



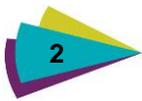
Cheshire East Council

# Low Emission Strategy



March 2018

Amec Foster Wheeler Environment  
& Infrastructure UK Limited



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## Report for

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## Document revisions

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5	Final	20/03/2018



## Executive summary

Cheshire East Council (CEC) has commissioned Amec Foster Wheeler Environment & Infrastructure UK Limited (Amec Foster Wheeler) to develop a Low Emissions Strategy (LES) for the borough. This report summarises the work undertaken during the feasibility and case study stages of the project and presents the final LES for Cheshire East.

Cheshire East is the third largest unitary authority in the North West with a population of approximately 375,000 and covering an area of 1,116km<sup>2</sup>. The area is predominately rural in nature with several market towns. The area is relatively affluent and car ownership is high, with 40% of households having two cars or more, against a UK average of 29%. Air quality across Cheshire East is generally good, although there are a number of Air Quality Management Areas (AQMAs) in the Borough, which have been declared as a result of exceedances of the annual mean nitrogen dioxide (NO<sub>2</sub>) Air Quality Objective (AQO) of 40µgm<sup>-3</sup>. There are also areas under investigation for potential exceedance of the short term hourly AQO of 200µgm<sup>-3</sup> (not to be exceeded more than 18 times per year). The annual mean AQO is exceeded at several locations in the Borough, so an overarching strategy for reducing emissions will help to achieve compliance.

Furthermore, the population of the Borough is forecast to increase by around 58,100 by 2030. The Council's Local Plan identifies sites for housing, employment, commercial and mixed use. This development in the Borough is likely to put future compliance at risk, therefore, integration of a LES into the development planning process will be an effective mechanism to achieve results.

If emissions from vehicles do not improve, projected increases in vehicle numbers resulting from the planned developments and housing growth in Cheshire East will result in larger exceedances of the annual mean AQO for NO<sub>2</sub>. Even without the expected growth in traffic, modelling indicates that it is unlikely that the AQO will be achieved across Cheshire East until beyond 2020.

Defra vehicle emission factors have predicted yearly decreases based on the logic that older, more polluting vehicles would fall out of circulation and newer cleaner vehicles will repopulate the UK vehicle fleet. This assumption relies on the progressively tighter Euro emission standards all registered UK vehicles must meet. However, a disparity between predicted emissions and emissions in reality has been found, particularly for diesel cars. Real-world emissions data collected under driving conditions have found that modern diesel cars have not performed as well as expected. There is still uncertainty regarding whether Defra emission factors published in 2014, to address the disparity, reflect the on-road performance of modern vehicles.

CEC aims to develop a LES with a broad consensus amongst stakeholders to ensure their support and help deliver a strategy that is workable. The LES will be based upon the Avoid; Shift; Improve (ASI) approach for the reduction of emissions and therefore NO<sub>2</sub> concentrations:

- ▶ Avoid: reduce vehicle kilometres driven;
- ▶ Shift: change mode from cars to public transport, cycling and walking; and
- ▶ Improve: improve the vehicle technology to reduce emissions.

This report considers the air quality management issues in the borough, the policy and legislative context of the LES. Existing guidance, policies and initiatives that have been implemented to improve air quality are considered so that the CEC LES can build upon these. This LES also builds upon the earlier case studies for Crewe and Congleton. These case studies considered the maximum potential impact on air quality of policies that influenced the engine class composition of the traffic fleet, fuel choices and incentivised the widespread use of Low Emission Vehicles (LEVs). It was found that provision of infrastructure to support the widespread uptake of LEVs would have the greatest benefit, followed by restrictions in the use of diesel cars and then imposition of development emission standards.

The recommendations for policies to be implemented by CEC are divided into three sections: policies which can be applied at the planning stage of new developments (and may also be appropriate for existing areas); policies that relate to the movement of freight; and policies that will help to reduce emissions during the construction of new developments. The policies are summarised in the table below.

Section	Number	Policy Area	Policy
<b>Planning Policies</b>	1	Transport	To minimise demand for travel by private motor vehicles and encourage transport by low emission modes and improve health and wellbeing, development proposals should incorporate high quality facilities for pedestrians, cyclists and public transport.
	2	Parking	CEC parking standards will be strictly enforced. This means that parking spaces in Principal towns and Key Service Centres will be restricted. This will help to reduce the traffic impacts of new developments as far as possible. CEC will also consider the feasibility of tightening parking standards in areas where there are air quality issues. The parking strategy and infrastructure of new developments will be used to incentivise the uptake of LEVs.
	3	LEV Infrastructure	CEC will seek to work with private hire and other commercial operators and public charging networks to deliver a reliable, well located charging network. CEC will investigate the feasibility of incentivised LEV use through various mechanisms.
	4	Traffic	All local roads in new development areas should have a speed limit of 20mph in order to reduce emissions from motorised vehicle traffic and encourage walking and cycling by improving safety and making streets more pleasant and liveable.
	5	Clean Air Zone	CEC will investigate the feasibility of declaring Clean Air Zones (CAZ), and seek to ensure vehicles entering the CAZ are Euro VI or better, diesel vans or light commercial vehicles that are Euro VI or better and petrol vans or light commercial vehicles that are Euro IV or better. CEC will consider using CAZ's to implement local measures to improve air quality.
	6	Energy	To reduce emissions from buildings, the boilers, CHP and biomass systems proposed in individual developments should meet the tightest emissions standards detailed in Institute of Air Quality Management (IAQM) guidance.
	7	Master planning	Developments should not create building configuration that inhibits effective pollution dispersion and should provide green space and infrastructure to help reduce pollutant concentrations and encourage walking and cycling.
	8	Exposure	Development proposals shall not increase the area of exceedance of the AQO for NO <sub>2</sub> . Where new developments are introduced into area where the AQO is exceeded, developments shall be designed to mitigate against exposure to poor air quality.
	9	Development Management	CEC will develop an SPD to regulate emissions and mitigate impacts of developments based on their size and the type of development. It will provide advice on how to classify the development; assess and quantify the impact on local air quality; and determine the level of mitigation required.
	10	Assessment	In accordance with the EPUK/IAQM guidance, developers will be required to produce an air quality assessment which should be submitted with the planning application to demonstrate that the appropriate standards have been adhered to.
	11	Damage Cost Calculations	Where significant impacts from the operational phase of a proposed development are predicted in the air quality assessment, CEC may request contributions (via a section 106 agreement or through Community Infrastructure Levy (CIL)) from developers to support projects to improve air quality and mitigate the impacts. Contributions / spend will be calculated through the Damage Cost approach, with the procedure detailed in a Supplementary Planning Document.
<b>Freight Policies</b>	1	Freight Quality Partnership (FQP)	To help in the development of servicing and delivery plans which highlight the benefits of transporting freight by rail, CEC will investigate the feasibility of a Freight Quality Partnership (FQP). This will include a Zero Emissions Network (ZEN) to help local businesses reduce the emissions associated with their activities.
	2	Freight Consolidation	To minimise the impact of emissions from vehicles delivering and collecting freight, for major developments, CEC will encourage the establishment of freight consolidation centres that will facilitate the use of zero emission vehicles.



Section	Number	Policy Area	Policy
	3	Fleet Operator Recognition Scheme (FORS)	Through the FQP, CEC will investigate the feasibility of incentivising operators of freight vehicles operating in the area to attain the Gold FORS accreditation where that they have made proven efforts to reduce emissions.
	4	Freight, Delivery and Servicing	To minimise emissions during the demolition and construction phase, development proposals should be planned so that emissions are reduced as far as possible.
<b>Construction Policies</b>	1	Control of Dust	Developers and contractors should follow the guidance set out in the IAQM guidance when drafting their construction plans and measures to minimise air pollution recommended in this document should be implemented.
	2	Non-Road Mobile Machinery	Wherever possible, renewable, mains or battery powered plant items should be used on construction sites. NRMM of net power between 37kW and 560kW used on any site will be required to meet Stage II of the 2012/46/EU Non-Road Mobile Machinery Directive as a minimum.
	3	Assessment	An assessment of the impact on air quality of the development during the construction phase shall be carried out in order to inform detailed mitigation methods in line with the IAQM 2014 guidance.
	4	Monitoring	All demolition and construction sites should be monitored for the generation of air pollution. PM <sub>10</sub> monitoring should be carried out at medium and high risk sites.

# Abbreviations

Abbreviation	Definition
$\mu\text{gm}^{-3}$	Micrograms per cubic metre
ASI	Avoid-Shift-Improve approach
AQAP	Air Quality Action Plan
AQMA	Air Quality Management Area
AQO	Air Quality Objective
CAZ	Clean Air Zone
CHP	Combined Heat and Power
Defra	Department for the Environment, Food and Rural Affairs
EA	Environment Agency
EC	European Commission
EU	European Union
EV	Electric Vehicles
FCC	Freight Consolidation Centres
FORS	Fleet Operator Recognition Scheme
FQP	Freight Quality Partnership
GLA	Greater London Authority
HDV	Heavy Duty Vehicle
IAQM	Institute of Air Quality Management
IGCB	Interdepartmental Group on Costs and Benefits
LAQM	Local Air Quality Management
LDV	Light Duty Vehicle
LES	Low Emission Strategy
LEV	Low Emission Vehicle
LEZ	Low Emission Zone
LV	Limit value
MRF	Materials Recycling Facilities
$\text{NO}_2$	Nitrogen dioxide
$\text{NO}_x$	Oxides of nitrogen
NPPF	National Planning Policy Framework
NPPG	National Planning Practice Guidance



<b>NRMM</b>	Non-Road Mobile Machinery
<b>OLEV</b>	Office for Low Emission Vehicles
<b>PM<sub>10</sub></b>	Particulate Matter with an equivalent aerodynamic diameter of ten micrometers (10 µm) or less
<b>PM<sub>2.5</sub></b>	Particulate Matter with an equivalent aerodynamic diameter of two and a half micrometers (2.5 µm) or less
<b>SPD/SPG</b>	Supplementary Planning Documents/Guidance
<b>TfL</b>	Transport for London
<b>ULEV</b>	Ultra Low Emission Vehicle
<b>ULEZ</b>	Ultra-low Emission Zone
<b>USA</b>	Updating and Screening Assessment
<b>ZEN</b>	Zero Emission Network



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# 1. Introduction

Cheshire East Council (CEC) has commissioned Amec Foster Wheeler Environment & Infrastructure UK Limited (Amec Foster Wheeler) to develop a Low Emissions Strategy (LES) for the borough. This report summarises the work undertaken during the feasibility and case study stages of the project and presents the final LES for Cheshire East.

Cheshire East is the third largest unitary authority in the North West with a population of approximately 375,000 and covering an area of 1,116km<sup>2</sup>. The area is predominately rural in nature with several market towns. The area is relatively affluent and car ownership is high, with 40% of households having two cars or more, against a UK average of 29%. The quality of the air in Cheshire East is generally good, but the Local Air Quality Management (LAQM) process has identified several locations where the health base annual mean Air Quality Objective (AQO) for nitrogen dioxide (NO<sub>2</sub>) is exceeded. As a result, several separate Air Quality Management Areas (AQMAs) have been declared and Air Quality Action Plans (AQAPs) produced with the aim of reducing NO<sub>2</sub> concentrations in these AQMAs. There are also areas of the Borough where there is a possibility that the short term (hourly) objective for NO<sub>2</sub>.

Following the Cheshire East Local Plan Strategy examination, the Inspector provided the recommendation that over 36,000 new homes should be constructed in the Borough by 2030. In addition to this, it was recommended that 31,000 jobs should be created in the longer term. These policies are forecast to see the Borough's population grow by over 58,100 people.

In view of the existing air quality issues in the borough and the significant level of growth forecast, CEC wish to produce an overarching LES to ensure that current emissions are reduced as far as possible and emissions associated with new development are minimised. This is necessary to ensure that the exposure to NO<sub>2</sub> concentrations above AQOs for both present and future occupants of Cheshire East if not avoidable is limited to the shortest time possible and residents are exposed to as low concentrations of Particulate Matter (PM) from construction dust as possible. This LES provides a package of measures selected on the basis of the earlier research and studies undertaken, and current best practice in emissions management.

## 2. Background

### 2.1 Air quality in Cheshire East

The current situation with regards to air quality in the Borough is detailed fully in the LAQM reports produced by CEC and the Cheshire East Low Emission Strategy Feasibility Study Phase 1 produced on behalf of CEC<sup>1</sup>. Modelling indicated that even without the expected growth in traffic, it is unlikely that the AQO objective will be achieved across the Borough without further intervention.

In summary, air quality across Cheshire East is generally good, although the LAQM process has identified locations where the annual mean NO<sub>2</sub> AQO of 40µgm<sup>-3</sup> is not achieved. As a result, 17 AQMAs have been declared. The locations which have been declared as AQMAs are listed below:

- ▶ West Road, Congleton: a section of the road between the Wagon and Horses gyratory and the fire station roundabout;
- ▶ A34/A54 Congleton: a stretch of the A34 through Congleton incorporating Clayton Bypass, Rood Lane and Rood Hill towards the town centre roundabout;
- ▶ Lower Heath, Congleton: a short stretch of the A34 at Lower Heath;
- ▶ A5022/A534 Sandbach: a number of properties around the junction of the A534 and the A5022 in Sandbach;
- ▶ Nantwich Road, Crewe: a stretch of the A534 through Crewe;
- ▶ Wistaston Road, Crewe: a section of the street through Crewe;
- ▶ Earle Street, Crewe: a section of the street through Crewe;
- ▶ Hospital Street, Nantwich: a stretch of the A534 through Nantwich;
- ▶ A556 Chester Road, Mere: an area along the length of the A556 Chester Road between the roundabout with the A56 Lymm Road and Junction 19 of the M6 to the south;
- ▶ A6 Market Street, Disley: an area along the A6, Disley from the crossroads with Buxton Old Road in the west to the junction with Redhouse Lane in the east;
- ▶ A523 London Road, Macclesfield: an area from the Mill Lane/ Silk Road junction in the north to approximately 65m south of the London Road Terrace junction in the south; and
- ▶ A50 Manchester Road, Knutsford: five properties along the A50 at the Windsor Way junction.
- ▶ Chester Road, Middlewich: An area of Chester Road in Middlewich;
- ▶ Middlewich Road, Sandbach: A small stretch of Middlewich Road through Sandbach;
- ▶ Broken Cross, Macclesfield: An area around the Broken Cross / Chelford Road roundabout;
- ▶ Hibel Road, Macclesfield: Stretch of Hibel Road close to the Silk Road roundabout; and
- ▶ Park Lane, Macclesfield: A stretch of Park Lane, Macclesfield.

All AQMAs have been declared as a result of breaches of the annual mean AQO for NO<sub>2</sub>. All of the AQMAs result from pollutant emissions from road traffic, linked to local areas of congestion or high traffic volumes. The AQMAs declared in Cheshire East are shown in Figure 2-1.

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<sup>1</sup> AMEC Environment & Infrastructure UK Limited (2014) Cheshire East Low Emission Strategy Feasibility Study Phase 1: Inception

For the purpose of this report, the reductions in Road-NOx to achieve compliance with the AQO were updated with 2016 monitoring concentrations<sup>2</sup> and calculated at each sites where the AQO were exceeded. Results are presented in Table 2.1.

