8. Appraisal and Evaluation Summary Tables

Introduction

Appraisal Summary Table (AST)

8.1 The Appraisal Summary Table (AST) is a one page summary of the main economic, safety, environmental and social impacts of a trunk road scheme. Table 8.1 presents the AST for the M1 J31-32 Widening Scheme prepared at the time of the scheme's appraisal.

8.2 The AST presents a brief description of the scheme, a problem statement detailing the problems that the scheme was planned to address, and makes an assessment of the schemes predicted qualitative and quantitative impacts against the following core NATA (New Approach to Appraisal) objectives:

- **Environment** – an estimate of scheme impact upon factors such as noise, local air quality, landscape, biodiversity, heritage and water;
- **Safety** – measured reduction in accidents and qualitative assessment of impacts on security;
- **Economy** – estimated impact of the scheme upon Journey Times, Vehicle Operating Costs; scheme cost and journey time reliability;
- **Accessibility** – a review of scheme impact upon access to the public transport network, community severance and non-motorised user impact; and
- **Integration** – a description of how a scheme is integrated with wider local planning policy objectives.

Evaluation Summary Table (EST)

8.3 The Evaluation Summary Table (EST) was devised for the POPE process, to record a summary of the reforecast impacts for the NATA objectives, compared to the predictions in the AST.

8.4 Drawing on results presented in this report, Table 8.2 presents the EST for the M1 J31-32 Widening Scheme.

8.5 Where possible, the format of the EST mirrors the appearance and process of the AST to enable direct comparison between the two.

Table 8.1 – Appraisal Summary Table (AST)

M1 WIDENING JUNCTION 31-32		Stage: ECC D&B Stage. Planned award date in May 2006.	Date: 17 March 2006	Version: 0002-NH50912-NHR-04
Option Four Lane Symmetrical Widening		Description Symmetrical Widening with Portal Gantries with a scheme length of 1.7km	Problems Traffic congestion during peak hours and weaving traffic	Present Value Cost to Government: £3.436m
OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE MEASURE	ASSESSMENT
ENVIRONMENT	Noise	No overall change in noise levels with scheme compared to Do-Minimum. Low noise surface and mounding proposed.	Do-Minimum 67 Do-Something 67	0
	Local Air Quality	The air quality assessment indicates a very slight increase in the roadside concentrations of both PM10 and NO2. NO2 concentrations are in excess of AQS in the 0 to 100 m bands. Two properties fall within the predicted exceedance of the NO2 AQS.	Net number of properties experiencing a change in: PM10: 10, NO2: 10	Overall assessment score: PM10: 0.07, NO2: 0.09
	Greenhouse Gases	There is an overall increase in CO2 emissions from the major road networks.	+44,448 Do Minimum +44,876 Do Something	+428 Tonnes
	Landscape	Winter Year 1 adverse impact on landscape local character, as a result of the loss of existing vegetation and the introduction of gantries. Areas of removed vegetation will be replaced and further enhanced by proposed planting measures. Mitigation planting will generally reduce the visual impact from all visual receptors, although most will still experience a barely perceptible deterioration in their view.	-	Slight Adverse
	Townscape	Not Applicable	Not Applicable	Neutral
	Heritage of Historic Resources	Slight increase in visual impact at two Grade II listed buildings and the two conservation areas of Aston and Brampton-en-le-Morthen.	-	Slight Adverse
	Biodiversity	Scheme will result in slight adverse impacts on Brampton Common Site of Scientific Interest, motorway verges, planted broadleaved woodland, ruderal vegetation, relict magnesian limestone grassland and diverse ephemeral / short perennial flora. There will be slight adverse impacts on badgers and birds and neutral impacts on bats.	-	Slight Adverse
	Water Environment	There will be slight beneficial impacts on water quality on two watercourses and neutral impacts on two watercourses. Scheme will not increase risk of flooding. Increases in surface runoff will be attenuated by a new infiltration basin.	-	Slight Beneficial
	Physical Fitness	Not Applicable	Not Applicable	Neutral
	Journey Ambience	Traveller stress is likely to improve slightly due to more free flowing traffic and fewer delays. Congestion will not increase by design year.	-	Moderate Beneficial
SAFETY	Accidents	The scheme is forecast to result in an increase in the number of accidents.	255 PIA over 60 years (increase)	PVB -£11.4m
	Security	The scheme will have no impact on security.	-	Neutral
ECONOMY	Public Accounts	Cost of the scheme to Central and Local Government	Central Government PVC Local Government PVC	£3.436m £0.0m
	Transport Economic Efficiency	The increase in capacity should lead to improvements in journey time for both consumers and business users.	Consumer User Benefits Business User Benefits	PVB: £118.157m PVB: £190.042m
	Reliability	Journey time reliability should improve as a result of increased capacity and reduced levels of congestion.	-	Large Beneficial
	Wider Economic Impacts	The wider economic imacts of the scheme have not been established.	-	Neutral
ACCESSIBILITY	Option values	The scheme has no impact on option values.	-	Neutral
	Severance	No rights of way are affected by the proposal	-	Neutral
	Access to the Transport System	The proposal does not alter access to the transport system	-	Neutral
INTEGRATION	Transport Interchange	The proposal does not impact on transport interchange.	-	Neutral
	Land-Use Policy	Overall the scheme will have a neutral impact on local, regional and national land use policy.	-	Neutral
	Other Government Policies	The scheme has both adverse and beneficial effects on other government policies. Overall the impact is neutral.	-	Neutral

Table 8.2 – Evaluation Summary Table (EST)

Objective	Sub Objective	Qualitative Impacts	Quantitative Measure	Assessment
Environment	Noise	Noise mound and low noise surface have been provided. Based on traffic flows which are slightly less than before the improvements and also less than forecasted, the local noise climate should be no worse than before the scheme and might be better than expected..		As Expected - 0 Possibly better than expected
	Local Air Quality	Based on traffic flows which are less than forecast the local air quality is likely to be similar to before the improvements and is possibly better than expected.		Possibly Better than Expected
	Greenhouse Gases	The scheme has resulted in an increase in CO2 emissions, although not as much as originally forecast. In the revised study area, the DM Carbon emissions are +92,551 and for the DS +93,453. This equates to an increase in carbon emissions of 90 tonnes.	Do Minimum +18,900 Do Something 18,990	+90 Tonnes
	Landscape	New planting/seeding provided and establishing satisfactorily; ongoing establishment should be evaluated at the five year after stage. The lighting proposed as part of the initial Scheme was not taken forward to construction and this was taken into account in the 2006 AST used for this report. Overall the evaluation is considered as expected in the AST but better than expected in the ES		As Expected – Slight Adverse
	Townscape	N/A	N/A	N/A
	Heritage of Historic Resources	It is considered that the provision of the environmental earthbund and new landscape planting adjacent to Vessey Close Farm has helped screen the setting of the Listed Buildings and identified SMR Ridge and Furrow and conservation areas from the motorway widening and impacts as expected.		As Expected – Slight Adverse
	Biodiversity	From the information received, in the Construction Environmental Management Plan and Great Crested Newt Monitoring records year 1, together with the establishment of vegetation viewed during the site visit, the impacts of the Scheme on Biodiversity are likely to be As Expected.		As Expected – Slight Adverse
	Water Environment	Pollution control measures have been incorporated into the scheme and it was agreed with EA that the proposed Infiltration area at J31 was not required. Based on the information available it is likely that the impacts are as expected however water should be considered within the 5YA report when more information may be available.		As Expected – Slight Beneficial (Based on the Information Available)
	Physical Fitness	The site visit confirmed that paths have remained open there was no restriction to access along them or additional severance. Dropped kerbs have been provided as recommended within the NMU survey of 2002.	N/A	As Expected - Neutral
	Journey Ambience	The proposed off site planting has not been undertaken allowing more long distance open views for motorway users to the surrounding countryside. The impact on traveller stress is moderate beneficial due to improved journey times and driver information.		As Expected – Moderate Beneficial

Objective	Sub Objective	Qualitative Impacts	Quantitative Measure	Assessment
Safety	Accidents	There has been an observed increase in the number of observed accidents and casualties along the M1 J31-32 section. However, across the wider revised accident area there has been an accident and casualty saving. The accident rate on the section has increased post scheme opening but is still less than the national average.	**Reforecast OPR COBA Boundary** Increase of 3.7 accidents per year 60 year accident increase of 302 Increase of 4.7 casualties per year **Reforecast Revised Boundary** Saving of 14.3 accidents per year 60 year accident saving of 1181 Saving of 23 casualties per year	Safety PVB Reforecast OPR COBA Boundary **-£17.987m** Reforecast Revised Boundary **+£70,313m**
	Security	The scheme has resulted in the addition of new emergency telephones and in August 2009 CCTV is expected to be added to the section. No lighting has been included in the scheme.	N/A	Slight Beneficial – Better than Expected
Economy	Public Accounts	The scheme costs have decreased compared to the OPR COBA cost which was £17.059m (although this included indirect taxation)		**PVC £11.339m**
	Transport Economic Efficiency	The increase in capacity has led to journey time savings on the section, although the savings are not as large as expected.		PVB **£60.061m**
	Reliability	There is increased capacity on the section. Journey times on the widened section have decreased in both the northbound and southbound directions. Journey times across the revised study area have also decreased/		Large Beneficial - As Expected
	Wider Economic Impacts	The revised study area shows both journey time and safety benefits.		Reforecast Revised Boundary Accident PVB **£70.313m**, TEE PVB **£368.674m**
Accessibility	Option Values	The scheme has not resulted in the provision of any new public transport services.	N/A	Neutral – As Expected
	Severance	No impact on any routes used by pedestrians, equestrians or cyclists or to the standard or quality of the routes. No evidence of change in patronage. No impact on bus services.	No data to quantify assessment	Neutral – As Expected
	Access to the Transport System	The scheme has not resulted in any change to access to the transport system.	No data to quantify assessment	Neutral – As Expected
Integration	Transport Interchange	The scheme did not involve the creation of interchange facilities or change access to any Park and Ride schemes.	N/A	Neutral – As Expected
	Regeneration / Land Use Policy	The scheme has had a neutral impact on local, regional and national policy.	N/A	Neutral – As Expected
	Other Government Policies	The scheme has both adverse and beneficial impacts on national, regional and local policies.	N/A	Neutral – As Expected

9. Conclusions

Success against Objectives

9.1 To conclude this report, this section summarises how the scheme is meeting its objectives. Objectives can be categorised as follows:

- NATA objectives: Impacts are assessed against the Government's five objectives for Transport; environmental impact, safety, economy, accessibility and integration; and
- Scheme specific objectives.

