Clean Air Strategy & Action Plan for Cardiff

March 2019

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Chapter 1- The Need for a Clean Air Strategy & Action Plan

Clean air is essential for a good quality of life, and poor air quality is considered the largest environmental risk to public health in the UK.[1] It has been reported that air pollution problems persist in Wales and pose significant public health risks.[2] The evidence linking poor health outcomes with exposure, even low pollutant concentrations, only continues to strengthen. It is therefore plausible that everyone is affected by air pollution to some extent.[3] In the UK, in the context of air quality management, the main air pollutants which are the primary public health concern, are particulate matter, and nitrogen dioxide (NO_2), and the principle source of these pollutants is from road transport emissions.[4]

It has been published that air quality has significantly improved in the UK over the past years.[5] Defra states "Total UK emissions of nitrogen oxides (NOx) fell by almost 70% between 1970 and 2015 and by over 19% between 2010 and 2015." In Wales, the most widely exceeded limit value is the annual mean nitrogen dioxide concentration (40µg/m^3).

Despite these somewhat improved levels, there are around 40 Air Quality Management Areas (AQMAs) declared by Local Authorities in Wales. Very few AQMAs have been revoked and those persons living and working within these defined areas are susceptible to high concentrations of air pollutants than elsewhere. Welsh Government (WG) explain that from a public health perspective there is no defined 'safe' level of exposure, and the national air quality objectives used to identify AQMAs should not be seen as 'safe' levels. Air pollution can cause adverse effects on health and quality of life at lower exposures, depending on the circumstances of the exposed individual. As a consequence, the majority of the avoidable health burden associated with air pollution in Wales is the result of population exposures outside AQMAs.

High on the agenda for UK Government is to tackle air pollution and protect the health and well-being of the UK population.[5]

A multi-sectorial approach is needed to develop and effectively implement long term policies and strategies that reduce risks of air pollution to health (WHO Regional Office for Europe 2013). This approach is supported across Wales through the Well-being of Future Generations (Wales) Act 2015[6] (National Assembly for Wales 2015), that includes goals to achieve a healthier Wales, that is more globally responsible and equal, through thinking more about the long-term, looking to prevent problems and taking a more joined-up approach. Many of the actions required to address air quality will have additional benefits to health and well-being by increasing levels of physical activity, improving mental well-being, and decreasing social isolation.

[1]World Health Organisation (2017). Evolution of WHO air quality guidelines: past, present and future.

[2] Welsh Air Quality Forum (2015). Air pollution in Wales 2015.
[3] Welsh Air Quality Forum (2016). Air pollution in Wales 2016.
[4] Brunt, H., Barnes, J., Jones, S., Longhurst, J., Scally, G. and Hayes, E. T. (2017) Air pollution, deprivation and health: Understanding relationships to add value to local air quality management policy and practice in Wales, UK. Journal of Public Health, 39 (3). pp. 485-497. ISSN 1741-3842.
[5] UK Government (2017). Air Quality plan for nitrogen dioxide (NO2) in the UK (2017).
[6] Welsh Government. Well-being of Future Generations (Wales) Act 2015.

CC is very aware of the concerns for air quality impacts. CC is committed to achieving levels as low as reasonably practicable by demonstrating levels beyond the annual objectives set for pollutants. In order to improve the air quality in Cardiff, action needs to be taken across the city as a whole and it is acknowledged that road traffic emissions (particulate matter (PM) and primary/ secondary nitrogen dioxide (NO_2)) are the primary contributing factor to poor air quality in Cardiff.

As outlined by Table 1- Composition of Cardiff's Vehicle Fleets Cardiff's licensed vehicle fleet contains a greater percentage of cars than the UK average, although a lower proportion of those are diesel powered.

Table 1- Composition of Cardiff's Vehicle Fleets

Area	Cars	% Diesel Cars	Light Goods Vehicles	% Diesel Vans	Heavy Goods Vehicles	Buses and Coaches
Cardiff	88.6%	36.5%	7.3%	96.4%	0.6%	0.5%
UK Average	82.8%	39.6%	10.1%	96.3%	1.3%	0.4%

WG'S publication; Local Air Quality Management, Policy Guidance, June 2017 recommended two clear goals:

(1) achieve compliance with the national air quality objectives in specific hotspots; and

(2) reduce exposure to pollution more widely, so as to achieve the greatest public health benefit.

Collective efforts, therefore, should look beyond targeted action in localised air pollution hotspots and do this in parallel with universal action to reduce risks for everyone.

Cardiff Council's (CC) Capital Ambition recognises that Cardiff is one of the UK's fastest growing cities, and that it is crucial that this growth is well planned and sustainable. One of the current administrations top priorities is implementing and sustaining a cohesive transport system, therefore addressing congestion and improving air quality in Cardiff. In line with the Capital Ambition report and WG's guidance, CC's Clean Air Strategy (CAS) & Action Plan will help implement and deliver the priorities set out in the Capital Ambition with an overarching aim to:

Improve Air Quality to Protect and Improve Public Health in Cardiff

As a major base of employment in South Wales, an improvement in air quality in Cardiff will not only benefit residents of the city but also those persons commuting from the wider region to the capital.

Actions to address the health impacts of air pollution in Cardiff can play a critical role in supporting other priorities such as active travel, health inequalities, integrated care, sustainability, growth and regeneration, localism and community engagement.

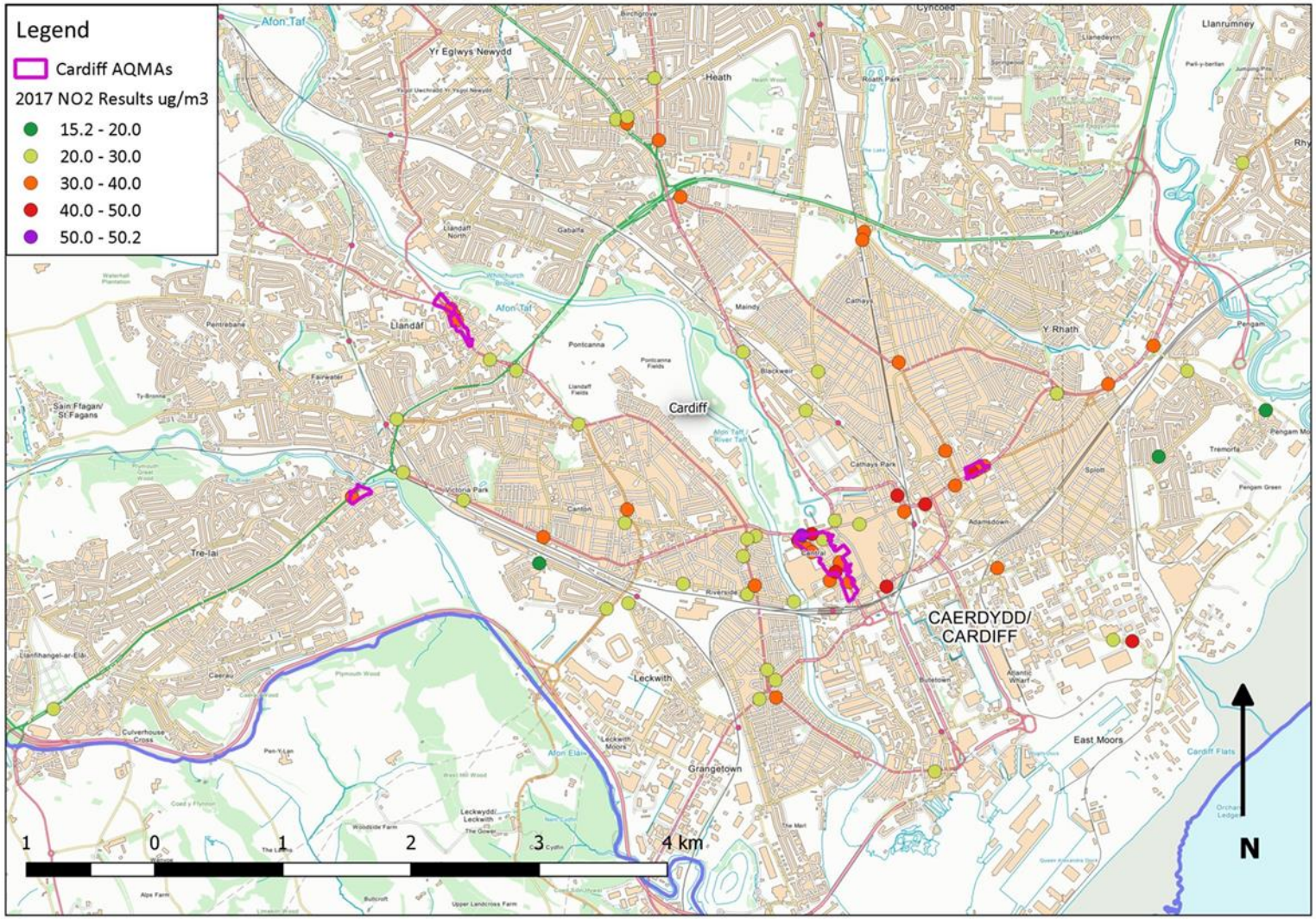
Based on monitoring results and further detailed assessments, there are currently four Air Quality Management Areas (AQMAs) declared across Cardiff which have all been declared due to exceedances of the annual mean NO_2 Air Quality Standard (40ug/m^3).

Two AQMAs are primarily focused in Cardiff City Centre: **Cardiff City Centre AQMA**, established 01/04/2013 and **Stephenson Court AQMA**, established 01/12/2010.

North of the City Centre, lies the **Llandaff AQMA** (established 01/04/2013) and to the west of Cardiff is the **Ely Bridge AQMA** (established 01/02/2007).

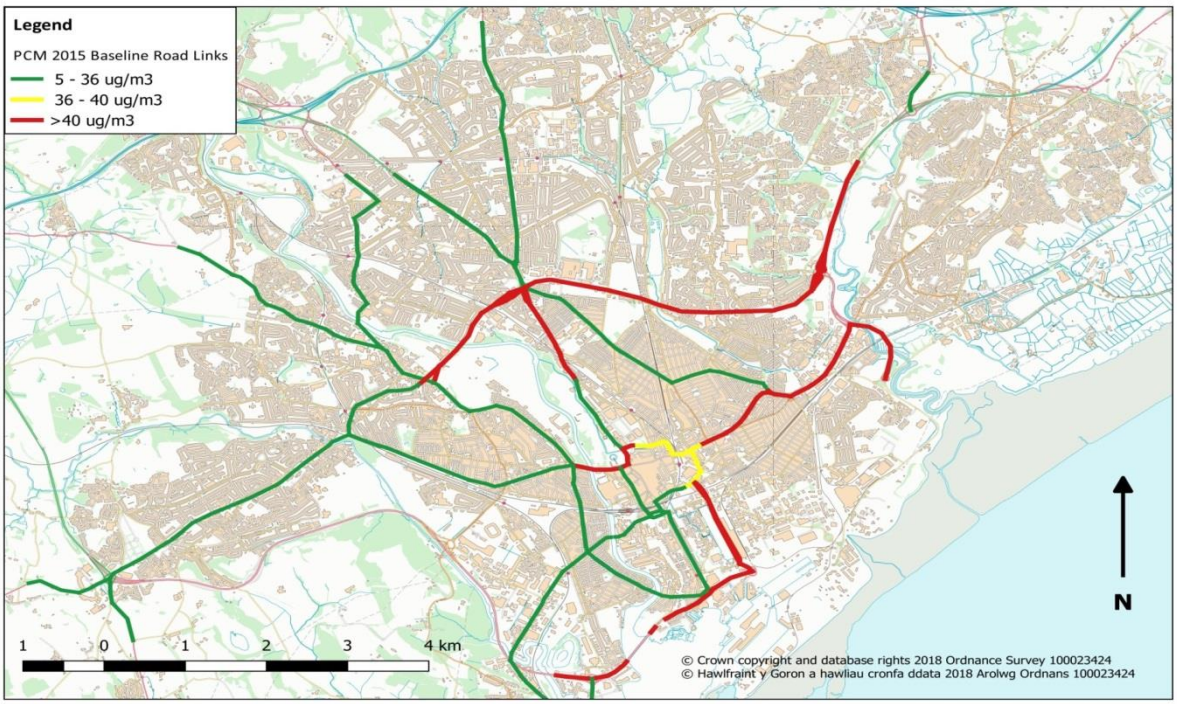
Figure 1- 2017 Monitored NO2 Results and Existing AQMAs in Cardiff displays the network of LAQM monitoring across Cardiff as well as highlighting the AQMAs.

Figure 1- 2017 Monitored NO2 Results and Existing AQMAs in Cardiff



Adding to the works undertaken by CC in accordance with its LAQM obligations, following the formal publication of Defra's UK detailed air quality plan to tackle roadside nitrogen dioxide (NO_2) concentrations in July 2017, it was identified from air quality monitoring undertaken by CC and modelled projections from WG that Cardiff would continue to exceed EU & UK Air Quality Directive Limit Values for NO_2 beyond 2020. Examining a baseline year of 2015 the report detailed modelled projections from JAQU which showed continued non-compliance of the national annual average NO_2 standard along identified road networks. The roads which have been modelled as exceeding the annual limit value are the A4161, the A4232, the A4234, the A470 and the A48. **Figure 2** displays the areas of concern;

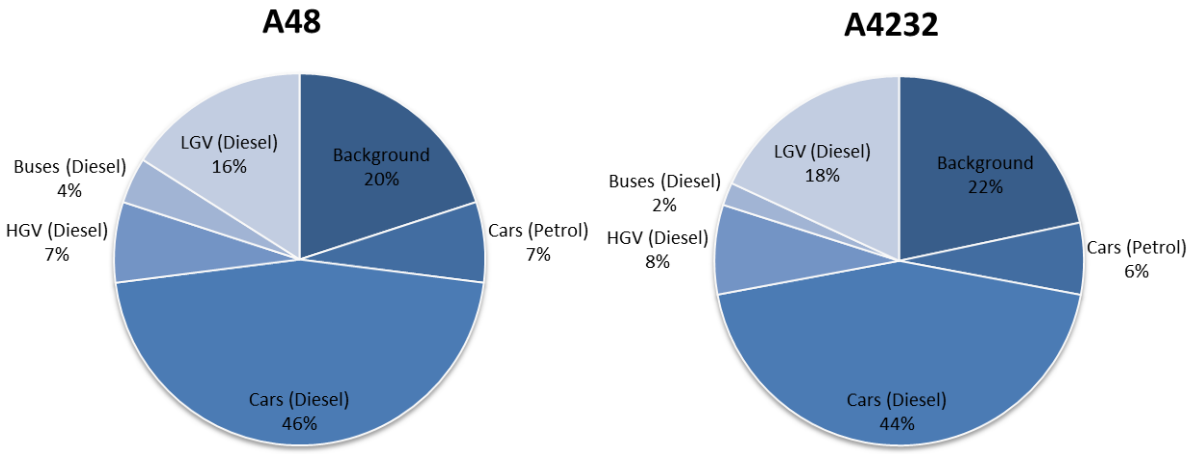
Figure 2- Updated Baseline NO_2 PCM Modelling Results Identifying Exceeding Road Links in Cardiff 2015



The particularly concerning road links are the A48 & A4232 whereby compliance for the annual average NO_2 is not achieved until beyond 2021.

Figure 3 represents the % NOx source apportionment for NOx pollution on the A48 and A4232 as modelled by the Department for Environment, Food and Rural Affairs (Defra)/Department for Transport's (DfT) Joint Air Quality Unit (JAQU). It is clear from this Figure that diesel cars account for the greatest source of pollution on this major road link in Cardiff.

Figure 3- NOx Emission % Source Apportionment, JAQU



As a result of the detail in the UK Plan, and a subsequent High Court ruling, in March 2018, under Part IV of the Environment Act 1995, Section 85(7), WG issued a formal direction to CC to address its air quality concerns, with particular reference to the specified five road links. The direction has been governed by the Welsh Minister for Environment who has determined that the direction deemed necessary to meet obligations placed upon the United Kingdom under the **EU Ambient Air Quality Directive (2008/50/EC).**

The Direction specifies that CC must undertake a feasibility study in accordance with the HM Treasury's Green Book approach[7], to identify the option which will deliver compliance with legal limits for nitrogen dioxide in the area for which the authority is responsible, **in the shortest possible time.**

This study will encapsulate the four AQMAs and strategic road networks in Cardiff, particularly the five highlighted pieces of road network.