Table 2.1 Road NOx reductions required to achieve AQO

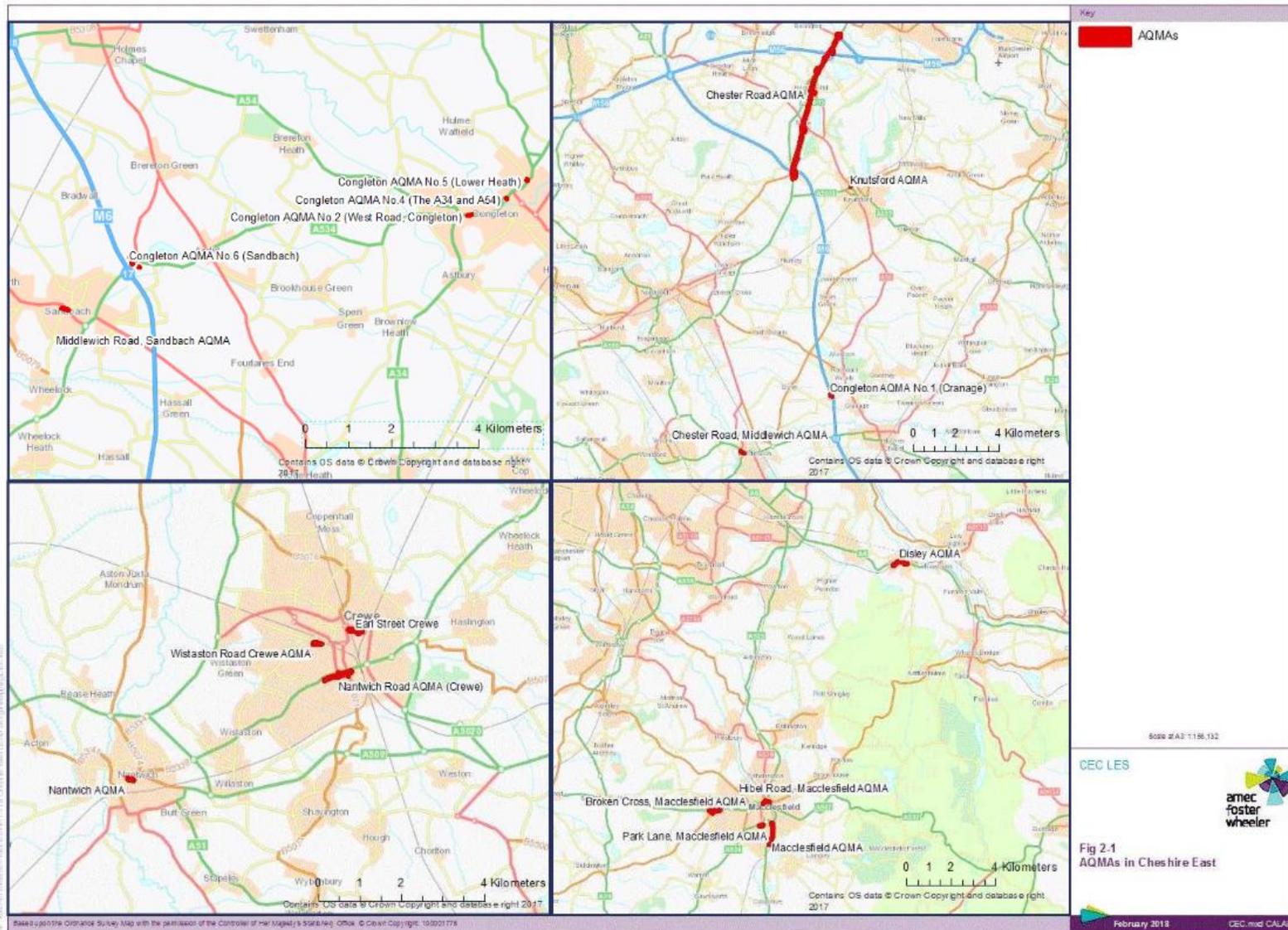
ID	Type	In AQMA	AQMA	2016 monitored NO <sub>2</sub> (µgm <sup>-3</sup> )	2016 Background NOx <sup>3</sup> (µgm <sup>-3</sup> )	Road NOx (µgm <sup>-3</sup> )	Required Road NOx reduction (µgm <sup>-3</sup> )	Required Road NOx reduction (%)
CE1	Roadside	Y	Park Lane, Macclesfield AQMA	42.82	16.58	64.87	6.83	10.53%
CE10	Roadside	Y	Macclesfield AQMA	49.74	15.80	83.68	24.48	29.25%
CE16	Roadside	Y	Disley AQMA	58.66	15.45	108.58	48.96	45.09%
CE47	Roadside	N	N/a	41.70	20.32	56.57	4.04	7.14%
CE48	Roadside	Y	Chester Road AQMA	50.20	18.75	80.13	25.43	31.74%
CE51	Roadside	Y	Chester Road AQMA	48.72	16.69	79.40	21.73	27.37%
CE54	Roadside	Y	Chester Road AQMA	40.94	30.17	41.16	2.16	5.25%
CE55	Roadside	Y	Chester Road AQMA	52.98	30.17	70.62	31.62	44.77%
CE57	Roadside	Y	Chester Road AQMA	45.09	20.72	64.12	12.29	19.17%
CE61	Roadside	Y	Chester Road AQMA	41.84	18.80	58.99	4.39	7.44%
CE84	Roadside	Y	Chester Road AQMA	45.81	20.72	65.91	14.08	21.36%
CE86	Roadside	Y	hibel Road, Macclesfield AQMA	43.33	18.86	62.85	8.02	12.76%
CE88	Kerbside	Y	Disley AQMA	44.49	15.45	70.62	11.00	15.58%
CE91	Roadside	Y	Broken Cross, Macclesfield AQMA	47.42	14.46	79.53	18.51	23.27%
CE93	Kerbside	N	N/a	40.90	15.02	62.44	2.17	3.48%
CE94	Roadside	N	N/a	52.66	21.37	82.84	31.68	38.24%
CE104	Roadside	Y	Congleton AQMA No.2 (West Road, Congleton)	64.50	16.19	124.40	65.81	52.90%
CE114	Roadside	N	N/a	66.39	20.20	123.78	70.65	57.08%

<sup>2</sup> Cheshire East Borough Council, 2017 Air quality annual status Report. <http://www.cheshireeast.gov.uk/pdf/environment/2017-air-quality-annual-status-report.pdf>

<sup>3</sup> Defra Background Maps 2015. <https://uk-air.defra.gov.uk/data/laqm-background-maps?year=2015>

ID	Type	In AQMA	AQMA	2016 monitored NO <sub>2</sub> (µgm <sup>-3</sup> )	2016 Background NO <sub>x</sub> <sup>3</sup> (µgm <sup>-3</sup> )	Road NO <sub>x</sub> (µgm <sup>-3</sup> )	Required Road NO <sub>x</sub> reduction (µgm <sup>-3</sup> )	Required Road NO <sub>x</sub> reduction (%)
CE116	Roadside	Y	Congleton AQMA No.4 (A34 and A54)	42.89	16.40	65.24	7.01	10.74%
CE117	Roadside	N	N/a	46.01	16.40	73.03	14.80	20.27%
CE127	Roadside	N	N/a	40.39	12.70	64.57	0.94	1.46%
CE136	Roadside	N	N/a	41.05	15.59	61.93	2.53	4.09%
CE152	Roadside	Y	Congleton AQMA No.6	47.62	25.16	64.36	18.37	28.54%
CE155	Roadside	Y	Congleton AQMA No.6	48.14	18.03	76.05	20.15	26.50%
CE203	Kerbside	Y	Nantwich Road AQMA (Crewe)	41.21	18.88	57.70	2.89	5.01%
CE216	Roadside	Y	Nantwich AQMA	50.53	16.57	84.41	26.49	31.38%
CE221	Roadside	Y	Nantwich AQMA	46.97	16.57	75.15	17.23	22.93%

Figure 2-1 AQMAs in Cheshire East



## 2.2 Health Impacts of Pollution

The air quality experienced by individuals can have a direct effect on their health, and the effect will depend on their existing health level. As discussed in the Low Emission Strategy Feasibility Study<sup>1</sup>, Particulate Matter less than 2.5µm in aerodynamic diameter (PM<sub>2.5</sub>) is the traffic-derived pollutant with strongest documented links to human health impacts<sup>4</sup>. The impact of PM<sub>2.5</sub> on mortality is a function of PM<sub>2.5</sub> concentration, population age structure and underlying age-specific mortality rates.

Accounting for the different demographic characteristics between England and Cheshire East, the estimated mortality burden due to exposure to anthropogenic PM<sub>2.5</sub> in Cheshire East is slightly lower than the average for England as a whole. As reported in the Public Health England document “*Estimating Local Mortality Burdens associated with particulate Air Pollution*”<sup>5</sup>, the mean concentration of anthropogenic PM<sub>2.5</sub> is 8.7 µgm<sup>-3</sup> versus the English average of 9.9 µgm<sup>-3</sup> and the proportion of mortality attributable to PM<sub>2.5</sub> is estimated to be 4.9% compared with a national average of 5.6%.

This translates into a mortality rate of 67.1 per 100,000 population (75 attributable deaths per year) for Cheshire East compared with 69.7 per 100,000 for the national average. It also translates to an average loss of life expectancy of about 10 years per death brought forward for Cheshire East versus the national average of about 10.6 years. The health effects of NO<sub>2</sub> exposure are less well-established, however NO<sub>2</sub> concentrations are generally considered as an indicator of levels of traffic pollution in any particular area.

The impact on health of the changes in pollutant concentrations can be considered by using Relative Risk (RR) (the percentage change in risk for 10 µg m<sup>-3</sup> concentration) for a particular pollutant. The Attributable Fraction (AF), the proportion of local deaths attributable to long-term exposure to air pollution<sup>5</sup> can then be calculated.

The PM<sub>2.5</sub> (RR) is 1.06 (10 µg m<sup>-3</sup> PM<sub>2.5</sub> leads to a 6% change in risk)<sup>5</sup>. A RR factor for NO<sub>2</sub> has recently been produced<sup>6</sup> which takes into account the recommended World Health Organization (WHO) number and the potential overlap with effects of PM<sub>2.5</sub> of up to around 30%. The RR for NO<sub>2</sub> is 1.039. Although the RR for NO<sub>2</sub> is lower than the RR for PM<sub>2.5</sub>, the dispersion modelling carried out during the case study phase indicated that the health benefits of the traffic measures considered would be predominantly related to reductions in NO<sub>x</sub> emissions, as they are likely to be more significant than reductions in PM<sub>2.5</sub> emissions achieved.

## 2.3 Local plan

The Local Plan (adopted in July 2017<sup>7</sup>), is the Statutory Development Plan for Cheshire East and is the basis for determining planning applications. The Local Plan Strategy document sets out the overall vision and planning strategy for development in the Borough and contains planning policies to ensure that new development addresses the economic, environmental and social needs of the area.

As part of the Cheshire East Local Plan Strategy examination, the Inspector provided further interim views, which included the recommendation that over 36,000 new homes should be constructed in the Borough by 2030, an increase on the initially projected 27,000. In addition to this, it was recommended that around 31,000 jobs should be created by 2030, an increase on the 20,000 jobs initially projected in the plan. These policies are forecast to see the Borough's population grow by around 58,100 people. Following two rounds of examination hearing sessions in 2014 and 2015, the Council published its Proposed Changes Version to the Local Plan Strategy and consultation closed on 19th April 2016. A Proposed Main Modifications to the Local Plan Strategy was then published and consultation closed on 20 March 2017. The Local Plan Strategy was adopted on 27 July 2017. Table 2.2 details the locations of the new homes that are proposed as part of the Local Plan. These sites are overwhelmingly planned for the outskirts of the existing towns but include new settlements

<sup>4</sup> WHO (2013) Review of Evidence on Health Aspects of Air Pollution – REVIHAAP Project

<sup>5</sup> Public Health England (2014) Estimating Local Mortality Burdens associated with particulate Air Pollution

<sup>6</sup> King's College London (2015) Understanding the Health Impacts of Air Pollution in London.

<sup>7</sup> Cheshire East Local Plan (2017)

[http://www.cheshireeast.gov.uk/planning/spatial\\_planning/cheshire\\_east\\_local\\_plan/cheshire\\_east\\_local\\_plan.aspx](http://www.cheshireeast.gov.uk/planning/spatial_planning/cheshire_east_local_plan/cheshire_east_local_plan.aspx)

Table 2.2 Proposed developments detailed in the local plan

Area	Existing Dwellings <sup>1</sup>	Total New Dwellings	Increase	Related AQMAs
Crewe	23,660	7,700	33%	Nantwich Road, Wistaston Road and Earle Street
Macclesfield	20,590	4,250	21%	A523 London Road, Broken Cross, Chester Road, Hibel Road and Park Lane
Alsager	5,360	2,000	37%	N/A
Congleton	11,990	4,150	35%	West Road, A34/A54 and Lower Heath
Handforth	4,540	2,200	48%	N/A
Knutsford	6,150	950	15%	A50 Manchester Road
Middlewich	5,890	1,950	33%	Chester Road, Middlewich
Nantwich	8,450	2,050	24%	Hospital Street
Poynton	6,950	650	9%	N/A
Sandbach	8,020	2,750	34%	A5022/A534 and Middlewich Road
Wilmslow	10,530	900	9%	N/A
<b>Local Service Centres</b>		3,500		N/A
<b>Other Settlements and Rural Areas</b>		2,950		N/A
<b>Total</b>	<b>166,340</b>	<b>36,000</b>	<b>22%</b>	<b>N/A</b>

<sup>1</sup> Cheshire East Council Ward Profiles, 2011

[http://www.cheshireeast.gov.uk/council\\_and\\_democracy/council\\_information/research\\_and\\_consultation/ward\\_profiles.aspx](http://www.cheshireeast.gov.uk/council_and_democracy/council_information/research_and_consultation/ward_profiles.aspx)

## 3. Policy context and legislation

### 3.1 International

#### EU Directive

The legislative framework for air quality consists of legally enforceable EU Limit Values (LVs) that are transposed into UK legislation as Air Quality Standards (AQS) that must be at least as challenging as the EU Limit Values. Action in the UK is then driven by the UK's Air Quality Strategy<sup>8</sup>.

The EU LVs are set by the European directive on air quality and cleaner air for Europe (2008/50/EC)<sup>9</sup> and the European directive relating to arsenic, cadmium, mercury, nickel, and polycyclic aromatic hydrocarbons in ambient air (2004/107/EC)<sup>10</sup> as the principal instruments governing outdoor ambient air quality policy in the EU. The Limit Values are legally binding levels for concentrations of pollutants for outdoor air quality.

Air quality in the UK currently meets the EU limit values for all the required pollutants except NO<sub>2</sub>. In February of 2014 the European Commission (EC) announced that it was taking legal action against Britain, and other Member States, for non-compliance with the European air quality limit values for NO<sub>2</sub>. A "letter of formal notice" of the EC's intention to take legal action was sent to the Government. The legal action would result in annual fines and although the level of any fine has not been specified, it is thought to be several hundreds of million pounds a year. In addition, in April 2015, a ruling by the UK's Supreme Court requires the government to take immediate action to reduce NO<sub>2</sub> concentrations as soon as possible<sup>11</sup>.

### 3.2 National

#### Air Quality Regulations

The two European directives, as well as the European Council's decision on exchange of information were transposed into UK Law via the Air Quality Standards Regulations 2010<sup>12</sup>, which came into force in the UK on 11 June 2010, replacing the Air Quality Standards Regulations 2007<sup>13</sup>. Air Quality Standards are concentrations recorded over a given time period, which are considered to be acceptable in terms of what is scientifically known about the effects of each pollutant on health and on the environment.