Scheme Specific Objectives

9.2 The evaluation of the scheme's specific objectives as reported in this study are summarised in Table 9.1.

Table 9.1 – Success against Scheme Objectives

Objective	Assessment	Success
Reduce Congestion by increasing the overall capacity of the section by adding a fourth lane for traffic in both directions	The scheme has increased the highway capacity in terms of number of lanes. Journey times have decreased on the widened section.	✓
Improve Safety through improved traffic management	On the widened section, the scheme has resulted in an increase in accidents in the opening year. The accident rate on this section has increased post scheme opening, but still remains well below the national average. When evaluated using a wider accident area, the scheme produced significant accident savings. However, the statistical significance of the accident analysis is low because there is only one year of post-opening data. Conclusions will be more certain at the Five Years After stage.	X
Improve Journey Times and Journey Time Reliability	There have been journey time decreases on the widened section and on adjacent motorway sections in both the northbound and southbound directions.	✓
Reduce or minimise traffic diverting onto local authority routes	Traffic volumes have increased at some local authority count sites, but it seems more likely that this is a result of local traffic growth rather than the M1 scheme. Some of the local authority sites close to the M1 show decreased traffic volumes and where there have been increased volumes; many are below background growth predicted in RTF08 and TEMPRO.	✓
Reduce traveller stress by improving traffic flow and reducing delays	The additional capacity of the widened section, coupled with a decrease in journey times and improved driver information has reduced traveller stress.	✓

9.3 In summary, the results in Table 9.1 show that based on the data available at the one year after stage, the M1 J31-32 Widening scheme is achieving all of its objectives, with the exception of accidents on the J31-32 link itself. However, this increase in accidents is far outweighed by the accident reduction on adjacent motorway links.

Did the Scheme offer Good Value for Money?

9.4 The scheme economics have been complicated by the general reduction in traffic flows on the motorway network in the area over recent years. The impact of this is to reduce the amount of vehicle hours on the network, which is normally an indicator of success on a major road scheme, but in this case the benefits cannot wholly be attributed to the scheme. The significant journey time benefits on the motorway also contribute towards the scheme benefits, but it is not clear whether journey times have improved because of the scheme or because traffic flows have decreased. It is likely to be a combination of these two factors but the relative importance of each is unknown.

9.5 The outturn cost of the scheme was only 66% of the forecast scheme cost which has contributed to the good Benefit Cost Ratio of the scheme.

9.6 The scheme has delivered healthy benefits and Benefit Cost Ratio in both the local study area and the wider study area. A cautious approach, of analysing just the single, widened motorway link, results in monetary benefits of nearly **£40m** and a BCR of **3.5** even when the effect of decreasing traffic flows is removed. This is considered good value for money.

9.7 If the wider network is considered, the apparent benefits increase significantly to £344m and a BCR of 30. However, it is felt that this approach includes too many non-scheme specific effects to be considered robust and that the local area economics should be used in reporting.

Five Years After study

9.8 The Five Years After study due to be undertaken in 2013 will follow a similar structure to this One Year After study setting out a comparison of the forecast and outturn impacts of the scheme against each of the NATA objectives (and sub-objectives) five years after opening. This will examine whether the successes reported in this report are continuing.

9.9 Particular issues for the five years after stage will be:

- Results from the analysis of accident analysis at the five years after stage are likely to offer greater robustness than those recorded at the one year after stage;
- A more detailed assessment of the wider impacts of the scheme should be undertaken, potentially comparing the impact on this section with other sections of the M1 and M62; and
- The environmental evaluation will focus more closely on the effectiveness of mitigation measures would should be more evident at the five years after stage.

Appendix A Traffic Volume Tables with Growth

A.1 HA Traffic Volumes and Growth

Table A.1 - AADT Flow for M1 J30-31

Year	Northbound (Site 1)		Southbound (Site 2)		RTF 08
	AADT	Index	AADT	Index	
2003	56,558	1.000	56,952	1.000	1.000
2004	55,179	0.976	55,380	0.972	1.005
2005	54,874	0.970	54,769	0.962	1.011
2006	54,784	0.969	55,146	0.968	1.016
2007	52,523	0.929	55,245	0.970	1.019
2008/09	53,417	0.944	53,879	0.946	1.023
Change & Average Annual Rate of Growth	**- 3,141**	**-1.1%**	**- 3,073**	**-1.1%**	**0.5%**

Table A.2 - AADT Flow for M1 J31-32

Year	Northbound (Site 3)		Southbound (Site 4)		RTF 08
	AADT	Index	AADT	Index	
2003	66,426	1.000	67,438	1.000	1.000
2004	66,015	0.994	67,075	0.995	1.005
2005	66,301	0.998	67,128	0.995	1.011
2006	66,056	0.994	66,737	0.990	1.016
2007	No Data	No Data	No Data	No Data	1.019
2008/09	65,462	0.985	65,470	0.971	1.023
Change & Average Annual Rate of Growth	**- 964**	**-0.3%**	**- 1,968**	**-0.6%**	**0.5%**

Table A.3 - AADT Flow for M1 J32-33

Year	Northbound (Site 5)		Southbound (Site 6)		RTF 08
	AADT	Index	AADT	Index	
2003	60,594	1.000	62,302	1.000	1.000
2004	60,085	0.992	61,407	0.986	1.005
2005	60,564	1.000	61,817	0.992	1.011
2006	57,629	0.951	59,897	0.961	1.016
2007	56,322	0.929	58,582	0.940	1.019
2008/09	57,533	0.949	58,271	0.935	1.023
Change & Average Annual Rate of Growth	**- 3,061**	**-1.0%**	**- 4,031**	**-1.3%**	**0.5%**

Table A.4 - AADT Flow for M1 J33-34

Year	Northbound (Site 7)		Southbound (Site 8)		RTF 08
	AADT	Index	AADT	Index	
2003	52,762	1.000	53,974	1.000	1.000
2004	51,212	0.971	52,364	0.970	1.005
2005	53,251	1.009	53,906	0.999	1.011
2006	51,927	0.984	52,698	0.976	1.016
2007	50,011	0.948	51,668	0.957	1.019
2008/09	50,208	0.952	50,777	0.941	1.023
Change & Average Annual Rate of Growth	**- 2,554**	**-1.0%**	**- 3,197**	**-1.2%**	**0.5%**

Table A.5 - AADT Flow for M18 J1- M1 J32

Year	Northbound (Site 9)		Southbound (Site 10)		RTF 08
	AADT	Index	AADT	Index	
2003	41,453	1.000	39,840	1.000	1.000
2004	41,325	0.997	39,988	1.004	1.004
2005	41,659	1.005	40,379	1.014	1.008
2006	41,942	1.012	41,023	1.030	1.013
2007	No Data	No Data	No Data	No Data	1.017
2008/09	40,584	0.979	40,132	1.007	1.021
Change & Average Annual Rate of Growth	**- 869**	**-0.4%**	**292**	**0.1%**	**0.5%**

A.2 SCC Traffic Volumes and Growth

Table A.6 - 2006 & 2008 AADT flow for A6102 Bochum Parkway

Year	Southbound	Index	Northbound	Index	RTF 08
2006	12,879	1.000	15,685	1.000	1.000
2008	13,468	0.046	16,033	0.022	1.011
Annual Growth Rate	**589**	**2.3%**	**348**	**1.1%**	**0.6%**

Table A.7 - 2006 & 2008 AADT flow for A57 Mosborough Parkway

Year	Towards Sheffield	Index	Away from Sheffield	Index	RTF 08
2006	14,270	1.000	13,787	1.000	1.000
2008	14,573	0.021	13,931	0.010	1.011
Annual Growth Rate	**303**	**1.1%**	**144**	**0.5%**	**0.6%**

Table A.8 - 2006 & 2008 AADT flow for A57 Sheffield Parkway

Year	Towards Sheffield	Index	Away from Sheffield	Index	RTF 08
2006	28,316	1.000	26,591	1.000	1.000
2008	29,868	0.055	27,432	0.032	1.011
Annual Growth Rate	**1,552**	**2.7%**	**841**	**1.6%**	**0.6%**

Table A.9 - 2006 & 2008 AADT flow for A6102 Prince of Wales Road

Year	Towards Sheffield	Index	Away from Sheffield	Index	RTF 08
2006	15,105	1.000	14,017	1.000	1.000
2008	14,900	-0.014	15,080	0.076	1.011
Annual Growth Rate	**- 205**	**-0.7%**	**1063**	**3.7%**	**0.6%**

Table A.10 - 2006 & 2008 AADT flow for A63 Shepcote Lane

Year	Southbound	Index	Northbound	Index	RTF 08
2006	7,204	1.000	7,687	1.000	1.000
2008	7,296	0.013	7,764	0.010	1.011
Annual Growth Rate	**92**	**0.6%**	**77**	**0.5%**	**0.6%**

Table A.11 - 2006 & 2008 24 Hour AADT flow for A6178 Attercliffe Common

Year	Towards Sheffield	Index	Away from Sheffield	Index	RTF 08
2006	18,696	1.000	15,456	1.000	1.000
2008	18,501	-0.010	15,524	0.004	1.011
Annual Growth Rate	**- 195**	**-0.5%**	**68**	**0.2%**	**0.6%**

Table A.12 - 2006 & 2008 AADT flow for M1 J34 SB Exit Slip

Year	Flow	Index	RTF 08
2006	13,139	1.000	1.000
2008	12,883	-0.019	1.011
Annual Growth Rate	**- 256**	**-1.0%**	**0.6%**

Table A.13 - 2006 & 2008 AADT flow for M1 J34 SB Exit Slip

Year	Flow	Index	RTF 08
2006	13,529	1.000	1.000
2008	13,284	-0.018	1.011
Annual Growth Rate	**- 195**	**-0.9%**	**0.6%**

Appendix B – A6102 Timing Points

Table B.1 - A6102 Outer Ring Road Timing Points

Clockwise Direction		Anti-clockwise Direction	
Ref	**Description**	**Ref**	**Description**
TP1	Leppings Lane Roundabout Exit	TP1	Meadow Head Roundabout Exit
TP2	Herries Road South Junction	TP2	Jordanthorpe Parkway Roundabout Entry
TP3	Moonshine Lane Roundabout Entry	TP3	Lightwood Lane Roundabout Entry
TP4	Barnsley Road Traffic Light Stop Line	TP4	White Lane Traffic Light Stop Line
TP5	Firth Park Road Traffic Light Stop Line	TP5	Gleadless Road Traffic Light Stop Line
TP6	Holywell Road Traffic Light Stop Line	TP6	Hollinsend Road Traffic Light Stop Line
TP7	Brightside Lane Traffic Light Stop Line	TP7	Hurlfield Road Traffic Light Stop Line
TP8	Attercliffe Common Traffic Light Stop Line	TP8	City Road Traffic Light Stop Line
TP9	Broughton Lane Traffic Light Stop Line	TP9	Harborough Avenue Traffic Light Stop Line
TP10	Shepcote Lane Traffic Light Stop Line	TP10	Castlebeck Avenue Traffic Light Stop Line (Lidl)
TP11	Barleywood Road Traffic Light Stop Line (Portakabin)	TP11	Sheffield Parkway Roundabout Entry
TP12	Coleford Road Traffic Light Stop Line (Mcdonalds)	TP12	Main Road Traffic Light Stop Line
TP12 A	B&Q Traffic Light Stop Line	TP13	Catley Road Traffic Light Stop Line (Lidl Car Park)
TP13	Catley Road Traffic Stop Line (Kwik Fit)	TP13 A	B&Q Traffic Light Stop Line
TP14	Main Road Traffic Light Stop Line	TP14	Coleford Road Traffic Light Stop Line (Mcdonalds)
TP15	Sheffield Parkway Roundabout Entry	TP15	Barleywood Road Traffic Light Stop Line (Portakabin)
TP16	Castlebeck Avenue Traffic Light Stop Line (Lidl)	TP16	Shepcote Lane Traffic Light Stop Line (Cutts Bros)
TP17	Harborough Avenue Traffic Light Stop Line	TP17	Attercliffe Common Traffic Light Stop Line
TP18	City Road Traffic Light Stop Line	TP18	Janson Street Traffic Light Stop Line
TP19	Hurlfield Road Traffic Light Stop Line	TP19	Brightside Lane Traffic Light Stop Line
TP20	Hollinsend Road Traffic Light Stop Line	TP20	Holywell Road Traffic Light Stop Line
TP21	Gleadless Road Traffic Light Stop Line	TP21	Firth Park Road Traffic Light Stop Line
TP22	White Lane Traffic Light Stop Line	TP22	Barnsley Road Traffic Light Stop Line
TP23	Lightwood Lane Roundabout Entry	TP23	Shirecliffe Road Roundabout Entry
TP24	Jordanthorpe Parkway Roundabout Entry	TP24	Herries Road South Junction
TP25	Meadow Head Roundabout Entry	TP25	Leppings Lane Roundabout Entry