The CAS & Action Plan appoints strategic measures that look to generate a positive impact to citywide air quality levels, in particular traffic derived NO_2 levels. Each measure has endured a cost benefit appraisal procedure by weighting the measures in terms of air quality impact, cost and timescale. The key theme of the strategic measures is to increase the uptake of sustainable modes of transport by influencing a behavioural change in Cardiff.

The strategic measures and assigned via the CAS & Action Plan forms the basis of the directed feasibility study, whereby results in terms of air quality impacts will be available once the Final Business Case for the feasibility study is complete.[8]

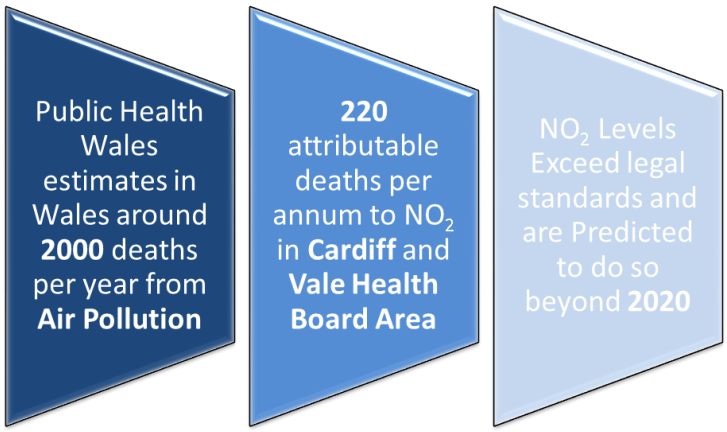
[7] HM Treasury Green Book

[8] Environment Act 1995 (Feasibility Study for Nitrogen Dioxide Compliance) Air Quality Direction 2018, 14th Feb 2018.

In order to achieve improvements in air quality and work towards fulfilling the main aim of this strategy, **strategic measures** need to be blanketed across the City via the successful implementation of defined actions. These strategic measures are listed below;

This document will outline various individual actions to implement these strategic measures in order to deliver significant improvements to air quality in Cardiff, whilst supporting the sustainable economic growth of the City and wider region. This will include a review of existing strategies, policies and plans which either have a direct or indirect impact on air quality in Cardiff.

Chapter 2- Background to Air Quality Issues



2.1 Public Health Impacts

There is clear scientific evidence which shows that air pollution exposure reduces life expectancy by increasing mortality and morbidity risk from heart disease, and strokes, respiratory diseases, lung cancer and other conditions[9]. Public Health Wales have stated that poor air quality is probably the second greatest health concern after smoking and is the most significant environmental determinant of health.

In the UK it has been estimated that an equivalent of **29,000** deaths are attributed to long term exposure to fine particulate air pollution exposure each year and an equivalent of **23,500** deaths are attributed to long term exposure to nitrogen dioxide (NO_2) exposure each year[10]. There is an overlap between the effects of both pollutants; as such, it has been estimated that the equivalent of **40,000 deaths** occur each year in the UK as a result of exposure to outdoor pollution[11]. On average, exposure reduces the life expectancy of every person in the UK by 7 to 8 months[12]. It has been estimated that reducing particulate air pollution by 10 µg/m3 in the UK would extend lifespan by five times more that eliminating casualties on the roads or three times more that eliminating passive smoking[13].

In Wales, based on data for the period 2011-2012, it has been estimated that an equivalent of **1,604** deaths can be attributed to fine particulate exposure each year, and **1,108** deaths can be attributed to nitrogen dioxide exposure each year[14]. Accounting for the pollutant effect overlap, it is estimated that an equivalent of around **2,000** deaths occur each year in Wales as a result of exposure to fine particulate and NO_2 exposure each year.

A study undertaken in 2014 published by Public Health England estimated that in **Cardiff 143** deaths were attributable to exposure to fine particulate air pollution.[15] More recent work by Public Health Wales estimates that there are 225 and 220 attributable deaths per annum to PM 2.5 and NO_2 in the Cardiff and Vale Health Board area[16]. As **Figure 4** demonstrates, these

[9] WHO. Review of evidence on health aspects of air pollution-REVIHAAP. 2013. Copenhagen: WHO. From: http://www.euro.who.int/__data/assets/pdf_file/0004/193108/REVIHAAP-Final-technical-reportfinal- version.pdf ?ua=1

[10] Defra. Draft plans to improve air quality in the UK: tackling nitrogen dioxide in our towns and cities. UK overview document. 2015. London: Defra.

[11] Royal College of Physicians and Royal College of Paediatrics and Child Health (2016). Every breath we take: the lifelong impact of air pollution. From: https://www.rcplondon.ac.uk/projects/outputs/every-breath-we-take-lifelong-impact-airpollution

[12] Defra. The air quality strategy for England, Scotland, Wales and Northern Ireland (vol. 1). 2007.

[13] Defra (2017) Air Quality: Public Health Directors briefing. From https://laqm.defra.gov.uk/assets/63091defraairqualityguide9web.pdf

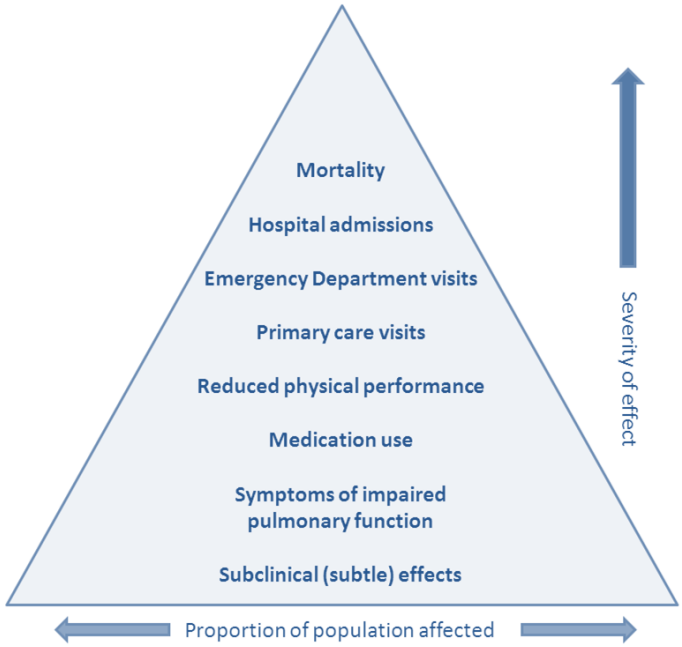
[14] Brunt., H (2017).

[15] Gowers., A. M, Miller., BG, Stedman., JR. Estimating local mortality burdens associated with particulate air pollution. 2014. London: Public Health England

[16] C&V deaths NO_2/ PM source needed

figures are undoubtedly the tip of the iceberg when it comes to the health impact of air pollution. Taking action to improve air quality is therefore crucial in order to improve the health of the population in Cardiff.

Figure 4- Effects of Poor Air Quality in Terms of Population Affected and Severity



In 2012, the International Agency for Research on Cancer listed diesel exhaust pollution as a Class 1 carcinogen and extended this to all ambient air pollution in 2013.

For particulate air pollution and nitrogen dioxide there is no safe level of exposure and any initiatives to reduce air pollution will have positive health benefits. Welsh Government have indicated that the national air quality objectives used to identify Air Quality Management Areas (AQMAs) should not be seen as 'safe' levels and impacts are observed below levels permitted by current legal limits. Air pollution can cause adverse effects on health and quality of life at lower exposures, depending on the circumstances of the exposed individual. As a consequence, the majority of the avoidable health burden associated with air pollution in Wales is the result of population exposures outside AQMAs.

Although air pollution is a public health priority in Wales, its management needs to be a collaborative approach between public bodies, private companies, third sector partners and the public, all whom have important roles to play in addressing this pressing issue.

Poor air quality does not only have a significant health impact but it also has a wider societal cost. Accounting for health service costs and reduced productivity through lost work-days in the UK this is significant, standing at around £20b every year.[17]

Widespread air pollution is associated with routine car use for journeys within, into and out of, Cardiff. Well-designed measures to reduce air pollution will also increase active travel rates. Reducing reliance on the car as the primary mode of transport will have co-benefits of increased physical activity, mental well-being, and improved productivity and reduced stress, and will play a vital role in reducing carbon emissions which contribute to climate change.

[17] Royal College of Physicians and Royal College of Paediatrics and Child Health (2016). Every breath we take: the lifelong impact of air pollution.

The Director of Public Health's Annual Report 2017 highlights how our built environment has become increasingly shaped around car use over the last 50 years, with journeys made by car across the UK increasing from 27% to 83% over that period, while journeys made by bus have fallen from 42% to 5%, and by cycling from 11% to 1%. Over half of adults in our area are overweight or obese. To help reduce these levels, as well as levels of cardiovascular disease and type 2 diabetes, we need active travel to become the default for short journeys once again.

Nearly one in four vulnerable people in our communities report being lonely. A built environment shaped around cars can create community 'severance' where short journeys are difficult to make by foot or bicycle. This places vulnerable people (including older people and people with disabilities) who may not have access to car transport at a higher risk of social isolation and loneliness. Residential roads with high traffic volumes also report less neighbourliness and sense of community. Measures which reduce the impacts of cars on local communities may also have a positive impact on social interactions.

2.2 Air Quality Policy and Legislation

The Clean Air Strategy (CAS) and Action Plan looks to address air quality on a city wide basis and as such it considers both UK air quality objectives for LAQM purposes as well as EU limit values transcribed into UK legislation.

2.2.1 UK Air Quality Strategy and LAQM

The UK Air Quality Strategy[18] identifies nine ambient air pollutants that have the potential to cause harm to human health. These pollutants are associated with local air quality problems, with the exception of ozone, which is instead considered to be a regional problem.

The Air Quality (Wales) Regulations and subsequent amendments (National Assembly for Wales, 2000 and 2002) set objectives for the seven pollutants that are associated with local air quality. The objectives aim is to reduce the health impacts of those pollutants to negligible levels in Local Air Quality Management in Wales.

Welsh Ministers have a responsibility to ensure air quality levels in Wales comply with air quality limit values in accordance with the Air Quality Standards (Wales) Regulations, 2010.

Cardiff Council has a statutory duty under Part IV of the Environment Act 1995 & Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 to manage local air quality. The Local Air Quality Management (LAQM) process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not air quality objectives are likely to be achieved.

The air quality objectives applicable to LAQM in Wales are set out in the Air Quality (Wales) Regulations 2000, No. 1940 (Wales 138) and Air Quality (Amendment) (Wales) Regulations 2002, No 3182 (Wales 298). Where the air quality reviews indicate that the air quality objectives may not be met the local authority is required to designate an Air Quality Management Area (AQMA). Action must then be taken at a local level and outlined in a specific Air Quality Action Plan (AQAP) to ensure that air quality in the identified area improves.

[18] https://www.gov.uk/government/publications/the-air-quality-strategy-for-england-scotland-wales-and-northern-ireland-volume-1

2.2.2 European Air Quality Directives

Air Quality Framework Directive (96/62/EC) on ambient air quality assessment and management defines the policy framework for 12 air pollutants known to have a harmful effect on human health and the environment. The limit values for the specific pollutants are set through a series of Daughter Directives.

European Directive 2008/50/EC consolidates existing air quality legislation (apart from the 4th Daughter Directive) and provides a new regulatory framework for PM2.5.

The UK Air Quality Standards Regulations 2010 came into force on 11th June 2010, replacing the previous Air Quality Standards Regulations 2007, and consolidated and transposed into national legislation the requirements of the European Directives 2008/50/EC and 2004/107/EC – the fourth Daughter Directive.

2.2.3 Air Quality Objectives and Limit Values

The air quality objectives and limit values currently applicable to the UK can be split into two groups. UK air quality objectives set down in regulations for the purposes of local air quality management, which are targets, and EU Limit Values transcribed into UK legislation, which are mandatory.

A summary of the UK Air Quality Objective and EU Limit Values for NO_2 and particulate matter (PM_{10} and $PM_{2.5}$) is given in **Table 2**. Furthermore, the UK has a target to reduce average concentrations of $PM_{2.5}$ at urban background concentrations by 2ug/m^3before 2020.

Table 2- UK and EU Air Quality Objectives for NO_2, PM_{10} and $PM_{2.5}$

	Pollutant	Standard/ Concentration	Measured As	Date to be achieved and maintained thereafter
UK Air Quality Objectives	Nitrogen Dioxide (NO_2)	200ug/m3 not to be exceeded more than 18 times per annum 40ug/m3	1 Hour Mean Annual Average	31.12.2005 31.12.2005
	Particulate Matter (PM 10)	50ug/m3 not to be exceeded more than 35 times per annum 40ug/m3	24 Hour Mean Annual Average	31.12.2004 31.12.2004
	Particulate Matter (PM 2.5)	25ug/m3	Annual Average	2020
EU Limit Values	Nitrogen Dioxide (NO_2)	200ug/m3 not to be exceeded more than 18 times per annum 40ug/m3	1 Hour Mean Annual Average	01.01.2010
	Particulate Matter (PM 10)	50ug/m3 not to be exceeded more than 35 times per annum 40ug/m3	24 Hour Mean Annual Average	01.01.2010 01.01.2010
	Particulate Matter (PM 2.5)	25ug/m3	Annual Average	2015

2.3 Air Quality in Cardiff

2.3.1 Monitoring

In line with the CC's statutory duties under Part IV of the Environment Act 1995, Shared Regulatory Services (SRS) undertakes regular air quality monitoring at specifically allocated locations across Cardiff using automated and non-automated principles for ambient air nitrogen dioxide (NO_2), particulate matter (PM_{10} & $PM_{2.5}$), sulphur dioxide (SO_2), carbon monoxide (CO) and ozone (O_3).

Under Section 82 of the Environment Act 1995 every local authority has an obligation to regularly review and assess air quality in their areas, and to determine whether or not air quality objectives are likely to be achieved.

Currently there are 72 specifically allocated monitoring locations across Cardiff where monitoring for annual nitrogen dioxide (NO_2) concentrations is undertaken with the use of passive diffusion tubes. In addition, two automated AURN monitoring stations located on Frederick Street in the City Centre and Newport Road, Roath provide continuous monitoring for nitrogen dioxide (NO_2), particulate matter (PM_{10} and $PM_{2.5}$), sulphur dioxide (SO_2), carbon monoxide (CO) and ozone (O_3).

With regards to prioritising ambient air quality sampling locations, the Council adopts a risk based approach to any allocation of monitoring sites, considering the requirements of The Department for Environment, Food and Rural Affairs' (Defra) Local Air Quality Management Technical Guidance 16, February 2018.[19] The designated monitoring locations are assigned based on relevant exposure and where the certain Air Quality Objective levels for a particular pollutant applies. TG(16) states that annual mean objectives should apply at "All locations where members of the public might be regularly exposed. Building facades of residential properties, schools, hospitals, car homes etc."

2.3.2 Air Quality Management Areas

Where the air quality reviews indicate that the air quality objectives are not being achieved, or are not likely to be achieved, Section 83 of the 1995 Act requires local authorities to designate an Air Quality Management Area ('AQMA').

Based on monitoring results and further detailed assessments, there are currently four Air Quality Management Areas (AQMAs) declared across Cardiff which have all been declared due to exceedances of the annual mean NO_2 Air Quality Standard (40ug/m^3), known to be derived from road transport.

Two AQMAs are primarily focused in Cardiff City Centre: Cardiff City Centre AQMA, established 01/04/2013 and Stephenson Court AQMA, established 01/12/2010.

North of the City Centre, lies the Llandaff AQMA (established 01/04/2013) and to the west of Cardiff is the Ely Bridge AQMA (established 01/02/2007). **Figure 5** details the location of the AQMAs and provides results of the latest 2016 monitoring results for NO_2 monitoring across Cardiff.

[19] Defra. Local Air Quality Management, Technical Guidance (TG16), February 2018.

2.3.3 Air Quality Action Plan

Section 84 of the Act ensures that action must then be taken at a local level which is outlined in a specific Air Quality Action Plan (AQAP) to ensure that air quality in the identified area improves. CC therefore has a statutory requirement to produce an Air Quality Action Plan (AQAP) for each identified AQMA within the local authority area. After declaring an AQMA the authority must prepare a **DRAFT** Air Quality Action Plan (AQAP) within 18 months setting out measures it intends to put in place to improve air quality to at least the air quality objectives, if not even better. The AQAP must be **formally** adopted prior to 24 months has elapsed. AQMA(s) are seen by local authorities as the focal points to channel resources into the most pressing areas of pollution as a priority.