#### Air Quality Strategy

The Air Quality Strategy sets the AQOs, which give target dates and some interim target dates to help the UK move towards achievement of the EU Limit Values. The AQOs are a statement of policy intentions or policy targets and as such, there is no legal requirement to meet these objectives except in as far as they mirror any equivalent legally binding Limit Values in EU legislation. The most recent UK Air Quality Strategy for England, Scotland, Wales and Northern Ireland was published in July 2007.

NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> are the pollutants of greatest health concern associated with road traffic, the main source of pollution in the area. National level measurement and modelling assessments carried out by Defra

<sup>8</sup> Defra in partnership with the Scottish Executive, Welsh Assembly Government and Department of the Environment Northern Ireland (2007) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland.

<sup>9</sup> Official Journal of the European Union, (2008) Directive 2008/50/EC of the European Parliament and of The Council of 21 May 2008 on ambient air quality and cleaner air in Europe.

<sup>10</sup> Official Journal of the European Union, (2004) Directive 2004/107/EC of the European Parliament and of The Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air.

<sup>11</sup> The Supreme Court (2015) Press Summary - R (on the application of ClientEarth) (Appellant) v Secretary of State for the Environment, Food and Rural Affairs (Respondent) [2015] UKSC 28 On appeal from [2012] EWCA Civ 897 - <https://www.supremecourt.uk/cases/docs/uksc-2012-0179-press-summary.pdf>

<sup>12</sup> The Stationery Office Limited (2010) Statutory Instrument 2010 No. 1001 Environmental Protection – The Air Quality Standards Regulation 2010.

<sup>13</sup> The Stationery Office Limited (2007) Statutory Instrument 2010 No. 64 Environmental Protection – The Air Quality Standards Regulation 2007.

have shown that policy measures already in place ensure that concentrations of other pollutants comply with the relevant objectives even at busy roadside locations.

The NO<sub>x</sub> (NO and NO<sub>2</sub>) emitted from vehicle exhausts and other combustion sources undergoes photochemical oxidation in the atmosphere, with NO<sub>2</sub> being formed by oxidation of NO to NO<sub>2</sub> and, conversely, NO<sub>2</sub> undergoing photolysis (in the presence of sunlight) to create NO and ozone (O<sub>3</sub>).

Table 3.1 sets out the AQOs that are relevant to this assessment, and the dates by which they are to be achieved. For NO<sub>2</sub>, it is the annual mean objective that is the more stringent AQO; it is generally considered that the 1-hour mean NO<sub>2</sub> AQO will not be exceeded if the annual mean objective is not exceeded. For PM<sub>10</sub>, the 24-hour mean objective is more stringent than the annual mean.

Table 3.1 Summary of relevant air quality standards and objectives

Pollutant	Objective (UK)	Averaging Period	Date to be Achieved by and Maintained thereafter (UK)
Nitrogen dioxide - NO <sub>2</sub>	200 µgm <sup>-3</sup> not to be exceeded more than 18 times a year	1-hour mean	31 Dec 2005
	40 µgm <sup>-3</sup>	Annual mean	31 Dec 2005
Particles - PM <sub>10</sub>	50 µgm <sup>-3</sup> not to be exceeded more than 35 times a year	24-hour mean	31 Dec 2004
	40 µgm <sup>-3</sup>	Annual mean	31 Dec 2004
Particles - PM <sub>2.5</sub>	25 µgm <sup>-3</sup>	Annual mean	2020
	Target of 15% reduction in concentration at urban background locations	3 year mean	Between 2010 and 2020

## LAQM

Since Part IV of the Environment Act 1995<sup>14</sup> came into force, local authorities have been required to periodically review concentrations of the UK Air Quality Strategy pollutants within their areas and to identify areas where the AQOs may not be achieved by their relevant target dates. This process of LAQM is an integral part of delivering the Government's AQOs detailed in the Strategy. Local authorities investigate the levels of pollution in their area by a combination of ambient monitoring and dispersion modelling as part of the Review and Assessment process. Ambient monitoring measures concentrations of the main pollutants directly at a limited number of locations and can use passive or automatic (continuous) monitoring equipment. However, as monitors cannot give a complete picture of an entire borough, dispersion modelling is often used to predict pollutant concentrations across a wider area, to investigate future scenarios and to estimate the contribution of different sources to the total pollution, known as source apportionment. In this way, air quality models can be used to assess whether or not the national air quality objectives are likely to be breached in their target year.

Under LAQM, where air quality objectives are not (or are unlikely to be) met, Air Quality Management Areas (AQMAs) must be designated officially by means of an 'order'. The extent of the AQMA may be limited to the area of exceedance or encompass a larger area such as an entire town centre or even entire towns.

Following the declaration of an AQMA, the local authority must undertake an assessment of air quality in the AQMA within 12 months and develop and implement an Air Quality Action Plan (AQAP) to improve air quality in that area. AQMAs are what drive various legal provisions in relation to air quality, specifically within the planning system. The local authority may update the action plan from time to time. The Latest guidance on

<sup>14</sup> HMSO (1995) Environment Act 1995.

the LAQM process is given in Defra's 2016 LAQM Technical Guidance (LAQM TG(16))<sup>15</sup> and LAQM Policy Guidance (LAQM PG(16))<sup>16</sup>.

While councils have a statutory duty to carry out LAQM, it is important to note that councils are not obliged to achieve the AQOs as they do not have sufficient control over all of the sources that could potentially give rise to the breach. Large industrial sources are regulated by the Environment Agency, major roads are controlled by the Highways Agency and, in London, by Transport for London. Much of the pollution is regional in nature, arising from other areas in the UK or even outside the UK.

When the UK Review and Assessment process was devised, it was thought that national and European measures would achieve compliance with the EU LVs across the UK, with the exception of limited number of hot spots which local authorities would identify and address. However, this is not what has happened and councils are now faced with widespread exceedances.

### December 2015 Nitrogen Dioxide action plan

In December 2015, Defra published plans to improve air quality in the UK focused on "*Tackling nitrogen dioxide in our towns and cities*"<sup>17</sup>. The document sets out the UK's approach to meeting the NO<sub>2</sub> limit values set out in the Ambient Air Quality Directive in the shortest time possible. This plan was produced following the Supreme Court order of 2015 that the government must submit new air quality plans to the European Commission no later than 31 December 2015<sup>18</sup>.

The UK is divided into 43 zones and agglomerations for air quality monitoring and reporting purposes. Compliance assessments are submitted to the Commission on an annual basis which demonstrate progress towards the limit values. The plans are in the form of an overarching national plan and individual local plans for each of the 38 zones currently exceeding the annual mean limit value for NO<sub>2</sub>. Cheshire East is part of North West & Merseyside UK zone.

The Defra Pollution Climate Mapping (PCM) model has been used to project future NO<sub>2</sub> concentrations, which provide expected UK compliance dates for each of the UK zones. Compliance is predicted to be achieved by 2030 with no new measures, and by 2025 with the implementation of the measures detailed in the plans.

The overview document includes the following measures to reduce NO<sub>2</sub> concentrations:

- ▶ Clean Air Zones (CAZs - for Birmingham, Leeds, Nottingham, Derby and Southampton);
- ▶ London Ultra-Low Emission Zone;
- ▶ An improved LAQM system;
- ▶ Incentivising ultra low emission vehicles through various Office of Low Emission Vehicle (OLEV) schemes such as the Plug-in Car Grant;
- ▶ Government Procurement including the Government Buying Standards (GBS) which set down minimum mandatory and best practice standards requirement for cars, vans, buses and trucks;
- ▶ Improvements to the road network;
  - ▶ Highways England road investment strategy;
  - ▶ Specific road improvements;
- ▶ Reducing emissions from buildings; and
- ▶ Reducing emissions from other sources;

<sup>15</sup> Defra (2016) Local Air Quality Management Technical Guidance LAQM.TG (16).

<sup>16</sup> Defra (2016) Local air Quality Management Policy Guidance PG (16)

<sup>17</sup> Defra (2015). Improving air quality in the UK. Tackling nitrogen dioxide in our towns and cities UK Overview Document

<sup>18</sup> The Supreme Court (2015) Press Summary - R (on the application of ClientEarth) (Appellant) v Secretary of State for the Environment, Food and Rural Affairs (Respondent) [2015] UKSC 28 On appeal from [2012] EWCA Civ 897 - <https://www.supremecourt.uk/cases/docs/uksc-2012-0179-press-summary.pdf>

- ▶ Ports and shipping;
- ▶ Aviation;
- ▶ Rail;
- ▶ Freight;
- ▶ Industry;
- ▶ Non-Road Mobile Machinery.

CAZs are areas where only the cleanest vehicles are encouraged (through the use of vehicle emission standards). Vehicle standards will be set based on emissions level for a vehicle type. This is to ensure that only the cleanest vehicles, including hybrid and vehicles using alternative fuels where appropriate, are encouraged to enter the area. Four classes of access control are defined according to the types of vehicles which must meet the standards specified. Local authorities will be free to decide whether all or a combination of the type of vehicles in these classes should be subject to control:

- ▶ A – Buses, coaches and taxis only;
- ▶ B – Buses, coaches, taxis and heavy goods vehicles (HGVs);
- ▶ C – Buses, coaches, taxis, HGVs and light goods vehicles (LGVs); and
- ▶ D – Buses, coaches, taxis, HGVs, LGVs and cars.

Any cities with Clean Air Zones other than Class A are likely to use cameras to ensure that those vehicle owners that are required to pay a charge do so. The government will legislate to require the implementation of CAZs in five cities (Birmingham, Leeds, Nottingham, Southampton and Derby) and CAZs will be implemented by other local authorities which decide emissions based access controls are the most effective solution for them to meet the limit values for NO<sub>2</sub>. The proposed emission standards are the same as those proposed for the Central London Ultra Low Emission Zone (ULEZ)<sup>19</sup>, and are as follows:

- ▶ Bus/coach – 0.4 g/kWh (Equivalent to Euro VI for NO<sub>x</sub> emissions);
- ▶ HGV – 0.4 g/kWh (Equivalent to Euro VI for NO<sub>x</sub> emissions);
- ▶ Van (1305-3500kg) – 0.125 g/km (Equivalent to Euro VI for 1760-3500kg Diesel Light Commercial Vehicle); and
- ▶ Car/light commercial (up to 1305kg) – 0.08 g/km (Equivalent to Euro 4 petrol car and Euro 6 diesel car).

The possibility of establishing CAZs without charging is discussed where behaviour change can be encouraged through other means. This would remove the need for complex enforcement systems and infrastructure, enabling the CAZ to be rapidly implemented and raise public awareness of air quality issues. It is suggested that, in some cases, initial operation of a CAZ on a voluntary basis could reduce the need for a charging CAZ.

### National Planning Policy Framework and National Planning Practice Guidance

The National Planning Policy Framework (NPPF)<sup>20</sup> sets out government's planning policies for England and how these are expected to be applied. With regards to air quality, the NPPF states:

*“Planning policies should sustain compliance with and contribute towards EU limits values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan.”*

<sup>19</sup> <https://tfl.gov.uk/modes/driving/ultra-low-emission-zone>

<sup>20</sup> Department for Communities and Local Government (2012) National Planning Policy Framework

The government has also produced Planning Practice Guidance (PPG)<sup>21</sup> which provides guiding principles on how planning can take account of the impact of new development on air quality. With regards to the development of Local Plans, it is stated that:

*“It is important to take into account air quality management areas and other areas where there could be specific requirements or limitations on new development because of air quality.”* and

*“the Local Plan may need to consider:*

- ▶ *the potential cumulative impact of a number of smaller developments on air quality as well as the effect of more substantial developments;*
- ▶ *the impact of point sources of air pollution (pollution that originates from one place); and,*
- ▶ *ways in which new development would be appropriate in locations where air quality is or likely to be a concern and not give rise to unacceptable risks from pollution. This could be through, for example, identifying measures for offsetting the impact on air quality arising from new development including supporting measures in an air quality action plan or low emissions strategy where applicable.”*

It is stated that air quality is relevant to planning applications when the development would:

- ▶ *“Significantly affect traffic in the immediate vicinity of the proposed development site or further afield. This could be by generating or increasing traffic congestion; significantly changing traffic volumes, vehicle speed or both; or significantly altering the traffic composition on local roads. Other matters to consider include whether the proposal involves the development of a bus station, coach or lorry park; adds to turnover in a large car park; or result in construction sites that would generate large Heavy Goods Vehicle flows over a period of a year or more.*
- ▶ *Introduce new point sources of air pollution. This could include furnaces which require prior notification to local authorities; or extraction systems (including chimneys) which require approval under pollution control legislation or biomass boilers or biomass-fuelled CHP plant; centralised boilers or CHP plant burning other fuels within or close to an air quality management area or introduce relevant combustion within a Smoke Control Area;*
- ▶ *Expose people to existing sources of air pollutants. This could be by building new homes, workplaces or other development in places with poor air quality.*
- ▶ *Give rise to potentially unacceptable impact (such as dust) during construction for nearby sensitive locations.*
- ▶ *Affect biodiversity. In particular, is it likely to result in deposition or concentration of pollutants that significantly affect a European-designated wildlife site, and is not directly connected with or necessary to the management of the site, or does it otherwise affect biodiversity, particularly designated wildlife sites.”*

### **Office of Low Emission Vehicles (OLEV) Investing in Ultra Low Emission Vehicles in the UK, 2015 to 2020**

In April 2014, OLEV published the Government's proposed package of support for ULEVs in the period 2015-20. This document included the government's plans on Shaping the Required Infrastructure. The key elements are detailed in Table 3.2.

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<sup>21</sup> Department for Communities and Local Government (2014) National Planning Practice Guidance – Air Quality.

Table 3.2 OLEV Plans for Shaping ULEV Infrastructure

Type of Infrastructure	Plan
<b>Charging Infrastructure</b>	<p>There will be a rapid chargepoint at every motorway service station by the end of 2014 and we will have a network of over 500 rapid chargers across the country by March 2015 – the best network in Europe.</p> <p>We need to go further to ensure that worries about charging are never a barrier to ULEV adoption.</p> <p>We will provide a £32m fund for charging infrastructure in the period 2015-2020. Among other things, this will ensure that ULEV drivers can easily find a rapid chargepoint to help undertake any journey they choose.</p>
<b>Gas refuelling Infrastructure</b>	<p>We are allocating £4m to ensure the UK has an initial network of gas refuelling stations to support freight and logistics operators in their efforts to reduce the environmental impact of their businesses.</p>
<b>Hydrogen Infrastructure</b>	<p>We are positioning the UK to be a lead market for the introduction of hydrogen fuel cell vehicles and will announce soon, and no later than autumn, 2014 the actions that both Government and industry stakeholders will be taking to achieve this.</p>

### 3.3 Local policies

#### Cheshire East Local Plan

The Local Plan includes policies to ensure that the required development will protect and enhance Cheshire East's built and natural environment and will make sustainable use of resources. These policies recognise the contribution that an attractive environment can make to a successful economy and the well-being of local communities. With particular reference to air quality, it is stated that development should avoid and, if necessary, mitigate against environmental impacts. The relevant policies in the Local Plan Strategy Submission Version<sup>22</sup> are as follows:

#### Policy Sustainable Environment 12 - Pollution, Land Contamination and Land Instability

- ▶ the Council will seek to ensure all development is located and designed so as not to result in a harmful or cumulative impact upon air quality, surface water and groundwater, noise, smell, dust, vibration, soil contamination, light pollution or any other pollution which would unacceptably affect the natural and built environment, or detrimentally affect amenity or cause harm. Developers will be expected to minimise, and mitigate the effects of possible pollution arising from the development itself, or as a result of the development (including additional traffic) during both the construction and the life of the development. Where adequate mitigation cannot be provided, development will not normally be permitted.
- ▶ development for new housing or other environmentally sensitive development will not normally be permitted where existing air pollution, soil contamination, noise, smell, dust, vibration, light or other pollution levels are unacceptable and there is no reasonable prospect that these can be mitigated against.
- ▶ development should support improvements to air quality, not contradict the Air Quality Strategy or Air Quality Action Plan and seek to promote sustainable transport policies.