Appendix C – Calculation of Route Stress

C.1 Calculation of Route Stress

Calculation of Route Stress (Reliability)

Based on approach in GOMMMS Vol 2 para 6.3.12 and Appendix I.
Congestion Reference Flow based on DMRB 5.1.3 Annex D for Motorway

Link		A	B	PkH	CAPACITY	NL	Wf	PkF	PkD	AADT	AAWT	CRF	Calculated Stress
M1 J31-32	Before	2300	25.0	23.4	1715	3	1	7.3	52.5	132793	143079	124388	106.8%
M1 J31-32	After	2300	25.0	18.3	1842.5	4	1	7.5	52.5	130932	143116	171732	76.2%

A, B - set parameters in the calculation of Routetress by road standard
PkH - Percentage HGV in Peak hour, in peak direction
*Capacity = [A-(B*PkH)]*
NL is the Number of Lanes per direction;
Wf is a Width Factor
PkF is the proportion (percentage) of the total daily flow (2-way) that occurs in the peak hour;
PkD is the directional split (percentage) of the peak hour flow;
AADT is the Annual Average Daily Traffic flow on the link;
AAWT is the Annual Average Weekday Total (Mon - Friday average)
CRF - Congestion Reference Flow: An AADT estimate at which a road is likely to become congested in the peak periods on an average day
*CRF=Capacity*NL*Wf*100/PkF*100/PkD*AADT/AAWT*
Stress = AADT/CRF

Appendix D – Calculation of Accident Rates

D.1 Accident Rate for OPR COBA Accident Boundary

Calculation of Accident Rates: M1 J31-32 Widening

Period	km	AADT	No. days	total	mvkm	accidents
2004	4	133090	365	194311400	194	5
2005	4	133429	365	194806340	195	8
2006	4	132793	365	193877780	194	6
Total 3 Years Before					**583**	**19**
Accident Rate 3 years before						**0.033**

2008	4	130932	365	191160720	191	10
Total 1 Years After					**191**	**10**
Accident Rate 1 Years After						**0.052**

Calculation of National Accident Rates based on COBA manual default accident rates and Accident Rate Reduction Factor (ß) 2000 base

Road Type	Base Accident Rate	(ß)	No of Years to growth	NA Accident Rate
Before D3 Motorway	0.089	1.001	5	**0.089**
After D4 Motorway	0.089	1.001	8	**0.090**

D.2 Accident Rate for Revised Accident Boundary

Calculation of Accident Rates: M1 J31-32 Widening

Period	km	AADT	No. days	total	mvkm	accidents
2004	52	109275	365	2074047574	2074	71
2005	52	109858	365	2085111366	2085	79
2006	52	108995	365	2068723326	2069	85
Total 3 Years Before					**6228**	**235**
Accident Rate 3 years before						**0.038**

2008	52	106533	365	2021992427	2022	64
Total 1 Years After					**2022**	**64**
Accident Rate 1 Years After						**0.032**

Calculation of National Accident Rates based on COBA manual default accident rates and Accident Rate Reduction Factor (ß) 2000 base

Road Type	Base Accident Rate	(ß)	No of Years to growth	NA Accident Rate
Before D3 Motorway	0.089	1.001	5	**0.089**
After D4 Motorway	0.089	1.001	8	**0.090**

Appendix E – Chi Squared Statistical Tests

E.1 Chi Squared Statistical Test for OPR COBA Accident Boundary

Chi-square test to compare accident/casualty rates (no. of accidents or casualties/ traffic volume) before and after the scheme

Chi-square tests can be used to test the association between two classifications (classifier variables) of a set of counts or frequencies.

Observed Data

	Total Number of Accidents	Number of Years over which accidents occurred	AADT (Traffic throughput)	Number of Days in Year	Vehicles Travelled in Sample Period
Before Data	19	3	133,104	365	145,748,880
After Data	10	1	130,932	365	47,790,180
Total Observed (Before + After)	29				193,539,060

Common Accident Rate per million vehicles travelled	1.498E-07

Expected Before, if there was no change as a result of scheme (E1)	21.839
Observed Before (O1)	19
Expected After, if there was no change as a result of scheme, (E2)	7.161
Observed After (O2)	10

Chi Squared Test (Based on Critical Value of 3.84 (Number of Degrees of Freedom = 1, p=0.05)

Before ((O1-E1)^2) /E1	0.369
After ((O2-E2)^2) /E2	1.126
chi-sq = sum(((obs-expected)^2)/expected)	**1.4947**

95% test

We can be 95% confident that the change in accident rate could have occurred by chance alone and therefore the change in accident rates is not necessarily a direct impact of the scheme

The larger the test statistic (for given degrees of freedom) the more likely there is to be a statistically significant association between the two variables

In this case the test statistic is very high

Observed Data

	Total Number of Casualties	Number of Years over which casualties occurred	AADT (Traffic throughput)	Number of Days in Year	Vehicles Travelled in Sample Period
Before Data	31	3	133,104	365	145,748,880
After Data	15	1	130,932	365	47,790,180
Total Observed (Before + After)	46				193,539,060

Common Casualty Rate per million vehicles travelled	2.377E-07

Expected Before, if there was no change as a result of scheme (E1)	34.641
Observed Before (O1)	31
Expected After, if there was no change as a result of scheme, (E2)	11.359
Observed After (O2)	15

Chi Squared Test (Based on Critical Value of 3.84 (Number of Degrees of Freedom = 1, p=0.05)

Before ((O1-E1)^2) /E1	0.383
After ((O2-E2)^2) /E2	1.167
chi-sq = sum(((obs-expected)^2)/expected)	**1.5501**

95% test

We can be 95% confident that the change in casualty rate could have occurred by chance alone and therefore the change in casualty rates is not necessarily a direct impact of the scheme

The larger the test statistic (for given degrees of freedom) the more likely there is to be a statistically significant association between the two variables

In this case the test statistic is very high

E.2 Chi Squared Statistical Test for Revised Accident Boundary

Chi-square test to compare accident/casualty rates (no. of accidents or casualties/ traffic volume) before and after the scheme

Chi-square tests can be used to test the association between two classifications (classifier variables) of a set of counts or frequencies.

Observed Data

	Total Number of Accidents	Number of Years over which accidents occurred	AADT (Traffic throughput)	Number of Days in Year	Vehicles Travelled in Sample Period
Before Data	235	3	109,376	365	119,766,720
After Data	64	1	106,533	365	38,884,545
Total Observed (Before + After)	299				158,651,265

Common Accident Rate per million vehicles travelled	1.885E-06

Expected Before, if there was no change as a result of scheme (E1)	225.717
Observed Before (O1)	235
Expected After, if there was no change as a result of scheme, (E2)	73.283
Observed After (O2)	64

Chi Squared Test (Based on Critical Value of 3.84 (Number of Degrees of Freedom = 1, p=0.05)

Before ((O1-E1)^2) /E1	0.382
After ((O2-E2)^2) /E2	1.176
chi-sq = sum(((obs-expected)^2)/expected)	**1.55777**

95% test

We can be 95% confident that the change in accident rate could have occurred by chance alone and therefore the change in accident rates is not necessarily a direct impact of the scheme

The larger the test statistic (for given degrees of freedom) the more likely there is to be a statistically significant association between the two variables

In this case the test statistic is very high

Observed Data

	Total Number of Casualties	Number of Years over which casualties occurred	AADT (Traffic throughput)	Number of Days in Year	Vehicles Travelled in Sample Period
Before Data	384	3	109,376	365	119,766,720
After Data	105	1	106,533	365	38,884,545
Total Observed (Before + After)	489				158,651,265

Common Casualty Rate per million vehicles travelled	3.082E-06

Expected Before, if there was no change as a result of scheme (E1)	369.149
Observed Before (O1)	384
Expected After, if there was no change as a result of scheme, (E2)	119.851
Observed After (O2)	105

Chi Squared Test (Based on Critical Value of 3.84 (Number of Degrees of Freedom = 1, p=0.05)

Before ((O1-E1)^2) /E1	0.597
After ((O2-E2)^2) /E2	1.840
chi-sq = sum(((obs-expected)^2)/expected)	**2.4377**

