Gunnislake
Air Quality Management Area
Draft Action Plan

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Contents

A7:1 Cornwall AQMA Summary

A7:1.1 This appendix forms part of the Cornwall-wide Air Quality Management Area Action Plan (AQMA-AP) which was submitted to Defra in March 2013 and which contained details of Cornwall-wide generic actions which are aimed at improving air quality across Cornwall as a whole as well as supporting climate change and carbon reduction programmes and initiatives in Cornwall[1].

A7:1.2 The Gunnislake AQMA is the fourth AQMA to be declared in Cornwall (CPR 2005, Bodmin 2008, Tideford 2011) and as with previous AQMAs, has been declared on consistent exceedences of the National Air Quality Strategy (NAQS) objective for nitrogen dioxide (NO_2).

A7:1.3 The CPR and Bodmin AQMA APs were submitted to Defra as independent documents. The Tideford AQMA-AP was incorporated as Appendix 6 into the Cornwall-wide AQMA-AP. This AQMA-AP for Gunnislake will be submitted to Defra as Appendix 7 to the Cornwall-wide AQMA-AP and will focus on actions which are specific to Gunnislake.

A7:2 Gunnislake AQMA Action Plan

A7:2.1 While the generic County-wide actions detailed in in the Cornwall AQMA-AP will have a beneficial impact on air quality across the whole of Cornwall, Gunnislake has its own unique road-traffic issues which have given rise to the NAQS exceedences and which require specific, tailored actions in order to meet the NAQS objectives.

A7:2.2 This AQMA-AP for Gunnislake will:

- Identify and assesses potential air quality options specific to Gunnislake for improving local air quality within the designated AQMA.

- Propose implementation of those options that are relevant to LAQM and which will work towards bringing about improvements in air quality within the AQMA.

A7:3 AQMA consultation process

A7:3.1 A leaflet explaining the reasons for declaring an AQMA for Gunnislake and showing the AQMA boundary was delivered to every residential property and business in Gunnislake along with a response form asking for comments and views.

A7:3.2 The Cornwall Council website hosted a Gunnislake Air Quality information page detailing the AQMA process and providing links to air quality information and the AQMA leaflet. Opportunities were provided for comment and responses to the AQMA.

[1] Cornwall Air Quality Action Plan 2013. www.cornwall.gov.uk/default.aspx?page=34884

A7:3.3 Consideration was given to the views expressed with regard to the AQMA declaration and the AQMA boundary. The AQMA boundary encompasses the whole of Gunnislake as it was felt that the air quality issues affect the village as a whole rather than only the areas of exceedences (Figure A7:1).

A7:4 AQMA consultation response

A7:4.1 Comments received during the consultation process have been taken into consideration and where possible incorporated into the Action Plan.

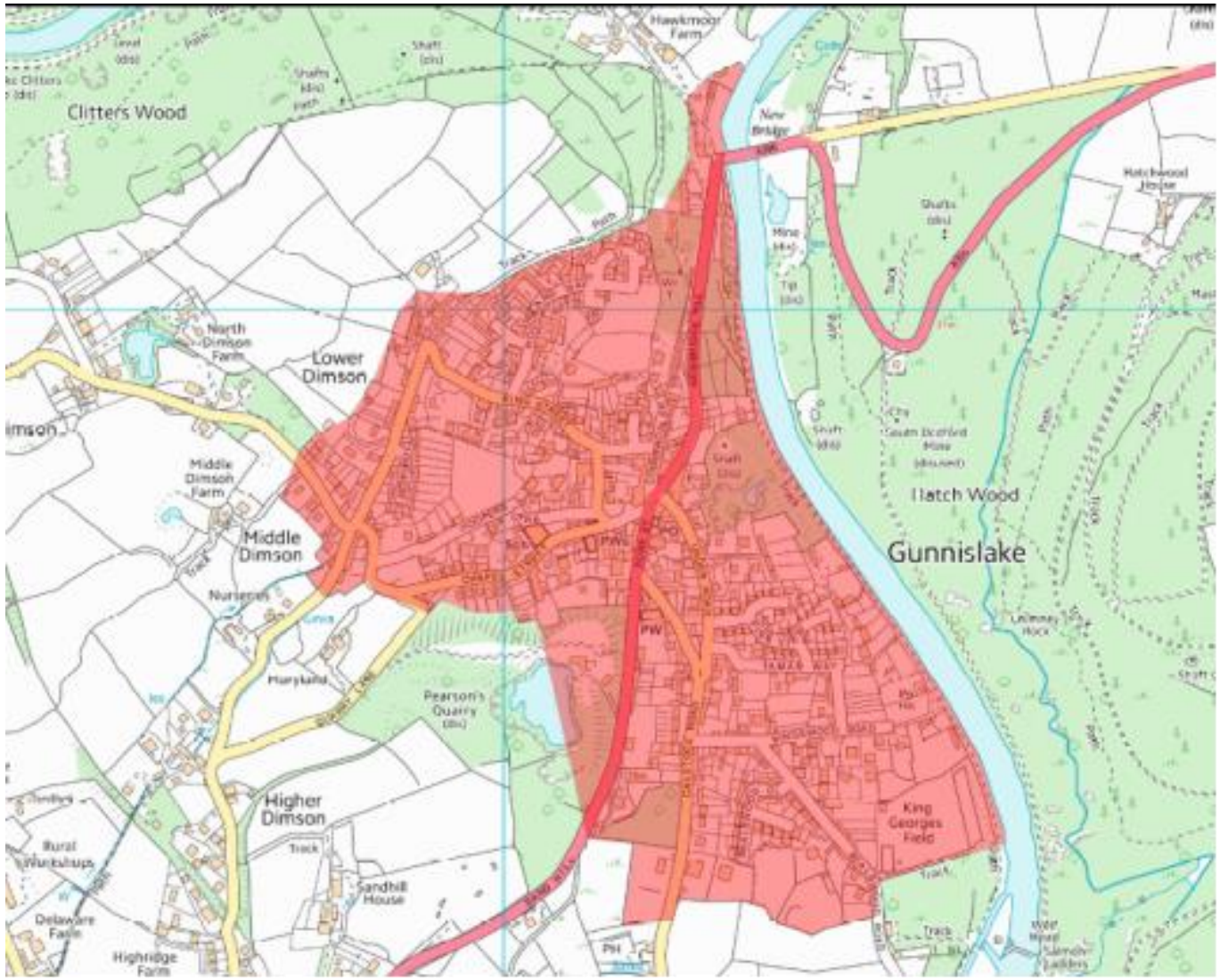

Figure A7:1 Gunnislake AQMA boundary

A7:5 Gunnislake Background

A7:5.1 Gunnislake, population ~3000 (ONS 2011)[2], is located on the A390 on the Cornwall/Devon border and is a major route into Cornwall from West Devon.

A7:5.2 After crossing the Cornwall/ Devon border the road travels south, approximately 500m uphill into Gunnislake to the first set of traffic lights, this regularly results in queues of traffic outside residential properties Plate 7.1.