#### Policy Connectivity 1 - Sustainable Travel and Transport

*To deliver the Council objectives of delivering a safe, sustainable, high quality, integrated transport system that encourages a modal shift away from car travel to public transport, cycling and walking; supportive of the needs of residents and businesses and preparing for carbon free modes of transport, the Council will expect development to:*

<sup>22</sup> Cheshire East Council (2016) Local Plan Strategy Proposed Changes Submission Version

- ▶ Reduce the need to travel by:
  - ▶ Guiding development to sustainable and accessible locations or locations that can be made sustainable and accessible;
  - ▶ Ensuring development gives priority to walking, cycling and public transport within its design;
  - ▶ Encouraging more flexible working patterns and home working;
  - ▶ Supporting improvements to communication technology for business, education, shopping and leisure purposes;
  - ▶ Supporting measures that reduce the level of trips made by single occupancy vehicles; and
- ▶ Improve pedestrian facilities so that walking is attractive for shorter journeys including:
  - ▶ Supporting the priority of pedestrians at the top of the road user hierarchy and making sure that in settlements, town centres and residential areas, the public realm environment reflects this priority;
  - ▶ Supporting safe and secure access for mobility and visually impaired persons including mobility scooter users and parents with pushchairs;
  - ▶ Creating safe and secure footways and paths linking with public transport and other services;
  - ▶ Ensuring new developments are convenient, safe and pleasant to access on foot; and
  - ▶ Supporting work to improve canal towpaths and Public Rights of Way where they can provide key linkages from developments to local facilities.
  - ▶ Supporting measures that introduce safe routes to schools.
  - ▶ Ensuring a selective and ongoing review of speed limits, as appropriate.
- ▶ Improve cyclist facilities so that cycling is attractive for shorter journeys including:
  - ▶ Creating safe and pleasant links for cyclists travelling around the Borough;
  - ▶ Providing secure cycle parking facilities at new developments, at public transport hubs, town centres and at community facilities;
  - ▶ Improving route signing;
  - ▶ Working with community groups to develop local cycling initiatives and seek external funding to assist with the development of the local network; and
  - ▶ Supporting the priority for cyclists over single occupancy vehicles by making sure that in settlements, town centres and residential areas, the public realm environment reflects this priority whenever possible.
- ▶ Improve public transport integration, facilities, service levels, access for all users and reliability including:
  - ▶ Rail infrastructure - current schemes comprise:
    - Improvements to Crewe Railway Station, promoting its role as a national rail hub and providing associated connectivity for buses;
    - Supporting the aspiration for re-opening the Sandbach to Northwich railway line to passengers including the opening of a station at Middlewich;
    - Supporting proposals for rail infrastructure and the provision of rail facilities as appropriate; and
    - Engaging in proposals for improving rail connectivity through High Speed Rail;
  - ▶ Bus Infrastructure - current schemes comprise:

#### Improvements to Crewe Bus Station.

- ▶ Improving public transport service levels, which may involve developers temporarily subsidising new bus services or the extension of an existing service to provide additional journeys, or supporting community transport initiatives to enable sustainable access to new development;
  - ▶ Engaging in proposals for improving rail connectivity through the Northern Hub capacity improvement scheme;
  - ▶ Considering options to enhance Bus Priority at junctions and the provision of dedicated bus lanes; and
  - ▶ Considering opportunities to improve cross border connectivity with neighbouring areas.
- ▶ Improve and develop appropriate road, rail and water freight transport routes and associated intermodal freight transport facilities in order to assist in the sustainable and efficient movement of goods.

### Policy Connectivity 2 - Enabling Business Growth through Transport Infrastructure

*The Council will support new developments that are (or can be made) well connected and accessible by:*

- ▶ *Minimising the future need to travel by locating new development in locations where there is a good range of housing, jobs, shops and services already accessible by public transport, cycling and walking.*
- ▶ *Enabling development by supporting transport infrastructure, regeneration and / or behaviour change initiatives that will mitigate the potential impact of development proposals including:*
  - ▶ *Supporting schemes outlined within the current Infrastructure Delivery Plan / Local Transport Plan.*
  - ▶ *Where new or improved infrastructure is provided, supporting measures to improve the walking, cycling and sustainable travel environment on routes relieved of traffic;*
  - ▶ *Supporting improvements to communication technology for business, education, shopping and leisure purposes;*
  - ▶ *Supporting the improvement of rail infrastructure - especially facilities at railway stations;*
  - ▶ *Supporting the improvement of national motorway network facilities, where appropriate and supported by the Highways Agency*
  - ▶ *Providing recharging points for hybrid or electric vehicles in major developments in order to reduce carbon emissions; and*
  - ▶ *Adhering to the current adopted Cheshire East Council Parking Standards for Cars and Bicycles (Parking Standards).*
- ▶ *The Council will support the economic benefits of High Speed 2 whilst ensuring that environmental and community impacts are minimised.*
- ▶ *The Council will work with neighbouring transport authorities and support proposals which mitigate the wider impacts of development and improve connectivity, particularly by public transport, so that the opportunities provided by economic growth can be accessible to a wider population.*
- ▶ *Proposals for the safeguarding of disused transport corridors will be supported. Recreational and appropriate uses for disused transport corridors may be allowed provided they do not preclude eventual re-use for transport purposes or impact on public safety.*

## Car Parking Standards

The CEC parking objectives set out to be consistent with and contribute to the overall aims of the National and Regional transport strategies which seek to:

- ▶ Achieve a reduction in overall traffic;
- ▶ To increase use of more sustainable and healthy forms of travel; and
- ▶ To achieve a more effective and efficient transport system, whilst taking into account:
  - ▶ The economic vitality of town centres;
  - ▶ The parking needs of people with disabilities; and
  - ▶ The parking needs of local residents, shops and businesses.

CEC has adopted the following car parking standards for development:

- ▶ Principal Towns and Key Service Centres;
  - ▶ 1 bedroom - 1 space per dwelling;
  - ▶ 2 bedrooms - 2 spaces per dwelling;
  - ▶ 3+ bedrooms - 2 spaces per dwelling.
- ▶ Remainder of Borough;
  - ▶ for 1 bedroom - 1 space per dwelling;
  - ▶ 2/3 bedrooms - 2 spaces per dwelling;
  - ▶ 4/5+ bedrooms - 3 spaces per dwelling.

## 4. Policies to improve air quality

### 4.1 Planning and air quality

Full consideration of the emissions generated by new developments is vital to ensure that the future air quality in the area is as good as possible. Policies to reduce emissions should be developed in accordance with the Avoid-Shift-Improve (ASI) approach. Policies are considered hierarchically, with the first tier reducing emissions by avoiding, or reducing, the polluting activity, the second tier reducing emissions by shifting to lower emission modes, such as walking and cycling or public transport, and the third tier reducing emissions by improving technology.

Effective land-use planning plays a vital role in reducing the impact of new developments on air quality. At this design stage, demand for travel by road can be minimised through sustainable transport links between the home, workplace, educational, retail and leisure facilities<sup>23</sup>, thereby reducing trip distances and avoiding emissions. Spatial planning should also be used to encourage the uptake of Low Emission Vehicles (LEVs) where journeys still need to be undertaken. Finally, enforcement of emission standards and development of new infrastructure can help to ensure that emissions from journeys that are not avoided, or shifted to different modes, emit as little pollution as possible.

The Department for Communities & Local Government Planning Practice Guidance<sup>24</sup> states that:

“Whether or not air quality is relevant to a planning decision will depend on the proposed development and its location. Concerns could arise if the development is likely to generate air quality impact in an area where air quality is known to be poor. They could also arise where the development is likely to adversely impact upon the implementation of air quality strategies and action plans and/or, in particular, lead to a breach of EU legislation (including that applicable to wildlife)”.

As detailed in the Institute of Air Quality Management (IAQM) guidance on “*Land-Use Planning & Development Control: Planning For Air Quality*”<sup>23</sup>, in arriving at a decision about a specific proposed development, the local planning authority should pay particular attention to:

- ▶ compliance with national air quality objectives and EU Limit Values;
- ▶ whether the development will materially affect any air quality action plan or strategy;
- ▶ the overall degradation (or improvement) in local air quality; or
- ▶ whether the development will introduce new public exposure into an area of existing poor air quality.

#### Development principles

The role of the planning system in minimising impacts, or even improving air quality has been recognised and over recent years several national, regional and local guidance documents have been produced which include recommendations on suitable design principles to minimise emissions. Examples have been produced by the following organisations:

- ▶ Institute of Air Quality Management (IAQM);
- ▶ Low Carbon Vehicle Partnership;
- ▶ Greater London Authority;
- ▶ West Yorkshire Low Emissions Group; and
- ▶ Sussex Air Quality Partnership.

<sup>23</sup> IAQM/EPUK (2017) Land-Use Planning & Development Control: Planning For Air Quality

<sup>24</sup> Department for Communities & Local Government (2014) Planning Practice Guidance. When could air quality be relevant to a planning decision? Paragraph: 005 Reference ID: 32-005-20140306

Whilst several of these documents cover regional areas, distant from Cheshire, they have been included here as they have been produced in order to tackle similar air quality problems. The key aspects of the guidance produced by each are detailed below.

#### Institute of air quality management

In relation to land-use planning, the IAQM/EPUK guidance<sup>23</sup> strongly encourages the following actions:

- ▶ Full integration of the inputs of the planning, transport, housing, education and environment departments to ensure that environmental considerations, including those related to air quality, are considered at the earliest stages of the strategic planning processes;
- ▶ Ensuring public services are joined up and easier to access via public transport or other sustainable choices such as cycling and walking; and
- ▶ Giving careful consideration to the location of developments.

For the development design phase, the guidance recommends:

- ▶ New developments should not contravene the Council's Air Quality Action Plan, or render any of the measures unworkable;
- ▶ Wherever possible, new developments should not create a new "street canyon", or a building configuration that inhibits effective pollution dispersion;
- ▶ Delivering sustainable development should be the key theme of any application;
- ▶ New development should be designed to minimise public exposure to pollution sources, e.g. by locating habitable rooms away from busy roads, or directing combustion generated pollutants through well sited vents or chimney stacks.

For the operational phase, the guidance recommends:

- ▶ The provision of at least 1 Electric Vehicle (EV) "rapid charge" point per 10 residential dwellings and/or 1000m<sup>2</sup> of commercial floorspace. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be made;
- ▶ Where development generates significant additional traffic, provision of a detailed travel plan (with provision to measure its implementation and effect) which sets out measures to encourage sustainable means of transport (public, cycling and walking) via subsidised or free-ticketing, improved links to bus stops, improved infrastructure and layouts to improve accessibility and safety;
- ▶ All gas-fired boilers to meet a minimum standard of <40 mgNO<sub>x</sub>/kWh;
- ▶ All gas-fired CHP plant to meet a minimum standard of:
  - ▶ Spark ignition engine: 250 mgNO<sub>x</sub>/Nm<sup>3</sup>;
  - ▶ Compression ignition engine : 400 mgNO<sub>x</sub>/Nm<sup>3</sup>;
  - ▶ Gas turbine: 50 mgNO<sub>x</sub>/Nm<sup>3</sup>.
- ▶ A presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of:
  - ▶ Solid biomass boiler: 275 mgNO<sub>x</sub>/Nm<sup>3</sup> and 25 mgPM/Nm<sup>3</sup>.

Typical measures that may be considered to offset emissions include:

- ▶ Support for and promotion of car clubs;
- ▶ Contributions to low emission vehicle refuelling infrastructure;
- ▶ Provision of incentives for the uptake of low emission vehicles;

- ▶ Financial support to low emission public transport options; and
- ▶ Improvements to cycling and walking infrastructure.

The Institute of Air Quality Management (IAQM)<sup>25</sup> has also developed guidance regarding the assessment of the impacts of construction on air quality and the determination of their significance.

Local communities may be concerned that development activities (particularly construction works) would result in regular and persistent dust emissions, which may affect local amenity and quality of life. The level of concern, and potential for annoyance, is directly related to the existing baseline dust levels, the number and proximity of residential areas to the Site, and the exact nature of the activities on-site. The degree of actual annoyance would also depend on factors, such as, the rate of dust deposition, and the application of mitigation measures on site.

Detailed assessment involves a three-stage process; construction sites are classified according to the risk of effects (based upon the scale and nature of the works, plus the proximity of sensitive receptors), appropriate site-specific mitigation measures are identified and the significance of effects is then determined.

The significance of the dust effects is generally undertaken after applying the site-specific mitigation. This would take account of the risk of effects, and other factors that might affect the risk of dust effects arising, even after any site-specific mitigation has been implemented.

#### Low carbon vehicle partnership

The Low Carbon Vehicle Partnership (LCVP) *Local measures to encourage the uptake of low emission vehicles Good Practice Guide*<sup>26</sup> includes a range of local authority measures to encourage the uptake of Low Emission Vehicles (LEVs) that relate directly to planning. These are detailed in Table 4.1.

Table 4.1 Planning measures to promote LEVs

Measure	Details
<b>Planning conditions in development frameworks</b>	Specify a minimum requirement for provision of LEV spaces (and associated infrastructure) in new developments
<b>(U)LEV specifications in building codes</b>	Specify the need for (U)LEV vehicle readiness in new and renovated buildings
<b>Permitted development rights for charging infrastructure</b>	Electric vehicle charge point installation designated as a permitted development right
<b>Infrastructure installation in rental properties</b>	Makes a term in a lease, contract, security instrument, or similar void to be unenforceable if it prohibits or unreasonably restricts the installation of electric vehicle charging in a lessee's designated parking space
<b>Developer contributions</b>	Planning obligations (section 106/section 75), community infrastructure levy, highway contributions
<b>Local Development Orders securing land for infrastructure</b>	Using Local Development Orders to secure land for infrastructure

This document also highlights the importance of parking in encouraging LEV uptake by influencing driver behaviour and choices. Dedicated parking can be used as an incentive by offering drivers the possibility of saving time and money. These measures are detailed in Table 4.2.

<sup>25</sup> Institute of Air Quality Management (IAQM) (2014) – Guidance on the Assessment of Dust from Demolition and Construction.

<sup>26</sup> LCVP (2015) Local measures to encourage the uptake of low emission vehicles Good Practice Guide

Table 4.2 Parking measures to promote LEVs

Measure	Details
Discounted on- and off-street parking for LEVs	LEVs permitted to use public parking facilities free or at a reduced cost
Dedicated LEV parking (not including recharging)	LEV-only car parking spaces that do not include charge points
Discounted residential parking permits for LEVs	Cost of parking permit reduced or waived for LEV owners
Reduced waiting time for parking permits for LEVs	Priority for parking permit applications given to LEV cars
Reduced parking spaces for high emission vehicles	Parking for conventional vehicles reduced
Workplace parking levy	Local authorities can charge businesses for every employee who parks in the area
Dedicated parking for LEV car club vehicles	Allocating parking for sole use by LEV car clubs

### Greater London Authority

The Mayor of London's Local Plan<sup>27</sup> and *Sustainable Design and Construction Supplementary Planning Guidance*<sup>28</sup> states that:

- ▶ Developments must ensure that 1 in 5 spaces provide an electrical charging point to encourage the uptake of electric vehicles;
- ▶ Developments should be designed to encourage and facilitate walking and cycling and the use of public transport and not exceed local car parking standards;
- ▶ Developments should be at least 'air quality neutral' when considered against emission benchmarks for building operation and transport;
- ▶ Developers of schemes which do not meet the 'air quality neutral' benchmark for buildings or transport (considered separately) after appropriate onsite mitigation measures have been incorporated will be required to off-set any excess in emissions. The developer should investigate options for providing NO<sub>x</sub> and PM abatement measures offsite in the vicinity of the development. This will involve working with the relevant planning authority or nearby property owners to identify suitable mitigation measures. Measures could include:
  - ▶ green planting/walls and screens, with special consideration given to planting that absorbs or suppresses pollutants;
  - ▶ upgrade or abatement work to combustion plant;
  - ▶ retro-fitting abatement technology for vehicles and flues; and
  - ▶ exposure reduction.