In the case of Cardiff, implementing individual AQMA action plans has not proven to be sufficiently successful. The main issue with this particular approach is that the AQAP focuses on introducing local measures to individual road links/ areas, which only targets at improving air quality within the identified AQMA itself. Importantly, the absence of an AQMA in parts of Cardiff does not mean there is no public health problem from air pollution.

Whilst such measures have been successful in improving air quality within the individual AQMA (High Street/ St Mary's Street Action Plan) such localised measures can, and have led, to adverse impacts on air quality in surrounding areas and result in more widespread air quality issues. These plans have not looked sufficiently at the primary cause of the problem, this being road traffic derived emissions, resulting in air quality levels being detrimentally increased in neighbouring areas.

CC recognises action needs to be taken across the city as whole and it is acknowledged that road traffic emissions (particulate matter (PM) and primary/ secondary nitrogen dioxide (NO_2)) are the **primary** contributing factor to poor air quality in Cardiff. CC's Capital Ambition report recognises that Cardiff is one of the UK's fastest growing cities, and that it is crucial that this growth is well planned and sustainable. Reducing the number of car journeys made in the city, and promoting the use of active and sustainable modes of travel are central to Cardiff Council's Transport Strategy and in improving air quality in the

CC recognises that in order to tackle these known pockets of poor air quality, a more suitable and constructive approach is required to target the whole of Cardiff, improving overall air quality. With the implementation of correct long term measures, all highlighted road networks and identified AQMAs should be able to benefit from improved air quality. The recent Welsh Government guidance on local air quality management recommended two clear goals:

(1) achieve compliance with the national air quality objectives in specific hotspots; and

(2) reduce exposure to pollution more widely, so as to achieve the greatest public health benefit.

Collective efforts, therefore, should look beyond targeted action in localised air pollution hotspots and do this in parallel with universal action to reduce risks for everyone.

It has been highlighted that any formal AQAP need to be devised via the involvement and input of various influencing sectors across local authority bodies and partner agencies. CC has acknowledged this approach which will allow for increased awareness within the council and fundamentally will produce an effective action plan, supporting the desirable outcome of reaching lowest levels reasonably practicable, and maximising health benefits to the residents of Cardiff and commuters to the Capital.

It is important to note the recent report by National Institute for Health and Care Excellence (NICE) [20]suggests that small-scale actions on their own are unlikely to lead to the significant reductions in air pollution needed to protect health. Rather, it is recommended that multiple interventions are driven forwards in parallel; with each producing a small benefit, a multiple-intervention approach would likely act cumulatively to produce significant change (both in terms of air pollution mitigation and population health adaptation and improvement).

2.3.4 Local Air Quality Targets

CC recognise that there is no defined "safe level" when describing levels of air quality[21]. **CC is committed** to achieving NO_2 levels **as low as reasonably practicable** in the shortest time possible by demonstrating levels beyond the annual objective set for NO_2 (40µg/m^3).

In 2018, a corporate decision was made to implement a local performance indicator for annual average levels of nitrogen dioxide (NO_2) achieved within Cardiff Council's Air Quality Management Areas (AQMAs).

Annual mean ratified concentrations of nitrogen dioxide (NO_2) are not to exceed 35µg/m3. This objective applies to locations within Cardiff's Air Quality Management Areas (AQMAs) where members of the public might be regularly exposed, such as building façades of residential properties, schools, hospitals, care homes.

Datasets for annual average NO_2 levels recorded at relevant public exposure locations within the AQMAs do not display signs of improvement; levels are consistently elevated and are seen to be either exceeding or encroaching on the annual average NO_2 objective. **Table 3** draws upon worse case ratified NO_2 datasets monitored via passive diffusion tubes at most relevant sensitive receptor locations, i.e. residential facades within each AQMA.

Table 3- Five year dataset for monitored annual average NO_2 levels at residential facades.

AQMA	Site ID	Bias Adjusted Annual Average NO_2 Concentration (µg/m^3)				
		2013	**2014**	**2015**	**2016**	**2017**
City Centre	143	**42.1**	**42.1**	38.2	38.7	38.4
Stephenson Court	131	**43.9**	**41.2**	39.5	39.6	**41.7**
Ely Bridge	117	**44.9**	**42.3**	39.5	**41.3**	38.0
Llandaff	161	39.1	37.2	32.3	35.0	33.4

As displayed by **Table 3**, although it can be suggested that compliance is met for three of the four AQMAs, CC do not consider these levels **as low as reasonably practicable**. With Cardiff's expected future growth and approved development works already in progress, further work is needed to ensure compliance with the air quality objectives is of a greater magnitude. Although CC does have a commitment to achieving NO_2 levels **as low as reasonably practicable**, targets must be set, therefore CC is committed to achieving annual average bias adjusted levels **<35µg/m3** at all monitored sensitive receptor locations (residential facades) within the AQMAs. It is suggested that the probability percentage of compliance exponentially decreases with annual average levels close to the 40µg/m3 annual mean objective. In order

[20] NICE (2017). Air pollution: outdoor air quality and health. NICE Guideline NG70
[21] Local air quality management in Wales Policy guidance June 2017

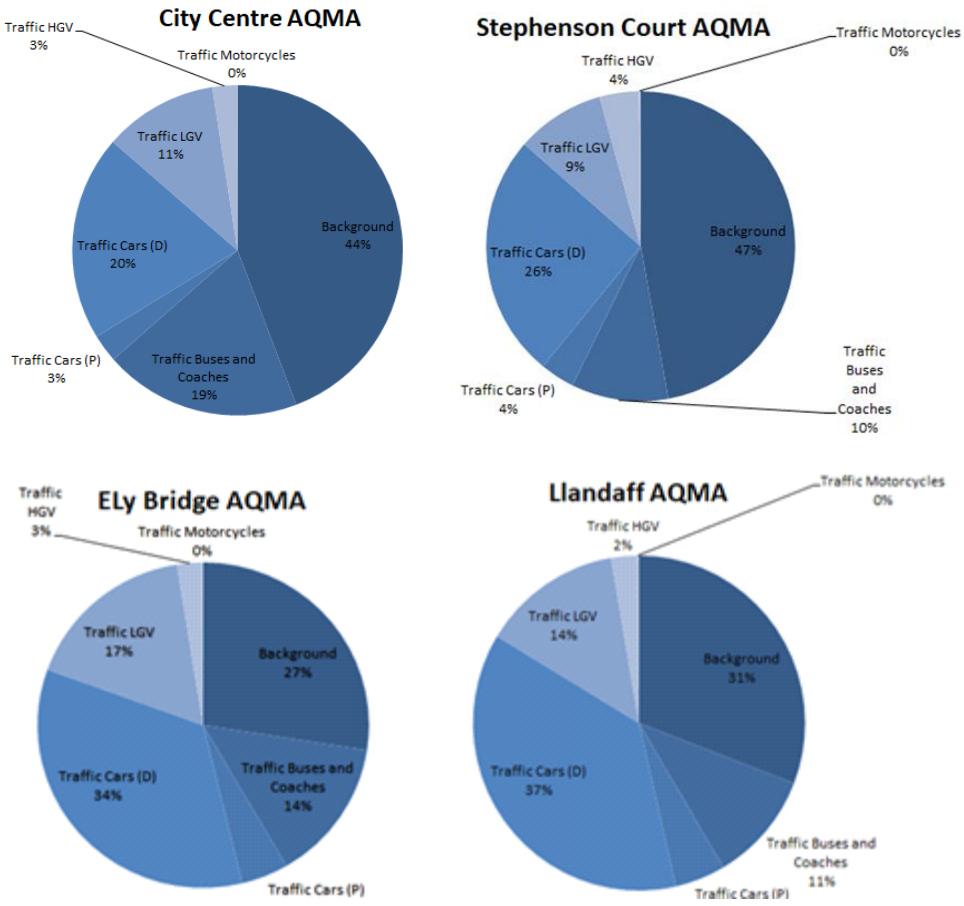
to ensure compliance is achieved at sensitive receptor locations within the established AQMAs, an annual average target level of 35µg/m3 is sought to be acceptable.

In order to monitor CC's identified strategic measures and their effectiveness, CC will continue to monitor levels of NO_2 at various relevant exposure locations citywide. CC will look at improving the network of monitoring across the city by examining ways of increasing monitoring capabilities, for example looking at personal air quality monitoring for the public and purchasing automatic monitoring equipment to provide a further understanding of air quality trends. CC will also design a transport monitoring programme which will look to examine different modes of transport trends, undertaken on a yearly basis. The scope for such a transport study would include examining figures for cycle trips, school journey mode determination, bus patronage, trends in peak traffic flow times and fleet composition analysis using routes through AQMAs and surrounding road networks.

2.3.5 Source Apportionment

Source apportionment analysis within Cardiff's AQMAs has been undertaken. Using available 2017 DfT data and adopting the guidance outlined in Local Air Quality Management (LAQM) Technical Guidance 16, Box 7.5, the percentage proportion of various vehicle classifications contributing towards measured annual average NO_2 concentrations was quantified. The analysis confirms that a large percentage proportion of NO_2 levels experienced at sensitive receptor locations within the established AQMAs is attributed by cars (predominantly diesel models), as well as buses & coaches. The analysis is detailed i**n Figure 5.**

Figure 5– AQMA NO_2 Source Apportionment Assessments



2.3.6 Air Pollution and Areas of Deprivation

Different people are affected in different ways by air pollution and some people are more at risk than others. For example, children, older people and those with chronic lung or heart conditions are more vulnerable to the effects of air pollution. There are also others at a higher risk e.g. those working in polluted places or commuting to work through heavily congested urban areas. Air pollution can disproportionately affect vulnerable population groups (e.g. children, older people, people with underlying chronic disease), as well as those exposed to higher levels because of living or commuting in urban or deprived locations (National Institute for Health and Care Excellence 2017; WHO Regional Office for Europe 2016).

Research also shows that people living in the deprived areas may also be more susceptible to air pollution than those who live in the least deprived areas and may also be exposed to high air pollution concentrations. The triple jeopardy concept - where air pollution, impaired health and deprivation interactions can create disproportionate disease burdens between and within communities - is at play in Cardiff.

In 2015, the Royal College of Physicians and the Royal College of Paediatrics and Child Health published a report on the lifelong impact of air pollution and concluded that air pollution as a stressor that interacts with many other stressors such as diet, socio-economic deprivation and climatic conditions to create adverse health impacts and increased susceptibility to disease.

Exposure to air pollution and the consequent health risks and impacts are not uniform. Air pollution combines with other aspects of the social and physical environment to create an inequitable disease burden on more deprived parts of society (WHO Regional Office for Europe 2013).

Figure 6 below overlays the most recent NO_2 monitoring data onto the latest health deprivation map for Cardiff, as detailed in the Welsh Index of Multiple Deprivation (WIMD), produced by Welsh Government, 2014. From this Figure it is evident that Cardiff may not exactly follow the Wales wide data, as it is evident that in some of the most deprived areas air quality is relatively good. However this is based on limited monitoring locations in these areas, with no monitoring in some areas of high deprivation, and it therefore highlights that further air quality monitoring should be considered in the most vulnerable population areas, where any relevant exposure is likely to occur.

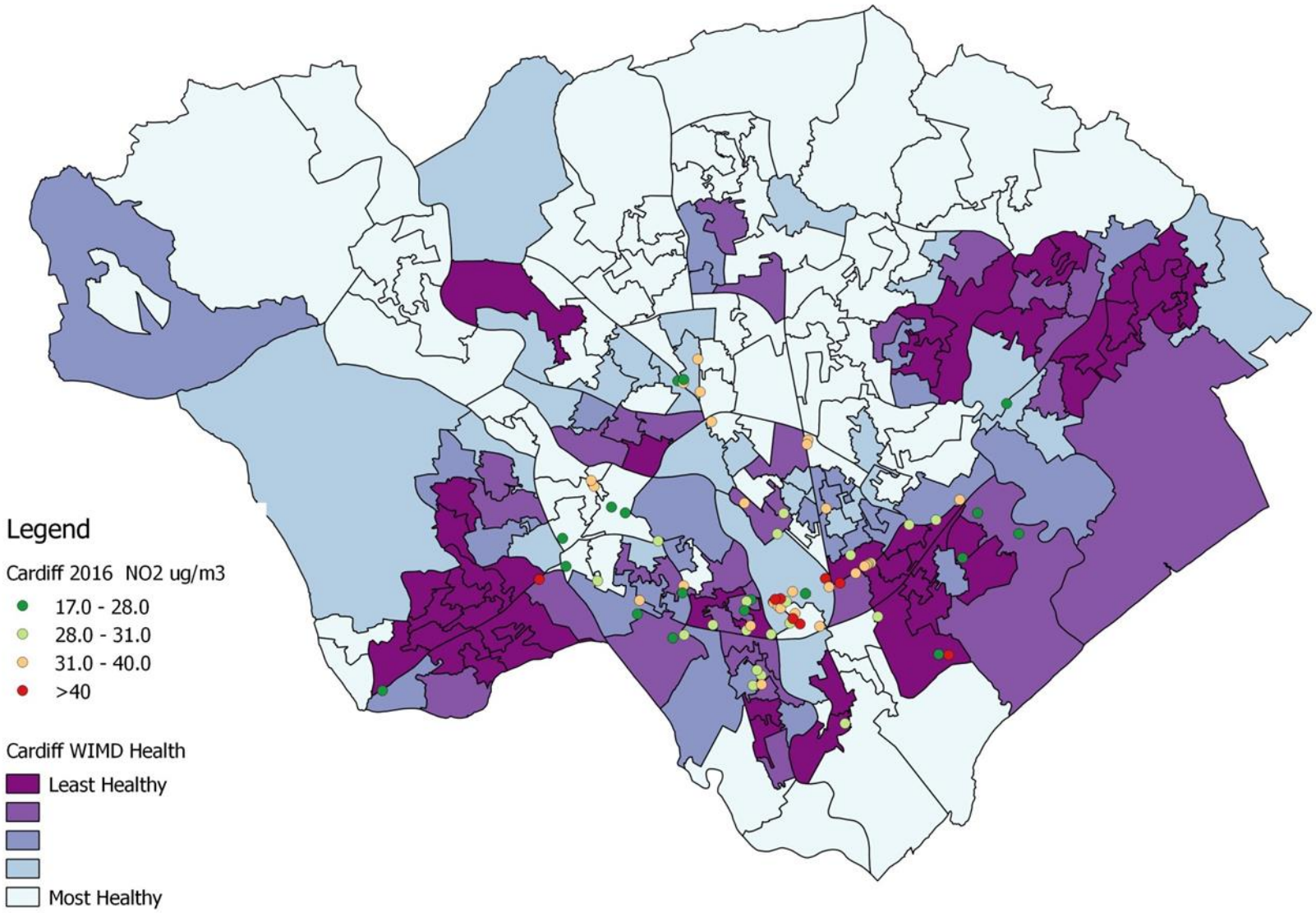
2.3.7 Clean Air Zones

As previously discussed in Chapter 1 the latest UK published document issued by Defra to mitigate road transport emissions illustrates projections for road links where, based on revised air dispersion modelling, NO_2 non-compliance will continue beyond 2020. The revised modelling has utilised revised emission factors and underpins areas in Wales whereby non-compliance for NO_2 is expected for 2020 and beyond, if no further action is implemented to improve air quality.

The published report outlined that the results of the modelling undertaken by Defra indicates that Cardiff may benefit from the introduction of a Clean Air Zone (CAZ), in order to achieve compliance with the national annual mean NO_2 objective in the shortest time possible. Defra's report stipulates that having a CAZ introduced in Cardiff by 2021 would ensure NO_2 compliance by 2022.

The road links predicted to exceed the national annual average NO_2 compliance value are shown in **Figure 2**.

Figure 6- Cardiff NO_2 Data 2016 and 2014 WIMD Health Data for Cardiff



As highlighted in Figure 2 the revised modelling undertaken on behalf of WG has projected continued non-compliance of the national annual average NO_2 standard by 2021 along the A48, Eastern Avenue and the A4232 near the Cardiff Bay Retail Park.

The Welsh and UK Governments have required all affected Local Authorities to detail and quantify all mitigation measures which would improve air quality and bring about compliance with national NO_2 objectives. The implementation of a Clean Air Zone (CAZ) is regarded as a "***last resort"*** approach after all other potential measures have been assessed. However, this strategy will consider the possibility of the introduction of a CAZ in Cardiff and this is detailed further in the Regulatory Measures section of this report Chapter 7.