A7:5.3 A 30 mph speed limit extends throughout Gunnislake and residential properties are immediately adjacent to the road for the majority of its distance through the village.

Plate 7.1 Newbridge Hill Gunnislake

A7:5.4 Average daily traffic values (vpd) of 6035 (2014) are relatively low but due to the nature of the village: the narrow roads, the steep incline, vehicle type and the stop-start effect of the traffic lights, there is a significant impact on air quality. There is also a seasonal increase of 19% during the summer months (July v/s January).

A7:5.5 The A390 between Newbridge Hill and Fore Street has a gradient of 12%, TRL research[3] has shown that emissions from HCVs in particular increase substantially at low speeds and when ascending a gradient. The relatively steep gradient in Gunnislake, combined with the stop-start conditions at the village centre traffic lights, provide a worst case scenario with regard to the generation of HCV emissions.

A7:5.6 Traffic through Fore Street, which is the main village street, is controlled by 4-way traffic lights that only allow one stream of traffic at a time through the 100m stretch of road. Traffic lights control the downhill flow on Fore Street, the uphill flow on Newbridge Hill, the entry to the A390 on Chapel Street and entry to the A390 on Under Road.

A7:5.7 Once through Fore Street there is a further steep gradient on the road out of Gunnislake, along Sand Hill and past Alma Cottages on the left.

A7:5.8 It is not considered that there are any polluting industries in the vicinity of the AQMA.

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[2] [2] ONS 2011 Office of National Statistics Online. *Mid 2009 population estimates*. www.statistics.gov.uk/statbase/Product.asp?vlnk=15106

[3] Latham S., Boulter P. and Barlow T. (2005) The Effects of Traffic Management Schemes on Emissions from Heavy-Duty Vehicles. TRL Project report PR/SE/960/04. TRL, Wokingham.

A7:5.9 Gunnislake railway station is located approximately 850m to the south of Gunnislake, adjacent to the A390. There are nine trains a day between Gunnislake and Plymouth which run approximately every 2 hours (06.00 - 23.00). Gunnislake is the end of the line and trains have a quick turnaround. Although diesel locomotives may be stationary for periods of 15 minutes or more at Gunnislake, they do not leave their engines running for periods in excess of 15 minutes. There is no potential for regular outdoor exposure of members of the public within 15m of the stationary locomotive.

A7:6 Gunnislake Detailed/Further Assessment (DA/FA) 2011

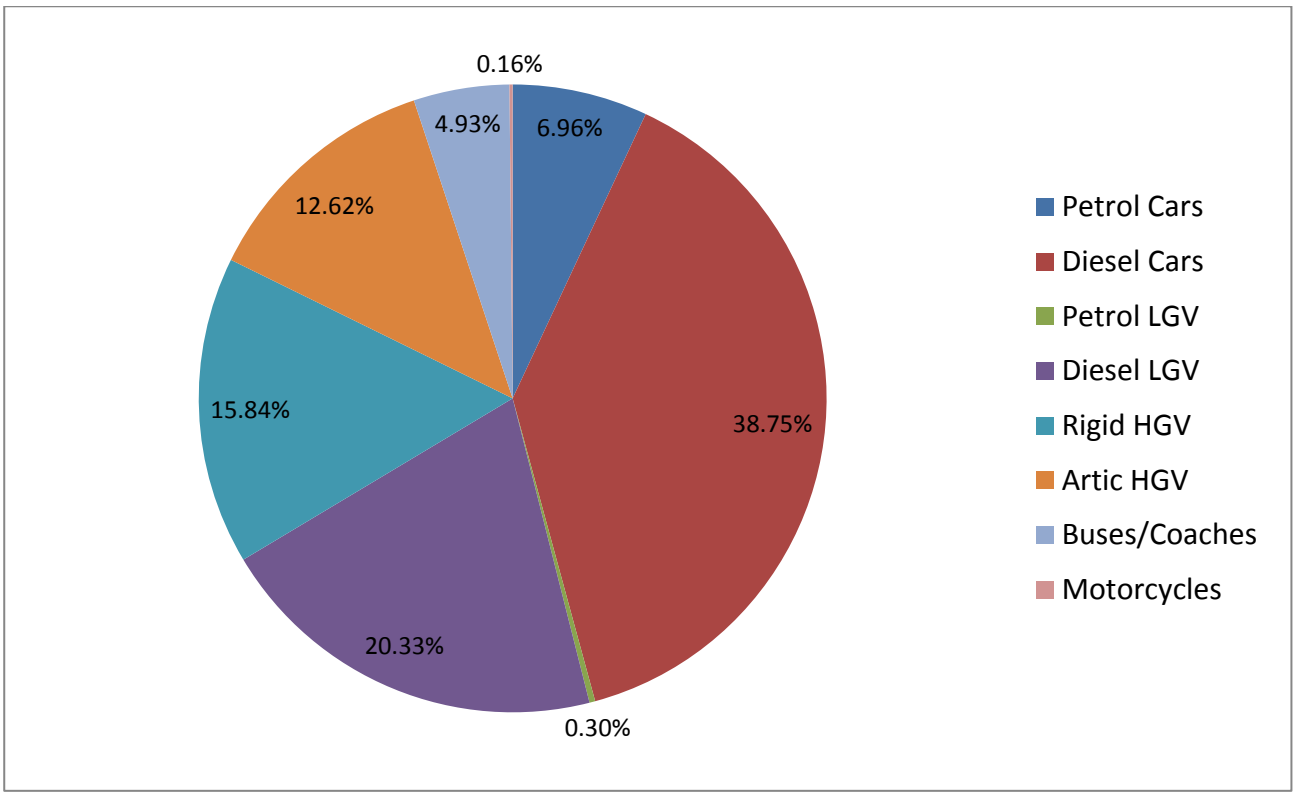
A7:6.1 The Cornwall Council 2010 Air Quality Progress Report concluded that, due to exceedences of the NAQS annual mean objective for NO_2 in Gunnislake, a DA/FA of air quality should be undertaken. The subsequent Gunnislake 2011 DA/FA concluded that modelling and monitored NO_2 annual average values for relevant sites in Gunnislake exceeded the NAQS annual NO_2 objective of 40$\mu g/m^3$. The DA/FA recommended that an AQMA be declared in Gunnislake to encompass the areas of monitored and modelled exceedences.

A7:7 Gunnislake Source Apportionment

A7:7.1 There is no significant industry in Gunnislake, consequently traffic-related emissions are considered to be the sole source of NO_2 emissions in Gunnislake.