The GLA *Supplementary Planning Guidance on The Control of Dust and Emissions during Construction and Demolition*<sup>29</sup> provides more detailed guidance on the implementation of all relevant policies in the London Plan and the Mayor's Air Quality Strategy to neighbourhoods, boroughs, developers, architects, consultants and any other parties involved in any aspect of the demolition and construction process. It sets out the methodology for assessing the air quality impacts of construction and demolition; and identifies good practice for mitigating and managing air quality impacts that is relevant and achievable, with the overarching aim of protecting public health and the environment.

<sup>27</sup> Greater London Authority (2015) The London Plan The Spatial Development Strategy for London Consolidated with Alterations since 2011

<sup>28</sup> Greater London Authority (2014) Sustainable Design and Construction Supplementary Planning Guidance, London Plan 2011 Implementation Framework

<sup>29</sup> GLA (2014) The Control of Dust and Emissions during Construction and Demolition: Supplementary Planning Guidance

It is stated that all demolition and construction sites should be monitored for the generation of air pollution. It is essential to monitor for dust generation, including PM<sub>10</sub>. This can range from visual monitoring at low risk sites to automatic monitoring with alert trigger levels at high risk sites. The need for monitoring depends on existing air quality and the risk of air pollution from the development.

This document also includes a policy to reduce emissions from non-road mobile machinery (NRMM). To address this significant contribution of NRMM to London's poor air quality, the GLA is controlling emissions from this equipment with the application of emissions standards for London from September 2015. The policy seeks progressive reduction in emissions and includes higher standards for the Central Activity Zone (CAZ) and Canary Wharf, where there is likely to be concentrated construction activity. The policy is as follows:

From 1 September 2015 NRMM of net power between 37kW and 560kW used:

- ▶ in London will be required to meet the standards set out below. This will apply to both variable and constant speed engines for both NO<sub>x</sub> and PM. These standards will be based upon engine emissions standards set in EU Directive 97/68/EC and its subsequent amendments.
- ▶ NRMM used on the site of any major development within Greater London will be required to meet Stage IIIA of the Directive as a minimum; and
- ▶ NRMM used on any site within the Central Activity Zone or Canary Wharf will be required to meet Stage IIIB of the Directive as a minimum.

From 1 September 2020 the following will apply:

- ▶ NRMM used on any site within Greater London will be required to meet Stage IIIB of the Directive as a minimum.
- ▶ NRMM used on any site within the Central Activity Zone or Canary Wharf will be required to meet Stage IV of the Directive as a minimum.

As detailed in the LLAQM Borough Air Quality Action Matrix<sup>30</sup>, replacing an average size piece of NRMM equipment (37 ≤ kW < 75) meeting Stage II emission standards operating for the whole year by same size equipment meeting Stage IIIB emission standards would reduce NO<sub>x</sub> and PM<sub>10</sub> emissions by 53% and 94% respectively. The requirements set out above may be met using the following techniques;

- ▶ reorganisation of NRMM fleet;
- ▶ replacing equipment (with new or second hand equipment which meets the policy);
- ▶ retrofit abatement technologies; and
- ▶ re-engining.

### West Yorkshire Low Emissions Group

The West Yorkshire Low Emissions Group has produced Air Quality & Emissions Technical Planning Guidance<sup>31</sup> as part of the West Yorkshire Low Emissions Strategy. Development proposals are classified as minor, medium or major depending on pre-defined criteria. Measures to reduce emissions are specified according to the development classification. Measures required are as follows:

- ▶ To prepare for increased demand [for electric vehicles] in future years, appropriate cable provision should be included in the scheme design and development, in agreement with the local authority and include the default mitigation listed below
- ▶ Minor impact proposal
  - ▶ Residential: 1 charging point per unit (dwelling with dedicated parking) or 1 charging point per 10 spaces (unallocated parking).

<sup>30</sup> [https://www.london.gov.uk/sites/default/files/air\\_quality\\_action\\_matrix.pdf](https://www.london.gov.uk/sites/default/files/air_quality_action_matrix.pdf)

<sup>31</sup> West Yorkshire Low Emissions Group. Air Quality & Emissions Technical Planning Guidance.

- ▶ Commercial/Retail: 10% of parking spaces which may be phased with 5% initial provision and the remainder at an agreed trigger level.
- ▶ Industrial: 10% of parking spaces which may be phased with 5% initial provision and the remainder at an agreed trigger level.
- ▶ Medium impact proposal
  - ▶ As for minor impact proposal, plus:
  - ▶ Detailed travel plan
  - ▶ Travel Plan including agreed mechanisms for discouraging high emission vehicle use and encouraging modal shift (i.e. public transport, cycling and walking) as well as the uptake of low emission fuels and technologies.
  - ▶ Improved pedestrian links to public transport stops.
  - ▶ Provision of new bus stops infrastructure including shelters, raised kerbing, information displays.
  - ▶ Provision of subsidised or free ticketing (Corporate and residential Metrocards, Student Metrocards).
  - ▶ Site layout to include improved pedestrian pathways to encourage walking.
  - ▶ Improved convenient and segregated cycle paths to link to local cycle network. Commercial Specific:
    - ▶ All commercial vehicles should comply with current or the most recent European Emission Standards from scheme opening, to be progressively maintained for the lifetime of the development.
    - ▶ Fleet operations should provide a strategy for reducing emissions, including the uptake of low emission fuels and technologies such as ultra-low emission service vehicles.
- ▶ Major impact proposal
  - ▶ Additional mitigation to be determined by damage cost calculation. Default mitigation options provided in the following categories:
    - ▶ Support measures to reduce the need to travel.
    - ▶ Support measures to reduce polluting motorised vehicle use.
    - ▶ Measures to support improved public transport.
    - ▶ Further measures to promote walking and cycling.

### Sussex air quality partnership

The Sussex Air Quality Partnership "*Air quality and emissions mitigation guidance for Sussex*"<sup>32</sup> includes a method for calculating the amount (value) of mitigation that is expected to be spent on measures to mitigate anticipated impacts. The list of suggested mitigation measures that amount could be spent on is as follows:

- ▶ EV recharging infrastructure within the development (wall mounted or free standing in-garage or off-street points);
- ▶ Car club provision or support to local car club/eV car club;
- ▶ Designation of parking spaces for low emission vehicles;
- ▶ Differential parking charges depending on vehicle emissions;

<sup>32</sup> Sussex Air Quality Partnership (2013) Air quality and emissions mitigation guidance for Sussex.

- ▶ All commercial vehicles should comply with either current or previous European Emission Standard;
- ▶ Fleet operations should provide a strategy for considering reduced emissions, low emission fuels and technologies;
- ▶ Use of ultra low emission service vehicles;
- ▶ Support local walking and cycling initiatives;
- ▶ On-street EV recharging;
- ▶ Contribution to low emission vehicle refuelling infrastructure;
- ▶ Low emission bus service provision or waste collection services;
- ▶ Bike/e-bike hire schemes;
- ▶ Contribution to renewable fuel and energy generation projects; and
- ▶ Incentives for the take-up of low emission technologies and fuels.

### Supplementary planning documents

Supplementary Planning Documents/Guidance (SPDs or SPGs) can be produced to provide additional information in relation to specific policy areas within the Local Development Framework and detail the guidance formally adopted by local authorities. Air quality SPDs and SPGs help by providing transparent and consistent advice to both Development Control departments and developers<sup>23</sup>. They are generally used to set out the requirements of air quality assessments, detail the standards to which developments should adhere, provide a methodology for calculating the cost of infrastructure necessitated by the development, emissions offsetting or additional mitigation measures (to be secured by planning conditions or Section 106 agreements as appropriate) and provide details on what forms of offsetting or mitigation are considered to be acceptable.

It is important that obligations are proportional to the nature and scale of development proposed and the level of concern about air quality. There have been three main approaches used for the calculation of the monetary value of, or need for, offsetting or mitigation since SPDs/SPGs began to be used in relation to air quality. The three main approaches are detailed below.

#### Fixed cost per unit

In some cases, standard contribution costs have been applied per unit of proposed development. This has the advantage of helping to generate funding for air quality improvement projects, but does not reward developers that have designed their development to reduce emissions. For example, the Mid Devon Supplementary Planning Document on Air Quality and Development (2008) states that new development that:

*“would lead to an increase in traffic that will have a worsening effect on air quality will be required to provide for mitigation through contribution to implement the Air Quality Action Plan as follows*

- ▶ *Market housing £2800-5509 per dwelling*
- ▶ *Affordable housing £0 per dwelling*
- ▶ *Employment £1000-2030 per 100 m<sup>2</sup> GFA*
- ▶ *Retail - food £55500-108449 per 100 m<sup>2</sup> GFA*
- ▶ *Retail – non food £9000-17616 per 100 m<sup>2</sup> GFA”*

## Damage Cost Calculation

The damage cost method was developed so that only developments that increase pollutant concentrations incur costs. The environmental damage costs associated with the proposal are calculated and used to determine the value of mitigation that needs to be spent on measures to mitigate the impacts. This method uses the HM Treasury and Defra Interdepartmental Group on Costs and Benefits (IGCB) damage costs, the cost to society of a change in emissions of different pollutants<sup>33</sup>, and calculation of the additional emissions generated by the proposal using the latest emissions factors from Defra, the Emission Factor Toolkit<sup>34</sup> or calculations based on manufacturers details provided with combustion plant. This approach is applied in *the Sussex Air Quality Partnership Air quality and emissions mitigation guidance for Sussex (2013)*<sup>32</sup> and the *West Yorkshire Low Emissions Group Air Quality & Emissions Technical Planning Guidance*<sup>31</sup>. The road transport emission increase is given as:

Road Transport Emission Increase =  $\sum$ [Estimated additional trip rate for 5 years (compared to current use) x Emission rate per 10 km per vehicle type x damage cost]

The damage costs provided by Defra in 2015<sup>33</sup> are shown in Table 4.3.

Table 4.3 Air quality damage costs per tonne, 2015 prices

Pollutant	Source	Central	Sensitivity - Low	Sensitivity - High
<b>Oxides of nitrogen (NO<sub>x</sub>)</b>	Transport Average	£25,252	£10,101	£40,404
	Industry	£13,131	£5,253	£21,010
	Domestic	£14,646	£5,859	£23,434
<b>Particulate Matter (PM)</b>	Transport Average	£58,125	£45,510	£66,052
	Industry	£30,225	£23,665	£34,347
	Domestic	£33,713	£26,396	£38,311
<b>Sulphur oxides (SO<sub>x</sub>)</b>		£1,956	£1,581	£2,224
<b>Ammonia (NH<sub>3</sub>)</b>		£2,363	£1,843	£2,685

This approach provides transparency in the calculation of costs and ensures that development designs which reduce emissions are rewarded by incurring lower costs. The method is also flexible in that the calculated costs will change as the emission factors and damage costs are updated by Defra.

The full approach for calculating damage costs, as detailed in EPUK/IAQM guidance<sup>23</sup> is as follows:

- ▶ Identify the additional trip rates (as trips/annum) generated by the proposed development (this information will normally be provided in the Transport Assessment);
- ▶ Assume an average distance travelled of 10km/trip;
- ▶ Calculate the additional emissions of NO<sub>x</sub> and PM<sub>10</sub> (kg/annum), based on emissions factors in the Emissions Factor Toolkit, and an assumption of an average speed of 50 km/h;
- ▶ Multiply the calculated emissions by 5, to assume emissions over a 5 year time frame;
- ▶ Use the HM Treasury and Defra IGCB damage cost approach to provide a valuation of the excess emissions, using the currently applicable values for each pollutant; and
- ▶ Sum the NO<sub>x</sub> and PM<sub>10</sub> costs.

<sup>33</sup> Defra (2015) Air quality: economic analysis – September 2015 Update - <https://www.gov.uk/air-quality-economic-analysis#damage-costs-approach>

<sup>34</sup> <http://iaqm.defra.gov.uk/review-and-assessment/tools/emissions.html#eft>

Examples of damage costs calculations carried out for developments in Cheshire East, and the agreed measures proportionate to the calculated damage costs are provided in Table 4.4.

Table 4.4 Damage Cost Examples

<b>Example 1 – Mixed-Use Development</b>	
<b>Development</b>	Around 300 homes, new sports, leisure and business facilities
<b>Trip Rate (AADT)</b>	2,250 (4% HGV)
<b>Annual NO<sub>x</sub> Emissions (kg/annum)</b>	1.46
<b>Annual PM<sub>10</sub> Emissions (kg/annum)</b>	0.28
<b>Damage Cost - 1 year (£)</b>	53,146
<b>Damage Cost – 5 years (£)</b>	265,731
<b>Agreed measures</b>	Public Transport Contribution Travel Plan Co-ordinator Promotion of Sustainable Transport Car Sharing Scheme Residential Cycling Voucher Cycling infrastructure Electric Charging Points Notice Boards

<b>Example 2 – Small Residential Development</b>	
<b>Development</b>	86 dwellings including the provision of informal areas of landscaping, off road vehicular parking
<b>Trip Rate (AADT)</b>	240 (0% HGV)
<b>Annual NO<sub>x</sub> Emissions (kg/annum)</b>	0.40
<b>Annual PM<sub>10</sub> Emissions (kg/annum)</b>	0.05
<b>Damage Cost - 1 year (£)</b>	13,176
<b>Damage Cost – 5 years (£)</b>	65,879
<b>Agreed measures</b>	Framework Travel Plan (FTP) prepared to promote sustainable travel to and from the development. The planned measures are: <ul style="list-style-type: none"> <li>- Appoint a Travel Plan Co-ordinator (TPC);</li> <li>- Encourage and Promote Sustainable Travel;</li> <li>- Resident Travel Information Packs;</li> <li>- Resident Travel Survey; and</li> <li>- Secure Cycle Parking.</li> </ul>

### Air quality neutral approach

The London Plan and the Mayor of London's Air quality Strategy set out that developments are to be at least 'air quality neutral'. To enable the implementation of this policy emission benchmarks have been produced for building operation and transport across London based on the latest technology (including its effectiveness and viability). Developments that do not exceed these benchmarks will be considered to avoid any increase in NO<sub>x</sub> and PM emissions across London as a whole and therefore be 'air quality neutral'. The benchmarks are to be considered minimum benchmarks that will be kept under review and will be updated in line with

technological and commercial advances. The application of this policy is detailed in the Air Quality Neutral Planning Support Update<sup>35</sup>.

Developers of schemes which do not meet the 'air quality neutral' benchmark for buildings or transport (considered separately) after appropriate onsite mitigation measures have been incorporated are required to off-set any excess in emissions. The developer should investigate options for providing NO<sub>x</sub> and PM abatement measures offsite in the vicinity of the development. This will involve working with the relevant planning authority or nearby property owners to identify suitable mitigation measures.