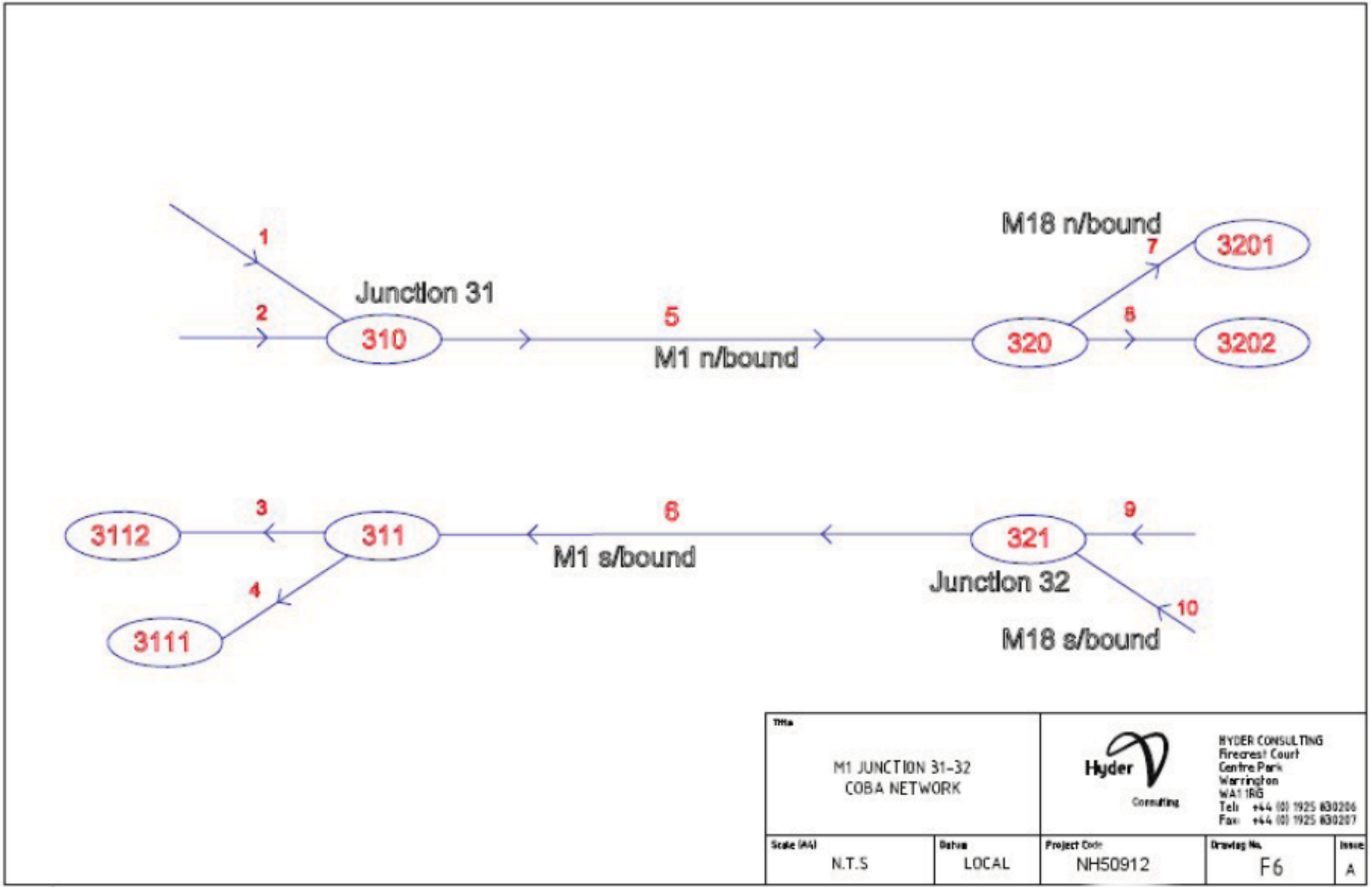
95% test

We can be 95% confident that the change in casualty rate could have occurred by chance alone and therefore the change in casualty rates is not necessarily a direct impact of the scheme

The larger the test statistic (for given degrees of freedom) the more likely there is to be a statistically significant association between the two variables

In this case the test statistic is very high

Appendix F – OPR COBA Network Diagram


1
2
Junction 31
310
5
M1 n/bound
320
M18 n/bound
7
3201
8
3202
3112
3
311
6
M1 s/bound
321
9
Junction 32
4
3111
10
M18 s/bound
Title
M1 JUNCTION 31-32
COBA NETWORK
Hyder
Consulting
HYDER CONSULTING
Fitzcrest Court
Centre Park
Warrington
WA1 1RG
Tel: +44 (0) 1925 830206
Fax: +44 (0) 1925 830207
Scale (A4)
N.T.S
Datum
LOCAL
Project Code
NH50912
Drawing No.
F6
Issue
A

Appendix G – Calculation of Safety Benefits

G.1 Calculation of Safety Benefits for M1 J31-32 Section Only

Number of Accidents

	Fatal	Serious	Slight	Total	AA	%KSI
2004	0	1	4	5		1.4
2005	0	0	8	8		0.0
2006	0	0	6	6	6.3	0.0
2008	0	0	10	10	10	0.0

Opening Year Accident Saving	**-3.7**
Average no. of accidents per year before construction	6.3
Capitalisation factor to 60 years (motorway)	82.4
No of accidents over 60 years without scheme	**522**
Average no of accidents per year on M1 J31-32 section after opening	10
Capitalisation factor to 60 years (motorway)	82.4
No of accidents over 60 years with widening scheme	**824**
Accident Saving Over 60 Years	**-302**
Opening Yr value of PIA	£83,400
Opening Yr accident benefit	-£305,800
60 yr capitalisation factor	72.26
60 yr accident benefit	-£22,097,108
Discount factor	0.814
Safety PVB	**-£17,987,046**

G.2 Calculation of Safety Benefits for Revised Accident Area

Number of Accidents

	Fatal	Serious	Slight	Total	AA	%KSI
2004	0	5	66	71		7.0
2005	1	1	77	79		2.8
2006	2	6	77	85	78.3	11.3
2008	1	6	57	64	64	9.9

Opening Year Accident Saving	**14.3**
Average no. of accidents per year before construction	78.3
Capitalisation factor to 60 years (motorway)	82.398
No of accidents over 60 years without scheme	**6454.51**
Average no of accidents per year in revised accident area after opening	64
Capitalisation factor to 60 years (motorway)	82.398
No of accidents over 60 years with widening scheme	**5273.472**
Accident Saving Over 60 Years	**1181**
Opening Yr value of PIA	£83,400
Opening Yr accident benefit	£1,195,400
60 yr capitalisation factor	72.26
60 yr accident benefit	£86,379,604
Discount factor	0.814
Safety PVB	**£70,312,998**

Appendix H – Economy Calculations

H.1 Vehicle Hours and Vehicle Hour Savings per Weekday

Link	Vehicle Hours					
	Original Study Area			Revised Study Area		
	Before	After	Saving	Before	After	Saving
M1 J30-31 NB	-	-	-	1,736,932	1,692,545	44,387
M1 J31-30 SB	-	-	-	1,731,668	1,796,125	- 64,457
M1 J31-32 NB	1,190,268	1,114,654	75,615	1,190,268	1,114,654	75,615
M1 J32-31 SB	1,052,624	938,968	113,656	1,052,624	938,968	113,656
M1 J32-33 NB	-	-	-	784,831	730,535	54,297
M1 J33-32 SB	-	-	-	948,090	839,135	108,954
M1 J33-34 NB	-	-	-	802,082	754,950	47,132
M1 J34-33 SB	-	-	-	903,100	808,138	94,962
M1 J32-M18 J1 NB	-	-	-	854,266	727,759	126,508
M18 J1-M1 J32 SB	-	-	-	878,203	729,055	149,148
Total	**2,242,892**	**2,053,622**	**189,271**	**10,882,064**	**10,131,863**	**750,201**

H.2 Vehicle Hours and Vehicle Hour Savings per Weekday with equal Before and After Flows

Link	Vehicle Hours					
	Original Study Area			Revised Study Area		
	Before	After	Saving	Before	After	Saving
M1 J30-31 NB	-	-	-	1,736,932	1,742,734	- 5,803
M1 J31-30 SB	-	-	-	1,731,668	1,866,404	- 134,736
M1 J31-32 NB	1,190,268	1,127,374	62,894	1,190,268	1,127,374	62,894
M1 J32-31 SB	1,052,624	965,766	86,858	1,052,624	965,766	86,858
M1 J32-33 NB	-	-	-	784,831	731,544	53,288
M1 J33-32 SB	-	-	-	948,090	876,354	71,736
M1 J33-34 NB	-	-	-	802,082	772,367	29,715
M1 J34-33 SB	-	-	-	903,100	840,235	62,865
M1 J32-M18 J1 NB	-	-	-	854,266	694,395	159,872
M18 J1-M1 J32 SB	-	-	-	878,203	695,734	182,469
Total	**2,242,892**	**2,093,140**	**149,753**	**10,882,064**	**10,312,906**	**569,158**

H.3 Calculation of Value of Time (VoT) Benefits

	Original Study Area	Revised Study Area
Vehicle-hours saved per annum	149,753	569,158
VOT per average vehicle	£12.66	£12.66
VOT savings in opening year	**£1.9m**	**£7.2m**
Capitalisation Factor	50.02	50.02
VOT Benefits	£94.8m	£360.4m
Discount Factor – opening year	0.814	0.814
60 Year VoT Benefits	**£77.2m**	**£293.4m**

H.4 Present Value of Benefits for M1 J31-32 Widening Scheme (£Ms in 2002 prices)

Source of Benefit	Predicted			Outturn	
	AST	OPR COBA	Revised COBA	Original Study Area	Revised Study Area
Value of Time Benefits	£308.2	£329.0	£180.1	£77.2	£293.4
Vehicle Operating Cost		- £17.9	- £15.4	- £15.4	- £15.4
QUADRO Benefits		- £4.1	- £4.1	- £4.1	- £4.1
Accident Benefits	-£11.4	- £11.4	- £3.7	- £18.0	£70.3
Total PVB	**£296.8**	**£295.6**	**£157.2**	**£39.7**	**£344.2**

Appendix I – Environmental Evaluation

I.1 Introduction

I.1.1 This report forms an Appendix to the Post Opening Project Evaluation One Year After Study for the M1 Junction 31 – 32 Widening Scheme and documents the evaluation of the Environmental sub-objectives.

I.2 Data Collection

I.2.1 The standard list of the background information requested and received for this report is included in Table I.13 - Information Requested and Received at the end of this Appendix.

I.3 Site Visit

I.3.1 A site visit was undertaken in July 2009 by a Landscape Architect. The scheme was viewed both from within the highway estate and from adjacent local roads and footpaths. Photographs were taken and have been included within this document where appropriate.

I.4 Consultations

I.4.1 Consultation has been carried out with the Statutory Bodies; Natural England, English Heritage and the Environment Agency as well as Rotherham Metropolitan Borough Council and Sheffield City Council. Consultation sought to establish the opinions of the above on the impacts of the scheme together with their opinion as to whether mitigation measures have been effective. Not all of those contacted felt that they could comment on the scheme. Table I.1 is a summary of the consultees together with their responses.

Table I.1 – Summary of consultees and responses received

Organisation	Field of Interest	Response
Natural England	Landscape and Biodiversity	Was unable to provide a response was not familiar with the scheme. Suggested contacting Rotherham MBC.
English Heritage	Heritage	EH could not provide comment as the scheme was deferred to Local Authority previously.
Environment Agency	Biodiversity & Water	Response received: Biodiversity - not aware of any impacts on biodiversity but have not actively monitored the area. Environmental Management - Not detected any improvement from pollution abatement measures as yet. Groundwater & Contamination - cannot confirm as yet if any issues

Organisation	Field of Interest	Response
		have arisen. Other teams – Other teams within the EA had no adverse comments to make.
Rotherham MBC	General	Not aware of any surveys having being carried out in respect of noise and air quality. Impacts considered as expected for listed buildings and conservation areas.
Sheffield CC	General	Did not feel it was able to make comment.

I.4.2 Further information on the responses received is contained within the specific topic sections in this report.

I.4.3 It is understood from the Highways Agency Part 1 Team that the Scheme is in the early stages of the claim period and it is not yet clear how many claims are likely to be successful. Information relating to Part 1 Claims will be included in the five year after evaluation.

I.5 Traffic Flows

I.5.1 Three of the Environmental Sub-Objectives (noise, local air quality and greenhouse gases) are directly linked to traffic flows. If the observed level of traffic is as that forecasted it can be assumed that the traffic noise and local air quality impacts are as expected.

I.5.2 Traffic volumes along the M1 and around junction 31 were predicted to change by between 0 and 11% due to scheme improvements. Traffic speeds were predicted to change very slightly on some links. The percentage of HGVs was not predicted to change.