2.4 Local Issues Impacting on Improving Air Quality

Research has shown that the car is the dominant mode of travel for journeys in Cardiff.[13] In order to improve air quality, which will play a vital role in contributing to health improvements in Cardiff, an increased use of sustainable and active travel alternatives is essential.

Cardiff Council is committed to achieving a 50:50 modal spilt by 2026, as set out in Cardiff's Local Development Plan (LDP) 2006- 2026[22]. However, there are a number of challenges that Cardiff faces in order to meet the 50:50 modal split;

- **Future Growth** - Cardiff's LDP provides for 41,000 new homes and 40,000 new jobs in Cardiff by 2026. It is envisaged that this level of growth will generate a (net) road traffic increase by 32% and so existing pressures on Cardiff's transport network will be intensified. A significant shift is required from car use to sustainable travel;

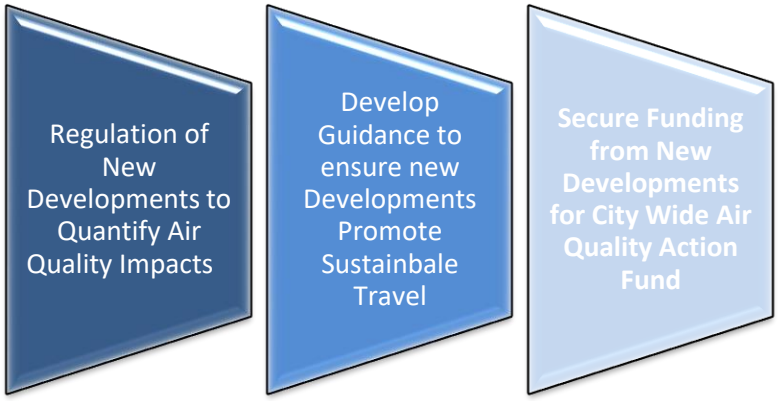
- **Inbound Commuting Traffic** - 38% of Cardiff's workforce travel to Cardiff from outside the county area. This commuting workforce from outside the county area has seen a 10% increase 2004 - 2014. Figures from the Census conducted in 2011 suggest that between 76% - 84% of the commuting workforce travel by car;

- **Health -** There is an urgent need to encourage healthy and active lifestyles in Cardiff; only 25% of Cardiff residents meet physical activity guidelines and 53% are obese or overweight (Welsh Health Survey 2010 and 2011). Social isolation and loneliness is another major need in our local population;

- **Sustainable and Active Travel Availability** - Areas poorly served by sustainable transport modes often have high levels of car ownership and become heavily reliant on the car for daily travel. The quality of the public transport network is major challenge for Cardiff; Ask Cardiff Surveys outlined a 4% decrease in daily bus use between 2007 and 2014. Across the UK over the last 5 years the cost of running a car has decreased by 5% while the cost of the bus has increased by 14% (Department for Transport). There is also a need for cycling and walking improvements in Cardiff. Levels of cycling are continuing to increase but 82% of Cardiff residents think cycling safety needs to be improved (Bike Life 2015).

[22] Cardiff Council Adopted Local Development Plan 2006-2026

Chapter 3 Planning and Development Control



Our built environment can affect the emission of road traffic related air pollutants by influencing how and how much, we travel. It can also affect the way air pollutants are dispersed through street design and the resulting impact on air flow (NICE 2017).

3.1 Prosperity for All

In September 2017, the Welsh Government published a national strategy, Prosperity for All[23] to deliver its key priorities during the latest term of the Assembly. One of the key themes of this strategy is to build healthier communities and better environments, and a key aspect of this theme is to reduce emissions in order to deliver improvements to air quality.

3.2 Well-being of Future Generations (Wales) Act 2015

In 2015 Welsh Government made a new law called the Well-being of Future Generations (Wales) Act. The new law has the sustainable development principle at its heart. This means that we need to work in a way that improves wellbeing for people today without doing anything that could make things worse for future generations.

The Well-being of Future Generations (Wales) Act 2015 (WFG) is a significant enabler to improve air quality as the Act calls for sustainable cross-sector action based on the principles of long-term, prevention-focused integration, collaboration and involvement. It intends to improve economic, social, environmental and cultural well-being in Wales to ensure the needs of the present are met without compromising the ability of future generations to meet their own needs. The Act places responsibilities on public bodies in Wales to work in new ways (including via Public Services Boards) towards national Well-being goals. Progress is measured against a suite of well-being and Public Health Outcomes Framework indicators; there is one specifically concerned with air pollution.

As **Figure 7** illustrates below, the Act is the legislative vehicle for "Health in all Policies in Wales" and provides the underpinning principles for all policy and decision making, including economic development, in Wales. Reducing air pollution, health risks and inequalities can help contribute to most, if not all, of the well-being goals. As such, the Act presents excellent opportunities to change policy and practice to enhance air quality management arrangements across Cardiff (and wider).

[23] Welsh Government, 2017 – Prosperity for All

The CAS & Action Plan ensures that future decision making in terms of air quality will comply with the WFG in terms of ensuring that the Council meets the five ways of working

•**Long term** – The CAS & Action Plan balances short-term needs of achieving compliance with the limits values in the shortest time possible, with the need to safeguard the ability to ensure longer term continued improvement in air quality within Cardiff.

•**Prevention** –By developing strategic measures, the Council should ensure improvements in air quality are achieved and will be able to prevent air quality getting worse in the future thus protecting public health and the wider environment.

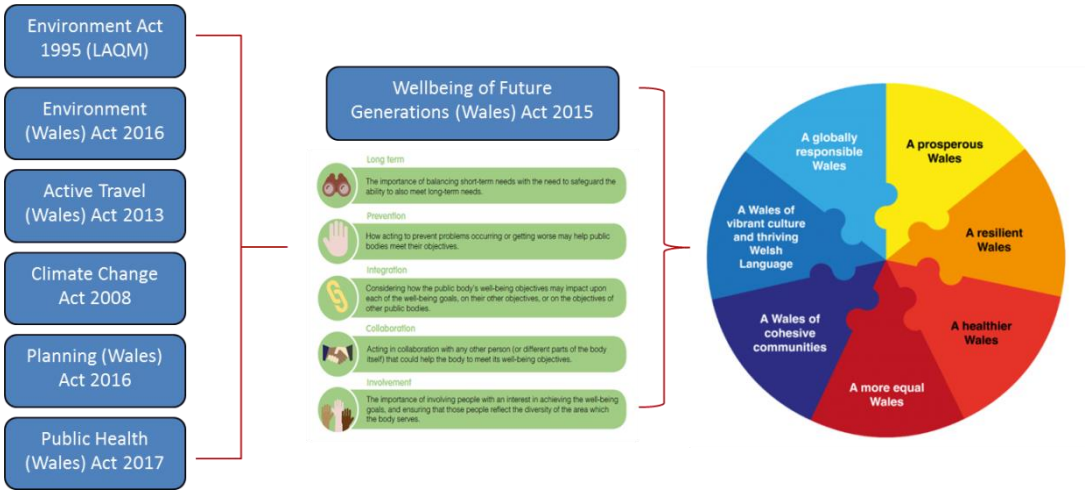
•**Integration** – The development of strategic measures takes into consideration other public body's well-being objectives and qualitatively assesses the impact upon each of the well-being goals, or the objectives of other public bodies.

•**Collaboration** –The development of the strategic measures has been done so in collaboration with many departments within the Council and other external organisations, i.e., Public Health Wales. This collaborative approach will be taken forward in the development of the initial plan as part of the feasibility study.

•**Involvement** – The prior to developing the Final Plan the preferred measures will be subject to an appropriate level of consultation, and will ensure that those who have a strong interest in improving air quality will be fully involved and their ideas considered.

Overall, improving air quality and developing a preferred option to achieve compliance with the NO_2 limit value, contributes significantly to the majority of the well-being goals.

Figure 7- The Well- being of Future Generations (Wales) Act 2015 Matrix



3.2.1 Cardiff Well-Being Plan 2018-2023

This CAS & Action Plan also supports the Councils Well-being Objectives, identified within the Council's Well Being Plan 2018-2023.

Under the Act the Cardiff Public Services Board (PSB) has produced its Well-Being Plan for 2018-2023[24], which sets out the Cardiff PSB's priorities for action over the next 5 years, and beyond. The Plan contains Well-being Objectives, high-level priorities that the Cardiff PSB have identified as being most important. It also contains 'Commitments,' or practical steps that the city's public services, together, will deliver over the next 5 years. The Well-Being Plan has set out Well-Being Objectives as follows:

- **Objective 1** - A Capital City that Works for Wales;
- **Objective 2** - Cardiff grows in a resilient way;
- **Objective 3 -**Safe, Confident and Empowered Communities
- **Objective 4** - Cardiff is a great place to grow up;
- **Objective 5** - Supporting People out of poverty;
- **Objective 6** - Cardiff is a great place to grow older; and
- **Objective 7 -**Modernising and Integrating Our Public Services

Within the Well-Being Plan Objective 2 details the following; *Cardiff is one of Britain's fastest growing cities, and is by far the fastest growing local authority area in Wales. Successful cities are those in which people want to live and this growth is welcomed and a sure sign of strength for the city. However, this growth will bring challenges too, putting pressure on both the city's physical infrastructures, community cohesion, its natural environment and public services. Managing the impacts of this population growth and of climate change in a resilient and sustainable fashion will be a major long term challenge for Cardiff.*

Improving levels of NO_2 and particulate matter ($PM_{10, 2.5}$) is a City level outcome indicator that the PSB will seek to impact in order to meet this specific Objective. The Plan forecasts a future Cardiff with improved air quality and has committed to taking 'a *city-wide response to air pollution through supporting the development and delivery of a Cardiff Clean Air Strategy.'*

3.3 Planning Policy Wales

Land-use planning policy in Wales is established within the policy document Planning Policy Wales (PPW), Edition 10 (Welsh Government, 2018)[25] and its updates which provide the strategic policy framework for the effective preparation of local planning authority development plans. PPW is supported by a series of Technical Advice Notes (TANs) and National Assembly for Wales Circulars. Local planning authorities have to take PPW, TANs and Circulars into account when preparing Development Plans.

With respect to planning policy guidance, TAN 18 on transport (Welsh Government, 2007) makes reference to local air quality and the need for Air Quality Action Plans to be prepared for any Air Quality Management Areas declared.

PPW places a general presumption in favour of sustainable development, stressing the importance of local development plans, and states that the planning system should perform

[24] Cardiff Well-Being Plan 2018-2023
[25] Planning Policy Wales – 10th Edition December 2018

an environmental role to minimise pollution. Local development plans should enable consideration of the effects that the proposed development may have on air quality, as well as the effect that air quality may have on the proposed development. To prevent unacceptable risks from air pollution, planning decisions should ensure that new development is appropriate for its location.

The need for compliance with any statutory air quality limit values and objectives is stressed, and the presence of AQMAs must be accounted for in terms of the cumulative impacts on air quality from individual sites in local areas. New developments in AQMAs should be consistent with local air quality action plans.

Within the PPW document Welsh Government is committed to reducing reliance on the private car and supporting a modal shift to walking, cycling and public transport. Delivering this objective will make an important contribution to decarbonisation, ***improving air quality***, increasing physical activity, improving the health of the nation and realising the goals of the Well-being of Future Generations Act.

PPW outlines barely compliant levels of air quality should not be viewed as 'clean' and still carries long-term population health risks, and thus it is desirable to keep levels of pollution **as low as possible.**

3.4 Cardiff's Local Development Plan 2006-2026

Cardiff's Local Development Plan (LDP) 2006-2026, forms the basis for decisions on land use planning in Cardiff up to 2026 and assumes that, within the plan's time frame, approximately 40,000 new jobs and 41,100 new dwellings will be developed in Cardiff as a direct response to Cardiff's role as the economic driver of the City-region.

In addition to its independent examination, the LDP was subject to a Strategic Environmental Assessment (SEA) to ensure that the policies reflect sustainability principles and take into account environmental impacts.

Policy KP2 of the LDP allocates 8 Strategic Sites to help meet the need for new dwellings and jobs. These strategic allocations on both greenfield and brownfield sites will include 500 homes or more and/or include significant employment/mixed uses which will bring significant benefits to the city. The sites are:

(i) Cardiff Central Enterprise Zone;
(ii) Former Gas Works, Ferry Road;
(iii) North West Cardiff;
(iv) North of Junction 33 on the M4;
(v) South of Creigiau;
(vi) North East Cardiff (West of Pontprennau);
(vii) East of Pontprennau Link Road; and
(viii) South of St. Mellons Business Park – Employment Only.

The LDP identifies that sustainable transportation solutions are required in order to respond to the challenges associated with new development by setting out an approach aimed at minimising car travel, maximising access by sustainable transportation and improving connectivity between Cardiff and the wider region.

The Plan sets out a strategy to achieve this by making the best use of the current network, managing demand and reducing it where possible by widening travel choices. The aim is to secure a modal split of 50% car and 50% non-car modes.

The following LDP policies are of relevance to air quality;

KP8: SUSTAINABLE TRANSPORT
Development in Cardiff will be integrated with transport infrastructure and services in order to:

- Achieve the target of a 50:50 modal split between journeys by car and journeys by walking, cycling and public transport;
- Reduce travel demand and dependence on the car;
- Enable and maximise use of sustainable and active modes of transport;
- Integrate travel modes;
- Provide for people with particular access and mobility requirements;
- Improve safety for all travellers;
- Maintain and improve the efficiency and reliability of the transport network;
- Support the movement of freight by rail or water; and
- Manage freight movements by road and minimise their impacts

For Cardiff to accommodate the planned levels of growth, existing and future residents will need to be far less reliant on the private car. Therefore, ensuring that more everyday journeys are undertaken by sustainable modes of transport, walking, cycling and public transport, will be essential.

KP14: HEALTHY LIVING
Cardiff will be made a healthier place to live by seeking to reduce health inequalities through encouraging healthy lifestyles, addressing the social determinants of health and providing accessible health care facilities. This will be achieved by supporting developments which provide for active travel, accessible and useable green spaces, including allotments.

KP18: NATURAL RESOURCES:
In the interests of the long-term sustainable development of Cardiff, development proposals must take full account of the need to minimise impacts on the city's natural resources and minimise pollution, in particular the following elements.....minimising air pollution from industrial, domestic and road transportation sources and managing air quality.

EN13: AIR, NOISE, LIGHT POLLUTION AND LAND CONTAMINATION
Development will not be permitted where it would cause or result in unacceptable harm to health, local amenity, the character and quality of the countryside, or interests of nature conservation, landscape or built heritage importance because of air, noise, light pollution or the presence of unacceptable levels of land contamination.

C6: HEALTH
Priority in new developments will be given to reducing health inequalities and encouraging healthy lifestyles through:

i. Identifying sites for new health facilities, reflecting the spatial distribution of need, ensuring they are accessible and have the potential to be shared by different service providers; and

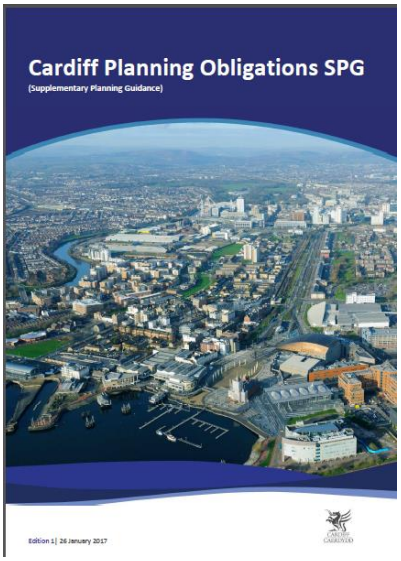
ii. *Ensuring that they provide a physical and built environment that supports interconnectivity, active travel choices, promotes healthy lifestyles and enhances road safety.*

The LDP also outlines the approach the Council will take to increase the proportion of people travelling by sustainable modes and to achieve the 50:50 modal split target. This will involve:

- enabling people to access employment, essential services and community facilities by walking and cycling through, for example, high quality, sustainable design and measures to minimise vehicle speed and give priority to pedestrians and cyclists;
- developing strategic bus and rapid transit corridor enhancements and facilitating their integration with the wider transport network;
- facilitating the transfer between transport modes by, for example, improving existing interchanges and developing new facilities such as strategically located park and ride facilities; and
- maximising provision for sustainable travel within new developments and securing infrastructure investment which can support modal shift within existing settlements.