As this approach assesses developments against benchmarks, rather than current emissions, it has the benefit of not penalising development on green or brownfield sites. It does however rely on trip rates, trip distances and emission factors that have been developed specifically for London.

## 4.2 Other guidance and initiatives

### Emission standards

In 1992 the European Union introduced new emission standards (Euro standards) for vehicles. These have progressively tightened limits for the main atmospheric pollutants. Euro VI has been the standard for heavy diesel vehicles since the end of 2013 and should reduce NO<sub>x</sub> to 5% of the 1992 limits. For cars, Euro 6 came into force in September 2014 and is estimated to reduce the emissions of NO<sub>x</sub> from diesel cars from 180mg/km to 80mg/km. Development-specific Low Emission Zones (LEZs) provide an opportunity to influence the composition of the traffic fleet in Cheshire East. For example, the Greenwich Peninsula LEZ set minimum euro-standards for the majority of vehicles entering the development site<sup>36</sup>.

It has been widely recognised that government policies to encourage the purchase of diesel vehicles in order to reduce greenhouse gas emissions have been successful in increasing the number of diesel vehicles on the road, but this has made compliance with the Air Quality Objectives for NO<sub>2</sub> more difficult as diesel vehicles emit more NO<sub>2</sub> than petrol vehicles<sup>37</sup>. Recent research has also identified a disparity between predicted emissions and emissions in reality, particularly for diesel cars<sup>38</sup>. Real-world emissions data collected under driving conditions have found that modern diesel cars have not performed as well as expected<sup>39</sup>. There is still uncertainty regarding whether Defra emission factors published in 2014, to address the disparity, reflect the on-road performance of modern vehicles<sup>40</sup>.

It is stated in the recently published Defra plans to improve air quality in the UK<sup>41</sup> that the new Euro VI standard for heavy duty diesel vehicles is delivering significant NO<sub>x</sub> emissions reductions and that, once introduced, the light duty diesel vehicle emission standards based on the proposed 'real driving emissions' test procedure will deliver further significant benefits. The UK intends to support the introduction of a robust test procedure as soon as possible.

The restriction of diesel vehicle use therefore has the potential to result in significant benefits to air quality. The LEZ approach could also be applied to restrict the use of diesel cars. For example, several London boroughs implement parking surcharges for diesel vehicles according to the 'polluter pays' principle. The Mayor of Paris has announced plans to ban diesel cars from the city by 2020.

In the 2015 NO<sub>2</sub> Action Plan<sup>17</sup>, Defra also details the intention to provide a framework for local authorities to implement Clean Air Zones (CAZs) when they decide that emissions based access controls are the most effective solution for them to meet the objectives for NO<sub>2</sub>. The CAZ framework will set a standard for vehicles to achieve to ensure a consistent approach by local authorities. Those not meeting the standard will be

<sup>35</sup> Air Quality Consultants and Environ (2014) Air Quality Neutral Planning Support Update: GLA 80371

<sup>36</sup> Defra (2010) Low Emissions Strategies using the planning system to reduce transport emissions Good Practice Guidance

<sup>37</sup> House of Commons Environmental Audit Committee (2014) Action on Air Quality Sixth Report of Session 2014–15

<sup>38</sup> Carslaw, D., Beevers, S., Westmoreland, E. and Williams, M. (2011) Trends in NO<sub>x</sub> and NO<sub>2</sub> emissions and ambient measurements in the UK. ([https://uk-air.defra.gov.uk/assets/documents/reports/cat05/1108251149\\_110718\\_AQ0724\\_Final\\_report.pdf](https://uk-air.defra.gov.uk/assets/documents/reports/cat05/1108251149_110718_AQ0724_Final_report.pdf))

<sup>39</sup> Carslaw, D. and Rhys-Tyler, G. (2013) Remote sensing of NO<sub>2</sub> exhaust emissions from road vehicles.

([https://uk-air.defra.gov.uk/assets/documents/reports/cat05/1307161149\\_130715\\_DefraRemoteSensingReport\\_Final.pdf](https://uk-air.defra.gov.uk/assets/documents/reports/cat05/1307161149_130715_DefraRemoteSensingReport_Final.pdf))

<sup>40</sup> Marner, B. (2016) Emissions of Nitrogen Oxides from Modern Diesel Vehicles.

(<http://www.aqconsultants.co.uk/getattachment/Resources/Download-Reports/Emissions-of-Nitrogen-Oxides-from-Modern-Diesel-Vehicles-210116.pdf.aspx>)

<sup>41</sup> Defra (2015) Draft plans to improve air quality in the UK Tackling nitrogen dioxide in our towns and cities UK overview document

subject to a charge or other restriction appropriate to the type of vehicle. Vehicle standards will be set based on emissions level for a vehicle type. This is to ensure that only the cleanest vehicles, including hybrid and vehicles using alternative fuels where appropriate, are encouraged to enter the area. The proposed emission standards, which take into account the higher emissions from diesel cars and light vehicles at each emission class, are as follows:

- ▶ Bus/coach – 0.4 g/kWh (Equivalent to Euro VI for NO<sub>x</sub> emissions);
- ▶ HGV – 0.4 g/kWh (Equivalent to Euro VI for NO<sub>x</sub> emissions);
- ▶ Van (1305-3500kg) – 0.125 g/km (Equivalent to Euro 6 for 1760-3500kg Diesel Light Commercial Vehicle); and
- ▶ Car/light commercial (up to 1305kg) – 0.08 g/km (Equivalent to Euro 4 petrol car and Euro 6 diesel car).

### Speed control measures

Several local authorities around the UK including Edinburgh, Brighton, Southwark, Lambeth and Islington have reduced speed limits on the roads that they control in efforts to improve safety. This policy also has numerous other benefits, such as reducing noise, sharing road space more equitably between modes of transport, and making streets more pleasant. It has been suggested that reducing the speed limit in urban areas from 30 mph to 20 mph can also reduce emissions. The theory relating speed limits to emissions is that removing the acceleration which occurs between 20-30mph by limiting the speed limit to 20 mph and encouraging “smoother” driving will reduce fuel consumption, and therefore emission and consequently have a positive impact on air quality.

A study undertaken by Imperial College London on behalf of the City of London determined that NO<sub>x</sub> emissions were lower from diesel vehicles travelling at 20 mph than those travelling at 30mph<sup>42</sup>. NO<sub>x</sub> emissions from petrol vehicles are actually higher when travelling at 20mph. The results therefore highlight the importance of fuel type, engine and driving style in determining whether lower speed limits will have air quality benefits. However, the higher contribution of diesel vehicles to overall emissions of NO<sub>x</sub> suggests that speed control measures could significantly reduce overall NO<sub>x</sub> emissions. The policy also encourages walking and cycling by improving safety and making streets more pleasant and liveable, generating further emission savings.

### Reducing emissions from buildings

As stated section 4.1, the IAQM/EPUK guidance<sup>23</sup> recommends the following emission standards for combustion plant at new buildings:

- ▶ All gas-fired boilers to meet a minimum standard of <40 mgNO<sub>x</sub>/kWh;
- ▶ all gas-fired CHP Plant to meet a minimum standard of:
  - ▶ spark ignition engine: 250 mgNO<sub>x</sub>/Nm<sup>3</sup>;
  - ▶ compression ignition engine : 400 mgNO<sub>x</sub>/Nm<sup>3</sup>;
  - ▶ gas turbine: 50 mgNO<sub>x</sub>/Nm<sup>3</sup>.
- ▶ A presumption should be to use natural gas-fired installations. Where biomass is proposed within an urban area it is to meet minimum emissions standards of:
  - ▶ Solid biomass boiler: 275 mgNO<sub>x</sub>/Nm<sup>3</sup> and 25 mgPM/Nm<sup>3</sup>.

The importance of maintaining combustion plant and equipment such as boilers to ensure that they are operating at their optimum efficiency to minimise harmful emissions has also been highlighted. Routine inspection and maintenance can ensure that efficiency is maintained. Where buildings are managed (for

<sup>42</sup> Transport and Environmental Analysis Group, Centre for Transport Studies, Imperial College London (2013) An evaluation of the estimated impacts on vehicle emissions of a 20mph speed restriction in central London

example through maintenance covenants, or the rental sector) building log books can also be reviewed to establish temperature set points for each room/floor to avoid unnecessary emissions.

## Measures related to freight

### Freight quality partnerships

Freight Quality Partnerships (FQPs) have been established across the country (e.g. Wiltshire and Swindon<sup>43</sup>, Exeter<sup>44</sup> and Central London<sup>45</sup>) in order to develop an understanding of freight transport issues and problems, and then, to promote constructive solutions. FQPs are a partnership between the freight industry, local government, local businesses, the local community, environmental groups and others with an interest in freight.

Typical projects by FQPs include:

- ▶ Construction logistics plans;
- ▶ Delivery and servicing plans;
- ▶ Local mapping, signage and routing;
- ▶ Night-time deliveries; and
- ▶ Communications strategies.

FQPs offer the possibility of agreement of emission standards for construction and delivery/servicing vehicles to ensure that HDVs operating in an area emit less pollution.

### Freight consolidation

Freight Consolidation Centres (FCCs) have been used at numerous locations across the country<sup>46</sup> to reduce the overall number of courier vehicles, reducing congestion and providing environmental benefits. The potential of switching high delivery/collection concentrations to zero emissions modes of transport has also been identified. High profile examples of Freight Consolidation Centres include the Meadowhall Centre in Sheffield, where over 50% of retailers use the scheme, and the Broadmead FCC in Bristol, with results indicating that participating retailers have benefitted from a 75% reduction in vehicle movements<sup>47</sup>.

Transport for London (TfL) also provides recent examples of freight consolidation coupled with low emission delivery including the Gnewt Cargo scheme for Regent Street<sup>48</sup>, waste consolidation at the Olympic Park (which reduced off-site vehicle movements by over 80%)<sup>49</sup> the Heathrow Consolidation Centre (which has brought about a 66% reduction in the number of vehicle movements to airport terminals)<sup>50</sup>, and the consolidation centre for the London Boroughs of Camden, Enfield, Islington and Waltham Forest (which has brought about a 45% reduction in the total distance travelled by delivery vehicles)<sup>51</sup>.

With regard to construction, the London Construction Consolidation Centre (LCCC) in Silvertown has been operating since September 2005. The pilot scheme showed significant transport and construction efficiency benefits, such as increased delivery reliability (98%), a reduction in vehicle trips to site and local emissions (of 75% each) and the potential to reduce site waste<sup>52</sup>. The LCCC has more than doubled in size in 2014

<sup>43</sup> Wiltshire and Swindon Freight Quality Partnership (FQP)

<http://www.wiltshire.gov.uk/parkingtransportandstreets/roadshighwaysstreetcare/transportfreight/freightqualitypartnershipwiltshire.htm>

<sup>44</sup> Devon County Council Freight Quality Partnerships

[http://www.devon.gov.uk/index/transportroads/traffic/traffic\\_management/freight\\_quality\\_partnerships.htm](http://www.devon.gov.uk/index/transportroads/traffic/traffic_management/freight_quality_partnerships.htm)

<sup>45</sup> Central London Freight Quality Partnership <http://www.centallondonfqp.org/>

<sup>46</sup> TTR and TRL for the DfT (2010) Freight Consolidation Centre Study

<sup>47</sup> WSP for BCSC (2015) Freight Consolidation and Remote Storage

<sup>48</sup> TfL Freight. Going the Extra Mile <http://content.tfl.gov.uk/going-the-extra-mile.pdf>

<sup>49</sup> TfL Freight. Waste Consolidation: An Olympic tale of victory <http://content.tfl.gov.uk/veolia-waste-case-study.pdf>

<sup>50</sup> TfL Freight. Expansion of Consolidation at Heathrow <http://content.tfl.gov.uk/heathrow-case-study.pdf>

<sup>51</sup> TfL Freight. The London Boroughs Consolidation Centre – a freight consolidation success story <http://content.tfl.gov.uk/lbbc-case-study.pdf>

<sup>52</sup> TfL Freight. Building on the benefits of consolidation centres <http://content.tfl.gov.uk/building-on-the-benefits-of-consolidation-centres.pdf>

and is currently servicing 15 major construction projects in London<sup>53</sup>. Similarly, the One Hyde Park construction consolidation centre reduced construction vehicle movements by 66%<sup>54</sup>. Widespread adoption of such schemes can be promoted through:

- ▶ Construction clients requiring the consideration and/or use of consolidation through their contracts;
- ▶ Developers and contractors choosing to use consolidation for good practice and economic/productivity considerations;
- ▶ Encouraging construction consolidation through the planning process by using site construction plans, Construction Statements and transport assessments for construction and operational phases to minimise trips, contract deviation and waste; and
- ▶ Contract award criteria that encourage freight companies to actively demonstrate logistics best practice.

### Fleet Operator Recognition Scheme (FORS)

The Fleet Operator Recognition Scheme (FORS) is an accreditation scheme that aims to improve fleet activity<sup>55</sup>. FORS applies to construction and other fleets. One of the aspects that fleet operators are audited upon is emissions. FORS is graduated into three levels enabling operators to demonstrate to customers and other companies the continuous improvement that they make to their fleets. Gold is the highest FORS award. To progress an operator must meet all the requirements of lower Bronze and Silver awards. To achieve the Gold Standard, operators must fulfil the following requirements related to their emissions:

- ▶ Performance measurement - make meaningful improvements against the FORS Silver and Bronze baseline data in the following performance indicators:
  - ▶ Total fuel usage and by distances travelled;
  - ▶ Transport related CO<sub>2</sub> output and by distance travelled;
  - ▶ Total incident and collision data and costs involving personal injury, vehicle or property damage; and
  - ▶ Total transport related fines and charges.
- ▶ Fuels and emissions champions - appoint individuals who are responsible for both the economic and environmental sustainability of the business

FORS estimate an 11% saving in fuel and emissions for scheme members and the City of London found between the financial years 2008/9 and 2009/10, there was a 16% reduction in emissions of CO<sub>2</sub>, a 32% reduction in emissions of NO<sub>x</sub>, and a 45% reduction in emissions of PM<sub>10</sub> as a result of FORS<sup>56</sup>.

### Zero emission last mile

Light Goods Vehicles (LGVs) are responsible for a significant proportion of emissions. Delivery of goods and services by zero emission modes of transport has been identified as an important measure that can be used to reduce these emissions. This is the concept of zero emissions 'last mile' deliveries<sup>57</sup>. Such schemes have been used in other areas of the country. Diesel lorries are used to transport goods from suburban depots to micro-consolidation centres and onward delivery is made by electric vans and Cargocycles. For example, Outspoken Delivery operate in Cambridge, Glasgow and Norwich<sup>58</sup>. Gnewt Cargo evaluated the existing Office Depot deliveries to the City of London using diesel vans against a system of Cargocycles and electric

<sup>53</sup> Freight in the City (2015) London Construction Consolidation Centre doubles in size as contractors realise benefits -

<http://freightinthecity.com/2015/04/london-construction-consolidation-centre-doubles-in-size-as-building-works-boom-in-the-capital/>

<sup>54</sup> TfL Freight. Consolidating Luxury Construction <http://content.tfl.gov.uk/one-hyde-park-case-study.pdf>

<sup>55</sup> FORS (2015) <http://www.fors-online.org.uk/cms/what-is-fors/>

<sup>56</sup> LLAQM Air Quality Action Matrix [https://www.london.gov.uk/sites/default/files/air\\_quality\\_action\\_matrix.pdf](https://www.london.gov.uk/sites/default/files/air_quality_action_matrix.pdf)

<sup>57</sup> CityAir (2015) <http://www.cleanerairforlondon.org.uk/sites/default/files/business/CA4B%20Appendix%20VIV%20-%20Zero%20Emission%20Last%20Mile.pdf>

<sup>58</sup> Outspoken Delivery <http://www.outspokendelivery.co.uk/>

vans for the final stage of delivery. The trial showed zero local air pollutant emissions were generated and the amount of space taken up by delivery vehicles dropped by 50%. This is now considered best practice in the City of London. London Bike Hub currently operates a cycle delivery service on behalf of Better Bankside with the support of Transport for London, providing businesses within the Bankside a zero emission delivery service<sup>59</sup>.