I.5.3 The CSR assumed that the widened section would be completed in 2007, with a scheme design year 2022. High growth traffic flows were used in the report to provide a 'worst case' scenario. Figures are included in Table I.2.

Table I.2 - Traffic Forecast Figures included within the Confirmatory Studies Report (2005)

Monitoring Point Locations	2004 (Base Year)	2007 (Opening year)	2022 (Design year)
M1 Mainline	133,463	146,158	173,409
A57 (East of M1)	30,053	33,223	41,367
A57 (West of M1)	32,629	33,013	33,667

I.5.4 At the time of writing this report there was no traffic data available for the A57 monitoring points after completion of the scheme. Comparison of

predicted with actual traffic flows could be considered as part of the five year after evaluation subject to any data being available.

I.5.5 Based on before and after observed traffic flows for the M1 mainline between junctions 31 and 32, including the percentage of HGVs, traffic flows are less than expected in the CSR. The actual 2004 AADT figure was 133,090. Traffic growth increases were assumed whereas in reality, there has been negative traffic growth. From information within the Traffic chapter of the POPE it would also appear that no induced or reassigned traffic has occurred in connection with the widening scheme with the observed flows for 2008/09 being 130,932 AADT.

I.6 Noise

Predicted Impacts

I.6.1 The AST stated that there would be no overall change in noise levels with the scheme compared to the 'Do-minimum' and that low noise surfacing and mounding was proposed.

Comparison of ES (1994) and Confirmatory Studies Report (2005)

I.6.2 A comparison with the 1994 ES recorded that the scheme as proposed in 2005 would result in a reduction in effects mainly due to the inclusion of low noise surfacing. In the 1994 ES it was anticipated that 9 dwellings would be eligible under the requirements of the Noise Insulation Regulations 1975 (as amended 1988). In the 2005 assessment it was predicted that as a result of mitigation that it was unlikely that any properties would be eligible.

I.6.3 Residential properties were considered the most sensitive receptors to the effects of road traffic noise in the 1994 ES, these were used as baseline ambient noise monitoring locations for the October 2005 surveys, the identified locations were: Woodville, Woodville Cottage, Vessey Close Cottages, Craiglea, Penny Hill and Brampton Villa.

Noise Level Changes

I.6.4 The results of the traffic noise assessment concluded that without the scheme, there would be a general rise in noise levels for all receptors of up to 0.5 dB LA10, 18-hour dB by 2022 due to expected traffic growth.

I.6.5 With the Scheme the operation of an extra lane would lead to the road moving slightly closer to some properties. It was predicted that at both opening (2007) and design (2022) years that increases would occur at some properties towards the southern end of the scheme of up to 0.5 LA10, 18-hour dB. It was assessed that this would not be perceptible to the residents of the properties.

I.6.6 Some properties towards the northern end of the scheme would undergo decreases in L_{A10}, 18hour dB of up to 3 dB as a result of the scheme.

Noise Nuisance

I.6.7 All the properties would experience a decrease or no change in nuisance levels with the scheme.

Vibration

I.6.8 No properties were close enough to the scheme to be susceptible to ground borne vibration effects, and vibration from air-borne low frequency noise was also not considered to be significant.

Approved Scheme

I.6.9 It was proposed that where the road was widened it would be surfaced with a low noise surface, which would result in a decrease in noise towards the northern end.

I.6.10 The 1994 ES proposed an earthbund immediately to the south of Vessey Close Farm overbridge, which would be 2m in height by 240m in length. It was predicted that this would shield some traffic noise from Vessey Close Cottages and Vessey Close Farm. An Environmental Bund is shown on the Environmental Objectives Sheet in the Confirmatory Studies Report (2005) between chainages 2300 and 2540 on the southbound side of the motorway estate.

Modification to Scheme

I.6.11 No noise specific modifications recorded.

Consultation Comments

I.6.12 Rotherham MBC is not aware of any surveys being carried out in respect of noise. No further responses in respect of noise are anticipated.

Key Findings

I.6.13 It was confirmed during the site visit and from as built drawings that the Environmental Bund has been constructed in the location anticipated in the before scheme studies. Figure I.1 shows the Environmental Bund, together with the planting.

I.6.14 It was confirmed with the Area 12 Mac that low noise surfacing has been added to this section of the motorway.

I.6.15 Traffic levels are less than forecast, and slightly less than actual flows before the improvements. Further information would be required to confirm noise levels at particular receptors but based on traffic flows the local noise climate should be no worse than before the scheme and may be better than expected although further study would be required to confirm this.

Table I.3 - Evaluation of Noise Sub Objective against AST

Origin of Assessment	Summary of Predicted Effects	Assessment
AST	No overall change in noise levels with the scheme compared to the 'Do-minimum'. Low noise surfacing and mounding proposed Quantitative Measure: Do-Minimum 67 Do-Something 67	0
EST	Noise mound and low noise surface provided as expected, Based on traffic flows which are slightly less than before the improvements and also less than forecast the local noise climate should be no worse than before the scheme and may be better than expected	As Expected and possibly better than expected

Figure I.1 - Environmental Bund Located to the South of Vessey Close Farm Overbridge

I.7 Local Air Quality

Predicted Effects

I.7.1 The AST stated that the air quality assessment indicated a very slight increase in the roadside concentrations of both PM 10 and NO2. NO2 concentrations would be in excess of Air Quality Standards (AQS) in the 0 to 100m bands. Two properties would fall within the predicted exceedance of the NO2 AQS.

I.7.2 There were no AQMA identified between junctions 31 and 32 of the M1 at the time of the 2005 assessment. A comparison between both 'Do-Minimum' and 'Do-Something' schemes indicated less than 1% variation in ambient air concentrations for all years considered as part of the assessment.

I.7.3 The localised, generalised and regional assessments indicated that little change in air quality was expected from the proposed widening of the M1 in comparison to the existing situation.

Approved Scheme including Mitigation Measures

I.7.4 The assessment was based on the widening of the M1 Motorway between junction 31 and 32 from a 3 lane to a 4 lane motorway in both directions. It was stated in the 2005 assessment that based on the modelling results that detailed assessment was not required for the CSR assessment; however that air quality monitoring was recommended for NO_2 for the period between autumn and winter 2005 for one year. It was considered that no scheme specific mitigation measures were required.

Modification to Scheme

I.7.5 No air quality specific modifications recorded.

Consultation Comments

I.7.6 Rotherham MBC is not aware of any surveys being carried out in respect of Local Air Quality. No further responses in respect of noise are anticipated.

Key Findings

I.7.7 The local authority is not aware of any air quality monitoring having been undertaken and no other air quality information has been available for this report. It is suggested that the local authority is contacted for the five year after evaluation to confirm whether any monitoring has subsequently been required. Based on observed traffic flows it is considered that impacts associated with air quality could be better than expected although further study would be required to confirm this.

Table I.4 - Evaluation of Air Quality Sub Objective against AST

Origin of Assessment	Summary of Predicted Effects	Assessment
AST	The air quality assessment indicates a very slight increase in the roadside concentrations of both PM_{10} and NO_2. NO_2 concentrations are in excess of AQS in the 0 to 100m bands. Two properties fall within the predicted exceedance of the NO_2 AQS The Quantitative Measure noted that the net number of properties experiencing a change in PM_{10} would be 10 and NO_2 would be 10	Overall assessment score: PM_{10} = 0.07 $N0_2$ = 0.09
EST	Based on traffic flows which are less than forecast the local air quality may be better than expected.	Possibly Better than Expected

I.8 Greenhouse Gases

Predicted Effects

I.8.1 A comparison between both 'Do-Minimum' and 'Do-Something' schemes indicated that there would be a change in CO2 emissions from 44,448 tonnes in the Do Minimum to 44,876 in the Do Something, a net increase of 428 tonnes.

I.8.2 The localised, generalised and regional assessments indicated that the change in greenhouse gas emission was expected from the proposed widening of the section due to increase in speeds.

Approved (Assessed) Scheme including Mitigation Measures

I.8.3 The assessment was based on the widening of the M1 Motorway between junction 31 and 32 from a 3 lane to a 4 lane motorway in both directions. It was stated in the 2005 assessment that based on the modelling results and advice from the Highways Agency that air quality monitoring was recommended for CO2. This monitoring takes the form of an assessment of traffic volume and speed and these factors have been monitored and used in this evaluation.

Modification to Scheme

I.8.4 No Greenhouse Gas specific modifications recorded.

Consultation Comments

I.8.5 Rotherham MBC is not aware of any surveys being carried out in respect of greenhouse gases. No further responses in respect of noise are anticipated.

Key Findings

I.8.6 Using the greenhouse gases sub objective guidance in WebTAG, CO2 reforecast CO2 emissions have been calculated for the M1 J31-32 widened section only and the revised wider study area.

I.8.7 For the widened section only, the DM Carbon emissions are +18,900 and for the DS +18,990. This equates to an increase in carbon emissions of 90 tonnes. For the revised study area, the DM Carbon emissions are +92,551 and +93,453 for the DS. This equates to an increase in carbon emissions of 90 tonnes.

Table I.5 - Evaluation of Greenhouse Gases Sub Objective against AST

Origin of Assessment	Summary of Predicted Effects	Assessment
AST	There would be an overall increase in CO_2 emissions from the major road networks Quantitative Measure: +44,448 Do Minimum +44,876 Do Something	+428 Tonnes
EST	There is an increase in overall CO_2 emissions from the +18,900 Do Minimum, +18,990	+90 Tonnes

I.9 Landscape

Predicted Effects

I.9.1 The AST stated that in Winter Year 1 there would be an adverse impact on landscape local character, as a result of the loss of existing vegetation and the introduction of gantries. Areas of removed vegetation would be replaced and further enhanced by proposed planting measures. Mitigation planting would generally reduce the visual impact from all visual receptors, although most would still experience a barely perceptible deterioration in their view. The overall impact was predicted to be slight adverse.

Comparison of ES (1994) and Confirmatory Study (2005)

I.9.2 The CSR concluded that the landscape effects identified within the ES resulting from the widening of the carriageway and the loss of planting were generally still appropriate.

Visual Intrusion

I.9.3 The widening of the carriageway would have only a slight impact on landscape and visual receptors, with most of the intrusion resulting from the addition of the lighting columns and gantries. Existing night-time views from the settlements, including the village of Ulley, included headlights from the

existing traffic within the motorway corridor. It was expected that the proposed cut-off lighting would increase light levels marginally.

I.9.4 The existing route was assessed overall as not highly visible and that the changes would be minimal. A total of nine visual receptors were identified, three were predicted to experience moderate adverse visual impacts in the first year of the works;

- Craig – Lea to Haven (10 properties), Worksop Road, Aston;
- Croft Farm, Aston; and
- Ulley Beeches, High Lane.

I.9.5 It was noted that users of High Lane route (parallel to motorway from bridge to Ulley Beeches) experienced substantial visual intrusion which would hardly be altered as a result of the proposals.

Landscape Character

I.9.6 The landscape was assessed as 'good' in the CSR noting that the area to the west of the motorway was designated as an 'Area of County Landscape Value'. It was concluded that there would be a slight adverse, short to medium term, impact on the landscape mainly as a result of the lighting columns. However it was assessed that the effect would be mitigated in parts by the existing and proposed vegetation.