3.5 Supplementary Planning Guidance (SPG)

In addition to the measures identified directly in the LDP the Council has recently prepared Supplementary Planning Guidance (SPG) which supports and provides additional guidance on the policy aims of the LDP which will have benefits on Air Quality in Cardiff.



3.5.1 Planning Obligations SPG (January 2017)

This document sets out the Council's approach to planning obligations when considering applications for development. It provides further guidance on how the policies set out in the LDP are to be implemented and will assist in securing the provision of sustainable development across the city.

Poor air quality can impact on people's health / quality of life and local authorities are required to assess air quality in their areas against National Air Quality Standards. Where the need arises as a result of a proposed development, the document confirms that developers will be requested to provide an Air Quality Assessment (AQA) and, in the event of an adverse assessment, a proposed scheme of mitigation measures. In addition to a scheme of mitigation measures, a financial contribution may be sought towards the site specific monitoring of air quality emissions.

In respect of Transportation and Highways, the SPG confirms the Council will maximise opportunities for trips generated by new development to be made by walking, cycling and public transport and seek to ensure that the highway network is able to accommodate road traffic movements associated with new development in a safe and efficient manner. The following guidance is covered:

(i) developments requiring the provision of a Transport Statement or Transport Assessment;

(ii) the provision of on-site infrastructure necessary to serve the development;
(iii) the provision of or contribution towards offsite highway works, public transport infrastructure/facilities provision and local interventions where the need arises;
(iv) integrating public transport; and
(v) travel plans detailing a long term management and monitoring strategy for the delivery of sustainable transport objectives through positive action.

3.5.2 Managing Transportation Impacts (Incorporating Parking Standards) SPG

This SPG sets out Cardiff Council's approach to assessing and managing the transport impacts of developments and supplements the transport and other related policies in Cardiff's Local Development Plan 2006-2026. It applies to all categories of development for which planning permission is required, including new developments, extensions, redevelopments and material changes of use.

The SPG provides detailed guidance with regard to:

1) How the Council will consider the impacts of development on the routes that make up the local highway network.
2) The detailed information that applicants for planning permission should include with their submissions to enable the Council to make a fully informed assessment of transport impacts.
3) The Council's approach to quantifying and assessing the transport impacts of development proposals as part of its determination of planning applications.
4) The types of transport infrastructure and other mitigation measures which may be sought to address transport impacts.
5) How the Council will seek to secure the transport infrastructure and other transport measures required to mitigate transport impacts, enable development to proceed and support the implementation of Transport policies in the Local Development Plan.
6) The scope and content of Travel Plans required as part of the overall package of measures to mitigate impacts and support the implementation of LDP transport policies.
7) The parking standards which apply to different types of development in specific areas of the city.
8) How the impacts of developments upon Public Rights of Way will be considered and the likely requirements for mitigation.

3.5.3 Cardiff Green Infrastructure SPG

Outlined in Cardiff's Local Development Plan (LDP) 2006- 2021, Policy **KP16** focuses upon Green infrastructure.

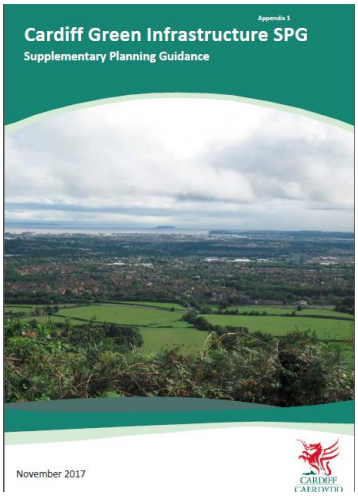
Green Infrastructure

The policy aims to ensure that Cardiff's green infrastructure assets are strategically planned and delivered through a green infrastructure network. Other policies in the Plan provide more detailed guidance on aspects of these assets, together with supporting SPG.

Where development is permitted, planning conditions and/or obligations will be used to protect or enhance the natural heritage network.

New developments should incorporate new and / or enhanced green infrastructure of an appropriate size, type and standard to ensure no fragmentation or loss of connectivity.

Where the benefits of development outweigh the conservation interest, mitigation and/or compensation measures will be required to offset adverse effects and appropriate planning obligations sought. The implementation of policies designed to provide and protect public open space throughout Cardiff would also serve to offset any increase in recreational pressure on the Cardiff Beech Woods SAC, thereby helping to avoid likely significant effect upon that site.



Management of Cardiff's green infrastructure network should be in place prior to development, and appropriate planning obligations sought. SPG on this topic will more fully outline the extent of Cardiff's green infrastructure and how this policy can be implemented in more detail.

A new Supplementary Planning Guidance (SPG) concerning Green Infrastructure was approved in 2017 by CC to provide a detailed understanding to the elements raised in the LDP.

- This document provides planning advice on a number of areas relating to development and the environment, including protection and provision of open space, ecology and biodiversity, trees, soils, public rights of way, and river corridors.

- The new document also differs from previous SPGs by providing more in depth design advice, aimed at giving developers a clearer understanding of the approach expected when submitting designs for new developments. By having this information up-front developers are better able to provide suitable designs to the Council through the planning process

The document sets out Cardiff Council's approach to the consideration of green infrastructure in relation to new developments, and will assist in securing the provision of sustainable development across the City as part of the Capital Ambition agenda.

The guidance will be used to ensure that all new developments satisfy the requirements for green infrastructure plan as set out in Policy KP16 of the LDP: *"Cardiff's distinctive natural heritage provides a network of green infrastructure which will be protected, enhanced and managed to ensure the integrity and connectivity of this multi-functional green resource is maintained.*

Protection and conservation of natural heritage network needs to be reconciled with the benefits of development. Proposed development should therefore demonstrate how green infrastructure has been considered and integrated into the proposals. If development results in overall loss of green infrastructure, appropriate compensation will be required."

3.5.4 Planning for Health and Well-being SPG

This document sets out the Council's approach to ensuring planning decisions consider impacts on the health and well-being of the population. The SPG is supplementary to Policies KP14 and C6 of the adopted LDP

Specifically in relation to air quality the SPG states that *"Air, noise and light pollution impacts on health and well-being, increasing the burden of disease from stroke, heart disease, lung cancer, and both chronic and acute respiratory diseases, including asthma. Invariably there is a disproportionate impact on disadvantaged groups. The importance of the need to consider this issue is set out in NICE (National Health and Care Excellence) Guidance 'Air pollution: outdoor air quality and health' which was published in June 2017."*

3.5.5 Planning Guidance for the Provision of Electric Vehicle Charging Points

In November 2018, the Council published a guidance documents for developers on the provision of charging points in new developments. This document sets out the Councils expectations on the minimum number of electric charging points that should be provided depending on the nature of the development. The expectations are summarised in Table 4 as follows:

Table 4 - Council Expectations on the Provision of EV Charging Points

Development Type	Provision
Houses	**One electric vehicle dedicated charging point** (up to 7kW(32A) where possible) **or installation of passive wiring** to allow future charging point connection per house with garage or driveway.
Flats	**At least 10% of parking bays** should be provide with dedicated electric vehicle weatherproof charging points.
Commercial Development, Car Parks and Community Facilities	**At least 10% of parking bays** should be provided with dedicated electric vehicle weatherproof charging points.
Public Transport Facilities and Taxi Ranks	Charging infrastructure will be required to facilitate the conversion of bus and taxi fleet, using **appropriate technological solutions at suitable locations across the city.**
Future Proofing	Subject to agreement with the Local Planning Authority standard provision may also require **installation of groundwork/passive wiring at the outset** to enable further future installation to match demand.

3.6 Development Management Consultations

The Local Planning Authority consults with the Shared Regulatory Services Air Quality Team on development proposals where air quality is a material consideration. A confidential pre-application enquiry process is available for developers to seek advice, obtain clarification and address any potential issues prior to the submission of a formal planning application. This

confidential advice is given on a 'without prejudice' basis and precedes the statutory consultations which would be carried out during the planning application process.

3.6.1 Planning Conditions and Planning Obligations

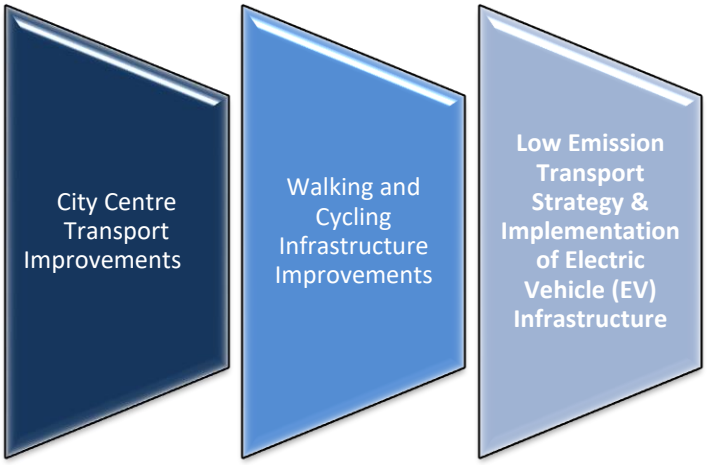
Many planning permissions are granted subject to various planning conditions. Conditions can enable many development proposals to proceed where it would otherwise be necessary to refuse planning permission. The proper use of conditions can improve the quality of development and enhance public confidence in the outputs of the planning system. Conditions should only be imposed where they are both necessary and reasonable, as well as enforceable, precise and relevant both to planning and to the development to be permitted.

Planning obligations are useful arrangements to overcome obstacles which may otherwise prevent planning permission from being granted. Contributions from developers may be used to offset negative consequences of development, to help meet local needs or to secure benefits which will make development more sustainable.

Planning obligations seeking to improve air quality may include contributions to enable the Council to improve monitoring capabilities.

The Council will look to draft a further SPG to provide specific guidance for addressing air quality impacts from new developments. The SPG will look to clearly set out the circumstances when an assessment for air quality impacts is required and will clarify the minimum amount of information required for the air quality assessment. The SPG will follow the Guidance on Land-use Planning and Development Control, as published by Environmental Protection UK (EPUK) and the Institute of Air Quality Management (IAQM).

Chapter 4 Transport Management and Active Travel



4.1 Transport Strategy

Cardiff Council's longstanding vision for transport in the city is for:

"An integrated transport system that offers safe, efficient and sustainable travel for all, where public transport, walking and cycling provide real and desirable alternatives to car travel."

Our priorities to achieve this are:

1. Widening travel choices making it practical for most daily trips to be made by alternatives to the car, such as public transport, walking and cycling;
2. Demand management taking steps to reduce the demand for travel overall, and particularly by car ; and
3. Network management using technology to make best use of the existing highway network, rather than building new roads that would generate more traffic.

4.1.1 Local Transport Plan

Cardiff is growing and changing, and this brings more journeys and more pressures on Cardiff's transport network. Reducing the number of car journeys made in the city, and promoting the use of active and sustainable modes of travel, are central to Cardiff Council's Transport Strategy and in improving air quality in the city. The LDP sets the target of achieving a 50:50 modal split – this means that 50% of all journeys need to be made by sustainable transport by 2026 in order to accommodate the future development set out in the LDP. Our policies set out in the LDP support the need to secure significant improvements to the public transport and active travel networks in combination with new developments.

Cardiff's Local Transport Plan (LTP) was approved by the Welsh Government in May 2015. The LTP sets out our main transport infrastructure proposals which will support this significant modal shift. The Local Transport Plan recognises the need to improve air quality. Its programme prioritises:

- development of active travel networks to increase walking and cycling for local journeys
- the provision of cycling infrastructure

- the bus network
- reduced speed limits
- reducing congestion
- improving transport efficiency and reliability
- Bus based park and ride.

4.2 Capital City Regional Deal

The Cardiff Capital Region (CCR) City Deal is a programme agreed in 2016 between the UK Government, the Welsh Government and the ten local authorities in South East Wales to bring about significant economic growth in the region through investment, upskilling, and improved physical and digital connectivity.

One of the Cardiff Capital Region (CCR)'s objectives is to connect communities, business, jobs, facilities and services in the area. The CCR Transport Authority, working closely with the Welsh Government, Transport for Wales and others, has been established as a sub-committee by the CCR Cabinet to facilitate the City Deal by coordinating transport planning and investment across the region. The transport improvements underlying the CASAP measures to be assessed later in this report will be fundamental to delivering this objective of CCR.

4.3 Active Travel (Wales) Act 2013

This Act[26] came into force in September 2014 and requires local authorities to map and continuously improve routes and facilities for cycling and walking. Reducing road traffic emissions will be a key aspect of the measures being taken forward and thus the increase in modal shift to active travel will be a key component of the Councils preferred option to achieve compliance.

4.4 Cycling Strategy and Integrated Network Map

The Cardiff Cycling Strategy sets out an ambitious vision to double the number of cycling trips by 2026, from a 9.2% modal share in 2015 to 18.4% in 2026. In order to achieve this vision, it will be necessary to develop a comprehensive network of cycling infrastructure which is suitable for use by people of all ages and abilities, and to work with key partners from employers, retail and schools to ensure that appropriate cycling facilities are provided at destinations and to promote cycling.

Infrastructure improvements for walking and cycling are planned and prioritised through the Integrated Network Map (INM) as detailed in Figure 8 and is a requirement of the Active Travel (Wales) Act 2013. The INM defines a network of walking routes and cycling routes and a schedule of schemes to improve this network of routes over a 15 year period. In accordance with the requirements of the Active Travel Act, the INM will be submitted to the Welsh Ministers for approval in November 2017 and updated every 3 years.

The Cycling Strategy and INM sets out proposals for two new cycle superhighways which will provide high quality cycle routes, segregated from pedestrians and

[26] Active Travel (Wales) Act 2013

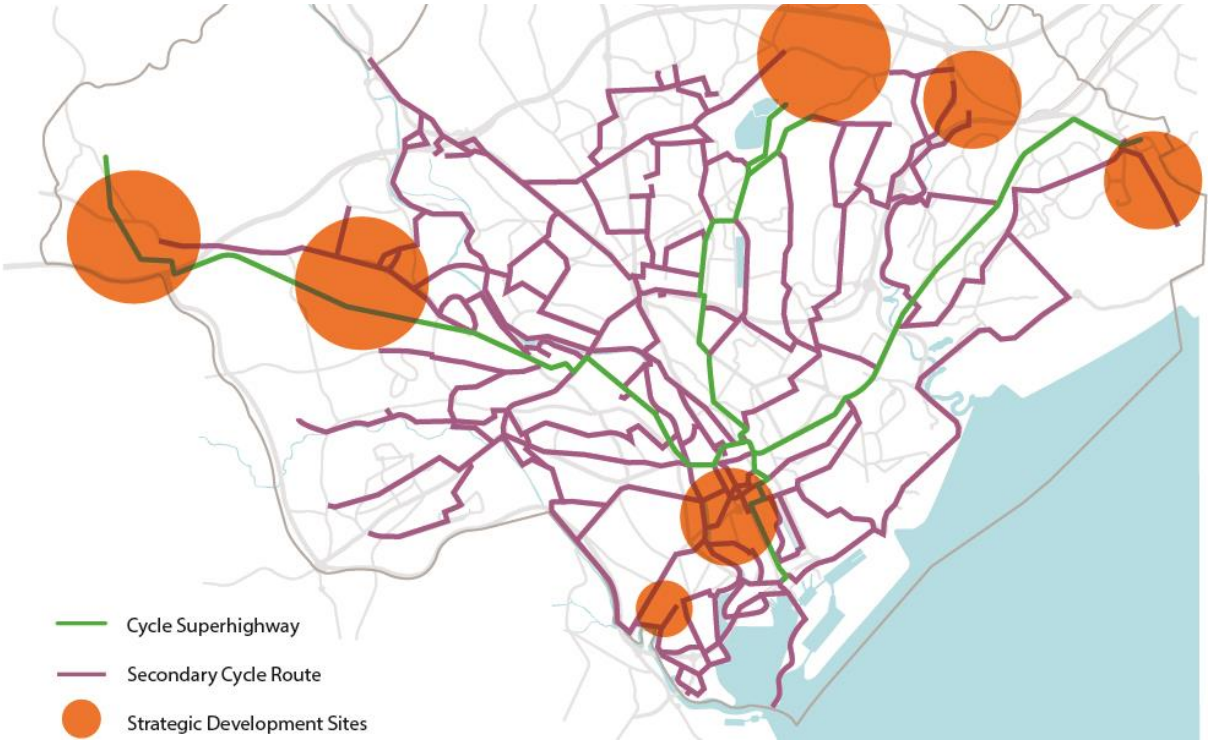
motor vehicles on busy roads, and will connect strategic development sites, existing residential areas, employment sites, the city centre and Cardiff Bay. These will be supported by a network of secondary routes.