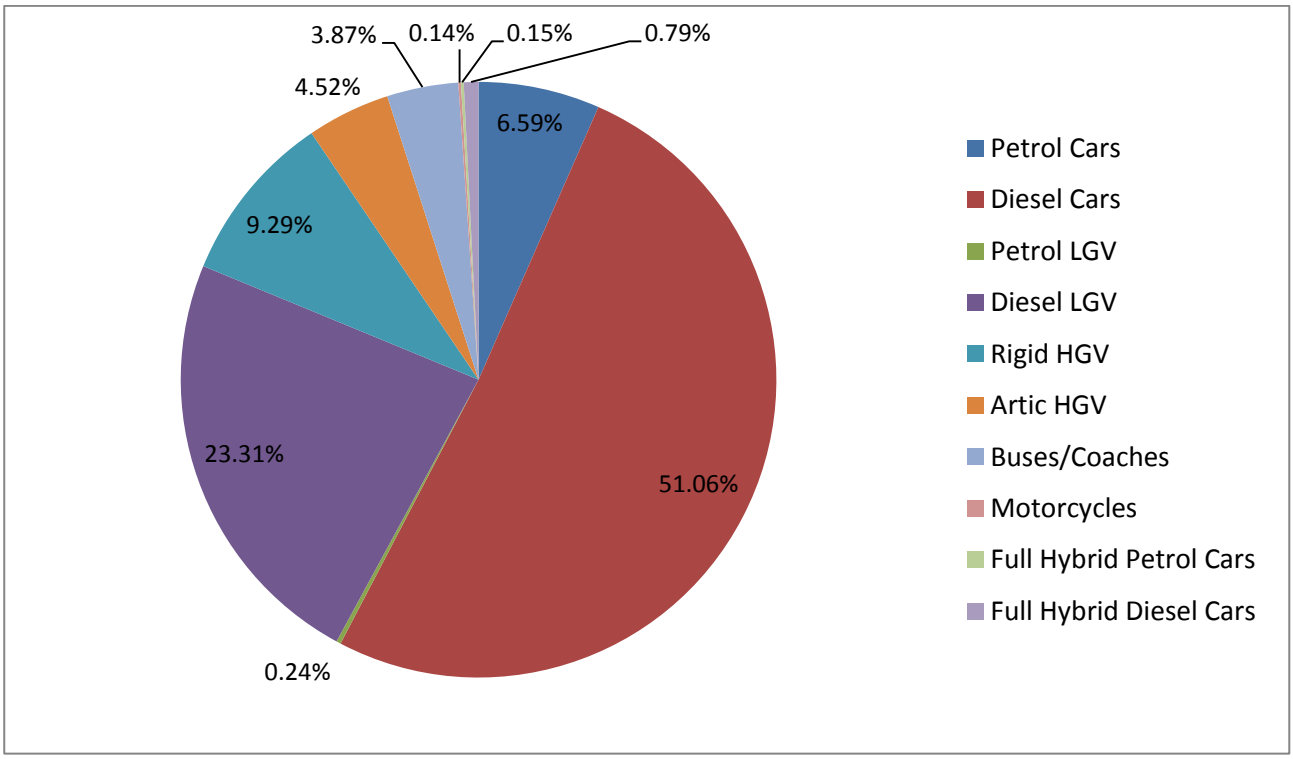
A7:7.2 The analysis of traffic data in the Gunnislake 2011 DA/FA enabled NO_x emissions to be apportioned between types of vehicle and vehicle movement. For the purpose of the Action Plan, the source apportionment has now been updated to make use of the latest emission factors. Although LDVs account for ~95% of traffic throughput, they account for approximately only 67% of total vehicle NO_x emissions. Conversely, HCVs account for approximately 5% of vehicle throughput but give rise to up to 33% of total NO_x emissions.

A further breakdown reveals the most significant contributors to NOx emissions. The greatest proportion comes from diesel cars which contribute over 38% and secondly diesel LGVs contributing over 20%. Rigid HGVs and artic HGVs contribute 15.8% and 12.6% respectively.



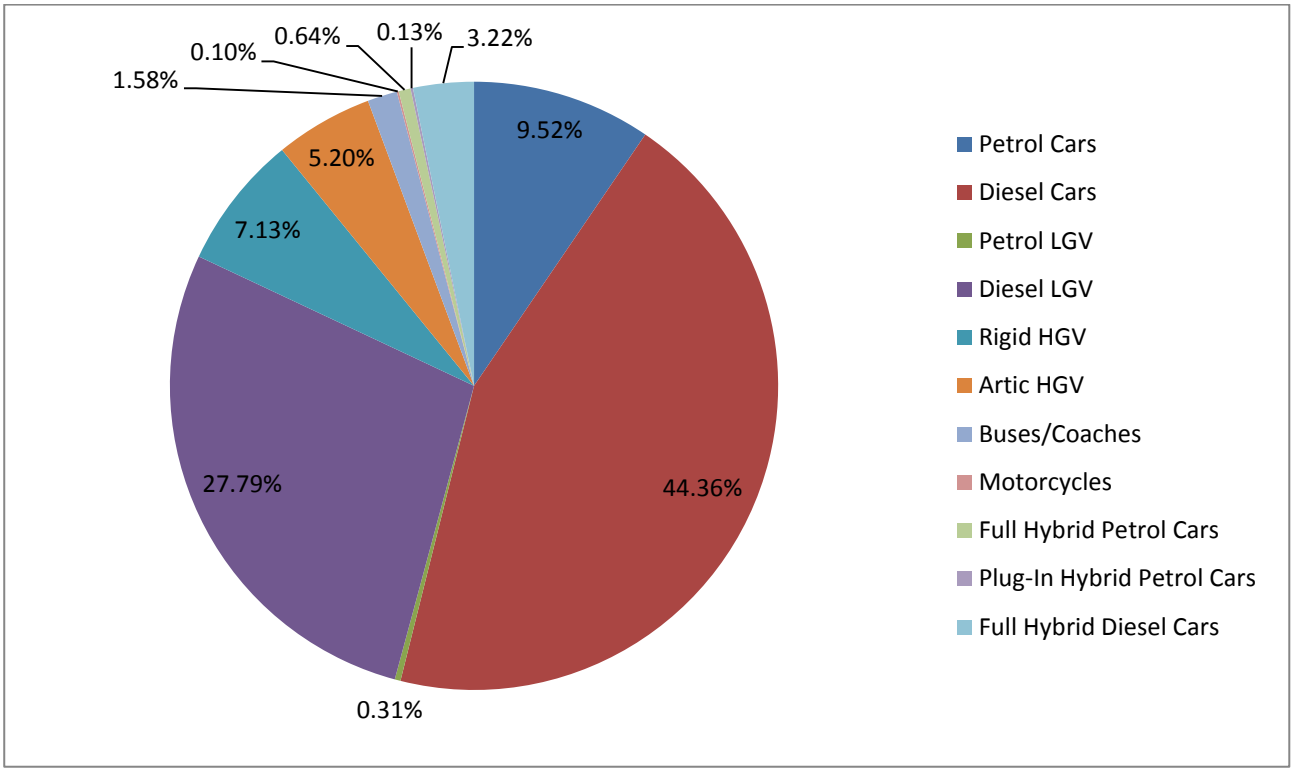
Graph A7:1 Source Apportionment for Gunnislake NO_x Emissions 2014

In 2020 the total contribution from LDVs is 82.3% and from HDVs 17.7%. The contribution from diesel cars is predicted to increase to over 50%, and for diesel LGVs to 23%. However the contributions for rigid HGVs and artic HGVs would fall to 9.3% and 4.5% respectively when compared to 2014 contributions.