I.9.7 It was predicted that vegetation loss would be required to the bottom of the slopes between Junction 31 and Vessey Close Farm as a result of the construction of retaining structures. This loss of existing vegetation was expected to have a slight adverse impact on landscape character.

Approved Scheme including Mitigation Measures

I.9.8 The scheme was designed to minimise light pollution at the request of the then Countryside Agency (now Natural England). It was also proposed that the extent of lighting would be minimised by the use of lanterns with full cut-off capability.

I.9.9 Proposed planting locations included, near Vessey Close Farm Overbridge. It was considered that the proposed environmental bund and planting near Vessey Close Farm overbridge would improve views from the Vessey Close Farm and Cottages.

I.9.10 Off site planting was suggested in the 2005 assessment as desirable at two locations to minimise the visual impacts of the scheme from the village of Ulley and Vessey Close Cottages;

- to the south of Vessey Farm Overbridge east of the carriageway; and
- off High Lane, near Ulley Beeches west of the carriageway.

I.9.11 It was stated within the ES that existing planting to be retained should be protected by temporary fencing during construction. It was reported in the

Environmental Action Plan that during site establishment areas of habitat and plants would be cordoned off to prevent damage from machinery and stockpiled material and this would be monitored on a weekly basis. Existing vegetation would appear to have been retained as expected.

Modification to Scheme

I.9.12 During the site visit it was recorded that lighting was not included in the widening scheme. It is noted that this is taken into account in the 2006 AST.

Consultation Comments

I.9.13 Natural England felt unable to provide feedback as it was not familiar with the scheme.

Key Findings

Visual Intrusion

I.9.14 Two photomontages were included within the Environmental Statement (1994), and are shown in Figures I2 and I3 overleaf.

Figure I.2 - Photomontage 1

Figure I.3 - Photomontage 2

I.9.15 During the site visit photographs (Figures I.4 and I.5) were taken from these viewpoints for comparison. The photographs illustrate that the proposed scheme generally appears as was expected with the exception that lighting has not been included. This change to in original scheme was noted in the 2006 version of the AST.

I.9.16 During the summer 2009 site visit the visual impact at receptors noted in the Confirmatory Studies was evaluated these are shown in Table I.6. It would be appropriate to re-visit these locations for the five year after study.

I.9.17 It is considered that the environmental mounding provided near Vessey Close Farm overbridge does improve views from Vessey Farm as expected. New planting has been provided and is establishing satisfactorily. The ongoing establishment and effectiveness of this as a screening measure would need to be confirmed during the five year after study. Figures I.6 and I.7 illustrate the screening provided by existing vegetation within the highway boundary located to the west of the motorway near Junction 31.

Table I.6 - Evaluation of Predicted Effects on Visual Receptors

Visual Receptor		Predicted Impact Year 1		Evaluation	
Craig – Lea to Haven, Worksop Road, Aston.	10 no. Residential properties	Some loss of vegetation and view of wider carriageway, 1 new gantry and new lighting. Views of lighting and gantries more evident in winter. Noticeable deterioration in view	Moderate Adverse	Lighting not included within constructed scheme. Vegetation retained as part of the Scheme to the west of the carriageway. Glimpsed views of gantries maybe visible.	Better than Expected in original assessment but As Expected in AST 2006 version
Croft Farm, Aston.	Farmhouse	Some loss of vegetation and view of wider carriageway, 1 new gantry and new lighting. Visual detractors more evident in Winter.	Moderate Adverse	Lighting not included within constructed scheme. Vegetation retained as part of the Scheme to the west of the carriageway. Glimpsed views of gantries maybe visible.	Better than Expected in original assessment but As Expected in AST 2006 version
Ulley Beeches, High Lane.	Residential property	Proposed lighting columns and 3 gantries visible. Traffic visible closer to the property. Noticeable deterioration in the existing view	Moderate Adverse	Lighting not included within constructed scheme. Glimpsed views of gantries maybe visible.	Better than Expected in original assessment but As Expected in AST 2006 version

Figure I.4 - View from Vessey Close Farm Overbridge Looking Southwards

Figure I.5 - View from Vessey Close Farm Overbridge Looking Northwards

Figure I.6 - View from Worksop Road, Aston. Existing Highway Vegetation present in the background.

Figure I.7 - View looking towards the motorway in an easterly direction from the footpath route located to the north of Aston. Vegetation to the boundary of the Motorway visible on the horizon.

Landscape Character

I.9.18 As the lighting has not been included as part of the scheme it is considered that the impact on Landscape Character could be better than expected. The loss of existing vegetation on the impact on landscape character is as expected.

I.9.19 It was predicted that vegetation loss would occur to the bottom of the slopes between the Junction 31 and Vessey Close Farm as a result of the construction of retaining structures. Figure I.8 illustrates the typical ground retention, using Soil Nailing, and existing vegetation retained along the section of the scheme between Junction 31 and 32 and the extent of vegetation loss. The ongoing establishment of seeding on the soil nailed slopes and adjacent planting should be evaluated during the five year after study.

I.9.20 Planting within the highway estate has been undertaken as expected and in line with that proposed in the CSR figures and it is generally establishing satisfactorily and providing a framework for the road. Stakes, ties and guards are present on most plants and it was noted that maintenance is being undertaken (Figure I.9). However, there is some noxious weed growth present. Ongoing establishment of planting and seeding should be evaluated as part of the five year after study.

I.9.21 The Employers Agent confirmed that off site planting by agreement has not been required and suggested this could be due to the bunds included in the scheme. The fact that lighting did not form part of the final design might also be a consideration.

I.9.22 The Tree Windthrow Risk Assessment undertaken in December 2005, recommended that prior to the handover of the landscape and tree works a condition inspection of retained trees be undertaken to ensure that decay, structural faults or construction damage to roots and stems had not impaired tree stability. Confirmation is being sought as to whether this was undertaken and will be included within this report when received.

I.9.23 Subject to successful ongoing establishment of retained and new planting, and seeding it is considered at the one year after stage that the impacts are as expected. Establishment of the planting and seeding should be reviewed as part of the five year after report.

Figure I.8 - The retention of existing vegetation adjacent to the soil nailed section of ground located between Junction 31 and Vessey Close Farm

Figure I.9 - Establishment of planting on the Motorway Embankment

Table I.7 - Evaluation of Landscape Sub Objective against AST

Origin of Assessment	Summary of Predicted Effects	Assessment
AST	Winter Year 1 adverse impact on landscape local character, as a result of the loss of existing vegetation and the introduction of gantries. Areas of removed vegetation will be replaced and further enhanced by proposed planting measures. Mitigation planting will generally reduce the visual impact from all visual receptors, although most will still experience a barely perceptible deterioration in their view.	Slight Adverse
EST	New planting has been provided within the motorway estate and is establishing satisfactorily. Existing planting has been retained where possible. The lighting proposed as part of the initial Scheme was later omitted and this was taken into account in the AST used for this report. Overall the evaluation is considered to be as expected in the AST but better than expected within the ES.	Likely to be As Expected

I.10 Cultural Heritage

Predicted Impacts

I.10.1 The AST stated that there would be a slight increase in visual impact at two Grade II listed buildings and the two conservation areas of Ashton and Brampton-en-le-Morthern with a slight adverse impact predicted overall.

Comparison of ES (1994) and Confirmatory Study Report (2005)

I.10.2 The conclusions of the ES, which stated that ‘no sites of historical or cultural interest would be affected; remained the same after the re-assessment reported in the CSR.

I.10.3 The CSR contained a summary of the Cultural Heritage Desk Based Assessment published in 2003, which included consultations with English Heritage, South Yorkshire Archaeology Service and Rotherham Metropolitan Borough Council.

Conservation Areas

I.10.4 It was predicted that both Aston and Brampton-en-le-Morthen conservation areas would experience minimal impacts and would be unaffected by the construction works.

I.10.5 At the time of writing the confirmatory study a new Conservation Area, Ulley, was being considered for designation by Rotherham MBC, this area was located 1.5km from the motorway corridor.

Listed Buildings

I.10.6 A total of 42 listed buildings were identified within the study area, however impacts were only predicted for one of them, a Dovecote (Grade II Listed), at

Vessey Close Farm. It was assessed that during construction increased visual intrusion of the motorway would occur. However, the proposed landscape screening towards the Vessey Close Farm overbridge and the construction of the earthbund would result in the motorway not affecting the setting of the Dovecote, post construction.

I.10.7 In addition to the features highlighted in the ES and CSR, Hardwick Hall Farm buildings (Grade II Listed) and Hardwick Grange (Grade II* Listed Building) were identified in the AST worksheets. No direct impact upon the listed buildings was predicted, however, increased levels of visual intrusion were predicted during construction, which would be mitigated post construction with the inclusion on the environmental bund.

Archaeology

I.10.8 The nearest SMR (Scheduled Monument Record), 80m from the motorway boundary, was identified as an area of 'Ridge and Furrow' cultivation earth works. It was assessed that this SMR would not be adversely affected.

Approved Scheme including Mitigation Measures

I.10.9 The following mitigation measures were proposed to screen any visual intrusion on the identified features of heritage importance. The earthbund to the south of Vessey Close Farm overbridge would mitigate against the impact on the setting of heritage resources. Tree planting was proposed to the north of Vessey Close Farm and this together with the retention of existing vegetation along the southbound verge within the existing motorway boundary would provide screening.

Modification to Scheme

I.10.10 During the site visit it was recorded that lighting was not included in the widening scheme.

Consultation Comments

I.10.11 English Heritage could not provide comments as the scheme was previously deferred to the Local Authority for consultation.

I.10.12 Rotherham MBC responded that there are a handful of listed buildings and two conservation areas (Aston and Brampton-en-le-Morthern) within 1km of the widening scheme. Not aware of any issues raised by owners of the listed buildings before or after the scheme was implemented. At a recent site meeting at a listed building in Brampton traffic noise was intrusive and possibly worse than previously recalled. However, Brampton is near the junction of the M1/M18 and the problem depends on wind direction. Overall, impact as expected.

Key Findings

I.10.13 It is considered that the provision of the environmental earthbund and new landscape planting adjacent to Vessey Close Farm has helped screen the setting of the Listed Building (Figure I.10) and the identified SMR Ridge and Furrow (Figure I.11) from the motorway widening and impacts are as expected.

I.10.14 During the site visit it was confirmed that the existing vegetation provides a screen for the motorway from the collection of Listed Buildings identified in the AST worksheets at Hardwick Grange (Figure I.12)

Figure I.10 - Taken from Hardwick Lane, looking in a westerly direction towards the Dovecote and the Motorway (M1) beyond the trees.

Figure I.11 - Taken from the track to Vessey Close Farm looking in a south westerly direction, over the site of 'Ridge and Furrow' towards the Motorway (M1)

Figure I.12 - Taken from the footpath adjacent to Hardwick Grange, Vessey Lane. Looking in a north westerly direction towards the Motorway (M1)

Conservation Areas

I.10.15 The impacts on the Conservation Areas of Ashton and Brampton-en-le-Morthern are considered to be as expected. Figures I.13 and I.14 are taken from within the Conservation Areas looking towards the Motorway (M1).