4.5 NextBike Scheme

The Nextbike hire scheme launched in Cardiff in March 2018. The scheme is financially funded by Welsh Government and its main objectives are to reduce congestion, free up parking spaces and provide a healthier way to travel around the city.

Since the introduction of the Nextbike scheme in March 2018, the Cardiff scheme has become the UKs most successful[27], with over 150,000 rentals since March. Due to success of the scheme, the amount of available units is set to double with an increase of a further 500 bikes bringing the total number of bikes available to 1,000 by the summer of 2019.

Figure 8- Integrated Network Map



4.6 School Active Travel Plans

The Council has a corporate commitment for every school in Cardiff to have an active travel plan by April 2022. Works are ongoing to understand how the Council can best support schools to develop and implement an active travel plan. The aim of an active travel plan is to increase the number of children, parents and staff travelling to school sustainably, in particular increasing walking, cycling and scooting. There are a range of resources, training and programmes available to schools and the ongoing works will identify what actions the schools need to take and access the relevant initiatives and programmes to implement these actions.

[27] NextBike In Depth Review 2018

4.7 City Centre Transport Improvement Projects

The employment, shopping, tourism and entertainment facilities in Cardiff City Centre attract hundreds of thousands of commuters and visitors each day from across the Cardiff City Region and further afield.

Traffic flows on main routes to and through the city centre generate peak time congestion which causes delays to bus services and can make the area less attractive for pedestrians and cyclists.

Increasing sustainable travel to and through the city centre will be crucial to achieving improvements in air quality. To achieve this, a programme of City Centre Transport Improvement Projects is being developed. Key measures will focus on sustainable transport improvements that will encourage mode shift and contribute to improving air quality levels.

Such transport network improvements will look to incorporate City Centre West, Central Interchange and Eastside City Centre Schemes.

4.7.1 Reducing Congestion

Traffic congestion delays journeys and can damage the environment of the city and its neighbourhoods. Queuing car traffic has a negative impact on air quality. Cutting congestion by reducing the number of journeys made by car will bring air quality improvements as well as reducing costs and journey times for individuals and businesses. Less traffic can also make journeys made by sustainable and active modes of travel easier, for example, by making bus journey times more reliable and providing a more attractive environment for walking and cycling. By managing Cardiff's highway network more effectively, we will make best use of the existing highway in a way which promotes access by sustainable modes of travel.

4.8 Car Clubs

By offering a flexible alternative to car ownership, car clubs can play an important role in an integrated transport network, giving access to a car for short periods without the need to own a private vehicle. Car club provision in Cardiff is set to grow in the short term, helping to reduce the number of journeys made by car and giving access to new, low emission vehicles.

4.9 20 MPH Zones

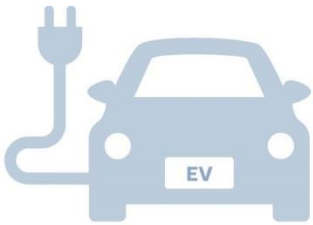
CC introduced a 'signs only' 20 miles per hour (mph) limit in the Cathays/Plasnewydd area in March 2014, as part of a two-year pilot project. Following the pilot, a commitment was made to look at how 20pmh limits might be more widely applied in Cardiff. It was determined that the installation of 20 mph limits in residential streets would support the general consensus that lower speed limits in residential areas can:

- improve air quality in terms of particulate matter exposure;
- improve the liveability of the city by reducing car use for local trips;
- make it easier to cross roads and access local facilities – especially for children and the elderly;
- improve the environment for walking and cycling resulting in greater levels of physical activity.

A wider future rollout of 20mph limits is underway in residential streets in areas around the city centre. The installation of 20 mph limits will complement the ongoing installation of school safety zones delivered through the on-going Safe Routes to School programme.

4.10 EV Infrastructure

There is a growing demand for, and need to support, a shift from traditional fossil fuels for residual motorised transport to more sustainable forms of clean, renewable energy, particularly with the commitment made by the UK government to ending sales of new petrol and diesel cars from 2040. Although this activity is largely led by private sector vehicle manufacturing markets, there is also a clear role for the Council in facilitating, championing and preparing for this transition.



A feasibility study reviewing best practice, the market and funding streams will inform a decision on the best option for the city. Locations for EV charging will be considered alongside the rollout of additional car club vehicles in the authority and is seen as vital in encouraging the use of more environmentally friendly modes of transport including Low Emission Vehicles. It is anticipated that a pilot will be undertaken of an EV charging system within 2018 that will contribute to the understanding of the potential of EV technology for Cardiff.

In 2018 Arcadis Consulting (UK) Ltd supported by Zero Carbon Futures (UK) Ltd were commissioned by Cardiff Council to prepare a feasibility study to explore how electrically powered Ultra Low Emission Vehicle (ULEV) charging points could be integrated across the city of Cardiff. As the market share of ULEV is growing and is forecasted to increase significantly over the coming decades, it is critical that the necessary charging infrastructure is provided to facilitate this growth, in order to support a cleaner transport system across Cardiff.

4.11 Low Emissions Transport Strategy

In 2018, Council approved the works to develop a Low Emission Transport Strategy. The Low Emissions Transport Strategy is focussed on the Council's responsibilities and aspirations in dealing with this significant public health issue by supporting a transition away from fossil fuels for transportation. It is also aimed at encouraging key partners in the City to consider similar actions. The Strategy forms a key strand of the Clean Air Strategy for Cardiff, together with developing transport policy and other emerging actions.

This strategy has been based on a series of background studies and discussions with major stakeholders and leaders in the field of low emission transport. This has helped to identify key opportunities for the Council to grasp. Many of these are direct actions addressing the delivery of routine services, but it is also clear that the Council has a wider leadership role that could help to stimulate change in the city and region. The strategic vision is therefore to position the Council as a "catalyst for change", proactively addressing city wide Air Quality challenges. The areas of particular focus are on:

- Facilitating and speeding up a pathway to zero emission transport;
- Using our procurement power to instigate change and provide broader market confidence;
- Engaging with and supporting local innovation; and
- working with partners to secure the best Circular Economies for the City and for Wales

4.11.1 On Street Residential Charging Points

The Council has been successful in obtaining a bid from the Office of Low Emission Vehicles (OLEV) 36 charge points in 21 locations across the city and accessible to the public by 31st March 2019. The Council will aim to submit a further bid in 2019/20 to further increase the network of residential charging points.

In addition to the above the Council will also be launching a rapid charge pilot with a commercial provider to assess the viability of undertaking a wider implementation project.

4.11.2 Electric Charging Points at Council Facilities

The Council has made progress in terms of increasing electric charging infrastructure at four main employment hubs. It has been agreed that in 2019/20 for 8 electric vehicle chargers each at County Hall, Lamby Way, Wilcox House and Coleridge Road (i.e., total of 32 chargers).

In conjunction with this the proposals are in place for the Council to fund the hire lease costs of 56 new EVs in 2019/20 (replacing existing petrol/diesel vehicles) and 37 vehicles in 2020/21.

4.12 Freight and Commercial Transportation

The M4 in Cardiff and South East Wales is a strategic motorway network in the UK and is a hub for major logistics and distribution companies. Consequently, the number of HGVs/LGVs on the road network contributes to overall air pollution. Source apportionment results detailed in Figure 5 indicates that HGV/ LGV movements are the second most contributing source to monitored NO_2 levels.

Recent years have seen an increase in the number of light goods vehicles (LGVs), which may be attributed to an increase in internet sales, home deliveries and growth in the independent service sector and trades.

The commercial sector can be difficult to influence, but they understand the need to reduce their carbon footprint, improve their "green" credentials and be socially responsible for the impact they have on the environment.

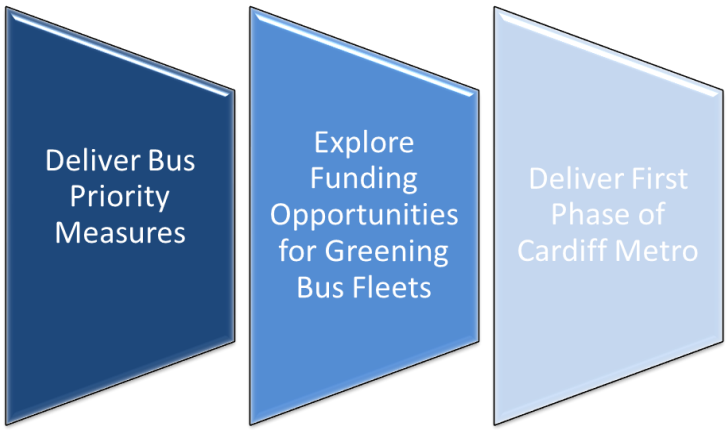
The need to support and improve freight is highlighted in Cardiff's LDP and LTP. Policy KP8 Sustainable Transport emphasises the support of freight movement by rail or water and the need to manage freight movements by road and minimise their impacts. The plans accentuate CC's commitment to pursue opportunities to implement infrastructure improvements for other transport modes including facilities for freight.

Through this strategy Cardiff Council will consider the establishment of a Freight Quality Partnership (FQP). By means of such partnerships industry and local government can work together to develop more efficient, safer and cleaner means of local goods distribution. CC will look to adopt the available free advice from the Freight Best Practise programme, funded by DfT, covering topics such as saving fuel, developing skills, equipment and systems, operational efficiency and performance management.

There are three main objectives associated with a FQP;

- **Environmental:** to protect and enhance the built and natural environment, e.g. by improving air quality, contributing to Greenhouse Gas reduction targets and reducing noise pollution.
- **Economic:** to support sustainable growth and regeneration in appropriate locations, e.g. by increasing competitiveness of local businesses, improving supply chain efficiency, reducing congestion, and investing in supply chain infrastructure.
- **Societal**: to protect communities and support the needs and aspirations of citizens e.g. by reducing disturbance from vehicles, improving safety and enabling efficient access to goods and services.

Chapter 5 Public Transport



Public transport has a key role to play in improving air quality by helping to reduce the number of car trips made to and within the city. Use of public transport is also known to increase physical activity levels, helping to keep our population healthy.

Public transport has a key role to play in improving air quality by helping to reduce the number of car trips made to and within the city.

5.1 Buses

Bus travel has an important role to play in reducing the number of journeys made by car. We are working to make bus travel an attractive and practical option for more people by providing infrastructure to help bus services beat the traffic queues and improve their reliability and frequency.

Bus lanes have been installed on a number of main roads into the city including the A470, A4119 and A48. Cardiff has 13.94km of bus lanes. 400m of bus lane can give each bus a time advantage of 5 minutes or more over general traffic on the approach to junctions and improve the ability of bus drivers to meet timetables (Cardiff 2014 Regional Bus Lane surveys).

However, it is also important that the buses used in Cardiff are as clean and low emission as possible. We will continue to work with Cardiff Bus and other local/ regional operators to identify measures to provide low emission bus fleets operating in Cardiff.

Our priorities for bus travel in Cardiff include:

- Developing a new bus interchange as part of the major redevelopment of Central Square;
- Working with bus operators to identify and develop an expanded city bus network, including new cross-city and local routes;
- Work with operators to increase the number of buses where bicycles can be taken on board, to encourage mixed active travel to be used as part of longer journeys;

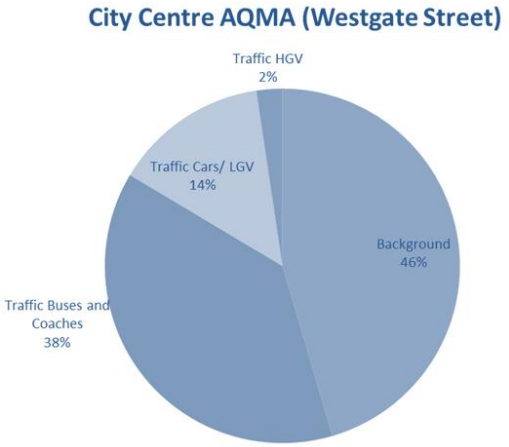
- Developing new bus park and ride facilities at M4 Junction 33 and other appropriate locations in Cardiff and neighbouring areas to reduce the number of cars driving into the city;

- Making bus services faster and more reliable by providing bus priority measures on strategic bus corridors to help reduce bus journey times, improve journey time reliability and make bus travel a more attractive alternative to the car for a greater range of journeys; and

- Investigating opportunities for the development of a green technologies bus fleet.

5.1.1 Cleaning the Bus Fleet

Figure 9- NO_2 Source Apportionment (Westgate Street)



Data provided by Cardiff Bus indicates 140 Cardiff Bus movements per hour along Westgate Street, whereby only 26% of these movements are made by Euro 6 category vehicles.

The conversion of Cardiff bus vehicles to Euro 6 equivalent will have an immediate positive impact on air quality levels, particularly in the City Centre AQMA. Real world testing of Euro 6 diesel buses demonstrates a 95% reduction in NOx emissions compared with Euro 5.

Table 5 summarises the current Cardiff Bus fleet and associated Euro Emission Standard classification. Table 6 summarises the hourly Cardiff Bus service fleet movements along Westgate Street and Euro Emission Standard Classification

Table 5 Euro Standards of Cardiff Bus

Cardiff Bus- Fleet Euro Standard (30th June 2018)		
Euro Standard	Number	%
Euro 3	95	42
Euro 4	44	19
Euro 5	50	22
Euro 6	40	17

Table 6 Cardiff Bus Fleet Hourly Breakdown on Westgate Street

Cardiff Bus- Fleet Euro Standard (Westgate Street 25.10.17)		
Euro Standard	Number	%
Euro 3	72	51
Euro 4	17	12
Euro 5	15	11
Euro 6	36	26

Cardiff Bus representatives have determined that 41% (94 vehicles) of the Cardiff Bus fleet would qualify for a Euro 6 retrofit programme.

In addition to the suggested retrofit programme, in 2018 SRS along with Cardiff Council's Transport team collaborated with Cardiff Bus to devise a bid application for the Ultra-Low Emission Bus (ULEB) fund made available by the Office for Low Emission Vehicles (OLEV). In February 2019 the bid application was deemed successful.

The proposal draws links between the air quality management areas (AQMAs) identified under the LAQM regime, as well as the issued direction from Welsh Ministers which targets Cardiff on the regional scale highlighting non-conformities in association with European Directives. Therefore linking the two together; due to the heightened profile of air quality and its potential adverse impact on public health, given Cardiff's Local Air Quality Management scenario, as well as its regional air quality concerns it is imperative that short term measures, such as increasing the uptake of low emission buses are implemented as soon as possible to start the process of achieving compliance with the air quality objectives.

The bid application has secured contributable funding for a total of 36 full electric buses that would be introduced to the Cardiff Bus fleet over a three year cycle. The vehicles will be introduced to three specific routes (27, 44/45 & 49/50). These routes will lead to a positive impact on air quality levels, especially within the City Centre AQMA. The introduction of the electric buses would form part of a cascade programme whereby Euro 3 standard buses would be offset from the fleet completely, therefore improving the overall fleet composition.

Tables below highlight the Cardiff Bus Fleet matrix in 2021 with the implementation of the full electric vehicles. The datasets show that the percentage of Euro III buses would reduce from 41% to 26%.

Table 7 Cardiff Bus fleet with ULEB funding (2021)

Cardiff Bus- Fleet Euro Standard (2021)		
Euro Standard	Number	%
Euro 3	59	26
Euro 4	44	19
Euro 5	50	22
Euro 6	40	17
Full Electric	36	16

It is important to highlight that the Council will continue to work with Cardiff Bus and other regional bus operators to continue making improvements in the composition of the bus fleets operating on the Cardiff road network. Ideally such work will focus on shifting to even greener bus types, such as hybrids, full electric and even hydrogen, rather than retro fitting older buses. Securing a greener bus fleet will be a key action in the strategic measure to **Increase the Uptake of Sustainable and Active Travel.**

5.2 Cardiff Capital Regional Metro

The Cardiff Capital Region Metro proposed by Welsh Government is likely to comprise a combination of rail-based and bus-based rapid transit routes linked through interchanges and using the same network brand and integrated ticketing system.