### Zero emission network

The Zero Emissions Network (ZEN) is a joint initiative between the London boroughs of Islington, Hackney and Tower Hamlets that helps businesses operate cheaper, cleaner and greener<sup>60</sup>. The scheme is designed to improve air quality and business efficiency within the 'ZEN' area. The ZEN project gives businesses exclusive access to offers to enable them to save money and reduce emissions. Offers include:

- ▶ Free business membership to city car clubs;
- ▶ Free trials of electric cars and vans;
- ▶ Free cycle workshops;
- ▶ Discounted 'Zero Emissions' taxi fares; and
- ▶ Free cycle training for all staff.

### Minimising emissions from supply chain

The impact of the supply chain on carbon emissions is well documented, but the resulting emissions of NO<sub>x</sub> and PM<sub>10</sub> are often not considered in procurement policy decisions<sup>61</sup>. Key areas for consideration to reduce the emission profile of business include:

- ▶ Implementing a Sustainable Supply Chain Policy: Embedding air quality and sustainability into the supply chain, as well as reducing carbon emissions;
- ▶ Reducing Journeys & Emissions: Through consolidation and centralisation of deliveries, as well as adopting sustainable transport methods; and
- ▶ Energy, Waste and Water: Broker energy from 'green' sources, avoid using combustion technologies, centralise recycling and explore Materials Recycling Facilities (MRF).

### Green Infrastructure

Green infrastructure can reduce exposure to pollution in two main ways<sup>62</sup>:

- ▶ Trees and vegetation can reduce air pollution directly by trapping and removing fine particulate matter or by direct absorption of gaseous pollutants; and
- ▶ Green corridors across towns can reduce pedestrian exposure to pollution by providing attractive routes away from major roads.

When considering green infrastructure to include in development proposals, it is important that beneficial impacts are maximised through the choice of appropriate species. With regard to trees, species that don't emit the most Volatile Organic Compounds (VOCs) that lead to ozone production<sup>63</sup>, but do have large leaf surface areas have the best effect on air quality. Studies have shown that Scots pine (*Pinus sylvestris*), common alder (*Alnus glutinosa*), larch (*Larix spp.*), Norway maple (*Acer platanoides*), field maple (*Acer campestre*), ash (*Fraxinus excelsior*) and silver birch (*Betula pendula*) remove the most pollutants without contributing to the formation of new pollutants, whilst oaks, poplars and willows can have a detrimental effect

<sup>59</sup> London Bike Hub (2015) <http://www.londonbikehub.com/betterbankside/>

<sup>60</sup> Cleaner Air for London (2015) <http://www.cleanerairforlondon.org.uk/zen>

<sup>61</sup> CityAir (2015) <http://www.cleanerairforlondon.org.uk/sites/default/files/business/CA4B%20Air%20Quality%20-%20Supply%20Chain.pdf>

<sup>62</sup> Houses of Parliament (2013). Urban Green Infrastructure. Post Note No. 448. -

<http://www.parliament.uk/business/publications/research/briefing-papers/POST-PN-448/urban-green-infrastructure>

<sup>63</sup> Treeconomics London (2015) Valuing London's Urban Forest Results of the London i-Tree Eco Project

on air quality through VOC formation<sup>64</sup>. Evergreen species also have provide year-round benefits<sup>65</sup>. The London i-tree Eco Project<sup>63</sup> estimated that trees remove 698 tonnes of NO<sub>2</sub> and 299 tonnes of PM<sub>10</sub> per year in Greater London. Studies into shrubs have shown that plants with high hair density (e.g. Silverbush, *Convolvulus cneorum*) are most efficient at trapping particulate matter, but other species with larger plants (e.g. Ivy, *Hedera helix*) may trap more pollution per plant<sup>66</sup>. One study predicted that the use of green walls in street canyons can achieve reductions in street level NO<sub>2</sub> and PM<sub>10</sub> concentrations of as much as 40% and 60% respectively, and also highlighted the importance of not restricting dispersion of pollutants through poorly considered tree planting<sup>67</sup>.

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<sup>64</sup> Centre for Ecology and Hydrology. University of Lancaster. Trees and Sustainable Urban Air Quality

<sup>65</sup> Woodland Trust (2012). Urban Air Quality

<sup>66</sup> Imperial College London, Shackleton, K., Bell, N., Smith, H., & Davies, L. The role of shrubs and perennials in the capture and mitigation of particulate air

<sup>67</sup> Pugh, T., Mackenzie, A, Whyatt, J and Hewitt, C. (2012). Effectiveness of Green Infrastructure for Improvement of Air Quality in Urban Street Canyons. Environ. Sci. Technol., 2012, 46 (14), pp 7692–7699

## 5. Case studies

### 5.1 Introduction

In 2015 case studies<sup>68</sup> were prepared to assess the potential impact of measures that could be applied to new development to reduce their impact. Case studies were prepared for two of the towns where the highest volume of new development were proposed, Crewe and Congleton, in order to determine the impact of possible development policies. To help inform the Low Emission Strategy, dispersion modelling was undertaken to quantify the maximum potential pollutant concentration reductions and consequent health benefits of the measures.

The case studies considered were:

- ▶ Provision of infrastructure to support the uptake of Electric Vehicles (EVs);
- ▶ Imposition of fuel type requirements; and
- ▶ Euro emission standard LEZs for developments.

The maximum potential impact of these scenarios, which would occur with full implementation of these policies in new developments, has been modelled in order to show the maximum potential benefits that the scenarios could provide. For this reason, it has been assumed that there will be 100% usage in the modelled scenarios

### 5.2 Modelling methodology

In order to test the maximum impact of the policies discussed above, future traffic data for Crewe and Congleton, including the developments proposed in the Local Plan, was obtained. The volume of traffic predicted to be generated by the Local Plan developments was determined. Emissions from this additional traffic was then added to the future baseline traffic flows under four different emission scenarios:

- ▶ Standard emissions scenario: using the standard vehicle type, fuel and emission class assumptions incorporated in the Defra Emissions Factor Toolkit;
- ▶ EVs scenario: assuming that all car journeys generated by the Local Plan developments are in battery powered EVs;
- ▶ Euro 6 scenario: assuming that all car journeys generated by the Local Plan developments are in cars (petrol and diesel) with Euro 6 engines; and
- ▶ Petrol scenario: assuming that all car journeys generated by the Local Plan developments are in petrol fuelled cars.

Annual average concentrations in air of NO<sub>x</sub> and PM<sub>10</sub> and PM<sub>2.5</sub> were calculated using the ADMS-Roads version 3.2.4.0 atmospheric dispersion model<sup>69</sup>. Emissions were calculated using the latest emissions factors from Defra, the Emission Factor Toolkit v6.0.2<sup>70</sup>, which is used to predict emissions which are imported into ADMS-Roads. Results from EVs, Euro 6 and Petrol scenarios were compared to the results of Defra Standards scenario to evaluate the maximum effect of changes in policies. The results of the assessment were also compared with the AQOs to assess whether the proposed development will be located in an area where the AQOs may be exceeded.

<sup>68</sup> Amec Foster Wheeler (2015) Cheshire East Low Emission Strategy Case Study Report

<sup>69</sup> [www.cerc.co.uk/environmental-software/ADMS-Roads-model.html](http://www.cerc.co.uk/environmental-software/ADMS-Roads-model.html)

<sup>70</sup> <http://laqm.defra.gov.uk/review-and-assessment/tools/emissions.html#eft>

## 5.3 Case study results

### Provision of electric vehicle infrastructure

When all car movements generated by the Local Plan developments are assumed to be EVs, NO<sub>2</sub> concentrations in the centre of Crewe and Congleton were predicted to be up to 7-10% lower than when applying the Defra standard fleet assumptions. Concentrations were predicted to be up to 2 µg m<sup>-3</sup> lower than in the future baseline scenario in Crewe and up to 7 µg m<sup>-3</sup> lower than the future baseline scenario in Congleton. PM<sub>10</sub> and PM<sub>2.5</sub> concentrations in Crewe and Congleton were predicted to be between 0.2% and 0.9% lower than when applying the Defra standard fleet assumptions.

### Enforcement of Euro 6 emission standards

When all car movements generated by the Local Plan developments are assumed to be in Euro 6 standard vehicles, NO<sub>2</sub> concentrations in the centre of Crewe and Congleton were predicted to be up to 3-4% lower than when applying the standard fleet assumptions. Concentrations were predicted to be up to 0.9 µg m<sup>-3</sup> lower than in the future baseline scenario in Crewe and up to 2.6 µg m<sup>-3</sup> lower than in the future baseline scenario in Congleton. PM<sub>10</sub> and PM<sub>2.5</sub> concentrations in Crewe and Congleton were predicted to only be between 0.1% and 0.5% lower than when applying the Defra standard fleet assumptions.

### Specification of fuel type (petrol)

When all car movements generated by the Local Plan developments are assumed to be only in petrol fuelled vehicles, NO<sub>2</sub> concentrations in the centre of Crewe and Congleton were predicted to be up to 6-8% lower than when applying the standard fleet assumptions. Concentrations were predicted to be up to 1.8 µg m<sup>-3</sup> lower than in the future baseline scenario in Crewe and up to 5.2 µg m<sup>-3</sup> lower than in the baseline scenario in Congleton. PM<sub>10</sub> and PM<sub>2.5</sub> concentrations in Crewe and Congleton were predicted to only be between 0.2% and 0.7% lower than when applying the standard fleet assumptions.

## 5.4 Health benefits

Calculations based on these modelling results indicated that the total number of deaths per year in Crewe and Congleton attributable to particulate pollution would fall only marginally as a result of the three measures (EVs, Euro 6 or Petrol) modelled.

The health benefits of the changes in NO<sub>2</sub> concentration were more significant due to the larger predicted changes in concentration. The calculations detailed in the Case Study Report<sup>68</sup> indicated that the total number of deaths per year in Crewe attributable to NO<sub>2</sub> pollution would fall from 38.8 to 35.6 as a result of the most effective measure modelled, the EVs scenario. The number of deaths per year in Congleton attributable to NO<sub>2</sub> pollution would fall from 20.2 to 16.8. This corresponds to a total saving of around 32.4 life years in Crewe and 35.5 life years in Congleton.

## 5.5 Economic benefits

The economic benefit of these emission scenarios, which theoretically could be implemented with little cost to CEC as they would be incorporated into individual development plans, were calculated using the Defra Interdepartmental Group on Costs and Benefits (IGCB) damage cost approach<sup>33</sup>. This produces estimates of the costs to society of the likely impacts of changes in emissions. The IGCB Air quality damage cost for NO<sub>x</sub> is £25,252 per tonne and is £58,125 per tonne for PM for transport, as shown in Table 4.3.

The most beneficial scenario, the EV scenario, is predicted to save 1.47 tonnes of NO<sub>x</sub> emissions and 0.01 tonnes of PM emissions across the modelled area in Crewe per year and 1.28 tonnes of NO<sub>x</sub> emissions and 0.01 tonnes of PM emissions across the modelled area in Congleton per year. This equates to an economic benefit of up to £37,982 per year in Crewe and up to £33,029 per year in Congleton in damage costs that would not be incurred.

## 6. Recommended policies

Based on the preceding sections, the following policies are recommended for implementation as the Low Emission Strategy for CEC. These are divided into three sections: policies which can be applied at the planning stage of new developments (and may also be appropriate for existing areas); policies that relate to the movement of freight; and policies that will help to reduce emissions during the construction of new developments. Based on the case study results, it is recommended that measures which incentivise the uptake of LEVs and encourage modal shift away from reliance on the private car should be prioritised and that the same measures should apply to all developments, rather than applying differential measures. This approach avoids the accumulation of multiple insignificant negative impacts that may then result in a combined significant impact.

Table 6.1 Recommended planning policies

No.	Policy Area	Recommended Policy	Rationale
1	Transport	<p>To minimise demand for travel by private motor vehicles and encourage transport by low emission modes, development proposals should:</p> <ul style="list-style-type: none"> <li>- be located so as they are accessible to local services and facilities by a range of transport modes;</li> <li>- include appropriate provision for access to public transport and other alternative means of transport to the car, which may involve supporting increased bus frequencies/routes;</li> <li>- seek to maximise use of sustainable (low carbon) modes of transport and improve health and wellbeing by incorporating high quality facilities for pedestrians, cyclists and public transport;</li> <li>- seek to reduce reliance on individual-owned cars by supporting the use of car clubs (particularly those using LEVs); and</li> <li>- include travel plans to promote the benefits of walking and cycling and associated measures, and encourage a reduction in the proportion of single occupancy car trips.</li> </ul>	<p>The CEC Local Plan Strategy<sup>71</sup> and Local Transport Plan<sup>72</sup>, contain a number of policies that relate to the reduction of the need to travel, the reduction of emissions and the encouragement of walking and cycling. These policies should be supported by the LES.</p> <p>Developments should seek to maximise use of sustainable (low carbon) modes of transport and improve health and wellbeing by incorporating high quality facilities for pedestrians, cyclists and public transport.</p>
2	Parking	<p>CEC parking standards will be strictly enforced. This means that parking spaces in Principal towns and Key Service Centres will be restricted. This will help to reduce the traffic impacts of new developments as far as possible. CEC will also consider the feasibility of tightening parking standards in areas where there are air quality issues.</p> <p>To encourage the uptake of electric vehicles in the CEC area, 1 Electric Vehicle (EV) "rapid charge" point will be provided per 10 residential dwellings and/or 1000m<sup>2</sup> of commercial floorspace. Where on-site parking is provided for residential dwellings, EV charging points for each parking space should be provided. Development proposal should also consider:</p> <ul style="list-style-type: none"> <li>- Discounted on- and off-street parking for LEVs;</li> <li>- Dedicated LEV parking (not including recharging);</li> </ul>	<p>CEC has adopted a range of parking standards for the Borough. The standards applied to particular areas depend on the access to public transport facilities. These parking standards should be strictly adhered to in order to reduce the traffic impacts of new developments as far as possible.</p> <p>IAQM/EPUK 2017 guidance<sup>23</sup> states that development proposals should support the transition to LEVs by including the provision of at least 1 Electric Vehicle (EV) "rapid charge" point per 10 residential dwellings and/or 1000m<sup>2</sup> of commercial floorspace, and where on-site parking is provided for residential dwellings, EV charging points should be provided for each parking space.</p>

<sup>71</sup> Cheshire East Local Plan (2014)

[http://www.cheshireeast.gov.uk/planning/spatial\\_planning/cheshire\\_east\\_local\\_plan/local\\_plan\\_strategy.aspx](http://www.cheshireeast.gov.uk/planning/spatial_planning/cheshire_east_local_plan/local_plan_strategy.aspx)

<sup>72</sup> Cheshire East Local Transport Plan (2014)

[http://www.cheshireeast.gov.uk/public\\_transport/local\\_transport\\_plan/local\\_transport\\_plan.aspx](http://www.cheshireeast.gov.uk/public_transport/local_transport_plan/local_transport_plan.aspx)