Graph A7:2 Source Apportionment for Gunnislake NO_x Emissions 2020

In 2030 the total contribution from LDVs is 86.1% and from HDVs 13.9%. The contribution from diesel cars is predicted to be 44%, and for diesel LGVs 28%. Contributions for rigid HGVs and artic HGVs will be to 7.1% and 5.2%.



Graph A7:3 Source Apportionment for Gunnislake NO_x Emissions 2030

A7:8 Gunnislake Modelled Data

A7:8.1 Dispersion modelling undertaken using ADMS-Roads v3.0 for the Gunnislake 2012 DA/FA indicated the potential for exceedences of the NO_2 annual mean objective at two locations: CAR4 and CAR10. Despite some uncertainty in the model input, the assumptions were considered valid but it was recommended that the decision as to whether or not to declare an AQMA should be based on monitoring data.

A7:8.2 In Sand Hill, both monitoring and modelling data indicated the risk of an exceedence of the NO_2 annual mean objective at all properties in Alma Terrace.

A7:8.3 The modelling also predicted an exceedence at Fore Street, adjacent to the traffic lights, although there were no monitoring sites sufficiently close to validate this finding. The DA/FA recommended that Cornwall Council determine whether the properties concerned are representative of relevant exposure and if so, acquire monitored data before they consider declaring an AQMA at this location.

A7:9 Improvements required to achieve the objective

A7:9.1 The level of improvement required in order to achieve the annual mean objective for NO_2 is a maximum of 41.7%. The generic Cornwall-wide

actions to reduce background NO_2 concentrations will have a negligible effect on air quality in Gunnislake; therefore, the majority of actions in this Action Plan should be directed towards mitigating the road traffic component. Table A7:1 shows the required reduction for diffusion tube sites exceeding in 2014.

Table A7:1 Required NO_2 reduction $\mu g/m^3$ and % - 2014					
Location	**2014 NO_2 Bias adj. $\mu g/m^3$**	**Background NO_2 $\mu g/m^3$**	**Traffic related NO_2 $\mu g/m^3$**	**Required NO_2 $\mu g/m^3$ reduction**	**Required % NO_2 reduction**
CAR1 Opposite Alma Terrace	42.1	5.7	36.4	2.1	5
CAR2 Alma Terrace	63.3	5.7	57.6	23.3	36.8
CAR3 Alma Terrace	68.6	5.7	62.9	28.6	41.7
CAR10 Newbridge Hill	41.6	5.7	35.9	1.6	3.8

A7:10 Projected concentrations based on 2014 values

A7:10.1 Using the 2013 updated Emission Factor Toolkit[4] for projection of the annual mean roadside NO_2 concentrations and based on 2014 diffusion tube data, NO_2 concentrations were projected for future years to 2030 for all current Gunnislake sites which are exceeding.

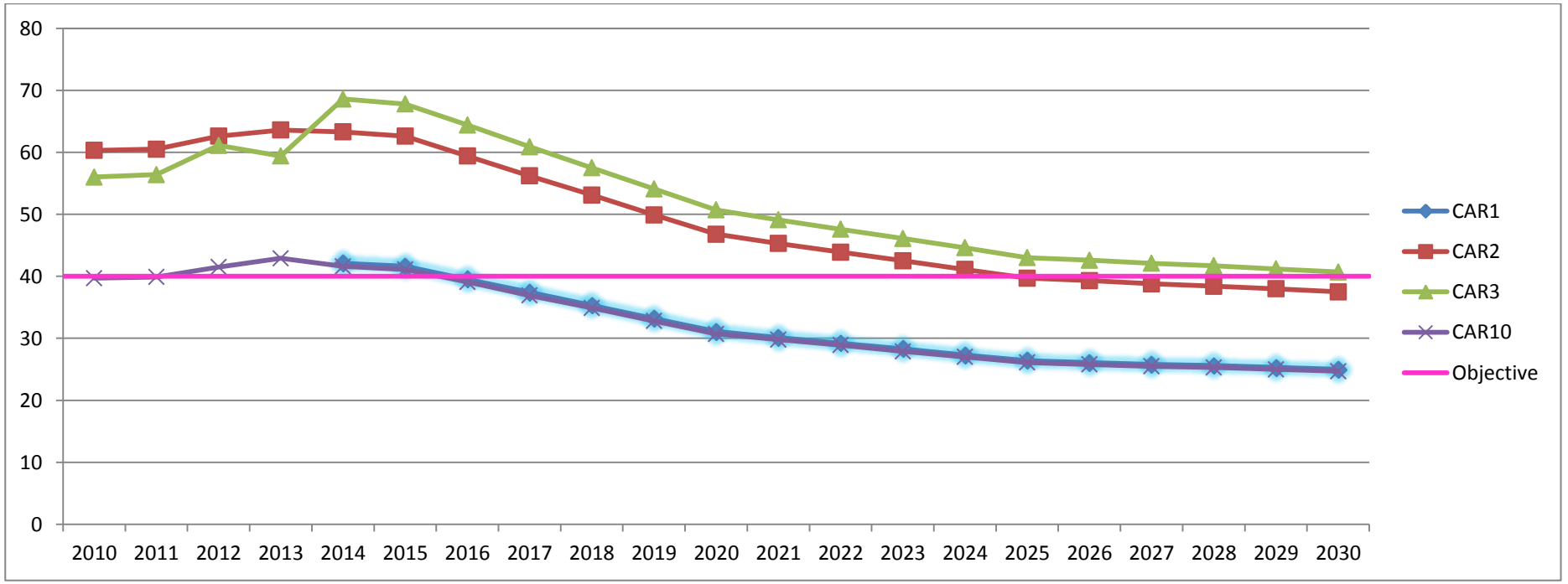
A7:10.2 Sites CAR1, CAR2, CAR3 and CAR10 exceeded the annual mean objective for NO_2 in 2014, monitored concentrations for all other Gunnislake sites were below the NAQS objective in 2014.

A7:10.3 Table A7:2 and Graph A7:4 show projected NO_2 concentrations from all exceeding Gunnislake sites to 2030, which is the last projection factor available. Data for 2010-2014 are measured data and for 2015 onwards concentrations are calculated.

A7:10.4 Values for all sites are projected to decline steadily, however projected values for CAR2 do not fall below the 40 µg m^{-3} annual objective until 2025, whilst CAR3 is still showing an exceedance in 2030. CAR1 & CAR10 are both predicted to fall below the objective in 2015.