We will continue to work closely with Welsh Government and other partners to support delivery of the Valley Lines Electrification programme and the design of future extensions to the Metro network through new rail and bus-based routes and improved interchange facilities.

A final decision on the Metro is expected from Welsh Government by mid-March 2018.

5.3 Bus Travel to Schools

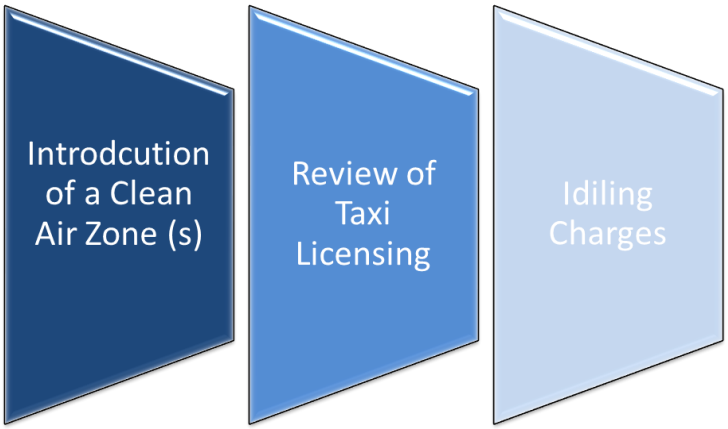
Where Cardiff Council provides buses for school transport, vehicle age and emission ratings are considered as part of a quality assessment through the procurement process. Cardiff Council will continue to ensure that school buses are of the highest possible standard and that evolving requirements in relation to quality are taken into consideration.

5.4 Trains

6% of journeys to work by Cardiff residents are made by rail and passenger numbers across the city and the wider region have grown significantly in recent years. Cardiff Council works closely with key partners, including Welsh Government, rail operators and Network Rail, towards improving and developing the rail network. The new Wales and Borders rail franchise offers the prospect of new rolling stock, increased capacity and frequencies to the meet the ever increasing demand for rail services and allow for further modal shift to rail based journeys.

Cardiff Council will work with operators to increase the number of trains where bicycles can be taken on board, to encourage mixed active travel to be used as part of longer journeys.

Chapter 6 Additional Regulatory Measures



In addition to the above measures, there are also regulatory measures that could be considered by the Council in order to assist in improving air quality and these are discussed further in this Chapter.

6.1 Clean Air Zones

Defra have defined a CAZ as an area where targeted action is taken to improve air quality and resources are prioritised and coordinated in order to shape the urban environment in a way that delivers improved health benefits and supports economic growth. Evidence shows that Clean Air Zones can deliver substantial benefits across large populations (NICE2017).

Defra have developed a framework for the implementation and requirements of CAZs and actions to improve air quality are set out against three main themes, namely

1. supporting local growth and ambition (decoupling growth and pollution);
2. accelerating the transition to a low emission economy; and
3. immediate action to improve air quality and health.

The framework details two types of CAZ that can be implemented.

- **Non-charging Clean Air Zones** – These are defined geographic areas used as a focus for action to improve air quality. This action can take a range of forms but does not include the use of charge based access restrictions. The framework sets out minimum requirements that CAZ are expected to achieve.

- **Charging Clean Air Zones** – These are zones where, in addition to any measures identified as part of a non-charging zone, vehicle owners are required to pay a charge to enter if they are driving a vehicle that does not meet the particular standard for their vehicle in that zone.

  At the time of drafting our strategy there is no Clean Air Zone Framework in place for Wales. As part of the UK National Plan to Tackle NO2, Welsh Government has committed to consulting on their proposed framework for how Clean Air Zones could be implemented in Wales.

  It is expected that a framework for Wales will be similar to that of Defra's framework, in particular with regards to the different Classes of CAZ that can be implemented, which are based on the Vehicle Type that is charged for entering the zone.

Clean Air Zone (CAZ) Classes as Defined by DEFRA

Class A CAZ – Buses, Coaches, Taxis and Private Hire Vehicles		
Vehicle Type	Euro category	Euro Standard
Bus	M3 (GVW over 5000kg and more than 8 seats in addition to the driver	Euro VI
Coach	M2 (GVW not exceeding 5000 kg, ref mas exceeding 2610kg and more than 8 seats in addition to the driver`	Euro VI
Taxi and Private Hire	Minibus M2 (GVW not exceeding 5000 kg, ref mas exceeding 2840 kg and more than 8 seats in addition to the driver) Passenger Vehicle with up to 8 seats in addition to the driver)	Euro 6 (diesel) Euro 4 (petrol)
Ultra low emission vehicles with significant zero emission range will never be charged for entering or moving through a CAZ		

Class B CAZ – Buses, Coaches, Taxis and Private Hire Vehicles , HGVs		
Vehicle Type	Euro category	Euro Standard
Bus	M3 (GVW over 5000kg and more than 8 seats in addition to the driver	Euro VI
Coach	M2 (GVW not exceeding 5000 kg, ref mas exceeding 2610kg and more than 8 seats in addition to the driver`	Euro VI
HGVs	N2 (GVW over 3500 kg and ref. mass over 2610 kg) N3 (GVW over 5000kg)	Euro VI
Taxi and Private Hire	Minibus M2 (GVW not exceeding 5000 kg, ref mas exceeding 2840 kg and more than 8 seats in addition to the driver) Passenger Vehicle with up to 8 seats in addition to the driver)	Euro 6 (diesel) Euro 4 (petrol)
Ultra low emission vehicles with significant zero emission range will never be charged for entering or moving through a CAZ		

Class C CAZ – Buses, Coaches, Taxis and Private Hire Vehicles , HGVs and LGVs		
Vehicle Type	Euro category	Euro Standard
Bus	M3 (GVW over 5000kg and more than 8 seats in addition to the driver	Euro VI
Coach	M2 (GVW not exceeding 5000 kg, ref mas exceeding 2610kg and more than 8 seats in addition to the driver`	Euro VI
HGVs	N2 (GVW over 3500 kg and ref. mass over 2610 kg) N3 (GVW over 5000kg)	Euro VI
Large Vans	N1 (GVW not exceeding 3500 kg and ref. mass over 1305 kg but not exceeding 2840 kg) N2 (GVW over 3500 kg and ref. mass not exceeding 2840 kg)	Euro 6 (diesel) Euro 4 (petrol)
Small Vans/ light commercial	N1 (GVW not exceeding 3500 kg and ref. mass not exceeding 1305 kg)	Euro 6 (diesel) Euro 4 (petrol)
Taxi and Private Hire	Minibus M2 (GVW not exceeding 5000 kg, ref mas exceeding 2840 kg and more than 8 seats in addition to the driver) Passenger Vehicle with up to 8 seats in addition to the driver)	Euro 6 (diesel) Euro 4 (petrol)
Ultra low emission vehicles with significant zero emission range will never be charged for entering or moving through a CAZ		

The Defra framework indicates that if a local authority decided to voluntarily implement a Clean Air Zone that extended to private cars (Class D), it should be done on a consistent basis in line with the framework. This means only cars which as a minimum meet Euro 6 standard (if diesel) or Euro 4 standard (if petrol) should be allowed free entry. Motorcycle and mopeds which meet Euro 3 should be allowed free entry, if the local authority decided such vehicles should be in scope. Consideration should be given to exemptions or discounts for residents.

Welsh Government has detailed that it will be developing a separate Framework for Clean Air Zones in Wales, and Cardiff Council will look to work with Welsh Government to help develop and shape this framework. In line with the existing Defra guidance, Cardiff Council will undertake initial feasibility studies on the viability of introducing such a zone in Cardiff, and more details of this is presented in Section 3 of this Strategy.

6.2 Urban Green Infrastructure

Urban Green infrastructure (GI), when designed and implemented correctly can lead to improved air quality on a local scale. GI has the ability to control pollution dispersion and deposition, and therefore is a useful tool to be used in urban environments to mitigate poor air quality. As well as improved air quality conditions, urban green infrastructure also provides benefits such as less heat stress, management of storm waters and a reduction in energy consumption and noise pollution.

Forms of GI include trees, hedges and bushes, green walls and green roofs.

-Trees and other GI influence wind flow. The combination of buildings, trees and gardens creates a rough surface area due to the variation in height, creating turbulence that increases mixing and pollutant dispersion (Figure 11).

- Dependant on the location of a pollution source i.e. Vehicle, trees located in narrow, enclosed streets "Street Canyons" can have both positive and negative impacts on air quality. When a pollution source is located within the street canyon, a tree's canopy leads to reduced mixing and therefore fumigation. When a pollution source is located outside a street canyon a tree's canopy acts as a barrier aiding improved air quality concentrations (**Error! Reference s ource not found.**).

-Hedges can be used as a barrier to increase the pathway between a pollution source and sensitive receptor (person), which increases mixing and reduces the pollutant concentration (**Error! Reference source not found.**).

Figure 10

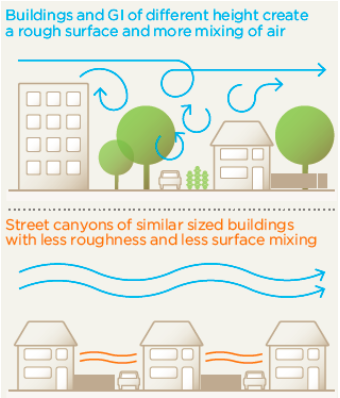


Figure 11

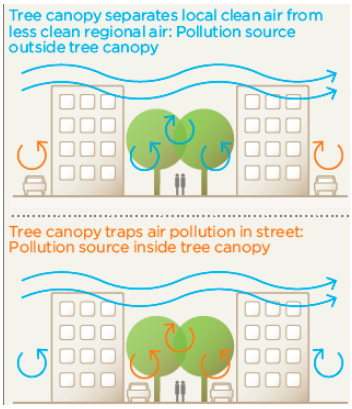
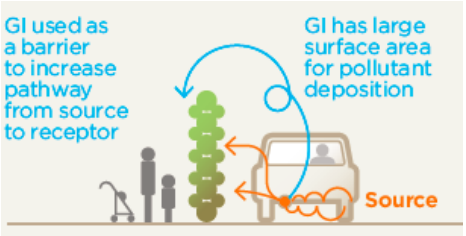


Figure 12



In January 2018, CC collaborated between different departments and produced a successful application bid to utilise funding made available by Welsh Government, known as Green Infrastructure Grant Funding Scheme. The requested funding is being used to enable a project that focusses on the benefits of trees and planting to the city, with a specific emphasis on methods of addressing air quality issues.

In addition to the funding received via the Green Infrastructure Grant Funding Scheme, Cardiff Council has also successfully acquired funding via the Landfill Communities Fund. The funding is being utilised to support a Green Walls project for Tredegarville CIW Primary School.

Tredegarville CIW Primary School is located in a very urban high rise setting in Cardiff city centre and as a result, the school provides its pupils with very little access to green space. However,

the school is enthusiastic about improving this situation through developing the green environment at its site.

There are particular concerns regarding air quality in the vicinity of the school, arising both from traffic and construction. Given that green walls (also referred to as 'green screens') have been used to improve air quality in cities such as London and Birmingham, a proposal is being put together for green walls to be installed in Cardiff. Such a project could bring together the joint ambitions around green spaces/biodiversity and air quality through making use of a passive/nature based solution.

6.3 Taxi Licensing

6.3.1 Background

Hackney carriage and private hire services are a vital aspect of the transport network in Cardiff. They are essential for many passengers with disabilities and play an important social role in enhancing the public transport system. However, they are also a source of road traffic derived emissions causing air pollution, especially in the City Centre.

The Licensing Authority of Cardiff Council regulates hackney carriage and private hire drivers, vehicles and operators and set the conditions that licence holders must adhere to. There are currently **2,261** hackney carriage/private hire drivers, **902** hackney carriages and **1,150** private hire vehicles.

Since 2009 there has been a cap in place on the issuing of new hackney carriage licenses. The primary difference between the types of vehicle is that hackney carriages are able to use taxi ranks and can be hailed from the roadside, whereas private hire vehicles can only be booked through a licensed operator.

Vehicles must be tested by a Cardiff MOT station either annually or bi-annually, depending on their age. This consists of an MOT test plus an additional compliance test that inspects items such as the taxi roof light that would not otherwise be tested as part of an MOT test. Furthermore, Licensing Officers also investigate complaints regarding the standard of vehicles and routinely carry out spot checks. If required they have powers to suspend a licence until they are satisfied with the vehicle's condition.

Currently there is no minimum emissions standard that vehicles have to adhere to and, thus vehicles may be licensed up to 10 years old; however, the age restrictions may be waived if the vehicle complies with the authorities' 'exceptional condition' policy that was introduced in 2016. This requires the vehicle to be inspected annually by a Licensing Officer to ensure if meets the required standard.

6.3.2 Cross Border Issues

Cross-border hiring is an issue facing the hackney carriage/private hire trade. This is where vehicles licensed by one authority carry out private hire work in another authority area. Although there are over 340 licensing areas across England and Wales, Licensing Officers have no cross-border enforcement powers. This means that although Cardiff can impose conditions on the vehicles which are licensed in Cardiff, enforcement officers have no powers over the vehicles licensed by other authorities which may be working in Cardiff.

This has created a situation whereby applicants may choose to licence in an area that has less stringent conditions, but operate predominantly in Cardiff. To help combat this, some Welsh licensing authorities have introduced 'intended use' policies that hackney carriage licenses to show a bone fide intention to trade predominantly in the area where they are licensed. However, this only applies to hackney carriages and unless all authorities in England and Wales adopt an intended use policy, applicants can still choose an authority without one.

Despite the growth and evolution of the industry, the main legal framework governing taxi services has not undergone any significant reform for nearly 200 years.

6.3.3 Welsh Government Taxi and Private Hire Vehicle Licensing In Wales Consultation 2017

In 2014, the Law Commission for England and Wales published its proposals for the reform of the legislative framework governing the licensing of taxis and private hire vehicles in England and Wales. Following commencement of relevant provisions of the Wales Act 2017, licensing of taxis and private hire vehicles will be a matter within the legislative competence of the National Assembly for Wales.

Welsh Government considered the proposals for the framework for licensing taxis and private hire vehicles put forward by the Law Commission, for the purpose of bringing new arrangements into effect in relation to Wales, and recently completed a consultation on these proposals.

One proposal detailed in the consultation would be the introduction of **national standards** for all taxis and private hire vehicles, set by the Welsh Ministers, with the power for local licensing authorities to set additional standards where it is appropriate to do so.

This may have benefits for improving air quality in Cardiff, as **if** these standards take into consideration of vehicles having minimum emission standards for taxis or prioritising/ incentivising electric/ zero emission vehicles, then the drivers may be encouraged to upgrade their vehicles which could see a reduction in the number of older more polluting vehicles on the roads. As a licensing authority these are measures that Cardiff could self-implement as part of additional standards. This strategy will recommend that such measures are considered by the Licensing Committee, depending on the outcome of the Welsh Government consultation. The Welsh Government is expected to publish a draft bill in 2018.

In their response to the consultation, the Shared Regulatory Service highlighted the issue of vehicles idling within the city centre and suggested a possible solution of additional 'holding areas' on the fringes of town centres for vehicles to wait until they are booked electronically. These areas could be tailored specifically for taxis, including charging points for the eventual move to electric vehicles and could be the catalyst for taxis to embrace electric vehicles.

6.3.4 Proposals

On the 5th March 2019 the Public Protection Committee agreed for Shared Regulatory Services to consult on the proposals to amend the Council's taxi licensing policy which would see the introduction of new emissions and age requirements for the granting of new licenses and/ or

change of vehicle applications on new existing licenses. **The proposals**[28] **would require that any vehicle included on the application for a new grant is a minimum Euro 6 emission standard (petrol and diesel) as part of the license application. The same emission standard would also apply for any change of vehicle on an existing license.**

Following the detailed consultation on this proposal the Public Protection Committee will be asked to approve the revisions of the Councils licensing policy, with an implementation date to be agreed. Whilst there is no direct cost the Council for implementing the revised license conditions, it could be argued that Council's new taxi strategy to set age and emissions criteria for licensing for private hire and hackney carriages could place a financial burden on drivers and operators licensed within Cardiff. This burden is not faced by taxis licensed outside of Cardiff and they are free to compete for trade alongside Cardiff licensed taxis. This potential could see Cardiff taxis placed at a financial disadvantage.

In order to redress the balance, the Council will assess measures in detail that will assist taxi operators with making the switch to newer, more efficient vehicles. The economic assessment will include for the provision of mitigating measures for the taxi trade, in terms of a grant scheme to assist with purchase of OEV/LEVs.