No.	Policy Area	Recommended Policy	Rationale
		<ul style="list-style-type: none"> <li>- Discounted residential parking permits for LEVs;</li> <li>- Reduced waiting time for parking permits for LEVs;</li> <li>- Reduced parking spaces for high emission vehicles; and</li> <li>- Dedicated parking for LEV car club vehicles.</li> </ul>	
3	<b>Low Emission Vehicle (LEV) Infrastructure</b>	<p>CEC will work with private hire and other commercial operators such as car clubs to understand their needs for rapid and other charging infrastructure and ensure that their requirements are included in development proposals.</p> <p>To encourage the uptake of LEVs CEC will work with public charging networks to help deliver a reliable, well located network of charging points. Other options will be considered to encourage the uptake of LEVs, including:</p> <ul style="list-style-type: none"> <li>- Discounted parking for LEVs;</li> <li>- Discounted residential parking permits for LEVs;</li> <li>- Reduced fees for taxi and private hire licenses for using LEVs;</li> <li>- Business support for enterprises seeking to use LEVs;</li> <li>- Educational and promotional activities surrounding LEVs;</li> <li>- Dedicated parking for LEV car club vehicles;</li> <li>- Workplace parking levy;</li> <li>- Dedicated LEV taxi ranks;</li> <li>- Rebates/incentives for LEV taxi purchase;</li> <li>- Discounted parking fees at park and ride sites; and</li> <li>- Planning conditions in development frameworks.</li> </ul>	<p>Case studies in the CEC area have demonstrated noticeable reductions in NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> through the introduction of LEV infrastructure. To have a wider impact, it is recommended policies are implemented to support the uptake of LEVs.</p> <p>As the local planning authority, CEC will play an active role in discussions to ensure that the area has the necessary LEV infrastructure.</p>
4	<b>Traffic</b>	<p>In order to reduce emissions from motorised vehicle traffic and encourage walking and cycling by improving safety and making streets more pleasant and liveable, all local roads in new development areas should have a speed limit of 20mph.</p>	<p>Many local authorities are reducing speed limits in built-up areas from 30mph to 20mph. The potential for this measure to reduce emissions by reducing acceleration has been identified, as have numerous other benefits, such as improving safety, reducing noise, sharing road space more equitably between modes, and making streets more pleasant.</p>
5	<b>Clean Air Zone (CAZ)</b>	<p>CEC will investigate the feasibility of designating CAZ's covering major towns. Potential benefits of non-charging CAZ's and charging CAZ's will be explored and implemented as appropriate.</p> <p>CEC will investigate the feasibility of designating major new developments as Class C CAZs to encourage the use of the cleanest buses, coaches, taxis, HGVs and LGVs.</p> <p>Incoming companies and organisations operating in the area will only be permitted to receive deliveries and send freight using HGVs that are Euro VI or better, diesel or light commercial vehicles that are Euro 6 or better and petrol vans or light commercial vehicles that are Euro 4 or better.</p> <p>Bus companies operating routes into these new areas will be required to use buses that are Euro VI or better, and taxis operating from the area should be Euro 6 or better (diesel) or Euro 4 or better (petrol).</p>	<p>The December 2015 Defra action plan to improve air quality and meet the EU NO<sub>2</sub> limit values set out in the Ambient Air Quality Directive introduces the concept of CAZs to encourage the cleanest vehicles.</p> <p>Four classes of access control are defined according to the types of vehicles which must meet the standards specified. In view of the infrastructure requirements for a CAZ covering all vehicle types and the minimal benefits identified in the case study of emission standards for cars, it is considered that Class C (Buses, coaches, taxis, HGVs and LGVs) CAZs are established on major developments through agreement with the relevant stakeholders.</p>
6	<b>Energy</b>	<p>To make the CEC area an exemplar of low emission development, boilers, CHP and biomass systems</p>	<p>IAQM/EPUK guidance<sup>23</sup> recommends emission standards to reduce emissions from buildings in</p>

No.	Policy Area	Recommended Policy	Rationale
		<p>proposed in individual developments should meet the tightest emissions standards detailed in IAQM/EPUK guidance<sup>23</sup>;</p> <ul style="list-style-type: none"> <li>- All gas-fired boilers to meet a minimum standard of &lt;40 mgNO<sub>x</sub>/kWh.</li> <li>- All gas-fired CHP plant to meet a minimum standard of:               <ul style="list-style-type: none"> <li>- Spark ignition engine: 250 mgNO<sub>x</sub> /Nm<sup>3</sup>;</li> <li>- Compression ignition engine : 400 mgNO<sub>x</sub> /Nm<sup>3</sup>;</li> <li>- Gas turbine: 50 mgNO<sub>x</sub> /Nm<sup>3</sup>.</li> </ul> </li> <li>- A presumption should be to use natural gas-fired installations. Where biomass is proposed it should meet the minimum emissions standard of 275 mgNO<sub>x</sub> /Nm<sup>3</sup> and 25 mgPM/Nm<sup>3</sup></li> </ul> <p>Development building design should be optimised to ensure adequate dispersion of emissions from discharging stacks and vents.</p>	<p>proposed developments.</p> <p>The importance of maintaining combustion plant and equipment such as boilers to ensure that they are operating at their optimum efficiency to minimise harmful emissions has been highlighted by the IAQM. Routine inspection and maintenance can ensure that efficiency is maintained.</p>
7	<b>Master-planning</b>	<p>Developments should not create a new “street canyon”, or a building configuration that inhibits effective pollution dispersion. In particular, bus and taxi facilities should be designed to avoid the build-up of pollution.</p> <p>New developments should also provide adequate, appropriate, and well located green space and infrastructure to help reduce pollutant concentrations and deliver public spaces that encourage walking and cycling.</p> <p>Where possible, evergreen tree species should be planted for the year-round benefits that they provide and species such as oaks, poplars and willows that produce VOCs should be avoided. Care should be taken to avoid reducing dispersion of pollutants through tree planting. Green walls should be used where possible to reduce pollution, and would be particularly beneficial in the most polluted areas.</p>	<p>IAQM/EPUK guidance<sup>23</sup> states that “wherever possible, new developments should not create a new “street canyon”, or a building configuration that inhibits effective pollution dispersion”.</p> <p>Research has been carried out into the species that provide the largest air quality benefits, and the use of these species should be prioritised.</p>
8	<b>Exposure</b>	<p>Development proposals should not increase the area of exceedance of EU established health-based standards and objectives for NO<sub>2</sub> and PM<sub>10</sub>.</p> <p>Where new developments are introduced into area where the standards and objectives are exceeded, developments should be designed to minimise and mitigate against increased exposure to poor air quality.</p> <p>This can be achieved through internal arrangement and good design to create distance between the source and receptors. As a last resort, and where the requirement for the housing is considered essential the incorporation of a ventilation strategy to ensure that polluted air is not drawn into the development. Any air intakes located away from the main source of air pollution to minimise increased exposure to poor air quality.</p>	<p>As there are existing exceedances of EU established health-based standards and objectives for NO<sub>2</sub>, care should be taken to ensure that developments should not increase the area of exceedance. It is recognised that some development will occur in areas where the standards are exceeded. Developments should be designed to reduce exposure to pollutant concentrations above the objectives to protect the health of future residents and receptors.</p>
9	<b>Development Management</b>	<p>CEC will develop an SPD to regulate emissions and mitigate impacts of developments based on their size and the type of development. It will provide advice on how to classify the development; assess and quantify the impact on local air quality; and determine the level of mitigation required.</p>	<p>Over recent years, a great deal of research and consideration has gone into the development of the design principles and policies to improve Air Quality. SPDs are a useful tool for Development Control departments and developers. Various air quality SPDs have been produced by local authorities which provide good models (e.g. West Yorkshire, Mid Devon District).</p>

No.	Policy Area	Recommended Policy	Rationale
10	Assessment	<p>In accordance with the IAQM/EPUK guidance<sup>23</sup>, developers will be required to produce an air quality assessment which should be submitted with the planning application to demonstrate that air quality has been considered and the appropriate standards have been adhered to. The air quality assessment should include the following:</p> <ul style="list-style-type: none"> <li>- Relevant details of the proposed development;</li> <li>- The policy context for the assessment;</li> <li>- Description of the relevant air quality standards and objectives;</li> <li>- The basis for determining significance of effects arising from the impacts (typically using IAQM/EPUK criteria);</li> <li>- Details of the assessment methods. Typically air quality dispersion modelling is carried out to predict the impact of the development and the pollutant concentrations to which introduced receptors would be exposed;</li> <li>- Model verification (when modelling of road traffic emissions is undertaken);</li> <li>- Identification of sensitive locations;</li> <li>- Description of baseline conditions using existing air quality monitoring and/or modelling data;</li> <li>- Assessment of impacts;</li> <li>- Cumulative impacts and effects;</li> <li>- Mitigation measures, to reduce exposure or the impact of the development, where significant effects are identified; and</li> <li>- Summary of the assessment results.</li> </ul>	<p>Assessment is required to demonstrate that the relevant policies have been incorporated into the development design and ensure that appropriate mitigation is included to reduce exposure where necessary.</p>
11	Damage Cost Calculations	<p>Where significant impacts from the operational phase of a proposed development are predicted in the air quality assessment, CEC may request contributions (via a section 106 agreement or through Community Infrastructure Levy (CIL)) from developers to support projects to improve air quality and mitigate the impacts. Alternatively the developer may seek to apportion funding (as calculated through the Damage Costs Calculations) to deliver on-site mitigations.</p> <p>Contributions will be calculated through the Damage Cost approach, with the procedure detailed in an SPD.</p>	<p>It is recommended that the value and scale of mitigation requirements for developments is calculated using the Damage Cost approach. The damage cost approach provides a transparent, simple method for calculating costs using the Defra damage costs, the cost to society of a change in emissions of different pollutants, and calculation of the additional emissions generated by the proposal. This method applied in isolation does risk penalising developments on empty sites, even when they have been well designed, as all emissions will be additional and incur costs.</p> <p>Development on empty sites that has been designed in order to minimise emissions should be encouraged. Therefore, subject to agreement with CEC, the cost of measures incorporated into the development design can be used to offset damage costs.</p>

Table 6.2 Recommended Freight Policies

No.	Policy Area	Recommended Policy	Rationale
1	<b>Freight Quality Partnership</b>	<p>To help in the development of servicing and delivery plans which highlight the benefits of transporting freight by rail, CEC will investigate the feasibility of creating a Freight Quality Partnership (FQP) that will be compulsory for any organisation operating HDVs in the area.</p> <p>This will include a Zero Emissions Network (ZEN) to help local businesses reduce the emissions associated with their activities. This will incentivise zero emission modes of transport and delivery and involve micro-consolidation of freight.</p> <p>Advice on minimising emissions from the supply chain to reduce the emission profile of local businesses by embedding air quality and sustainability into their supply chains would also be provided.</p>	<p>FQPs have been established across the country to promote solutions to freight issues and problems. This will enable innovative solutions to pollution issues generated by freight movement to be considered, including those that make smart use of data.</p> <p>The CEC Local Transport Plan<sup>73</sup> highlights the potential to capitalise on the growth in rail freight and the rail connectivity of Crewe and Middlewich.</p> <p>The Zero Emission Network idea is already in operation in several local authorities. It provides a means to encourage businesses to reduce their emissions.</p>
2	<b>Freight Consolidation</b>	<p>To minimise the impact of emissions from vehicles delivering and collecting freight, for major developments, CEC will encourage the establishment of Freight Consolidation Centres (FCC) that will facilitate undertaking the final stage of delivery by zero emission vehicles.</p>	<p>FCCs have been used at numerous locations across the country to reduce the overall number of courier vehicles, reducing congestion and providing environmental benefits.</p>
3	<b>Fleet Operator Recognition Scheme (FORS)</b>	<p>Through the FQP, CEC will investigate the feasibility of incentivising operators of freight vehicles operating in the area to attain the Gold FORS accreditation so that they have made proven efforts to reduce emissions.</p>	<p>The FORS is an accreditation scheme that aims to improve fleet activity and includes consideration of emissions.</p>

Table 6.3 Recommended Construction Policies

No.	Policy Area	Recommended Policy	Rationale
1	<b>Freight, Delivery and Servicing</b>	<p>To minimise emissions during the demolition and construction phase, development proposals should:</p> <ul style="list-style-type: none"> <li>- Make maximum use of rail and water transport during the construction period, including removal of excavated material, and for servicing and deliveries;</li> <li>- Co-ordinate and phase construction projects to enable the transport impacts to be effectively managed;</li> <li>- Manage servicing and deliveries in line with best practice to minimise the impact on the surrounding road network;</li> <li>- Support the provision and operation of measures to reduce freight trips and promote cleaner vehicles (e.g. consolidation centres); and</li> <li>- Ensure that the operators of all freight vehicles operating in the area have attained the Gold FORS accreditation so that they have made proven efforts to reduce emissions.</li> </ul>	<p>Vehicles transporting materials and equipment during the construction of major developments can significantly increase localised emissions. Construction should be planned so that emissions are reduced as far as possible.</p>

<sup>73</sup> Cheshire East Local Transport Plan (2014)

[http://www.cheshireeast.gov.uk/public\\_transport/local\\_transport\\_plan/local\\_transport\\_plan.aspx](http://www.cheshireeast.gov.uk/public_transport/local_transport_plan/local_transport_plan.aspx)

2	<b>Control of Dust</b>	Developers and contractors should follow the guidance set out in the <i>IAQM guidance on the assessment of dust from demolition and construction</i> <sup>25</sup> when drafting their construction plans and measures to minimise air pollution during the demolition and construction process recommended in this document should be implemented.	<i>The IAQM guidance on the assessment of dust from demolition and construction</i> <sup>25</sup> seeks to reduce emissions of dust, PM <sub>10</sub> and PM <sub>2.5</sub> from construction and demolition activities from new developments. It sets out the methodology for assessing the air quality impacts of construction and demolition and identifies good practice for mitigating and managing air quality impacts that is relevant and achievable, with the overarching aim of protecting public health and the environment. This document should be followed for developments in the CEC area.
3	<b>Non-Road Mobile Machinery</b>	Wherever possible, renewable, mains or battery powered plant items should be used on construction sites.  NRMM of net power between 37kW and 560kW used on any site will be required to meet Stage II of the Directive 97/68/EC as a minimum. This will apply to both variable and constant speed engines for both NO <sub>x</sub> and PM.  From 2020 NRMM used on any site will be required to meet Stage IIIA of the Directive as a minimum.	NRMM used in demolition and construction is a significant source of pollution. Diesel or petrol powered plant items emit higher levels of PM and NO <sub>x</sub> than electric equivalents. Therefore, wherever possible, renewable, mains or battery powered plant items should be used.
4	<b>Assessment</b>	An assessment of the impact on air quality of the development during the construction phase should be carried out in order to inform detailed mitigation methods for controlling dust and pollution emissions in line with the <i>IAQM 2014 guidance</i> <sup>25</sup> on the assessment of dust from demolition and construction	<i>The IAQM 2017 guidance</i> <sup>25</sup> sets out the methodology for assessing the air quality impacts of construction and demolition and identifies good practice for mitigating and managing air quality impact.  Assessment is required to demonstrate that potential impacts have been considered and suitable measures have been incorporated into the Construction Environmental Management Plan (CEMP).
5	<b>Monitoring</b>	All demolition and construction sites should be monitored for the generation of air pollution. PM <sub>10</sub> monitoring should be carried out at medium and high risk sites.	<i>The IAQM 2017 guidance</i> <sup>25</sup> sets out the monitoring requirements for new developments. Monitoring best practice should be applied. This means that PM <sub>10</sub> monitoring should be carried out at medium and high risk sites.