[4] Defra Emission Factor Toolkit: http://laqm.defra.gov.uk/review-and-assessment/tools/emissions.html#eft

Table A7:2 Projected Concentrations based on 2014 Monitored Values																					
	Measured Concentrations					Projected Concentrations NO_2 µg/m^3 (based on 2014)															
Monitoring site	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
CAR1					**42.1**	**41.6**	39.5	37.4	35.3	33.2	31.1	30.1	29.2	28.3	27.3	26.4	26.1	25.8	25.6	25.3	25.0
CAR2	**60.3**	**60.5**	**62.6**	**63.6**	**63.3**	**62.6**	**59.4**	**56.2**	**53.1**	**49.9**	**46.8**	**45.3**	**43.9**	**42.5**	**41.1**	39.7	39.3	38.8	38.4	38.0	37.5
CAR3	**56.0**	**56.4**	**61.1**	**59.4**	**68.6**	**67.8**	**64.4**	**60.9**	**57.5**	**54.1**	**50.7**	**49.1**	**47.6**	**46.1**	**44.6**	**43.0**	**42.6**	**42.1**	**41.7**	**41.2**	**40.7**
CAR10	39.7	39.9	**41.5**	**42.9**	**41.6**	**41.1**	39.1	36.9	34.9	32.8	30.7	29.8	28.9	27.9	27.0	26.1	25.8	25.5	25.3	25.0	24.7



Graph A7:4 Projected Concentrations based on 2014 Monitored Values

A7:10.5 Projected values are based on the assumption that reductions in the pollutant concentrations emitted from vehicles will occur due to anticipated improvements in vehicle technologies. However it must be recognised that this assumption is not reflected in monitored values.

A7:10.6 The Defra report "*Trends in NO_X and NO_2 emissions and ambient measurements in the UK*" (Defra 2011[5]) states that "*Ambient trends in the concentrations of NO_X and NO_2 have not decreased by as much as ... current UK emission factors (UKEF) suggest*" and highlights the uncertainty surrounding the expected NO_X and primary NO_2 emission factors for Euro 6 (LDV standard) and Euro VI (HDV standard).

A7:10.7 The report states that emissions data from remote sensing data (RSD) suggests Euro 1 and 2 petrol cars have much higher NO_X emission factors than that currently used in the National Atmospheric Emissions Inventory (NAEI) but agreement is better for Euro 4 petrol cars. For diesel cars and LDVs the report says that "*the RSD indicate higher emission factors than used in the NAEI across all Euros, but the difference gets progressively larger for the later Euro classes as the reduction in emission factors implied by the UKEF does not seem to have occurred. For rigid HGVs, there is reasonable consistency between the RSD and UKEF."*

A7:10.8 One of the conclusions of the report, is that "*A potentially important issue to emerge from this work is that selective catalytic reduction (SCR) used on HGVs is shown to be ineffective under urban-type (slow speed, low engine temperature) conditions.*" This finding is significant in explaining the discrepancy between projected trends and monitored values. The report shows that current trends in NO_2 and NO_X concentrations do not match up with historical predictions using emissions factors, and shows that the UK emissions factors are flawed.

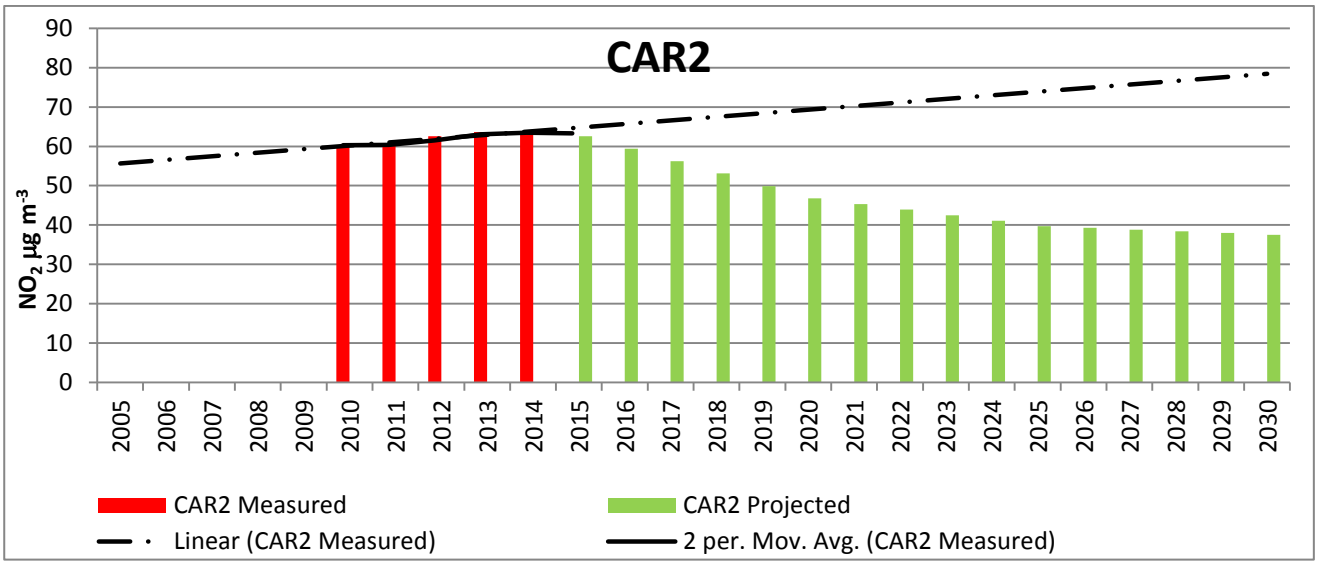
A7:10.9 The report concludes that, using "... *our best estimate and interpretation of the RSD, the following points can be made: For UK urban areas (2002–2009) the total urban road transport emissions reduce on average by 6.0% per annum for the uncorrected case. The trend reduces to a decrease of 4.2% per annum taking account of the RSD emissions*."

A7:10.10 Defra has recently updated the emission factors[6] and the projected values given in A7:10 are based on the updated emission factors. As detailed above, it is anticipated that there will still be a downward trend in NO_x/NO_2 emissions but that the trend will not be as steep as previously estimated.