I.10.16 Rotherham MBC has confirmed that Ulley village has not been designated as a Conservation Area to date, however this is still under consideration.

Figure I.13 - View looking in a south westerly direction towards the motorway (M1) from Toad Lane in Brampton-en-le-Morthen

Figure I.14 - View looking in a north easterly direction towards the Motorway (M1) from a public footpath route located on the eastern boundary of Ashton Conservation Area

Table I.8 - Evaluation of Heritage Sub Objective against AST

Origin of Assessment	Summary of Predicted Effects	Assessment
AST	Slight increase in visual impact at two Grade II listed buildings and two conservation areas of Ashton and Brampton-en-le-Morthern.	Slight adverse
EST	Any impacts on the setting of the identified sites of cultural heritage importance, Conservation Areas, Listed Buildings and the area of Ridge and Furrow are limited as expected - screened by retained planting northbound of Vessey Close Overbridge, and new planting within the highway estate and on the environmental bund	As Expected.

I.11 Biodiversity

Predicted Impacts

I.11.1 The AST stated that the Scheme would result in slight adverse impacts on Brampton Common Site of Scientific Interest, motorway verges, planted broadleaved woodland, ruderal vegetation, relict magnesian limestone grassland and diverse ephemeral / short perennial flora. There was expected to be a slight adverse impacts on badgers and birds and neutral impacts on bats. Overall the impact was predicted to be slight adverse.

Comparison of ES (1994) and Confirmatory Studies (2005)

I.11.2 Badgers were not highlighted as using the area in the ES, however they were included within the CSR.

I.11.3 The survey work that formed part of the ES identified sneezewort being present within the Study Area. This was not reported in the CSR.

Confirmatory Studies 2005

I.11.4 It was stated that no statutory sites would be affected by the proposed works and it was predicted that the following impacts would occur;

- indirect impacts from the motorway run off affecting local watercourses of Ulley Brook and Ulley Beech Brook (non-statutory nature conservation sites);
- no direct or indirect impacts on Nickerwood and Rocky Bottom SSI, located to the southwest of Junction 31; and
- low adverse, short term effect on Brampton Common located north and east of Vessey Close farm overbridge. This was recorded as being of little ecological value within the Environmental Impact Table.
- The field study undertaken for the CSR found no ditches, slow flowing streams or ponds suitable for Water Voles that would be directly affected by

the proposed widening. It was reported that due to the low availability of suitable habitat for this species the potential impacts were described as moderate and short term in nature.

I.11.5 One pond was highlighted within the 'before studies', as being situated within 50m to the east of the motorway, near to Vessey Close Farm. Table I.10 is an extract from the CSR and indicates the predicted impacts together with the recommended mitigation measures included within the Confirmatory Study.

Table I.10 - Predicted Biodiversity Impacts (From Confirmatory Studies Report, 2005)

Site/Species and Nature Conservation Value	Potential Impact(s)	Positive/ Negative	Significance of Impact	Comment
Non-statutory sites within the local area.	None identified. Potential impacts during construction identified in 1994 ES.	No Effect	No Impact	Local SSIs too far from the proposed route for any direct or indirect impacts to be likely. Adoption of good working practices as identified in the 1994 ES.
Relict Magnesian limestone grassland.	Removal and encroachment from works.	Negative	Minor	Measures should be in place to ensure that the seed is collected from this site prior to works and re-sown in a nutrient poor sub soil following completion of works.
Diverse ephemeral short perennial.	Removal and encroachment from works.	Negative	Minor	As with relict Magnesian grassland.
Watercourses.	Impacts on water quality, noise and dust pollution during construction.	Negative	Minor	The significance of this impact would be greatly reduced through good working practices.
Planted broad-leaved trees. Important habitat for local bird species.	Removal of some trees for carriageway widening.	Negative	Minor	Areas of trees provide important cover for a number of species. Some removal of trees is unavoidable and should be kept to a minimum. Clearance should take place outside the bird-nesting season to avoid disturbance to breeding birds.
Tall Ruderal grassland	Some removal and encroachment from works.	Negative	Negligible	Where possible areas resulting in loss of this grassland type should be re-seeded into nutrient poor sub soil using a seed-mix much the same as the structure of the relict Magnesian limestone grassland type.
Tall semi-improved grassland.	Some removal and encroachment from works	Negative	Negligible	As tall ruderal.

Site/Species and Nature Conservation Value	Potential Impact(s)	Positive/ Negative	Significance of Impact	Comment
Great Crested Newts: Protected under the Wildlife & Countryside Act 1981 and EC legislation.	Impacts on water quality, removal of vegetation.	Negative	Moderate	Removal of vegetation adjacent to the pond and watercourses should be kept to a minimum. Potential hibernacula must be kept in situ. Amphibian fencing may be required.
Water Voles: Protected under the Wildlife & Countryside Act 1981.	Impacts on water quality, loss of habitat, disturbance during construction.	Negative	Moderate	The significance of this impact would be greatly reduced through good working practices. Removal of vegetation should be kept to a minimum.
Wild Birds: Including UK BAP Priority Species and BoCC red, amber and green listed species.	Disturbance during construction.	Negative Short-term	Moderate	The significance of this impact would be greatly reduced through good working practices and appropriate timing of works. Temporary effects of disturbance during construction.
Badger: Protected under the Wildlife & Countryside Act 1981 and the Protection of Badgers Act 1992.	Disturbance of badger foraging area and possible sett.	Negative Short-term	Moderate	Badgers known to be using small copse in study area. Surveys should be conducted prior to works to ensure no sett has been established.
Bats: Protected under the BERN Convention; the Wildlife & Countryside Act 1981; Schedule 2 of the Conservation (Natural Habitats) Regs 1994.	Disturbance to potential foraging area.	Negative Short-term	Moderate – Short Term	The significance of this impact would be greatly reduced through good working practices and appropriate timing of works.

Approved (Assessed) Scheme including Mitigation Measures

I.11.6 The mitigation measures recommended in the CSR were generally the requirement for the implementation of good working practices during the construction of the scheme including the retention of the maximum amount of habitat and a watching brief kept by a professional ecologist. Surveys for Great Crested Newts were also recommended.

I.11.7 Habitat creation is included on the Environmental Objective drawings in the form of areas of Conservation Grassland to be re-seeded using a seed mix with the same structure as the relict Magnesium Limestone Grassland type.

Modification to Scheme

I.11.8 No specific modifications to the scheme have been confirmed in connection with the Biodiversity sub-objective.

Consultation Comments

I.11.9 The Environment Agency commented that they are not aware of any impacts on biodiversity but have not actively monitored the area.

I.11.10 Natural England was unable to provide any feedback as it was not familiar with the scheme or the local setting. NE suggested contacting the ecologist at Rotherham MBC. No comments were received and it is suggested that Rotherham MBC is consulted with again for the five year after report.

Key Findings

I.11.11 The following environmental measures were included within the Environmental Action Plan (part of the CEMP) and treatment of environmental areas programme:

- Check Vessey Close Bridge for the presence of Bats on a weekly basis;
- Check plantations and scrub for signs of badger activity on a weekly basis;
- Check woody vegetation for birds nest before felling in January 2007;
- Survey using Artificial Cover Objects to start in February or March 2007 prior to habitat clearance of excavation works, other than on mown verges, to determine the presence of GCNs;
- Erection of protective fencing and maintaining integrity of newt fencing on a weekly basis; and
- Top soil to be removed from grassland / botanically rich areas and stored to act as a seed bank for spreading on new slopes and verges. Re-plant similar assemblage of species of different ages. Re-seed embankments with calcareous grassland mixture, preferably sourced from a local magnesium limestone site, to mitigate for loss of degraded relict areas of magnesium limestone grassland.

I.11.12 Within the CEMP it was noted that the only Protected Species for which a risk had been identified was great crested newts but review of existing data identified a lack of information relating to the status of reptiles on the site and the CEMP suggested that until surveys were completed the precautionary principle required that this group was also treated as being at risk. During the CEMP survey work it was established that the pond, which lies 150m east of the motorway, held a small population of great crested newts. The road improvements required existing soft estate to be removed to accommodate the new carriageway. Existing terrestrial habitat linked the pond with the motorway verge so a DEFRA GCN development licence was obtained (WLF 024036).

I.11.13 It is understood that annual post opening monitoring to June 2010 is an obligation under the consent for the highway improvements and is being undertaken for Great Crested Newts at Vessey Farm Pond. It has been confirmed by the Employer's Agent that field surveys were carried out between March and June

2008. The surveys established that the pond is still being used by amphibians, including great crested newts. The records show that an increase in great crested newt population has occurred during the time since 2006. Based on the survey results to date it would appear that the mitigation measures have benefited the great crested newts and other amphibian populations. Results of the ongoing monitoring should be made available to inform the Five Year After evaluation.

I.11.14 Figure I.15, shows this pond in its context. Tall ruderal vegetation is present around the pond.

I.11.15 Based on the monitoring regime during construction included within the CEMP and the level of vegetation retention during the scheme it is likely that the impacts are as expected in respect of badgers.

I.11.16 In respect of bats none of the existing structures on the motorway were widened during the construction of the scheme. Vegetation loss is in line with that anticipated therefore it is likely that the impacts are as expected.

I.11.17 Animal mortality data has been received from the MAC. During the MAC commission (June 2003 to date) there have been a total of 4 recorded incidents on this section of the motorway. None of which have occurred after the opening of the widening scheme.

I.11.18 Based on the As-Built landscape plans and site visit it appears that the planting areas have generally been incorporated in line with the proposed mitigation measures. It has not been possible to evaluate the success of the establishment of the Magnesium Limestone grassland areas at this one year after stage (Figure I.16) as no survey information was made available to POPE.

I.11.19 Biodiversity should be further evaluated at the five year after stage when further monitoring information would be available. Rotherham MBC and the local Wildlife Trust should be consulted with for the five year after report.

Figure I.15 - Pond located to the east of the Motorway, within Vessey Close Farm

Figure I.16 - Location of retained Magnesium Limestone grassland south of Vessey Close Farm Overbridge

Table I.9 - Evaluation of Biodiversity Sub Objective against AST

Origin of Assessment	Summary of Predicted Effects	Assessment
AST	Scheme will result in slight adverse impacts on Brampton Common Site of Scientific Interest, motorway verges, planted broadleaved woodland, ruderal vegetation, relict magnesian limestone grassland and diverse ephemeral/short perennial flora. There will be slight adverse impacts on badgers and birds and neutral impacts on bats.	Slight Adverse
EST	From the information received, in the Construction Environmental Management Plan and Great Crested Newt Monitoring records year 1, together with the establishment of vegetation viewed during the site visit, it is considered that the impacts of the Scheme on Biodiversity are likely to be As Expected. Rotherham MBC should be consulted at the five year after stage.	Based on the information available it is likely that impacts are As Expected

I.12 Water Environment

Predicted Impacts

I.12.1 It was expected that a neutral effect would occur on Pigeon Brook and Anston Brook and a slight beneficial effect would occur on Ulley Brook and Ulley Beech Brook.

I.12.2 The AST stated that there would be slight beneficial impacts on water quality on two watercourses and neutral impacts on two watercourses. The Scheme was not expected to increase the risk of flooding. The increase in surface runoff would be attenuated by a new infiltration pond. A slight beneficial impact was predicted overall.

