

When a scheme is appraised, an economic assessment is used to determine the scheme's value for money. The assessment is based on an estimation of costs and benefits from different sources. This includes Transport Economic Efficiency (TEE) benefits (savings related to travel times, vehicle operating costs and user charges), accident costs (savings related to numbers and severity level of accidents) and costs to users due to delays during construction and future maintenance periods.

This is out of scope for the one year after evaluation, but an attempt to reforecast an outturn BCR (Benefit-Costs Ratio) will be made at five-years after.

Appendix A

A.1 Comparison of 2018 and 2019 average daily traffic volumes

	2018		2019		difference		%	
	NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB	NB/WB	SB/EB
A556	21000	22000	29000	29000	8000	8000	39%	36%
M6 J18-19	57000	59000	66000	66000	9000	7000	16%	12%
M6 J19-20A	51000	52000	51000	52000	0	0	-1%	0%
M56 J2-3	34000	33000	36000	35000	2000	2000	7%	5%
M56 J3-4	88000	#N/A	90000	#N/A	2000	#N/A	2%	#N/A
M56 J4-5	79000	79000	81000	82000	1000	3000	2%	4%
M56 J5-6	72000	70000	77000	77000	5000	6000	7%	9%
M56 J6-7	64000	64000	69000	68000	4000	4000	7%	6%
M56 J7-9	38000	42000	39000	42000	1000	0	3%	1%

Source: NTIS data for Sept 2018 & Sept 2019 ADT.

A.2 Comparison of observed flows for 2019 and 2018 against forecast

ADT	Forecast DS (2017)	Flow after (2018)	% difference	Flow after (2019)	% difference
A556	53000	43000	19%	59000	-12%
M6 J18-19	122000	116000	5%	131000	-8%

Source: NTIS data for Sept 2018 & Sept 2019; forecasts from Environmental Statement Second Addendum, Revision 1, Appendix 6.4, table 4

The majority of our analysis was based on data for September 2018 because this was approximately 'one-year after'[26] and to align with local traffic data which was only available for November 2018. However, the construction of the M6 junctions 16 to 19 smart motorway project was undertaken between October 2015 and March 2019 is likely to have impacted traffic volumes at this time.

To understand the extent of this impact, mainline data for September 2019 (after the M6 junctions 16 to 19 had opened) was compared against September 2018. For the M56 and the M6 north of J19, the choice of year makes less than 10%

[26] The project opened March 2017, with detrunking was complete November 2017

difference, with the 2019 data being slightly higher than 2018, as expected. However, for the A556 and the M6 south of J19, the choice of year had a more noticeable impact and indicated that the construction of the M6 Smart Motorway was indeed supressing traffic during the period of this study.

Neither the M6 junctions16 to 19 nor the M56 junctions 6 to 8 smart motorway project[27] was considered in the appraisal of the A556. The Do Something[28] forecasts would have assumed that these other roads remained unimproved. Using 2019 as the comparison, the Do Something forecast was too low. A small amount of this can be accounted for by the difference in years[29], but by no means the full discrepancy. Without the impact of the smart motorway construction, and considering background growth, the forecasts were likely to have been within 10% of outturn and could be considered reasonably accurate, even though the M6 project was not considered in the appraisal and the Do Minimum scenario was underestimated. This will be revisited in the five years after evaluation.

[27] Started construction 31st March 2020
[28] DS = Do-Something ie with the project
[29] background traffic growth would have increased a small amount between the forecast year of 2017 and 2019

Appendix B

B.1 Safety counterfactual methodology

Personal injury collisions (hereafter referred to as collisions) on the strategic road network are rare and can be caused by many factors. Due to their unpredictable nature, we monitor trends over many years before we can be confident that a real change has occurred as result of the scheme.

To establish whether any change in collision numbers is due to the scheme or part of wider regional trends we have established a test we call the Counterfactual. The Counterfactual answers the question: What would have likely occurred without the scheme being implemented? To answer this question, we estimate the range of collisions that could have occurred without the scheme in place. Previous Post Opening Project Evaluations answered this question by looking at national trends in collisions. Adjustments have been made to the methodology for estimating the Counterfactual. These have been made to address the following areas:

Amended Data Collection Method

- Revised method for identifying collisions that occurred on the network.
- Only validated STATS19 information is used for reporting purposes.

Adjusting for Traffic Flows

- Baseline traffic flows are an important factor when determining the counterfactual. We now assume that without the changes made to the network, the trends would follow regional background traffic growth patterns.
- We can now calculate the collision rate for the busiest stretches of conventional motorways.

Better Differentiation between different types of Motorway

- The existing methodology only had one definition of motorway.
- The new method allows us to differentiate between conventional motorways, conventional motorways with high traffic flows and smart motorways.

Assessing Regional Trends

- The new method uses regional rather than national trends for collision rates and background traffic growth, which provides greater granularity and makes the hypotheses more realistic.

We have found that the adjustments have resulted in a slight change from the previous methodology. We still have confidence in the accuracy of the previous methodology but believe we have made suitable changes that will ensure a methodology fit for purpose for the future.

Since this scheme, smart motorways have evolved. More recent all lane running schemes have demonstrated that they are making journeys more reliable for those travelling during congested periods, enabling us to operate the road at a higher speed limit for longer periods, whilst maintaining safety.

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