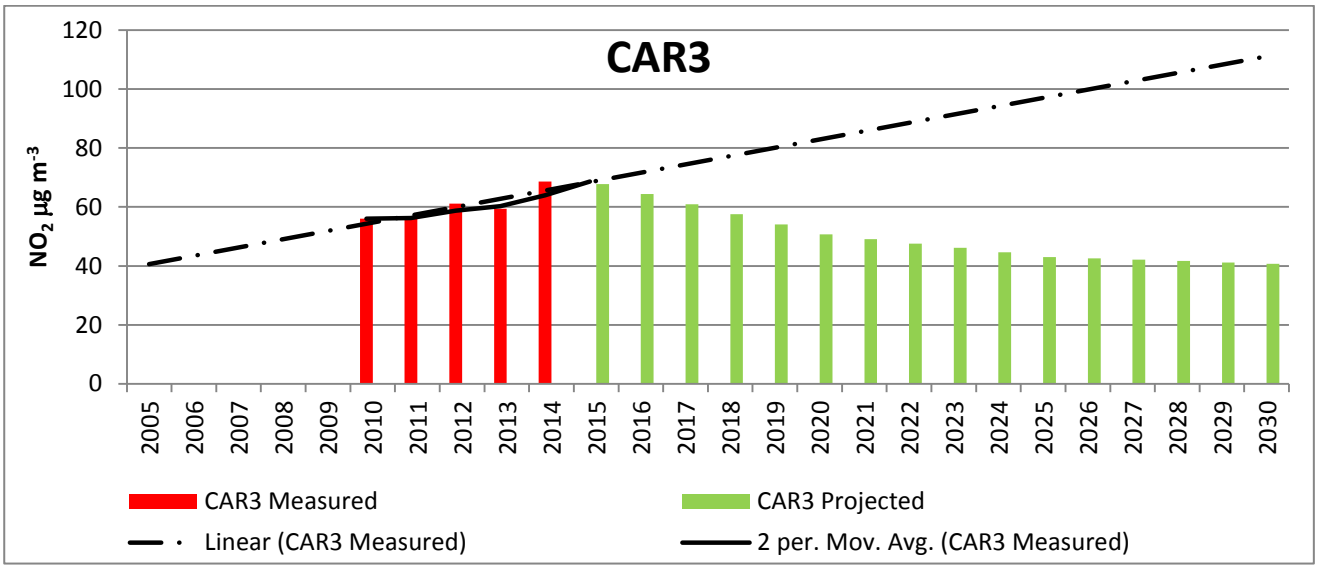
A7:10.11 The linear projected values for all sites do not support the Defra predictions. Graphs A7:5 – A7:7 show monitored values for CAR2, CAR3 and CAR10 up to 2014 and Defra projected values up to 2030. Measurements for CAR1 are not displayed graphically as monitoring only began at this site in 2014 therefore no trend can be shown.

[5] Defra 2011. Trends in NO_x and NO_2 emissions and ambient measurements in the UK. http://uk-air.defra.gov.uk/reports/cat05/1108251149_110718_AQ0724_Final_report.pdf

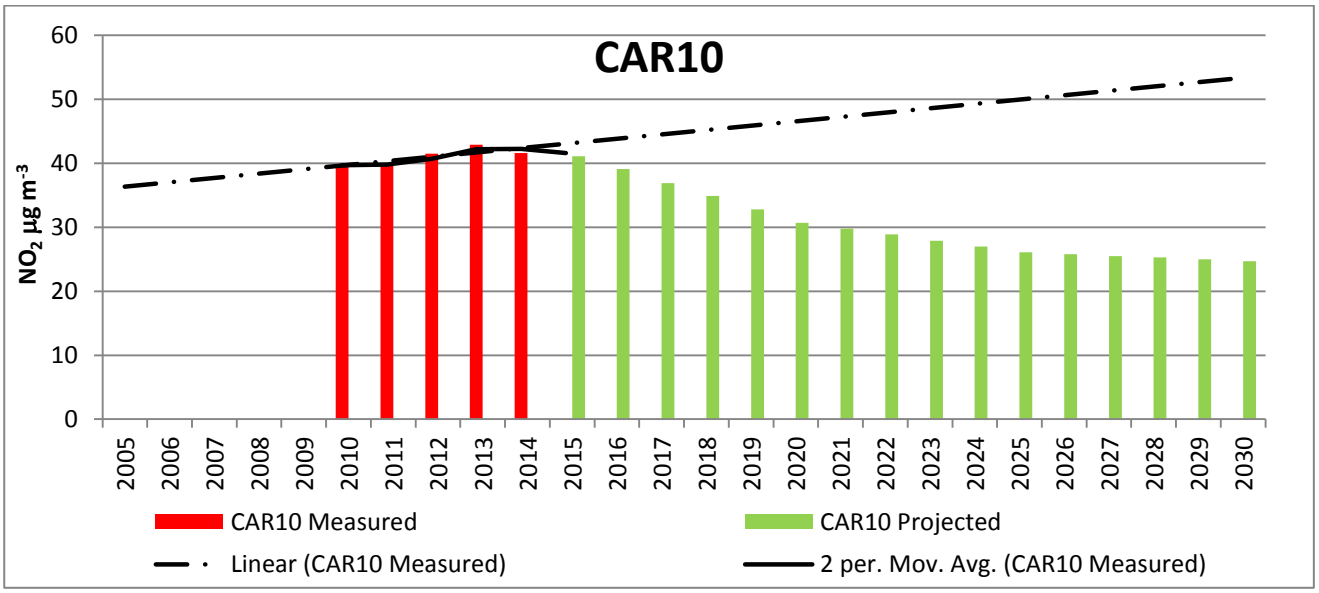
[6] DEFRA Emission Factors Toolkit for Vehicle Emissions http://laqm.defra.gov.uk/review-and-assessment/tools/emissions.html#eft



Graph A7:5 Recorded and projected values to 2030 for CAR2



Graph A7:6 Recorded and projected values to 2030 for CAR3



Graph A7:7 Recorded and projected values to 2030 for CAR10

A7:10.12 Monitored NO_2 diffusion tube values for exceeding sites CAR2, CAR3 and CAR10 for 2010 to 2014 (Graphs A7:5-A7:7) do not show a downward trend as projected by Defra.

A7:11 Suggested Action Plan Options for Gunnislake

A7:11.1 A range of options were examined against cost, feasibility, effectiveness and potential air quality impacts (both direct and indirect) (Table A7:3).

A7:11.2 The following actions were not considered viable for the reasons detailed in Table A7:3:

- Action 2 (Purchase roadside residential properties)
- Action 3 (Build a bypass around Gunnislake)
- Action 4 (HGV Ban)

A7:11.3 Proposed Actions for Gunnislake which are considered to be viable are given in Table A7:4 below.

A7:11.4 Actions which are considered viable all have a cost associated. It must be noted that no budget exists to implement actions and therefore funding would have to be found before work could start on putting actions into effect.