Risk of Accidental Spillage

I.12.3 The calculations included as part of the 2005 confirmatory study identified that the probability of serious pollution incident occurring would be once in 67 years, less than the threshold. An acceptable risk was reported at the time of the 'before studies' as 1 in 50 years for watercourses, excluding sensitive watercourses and aquifers reported as 1 in 100years.

Ground Water

I.12.4 No Source Protection Zones within the study area and unlikely that significant impacts to groundwater would occur.

Drainage and Flooding

I.12.5 The proposed drainage system and pollution control measures included as mitigation would reduce the risks at the outfalls.

I.12.6 It was stated that the implementation of the proposed drainage system would have a net beneficial impact on operational discharges compared to the Do-minimum scenario.

Approved Scheme and Mitigation Measures

I.12.7 The following mitigation measures were proposed in the before scheme studies:

- Edge of pavement combined filter drains or kerb gullying connection to a carrier drain situated in the verge
- Storage pipes to temporarily retain flows in excess of existing flows for all rainfall events up to and including a 1 in 50 year return period.
- Oil interceptor with a integral silt trap at or near the outfall point with a minimum capacity of $20m^3$
- A penstock facility to permit isolation in the event of an accidental spillage
- A trapped outlet to the receiving ditch or stream course to retain silt and oils in the ditch
- A Penstock at each outlet to permit isolation in the event of an accidental spillage.

I.12.8 It was stated that the rainfall onto the carriageway would be removed by surface water channels at the edge of each carriageway, which would outfall into surface water pipes. Existing pipes would remain as part of the system where possible.

I.12.9 All the highway runoff from the widened section would be discharged into the existing outfall at Junction 31. It was proposed within the Confirmatory Studies Report that the pipes would outfall into an infiltration basin in the verge at the centre of Junction 31.

I.12.10 It was stated in the confirmatory study that mitigation would include consultation with The Environment Agency, responsible for issuing the necessary consents for working in or discharging to rivers.

Modification to Scheme

I.12.11 It is understood that before construction commenced it was agreed with the Environment Agency that the proposed Infiltration area at Junction 31 was not required and alternative measures including the lining of lengths of ditches adjacent to the outfalls and installation of Penstocks as a means on interception during any pollution events.

Consultation Comments

I.12.12 In respect of environmental management and groundwater and contamination the Environment Agency commented that there are no improvements from pollution abatement measures as yet and it cannot confirm as yet if any issues have arisen. No adverse comments have been received from other teams within the EA.

Key Findings

I.12.13 Based on the As Built drawings, site visit and discussion with the employers agent pollution control measures have been included at the Outfalls near Ulley Beech Brook and Ulley Brook (Figures I.17, I.18 and I.19) and Pigeons Brook. At some outfalls a penstock equipped lined ditch has been provided and at others a tank where flows can be diverted, again by the use of penstocks. It is understood that the EA was of the view that interceptors are of limited value and did not support installing them.

I.12.14 Kerb edge gullies and filter drains have been included as part of the drainage on the Scheme (Figures I.20 and I.21).

Figure I.17 - Penstock facility located at Ulley Beech Outfall

Figure I.18 - Open ditch drainage located near Ulley Beech Brook Outfall

Figure I.19 - Manhole cover of Interceptor located near Ulley Beech Outfall

Figure I.20 - Edge of highway gully located on the northbound carriageway

Figure I.21 - Filter drain located on the edge of the carriageway

I.12.15 No confirmation in respect of the requirement for pollution control measures at the Outfall into Pigeon Brook was available at the time of writing.

I.12.16 Information received to date has not highlighted any adverse impacts on the water environment as a result of the Scheme and it is likely that impacts are as expected. Water should be re-considered in the five year after evaluation when it is expected that more information would be available.

Table I.10 - Evaluation of Water Environment Sub Objective against AST

Origin of Assessment	Summary of Predicted Effects	Assessment
AST	There will be slight beneficial impacts on water quality on two watercourses and neutral impacts on two watercourses. Scheme will not increase risk of flooding. Increase in surface runoff will be attenuated by a new infiltration pond.	Slight Beneficial
EST	Evidence of the inclusion of pollution control measures has been recorded throughout the scheme and Outfalls 2 and 3, Ulley Beech Brook. It is understood that before construction commenced it was agreed with the Environment Agency that the proposed Infiltration area at Junction 31 was not required.	Based on information received it is likely to be As Expected.

I.13 Physical Fitness

Predicted Impacts

I.13.1 The AST stated 'not applicable' under qualitative impacts, with a neutral score overall.

I.13.2 The ES concluded that there would be no alteration to the footpath network, though some inconvenience might occur during construction. The CSR confirmed that there would be no permanent closure of footpaths or bridleways, nor any permanent loss of amenity.

I.13.3 It was assessed that no new severance of pedestrian or equestrian movement would occur as a result of the proposed scheme.

Approved Scheme and Mitigation Measures

I.13.4 The Non–Motorised User (NMU) Crossing Survey prepared in 2002 recommended improvements, comprising of a drop crossing at the junction 31 to accommodate NMUs.

Modification to Scheme

I.13.5 None recorded.

Consultation Comments

I.13.6 No responses in respect of physical fitness are anticipated.

Key Findings

I.13.7 It is understood that no MNU post opening survey has been undertaken on the basis that NMUs are prohibited access to the Motorway. No new surveys of footpaths or bridleways have been carried out for this report. It is considered unlikely that the improvements within the motorway corridor will have had any impact on users of the PROWs.

I.13.8 The existing footpath route that runs along High Lane is very close to the motorway as can be seen in Figure I.22 below, existing hedges have been retained and it is considered that although the new gantries are visible that the visual intrusion has remained similar to before the scheme, as expected

I.13.9 In line with the recommendations of the NMU survey dropped kerbs are present at pedestrian crossing points on the roundabout at Junction 31. It is understood that dropped kerbs were provided prior to the scheme. (Figures I.23 and I.24).

Table I.11 - Evaluation of Physical Fitness Sub Objective against AST

Origin of Assessment	Summary of Predicted Effects	Assessment
AST	Not applicable	Neutral
EST	The site visit confirmed that paths have remained open there was no restriction to access along them or additional severance. Dropped kerbs have been provided as recommended.	As Expected

Figure I.22 - View from footpath route (High Lane) looking towards the Motorway (M1) in a south easterly direction

Figure I.13 - Dropped kerb at pedestrian crossing point on the roundabout at Junction 31

Figure I.24 - Dropped kerb at pedestrian crossing point on the roundabout at Junction 31

I.14 Journey Ambience

Predicted Impacts

I.14.1 The AST stated that traveller stress was likely to improve slightly due to more free flowing traffic and fewer delays. Congestion would not increase by the design year. Overall the impact was predicted to be moderate beneficial.

Driver Views

I.14.2 It was commented on within the Landscape Section of the CSR with regards to Journey Ambience, the addition of gantries on the motorway was expected to have an impact on the visual quality of the landscape as viewed by the motorist. It was assessed that there would be no change in the short-term; however, increased planting would limit longer distance views from the motorway in the medium term.

Driver Stress

I.14.3 It was assessed in the Environmental Impact Tables that driver stress was high. In terms of safety it was assessed that there would be no change.

Driver Care

I.14.4 In terms of driver care it was assessed that in terms of driver information that it would be better as a result of the scheme. Driver cleanliness, facilities and environment were considered not applicable.

Approved Scheme and Mitigation Measures

I.14.5 No specific mitigation measure.

Modification to Scheme

I.14.6 None recorded.

Consultation Comments

I.14.7 No responses in respect of journey ambience are anticipated.

Key Findings

Driver Ambience and Traveller Care

I.14.8 It was noted during the site visit that there were several SOS locations along the scheme and dedicated refuge areas for maintenance vehicles, which are located off the hard shoulder when the hard shoulder running is in operation. The SOS communication point is located behind safety barriers in most instances (Figure I.25).

Figure I.25 - Refuge Area and SOS point

Traveller Stress

I.14.9 Traveller stress is split into 3 components. This includes frustration, fear of accidents and route uncertainty.

I.14.10 In terms of frustration, the scheme was predicted to reduce journey times and improve vehicle speeds. The additional lane in both directions and the improved lane layout has resulted in reduced journey times and increased speeds on the widened section.

I.14.11 In terms of fear of accidents, the scheme was predicted to result in an increase in accidents, in both the opening year and over the 60 year appraisal period. The scheme was also expected to increase speeds on the widened section, would improve land markings and include a new safety barrier. Post opening, although the scheme has resulted in an increase in accidents, there has been a reduction in the HGV % on the widened section, with lane markings and the crash barrier both improved.

I.14.12 In terms of route uncertainty, the scheme has improved journey times and the addition of new electronic gantry signs has improved the amount and quality of information available to drivers on the section.

I.14.13 It is expected that the impact on traveller stress has slightly improved.

Traveller Views

I.14.14 The proposed off site planting has not been undertaken, it is considered that views for motorways users are more open to views to the surrounding countryside than was expected.

I.14.15 It is considered that the effect of the introduction of the gantries on driver views is as expected.

Table I.12 - Evaluation of Journey Ambience Sub Objective against AST

Origin of Assessment	Summary of Predicted Effects	Assessment
AST	Traveller stress is likely to improve slightly due to more free flowing traffic and fewer delays. Congestion will not increase by the design year	Moderate Beneficial
EST	The proposed off site planting has not been undertaken allowing more long distance open views for motorway users to the surrounding countryside. The impact on traveller stress has been slight beneficial due to the improved journey times and improved driver information.	As Expected

Table I.13 – Information requested and received

Information Requested	Comments
AST	AST version dated 17th March 2006
Environmental Statement	The widening scheme was subject to an EIA and was reported in an ES published in 1994. The scheme was put on hold and due to the time lapse, in 2005 the Highways Agency requested that confirmatory studies be undertaken to update the baseline information. The Confirmatory Studies Report (CSR) for the scheme was published in October 2005. A Tree Windthrow assessment was published in December 2005
As Built drawings for landscape, ecological mitigation measures, drainage, fencing, earthworks etc	It was confirmed by the Employer's Agent that with the exception of landscape works there was little 'built' ecological mitigation work. No drawings were produced. Landscape, drainage, fencing and earthworks 'as built' information provided
Construction Environment Management Plan (CEMP)	CEMP provided (including Environmental Action Plan).
Landscape and ecology management plans	Not available to date
Contact names for consultation	Some provided others sourced by the POPE team
Archaeology reports	Informed that no archaeological works required
Properties eligible for noise insulation	None
Part 1 Claims	The HA Part 1 Claims Team advised that it is too soon in the claims process and information will be made available for the FYA report
Post opening survey or monitoring e.g. for ecology, water quality	Great Crested Newt Monitoring Report Method Statement and 2008 Monitoring Report received.
Animal mortality data	Animal mortality data for M1 Junction 31-32 from June 2003 to date received from MAC.

Information Requested	Comments
Scheme newsletters etc	Informed none available.
NMU post construction survey	None undertaken as NMU prohibited on the motorway and no impact on the surrounding NMU network.