Table A7:3 Suggested options for Gunnislake, feasibility assessment, likely impact on air quality and costs

No	Action	Lead Agency	Focus	Indicator	Feasibility	Impact on carbon emissions	Cost	Health benefit
1	Develop a programme to continuously monitor traffic flow, real-time air quality and visual monitoring.	CC	Identify periods of pollution exceedances.	N/a	CC are investigating funding sources.	N/a	££	N/a
2	Purchase residential properties along roadside.	CC	Remove relevant exposure.	No relevant exposure.	Limited funding available/ detrimental to community. Unrealistic to implement.	N/a	££££	√√√√√
3	Build a by-pass around Gunnislake.	CC	Remove traffic from Gunnislake.	Reduced pollution.	Lack of available routes, destruction of green space, funding unlikely to be found.	N/a	£££££	√√√√
4	HGV Ban.	CC	Remove HGVs.	Improved traffic flow – reduction in HGV traffic.	Not realistic to implement. Dependent on other routes for HGV traffic and co-operation of hauliers.	Low	£££	√√√√
5	Work with haulier to re-route HGVs around Gunnislake (via A38).	CC	Remove HGVs	Improved traffic flow – reduction in HGV traffic.	Dependent on other suitable routes for HGV traffic and co-operation of hauliers.	Low	£££	√√√√
6	Launch Eco Stars scheme	CC	Remove HGVs and promote more fuel efficient vehicles	Improved HGV emissions	Dependent on co-operation of hauliers.	Low	££	√√√
7	Use of experimental traffic order to redesign traffic flows.	CC	Smooth-flowing traffic will reduce congestion & associated pollution levels.	Smoother traffic flow.	Further assessment needed. May move congestion to other areas.	N/a	£££	√√√√
8	Insert pinch point adjacent to Alma Terrace	CC	Smooth-flowing traffic will reduce congestion & associated pollution levels.	Reduced pollution levels at relevant sites.	Feasibility/safety study required. Need to ensure air quality problem is not moved.	N/a	£££	√√√√

No	Action	Lead Agency	Focus	Indicator	Feasibility	Impact on carbon emissions	Cost	Health benefit
9	Buses replaced by cleaner vehicles	CC	Reduced vehicle emissions; efficiency savings.	Reduction in pollution concentrations.	Reliant on bus companies (cost with the bus operators).	Low	££	√√√√
10	Encourage & promote local car share	CC	To reduce commuter traffic	Reduced traffic volume	Dependent on co-operation of car users.	Low	£	√√
11	Review of speed limits and signage.	CC	Smooth-flowing traffic will reduce congestion & associated pollution levels.	Reduced queuing traffic.	Dependent on information gained from the continuous monitoring programme.	N/a	££	√√√
12	Encourage and promote modal shift (bus and rail)	CC	Reduce commuter traffic, reduce NOx emissions	Reduced traffic volume	Realistic if quality and reliable service offered. Dependent on take-up by car users.	Low	££	√√√
13	Increased frequency of bus services through Gunnislake to other areas.	CC	Reduce commuter traffic, improve public transport options for residents	Reduced traffic volume	Realistic if quality and reliable service offered. Dependent on take-up by car users.	Low	££	√√√
14	Bus stop upgrades inc. real time information, accessibility and bus shelter improvements	CC	Reduce commuter traffic, improve public transport options for residents	Reduced traffic volume	Already commenced at some locations.	Low	£££	√√√
15	New and enhanced cycle and pedestrian links	CC	Reduce commuter traffic, reduce congestion and encourage more active lifestyle	Reduced traffic volume	Some could be funded/implemented through new development. Unlikely to significantly reduce number of cars on road.	Low	££	√√√√
16	Restricted parking on street at Alma Terrace	CC	Reduced congestion caused by vehicles waiting to pass around parked cars	Reduced pollution levels at relevant sites, smoother traffic flow.	Impact would need to be assessed. Dependent on consultation with residents, parish council, ward councillor and Highways.	N/A	£	√√
17	Free parking in town centre car park for residents of Alma Terrace	CC	Reduce congestion caused by people parking on the street at Alma Terrace	Reduced pollution levels at relevant sites, smoother traffic flow.	Cost implication of lost revenue from parking charges. Would need to consider feasibility with Car Parks/Transportation.	N/A	££	√√

Table A7:4 Shortlisted options to be taken forward as part of the Gunnislake Action Plan

No	Action	Lead Agency	Focus	Indicator	Feasibility	Estimated completion date	Impact on carbon emissions	Cost	Health benefit
1	Develop a programme to continuously monitor traffic flow, real-time air quality and visual monitoring.	CC	Identify periods of pollution exceedances.	N/a	CC are investigating funding sources.	On-going	N/a	££	N/a
2	Work with haulier to re-route HGVs around Gunnislake (via A38)	CC	Remove HGVs	Improved traffic flow – reduction in HGV traffic.	Dependent on other routes for HGV traffic and co-operation of hauliers.	On-going	Low	£££	√√√√
3	Launch Eco Stars scheme	CC	Remove HGVs and promote more fuel efficient vehicles	Improved HGV emissions	Dependent on co-operation of hauliers.	On-going	Low	££	√√√
4	Use of experimental traffic order to redesign traffic flows.	CC	Smooth-flowing traffic will reduce congestion & associated pollution levels.	Smoother traffic flow.	Further assessment. May move congestion to other areas.	On-going	N/a	£££	√√√√
5	Insert pinch point adjacent to Alma Terrace	CC	Smooth-flowing traffic will reduce congestion & associated pollution levels.	Reduced pollution levels at relevant sites.	Feasibility/safety study required. Need to ensure air quality problem is not moved.	On-going	N/a	£££	√√√√
6	Buses replaced by cleaner vehicles	CC	Reduced vehicle emissions; efficiency savings.	Reduction in pollution concentrations.	Reliant on bus companies (cost with the bus operators).	On-going	Low	££	√√√√
7	Encourage & promote local car share	CC	To reduce commuter traffic	Reduced traffic volume	Dependent on co-operation of car users.	On-going	Low	£	√√
8	Review of speed limits and signage.	CC	Smooth-flowing traffic will reduce congestion & associated pollution levels.	Reduced queuing traffic.	Dependent on information gained from the continuous monitoring programme.	On-going	N/a	££	√√√
9	Encourage and promote modal shift (bus and rail)	CC	Reduce commuter traffic, reduce NOx emissions	Reduced traffic volume	Realistic if quality and reliable service offered.	On-going	Low	££	√√√

No	Action	Lead Agency	Focus	Indicator	Feasibility	Estimated completion date	Impact on carbon emissions	Cost	Health benefit
10	Increased frequency of bus services through Gunnislake to other areas.	CC	Reduce commuter traffic, improve public transport options for residents	Reduced traffic volume	Realistic if quality and reliable service offered.	On-going	Low	££	√√√
11	Bus stop upgrades inc. real time information, accessibility and bus shelter improvements	CC	Reduce commuter traffic, improve public transport options for residents	Reduced traffic volume	Already commenced at some locations.	On-going	Low	£££	√√√
12	New and enhanced cycle and pedestrian links	CC	Reduce commuter traffic, reduce congestion and encourage more active lifestyle	Reduced traffic volume	Some could be funded/implemented through new development.	On-going	Low	££	√√√√
13	Restricted parking on street at Alma Terrace	CC	Reduced congestion caused by vehicles waiting to pass around parked cars	Reduced pollution levels at relevant sites, smoother traffic flow.	Impact would need to be assessed. Dependent on consultation with residents, parish council, ward councillor and Highways.	On-going	N/A	£	√√
14	Free parking in town centre car park for residents of Alma Terrace	CC	Reduce congestion caused by people parking on the street at Alma Terrace	Reduced pollution levels at relevant sites, smoother traffic flow.	Cost implication of lost revenue from parking charges. Would need to consider feasibility with Car Parks/Transportation.	On-going	N/A	£	√√

A7:12 Shortlisted Options for Gunnislake (Table A7:4)

A7:12.1 Shortlisted actions are discussed further below. In most cases further work is needed to determine the feasibility and likely impact the suggested actions would have. If an action is found to be viable in terms of air quality improvement, funding would still need to be found in order to finance its implementation. As mentioned above, no specific budget exists to finance the implementation of actions and therefore there is no guarantee of when or indeed if the action could be put into effect.

A7:12.2 **Action 1.** Develop a programme to continuously monitor traffic flow, real-time air quality and visual monitoring. In order to identify the linkages between traffic flow and pollution levels it is considered vital that a continuous monitoring programme is initiated to provide data on both traffic flow and NO_2/PM levels. Identification of peak traffic flow, vehicle type and pollution data will inform future actions and enable an assessment to be made of the effect of any actions which have been implemented.

A7:12.2 Action 1 will not result in any reduction of pollution values, but will inform a range of future actions to address the air quality exceedences in Gunnislake.

A7:12.4 **Action2.** Work with hauliers to re-route HGVs around Gunnislake (via A38). A reduction in HGV traffic could reduce pollution in the area. A reduction in HGVs could also help improve traffic flow through the area.

A7:12.5 The viability of this action will depend on co-operation of hauliers and suitable alternative routes being available. This will be subject to the nature of the work being undertaken by the hauliers and whether the journeys require local stops.

A7:12.6 The likely reduction in air pollution from a reduction in HGVs is not possible to accurately predict.

A7:12.7 **Action 3.** Launch Eco Stars Scheme. The Eco Stars fleet recognition scheme engages with operators of commercial vehicles and seeks to influence their environmental impact on local air quality. The scheme works on the principle of reviewing operators' vehicles on an individual basis for environmental credentials, including Euro Engine Standard, and any additional fuel savings and environmental features, such as anti-idling cut-off and in-cab fuel monitoring.

A7:12.8 Operators receive a plan setting out measures which would help to improve their operational practices from environmental, air quality and economic perspectives. It is anticipated that improved fuel efficiency achieved through newer and/or smaller vehicles, improved driving practices and route management could reduce air pollution in the area.

A7:12.9 The viability of this action would depend on the take-up of the scheme amongst vehicle operators. Its impact on air pollution is impossible to accurately predict.

A7:12.10 **Action 4.** Use of experimental traffic order to redesign traffic flows. The viability of the implementation of this action will be assessed using

information gained from the continuous pollution and traffic monitoring programme. This could determine if the action would have a positive impact at existing hot spots and whether the problem would be moved to another area.

A7:12.11 It is anticipated that changes to traffic flow could reduce traffic related pollution. The likely reduction in air pollution from potential changes to traffic flow is impossible to accurately predict.

A7:12.12 **Action 5.** Insert pinch point adjacent to Alma Terrace. A feasibility study is required to determine whether this action is viable in terms of traffic movement, safety and impact on air pollution.

A7:12.13 Cars parked outside the residential properties at Alma Terrace frequently cause southbound traffic to wait for oncoming northbound traffic to pass to allow enough room to proceed. It is considered that these waiting vehicles contribute to the poor air quality.

A7:12.14 A pinch point at Alma Terrace could give priority to southbound traffic and hold northbound traffic further up Sand Hill, allowing the traffic to flow freely past the properties and thus reduce pollution at these receptors.

A7:12.15 **Action 6.** Buses replaced by cleaner stock. This action is reliant on the bus companies replacing aging stock.

A7:12.16 The likely reduction in air pollution from potential changes to local bus and taxi stock is impossible to accurately predict however, as stated previously, NO_x emissions from Euro IV vehicles are half those of Euro II vehicles and PM Euro IV emissions are 80% lower than Euro II vehicles (AQC 2009)[7]. The replacement of old stock will have a significantly large beneficial effect on local air quality. Cornwall Council will continue to lobby and work with bus companies.

A7:12.17 **Action 7.** Encourage and promote local car share. It is considered that a reduction in traffic volume could decrease pollution at relevant sites.

A7:12.18 The feasibility of this action depends on car share being a viable option for commuters and other car users.

A7:12.19 The likely take up and subsequent reduction in air pollution at sites of relevant exposure which result from car share is impossible to accurately predict.

A7:12.20 **Action 8.** Review of speed limits and signage. It is thought that as the A390 through Gunnislake is subject to congestion at peak times, changes to the speed limit signage could regulate the traffic flow through the village and reduce queuing traffic.

A7:12.21 The viability of the implementation of this action will be assessed using information gained from the continuous pollution and traffic monitoring programme.

[7] AQC 2009. *Review of Bus Fleet Compositions and Implications for Emissions Reduction Strategies*. http://uk-air.defra.gov.uk/reports/cat05/0906110919_Bus_Emissions_Report_Final_220409.pdf

A7:12.22 **Action 9.** Encourage and promote modal shift (bus and rail). If robust bus and rail services are offered it is considered that car users may opt for alternative modes of travel thus reducing traffic volume.

A7:12.23 The feasibility of this action depends on bus and rail operators offering services which represent viable alternatives for car users.

A7:12.24 The likely reduction in air pollution at sites of relevant exposure which result from modal shift is impossible to accurately predict.

A7:12.25 **Action10.** Increased frequency of bus services through Gunnislake to other areas. It is thought that an increase in bus service frequency could improve up take thus reducing commuter traffic.

A7:12.26 It is impossible to accurately predict the reduction in air pollution resulting from increase bus use.

A7:12.27 **Action 11.** Bus stop upgrades inc. real time information, accessibility and bus shelter improvements. Improved bus stops and information could increase use among car users thus reducing traffic volume.

A7:12.28 It is impossible to accurately predict the reduction in air pollution resulting from increase bus use.

A7:12.29 **Action12.** New and enhanced cycle and pedestrian links. Improved infrastructure for cyclists and pedestrians could reduce traffic volume if car users, particularly commuters, are encouraged to make use of links.

A7:12.30 It is impossible to accurately predict the uptake of cycle and pedestrian links as alternatives to car travel and any subsequent reduction in air pollution resulting from increase cycling and walking.

A7:12.31 **Action 13.** Restricted parking on street at Alma Terrace. Restricting parking on the street along the length of Alma Terrace could improve traffic flow past the houses. There would be enough space for both lanes of traffic to move freely, reducing pollution from stationary vehicles waiting to pull out around parked cars.

A7:12.32 It is not possible to accurately predict the impact this would have on pollution levels at Alma Terrace.

A7:12.33 **Action14.** Free parking in town centre car park for residents of Alma Terrace. Free parking for residents of Alma Terrace could reduce on-street parking and congestion caused when parked cars hinder traffic flow.

A7:12.34 The loss of income from the car park could be a barrier to this action being implemented. There may also be concerns that residents using the car park as long term parking could mean not enough spaces for short stay visitors to Gunnislake.

A7:12.35 It is impossible to accurately predict the reduction in air pollution resulting from free parking in the car park.

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