It is proposed that Cardiff Council develop a similar grant scheme to those outlined by other Councils. Funding for the scheme would be facilitated via the acquired funding allocated in support of WG's legal direction and required feasibility study.

Cardiff Council would ensure that the grant scheme remains in place until such a time as all vehicles, are upgraded. Further it is possible that the licensing policy could be revised further in the future as the report being taken to the Public Protection Committee states the following:

- A consultation on whether to require all hackney carriage and private hire vehicles licensed for the first time to be ULEV from January 2021;
- A consultation on whether to require all existing hackney carriage and private hire vehicles to be ULEV from January 2025.

Therefore a longer term grant scheme may need to be considered should the Council implement further policy revisions. Further the Welsh Government's current consultation on Improving Public Transport[29] states that Welsh Government proposes that a 'national standard should apply which specifies requirements for the vehicular emissions of taxis and PHVs' and thus Welsh Government may need to consider a wider national scheme to support any such policy.

6.4 Vehicle Idling Charges

An idling engine can produce up to twice as many exhaust emissions as an engine in motion. This can affect the air quality of the surrounding environment and the air we breathe.

[28] Public Protection Committee 5th March 2019 Item 5 Update To The Age, Emission And Testing Requirements Of Hackney Carriage And Private Hire Vehicles

[29] https://beta.gov.wales/sites/default/files/consultations/2018-12/improving-public-transport_0.pdf

Under the Road Traffic (Vehicle Emissions) (Fixed Penalty) (Wales) Regulations 2003 Cardiff Council has the power to implement 'no vehicle idling' areas, particularly where groups congregate (such as outside schools, hospitals and care homes, and in areas where exposure to road-traffic related air pollution is high, i.e., in AQMAs.

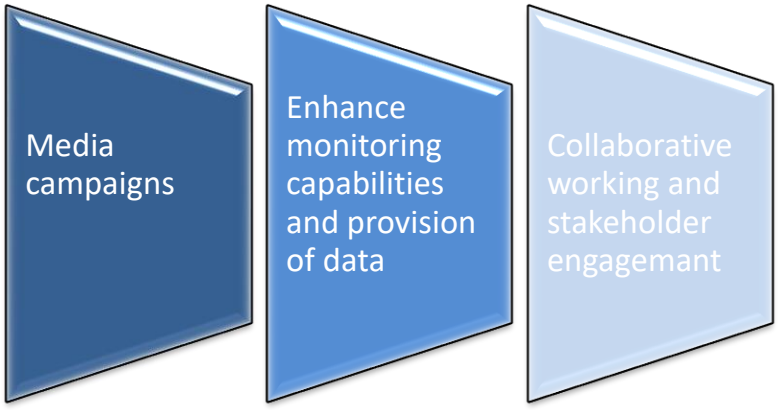
The Council will therefore assess the feasibility and likely benefits of introducing No Vehicles Idling Areas.

6.5 Review of Car Parking Charges and Residential Permitting Charges

The Council has powers to review the amount it charges residents for on road parking permits. An assessment should be made of the potential impact of introducing a sliding scale of permit charges based on the emission standards of vehicles, which would see a significant reduction in permit costs for EV/0LEVs, in order to encourage and expedite the update take of such vehicles. Such measures have already been implemented in a number of Local Authorities in England.

Similar measures will also be considered at Council Car Parks and on Street Parking locations, whereby the most polluting vehicles would be charged a premium parking rate.

Chapter 7 Influence and Deliver Transport Behavioural Change



Behavioural change is one of the most important elements the Council will need to take a lead on to help achieve the needed increase in active and sustainable transport to deliver the 50:50 modal split target set out in the LDP. A major aspect of this will be delivering an effective communications strategy focused on promoting actions that all stakeholders including the council, businesses and the general public can take to instigate this behavioural change.

7.1 Communications

The communication strategy will need to focus on promoting and marketing the wider health and environmental benefits of tackling air quality. It is essential that the key messages clearly show how:

- air pollution has a direct impact on the lives of residents and visitors to Cardiff;
- individual actions can affect air quality; and
- making personal changes will benefit an individual's health and wellbeing, as well as helping make Cardiff a more attractive and sustainable place in which to live and work.

To support this, we will produce a local public awareness campaign, with input from the Welsh Government and Public Health Wales with a focus on:

- providing technical scientific evidence on the Council's website and the Welsh Air Quality Forum websites;
- promoting air quality and engaging with government and business audiences through seminars, social media and conferences;
- communicating with the public about how to reduce the impacts of air pollution by travelling using alternatives to the private car, particularly on days when air quality is poor. This will include using variable message signs and other forms of advertising on our road network as well as other media, including social media;
- working with Welsh Government and other partners to integrate information about air quality into educational resources for to young people;
- improving the air quality information that the Council can provide by increasing our ability to undertaken real-time air quality monitoring.

7.1.1 Car-Free Day

Car- Free Day is considered an excellent opportunity to endorse air quality awareness. Specifically CC has shared great success promoting Car-Free Day events. In May 2018, CC organised a car-free day event in the city's central area. The event coordinated with the HSBC UK Let's Ride event and on street entertainment.

Footfall in the city centre was up by 28% compared with the same day last year, with 125,173 people recorded in the city centre on Sunday compared with 90,005 people on Sunday May 14th, 2017. Organisers of the event have said that 5,000 people took part in the HSBC UK Let's Ride event, with a further 5,000 people taking part in the entertainment.

As well as providing a carnival atmosphere for the public to enjoy, the idea of Car Free Day was also to monitor air quality and traffic flow in the city centre.

With the increase in footfall in the city centre, the Council was also keen to monitor traffic flows on specific roads that were still open on the periphery of the city centre closure. The results showed a 25% reduction on Newport Road; a 16% reduction on Central Link; a 22% reduction on Cathedral Road; an 11% reduction on Bute Street; an 8% reduction on Clare Road; a 30% reduction on Moira Terrace; an 8% reduction on Fitzalan Place and a 45% reduction on North Road.

City Centre Footfall- City Centre footfall cameras recorded a 28% increase in pedestrian footfall versus the previous year (cameras are located on Queen St, High St, St Mary Street and The Hayes)

Bus Use- Cardiff Bus reported that they had more passengers than they would on a normal 'event day'. Stagecoach recorded a +5% increase in passengers versus a normal Sunday (these figures suggest that most people walled or cycled).

The summary of air quality monitoring;

Shared Regulatory Services (SRS) on behalf of Cardiff Council undertook a study to examine levels of air quality within Cardiff's City Centre in order to quantify the impact that the car-free day event on Sunday 13th May 2018 would have on the main traffic derived pollutant of concern nitrogen dioxide (NO_2). It was anticipated that levels of NO2 would reduce due to the restriction of vehicles and thus the study was undertaken in order to demonstrate and quantify this likely reduction.

Air Monitors Ltd supplied SRS with three near real-time indicative air quality monitors (AQ Mesh Pods). AQ Mesh pods measure gases, in this case nitric oxide, nitrogen dioxide and ozone using electrochemical sensors powered by Lithium batteries. The data from the pod is pushed to a cloud server where it is corrected for temperature, pressure and relative humidity as well as cross gas interference. To verify the performance of the gas sensors the units ran alongside a reference station and local scaling factors were derived and used to characterise the sensors. This then enables direct comparison of the data between the pods and the reference station.

In order to give a detailed understanding for the impact to air quality, levels were recorded before and after car- free day to enable a comprehensive comparison between normal baseline conditions and car-free day. The monitors were cited at their specified locations on Friday 4th May 2018 and decommissioned on Thursday 24th May 2018.

The monitors were located at locations situated on specific network routes influenced by the day's event;

- Westgate Street
- Castle Street/ Duke Street
- Stephenson Court, Newport Road

When comparing Sunday 20th May to Car-Free Day event 13th May, the daily average reduction for NO_2 was as follows;

Duke Street/ Castle Street- 86.52%

Stephenson Court on Newport Road- 35.80%

Westgate Street- 84.20%

7.2 Collaboration with other Stakeholders

Recent policy guidance from Welsh Government on local air quality management stressed that the need to work actively with internal and external partners to reduce air quality (ref http://gov.wales/docs/desh/publications/170614-policy-guidance-en.pdf). Stakeholders can include both the private and public sector and the council will need to work with them to support the aim of this Strategy and help share and adopt best practice within their organisations. The Council will need to work closely with others with an interest in air pollution to ensure a joined up approach using their environment, health and transport expertise. For example, encouraging physical activity to improve health and work to improvement to the natural environment will complement active travel initiatives and can help reduce traffic congestion, pollution and noise.

It is important to see improving air quality as a corporate responsibility for both the private and public sector. Organisations such as the Council, NHS, NRW, Public Health Wales etc can play an important role in improving air quality through both how they operate and through influencing their employees' behaviour. Improving air quality should, therefore, be considered an important part of corporate responsibility and sustainability.

7.2.1 Proposals

Working initially through Cardiff Public Services Board, a Healthy Travel Charter for Cardiff has been developed with major public sector employers which will be launched in April 2019. Signatories to the Charter make 14 commitments on improving access to active and sustainable travel for staff and visitors to their main sites, and jointly commit to three targets namely:

- Reduce the proportion of commuting journeys made by car;
- Increase the proportion of staff cycling weekly; and
- Increase the proportion of vehicles used for business purposes which are plug-in hybrid or electric.

The Charter will be signed by 11 public sector organisations at launch, employing over 33,000 staff, with additional public and private sector organisations subsequently invited to sign up to the Charter.

Chapter 8 Assessment of Actions to Deliver Strategic Measures

8.1 Summary of Actions

The previous Sections outlined strategic measures that the Council are currently working towards in order to improve air quality in Cardiff.

Table 9 summarises current and envisaged individual actions that will enable the strategic measures to be implemented and provides a qualitative assessment of the actions in terms of their potential impact on air quality, cost and time scales for implementation. The qualitative appraisal identifies whether the actions are likely to have a direct impact on the existing AQMAs in Cardiff.

8.2 Delivering Legal Compliance

Whilst the overall aim of this strategy is to deliver improvements in Air Quality across Cardiff to protect and improve public health, another significant driving factor is to deliver compliance with the EU Ambient Air Quality Directive (2008/50/EC), in the shortest time possible, as ruled by the UK High Court in 2016.

As previously discussed CC has been identified by Defra for having road links with exceeding annual average levels of NO_2.

The detailed UK plan for tackling roadside nitrogen dioxide concentrations provides some guidance on local measures and specifically states in reference to Cardiff; "***Where alternative local measures are suggested, to be effective they must be capable of achieving compliance within the same amount of time, or sooner, than a Clean Air Zone with access restrictions."***

Under Part IV of the Environment Act 1995, Section 85(7), WG has issued formal direction to Cardiff Council to address its air quality concerns outlined by the projections modelled and illustrated within the UK detailed plan. The direction has been governed by Welsh Ministers who have determined that the direction is necessary to meet obligations placed upon the United Kingdom under the EU Ambient Air Quality Directive (2008/50/EC). The direction outlines specified activities that are required to be completed by specified deadlines.

- **Initial Scoping Proposals (Deadline 31st March 2018)-** Setting out the proposed approach to the feasibility study and including scope of work, governance, resourcing, procurement approach, indicative costs and timings.
- **Initial Plan (Deadline 30th September 2018)-** Setting out the case for change and identifying, exploring, analysing and developing options for measures which the local authority will implement to deliver compliance in the **shortest time possible,** with indicative costs for those options.
- **Final Plan (Deadline 30th June 2019)-** Identifying in detail the preferred option for delivering compliance in the shortest possible time, and including a full business case setting out value for money considerations and implementation arrangements and timings.

As part of the UK detailed plan, those identified local authorities are required to undertake a feasibility study in accordance with the HM Treasury's Green Book approach, to identify the

option which will deliver compliance with legal limits for nitrogen dioxide in the area for which the authority is responsible, **in the shortest possible time.**

The feasibility study will look to examine the likelihood of the council's proposed measures achieving compliance with the EU & UK Ambient Air Quality Directive Limit Values for NO_2, and if so, when a date of compliance is envisaged. The expected date of compliance for these proposed measures must be cross referenced to benchmarked compliance date expected for the introduction of a charging Clean Air Zone (CAZ). If compliance is not likely to be expected prior to the anticipated CAZ benchmarked compliance date, a CAZ will be the agreed option.

If compliance is not likely to be expected prior to the anticipated CAZ benchmarked compliance date, a CAZ will be the preferred option. Subsequent modelling will be then be required to assess a number of CAZ options together with proposed measures.

The feasibility study will rely heavily on detailed modelling to project transport trends, associated emissions and subsequent concentrations of NO_2. A specific working group will be assigned formed of council officers, public service health bodies and external consultants. In line with WG's direction, this working group will deliver a Full Business Case for the preferred "FINAL" option scenario.

As discussed previously it is CC's objective to ensure levels are as low as reasonably practicable in the shortest time possible. The production of this CAS & Action Plan provides the basis for the referenced feasibility study in the form of a long list of measures. The document also satisfies CC's LAQM duties by delivering an action plan to improve air quality within its four designated AQMAs. Due to Cardiff's interlinking and converging transport system by addressing the air quality concerns highlighted along the road links outlined by WG it is evident that the air quality concentrations associated with the AQMAs will also be impacted.

As such the measures/actions detailed in Table 7 need to be shortlisted to a number of preferred options which need to be informed by local evidence and understanding. These options will be taken forward for detailed assessment and Cardiff Council will be required to assess these measures and provide robust evidence on the impact of the measures. This will be informed by local traffic and air quality modelling, as this will provide a more detailed assessment of the specific local situation than the national air quality model that currently shows Cardiff to be non-compliant beyond 2020.

8.3 Assessment of Measures

In line with the prescribed Local Air Quality Management Technical Guidance (LAQM TG16), in order to appraise the package of current and proposed mitigation measures for the City of Cardiff, measures which provide the most significant impact on emissions and rank high on a cost benefit analysis should be short listed and subject to further quantifiable analysis.

However, in view of the requirement to demonstrate compliance with the EU Ambient Air Quality Directive, in the shortest time possible, it is felt that the full measures cannot be ranked based on the appraisal format in LAQM TG16. At this stage it is not confirmed what funding resource will be available for the majority of measurements and therefore there is some uncertainty in being able to assess likely implementation dates. What can be confirmed

at this stage is that the cited measures will each achieve different levels of air quality impact within different timescales and financial budgets.

With regards to assessing each measure for impact on emissions, as detailed in LAQM TG16 the following guidelines were adopted to quantify the level of impact;

- **Low effect** – action focused on a small proportion of sources contributing to an exceedance;
- **Medium effect** – action focused on only one key emissions source;
- **High effect –** action focused on dealing with key high emitting sources, or a number of emissions sources.

Table 8- Qualitative Assessment Tool for Assessing Actions

Cost		Air Quality Impact		Timescale	
£	**<£100k**	✓	Low	S	6- 12 months
££	**£100k- £500k**	✓✓	Medium	M	1- 2 years
£££	**£500k- £1 million**	✓✓✓	High	L	>2 years
££££	**>£1 million**	-	Negligible	-	

Table 9- Qualitative Assessment of Actions to Deliver Strategic Measures								
Strategic Measure	Action	Additional Information	Air Quality Impact	AQMA/ JAQU Identified Areas	Cost	Non- Air Quality Impacts	Implementation Timescale	Funding
Enhance Local Planning Policy	Implementation and consideration of existing Local Development Plan (LDP) policies (KP18 & EN13) during any planning application process.	-		All	-	Section 106 agreements can be used to secure funds for air quality improvement schemes where mitigation is required. Local planning policies to encourage active travel as an alternative mode will contribute to health benefits.	In place	Existing Budgets
Enhance Local Planning Policy	Planning for Health and Well-being SPG	The SPG is supplementary to Policies KP14 and C6 of the adopted LDP.		All	-	-	In Place	Existing Budgets

Table 9- Qualitative Assessment of Actions to Deliver Strategic Measures								
Strategic Measure	Action	Additional Information	Air Quality Impact	AQMA/ JAQU Identified Areas	Cost	Non- Air Quality Impacts	Implementation Timescale	Funding
Enhance Local Planning Policy	Develop Supplementary Planning Guidance (SPG) to provide a specific guidance for air quality in accordance with new developments.	SPG will look at criteria needed to proceed to an AQA/mitigation measures that need to be implemented to ensure any adverse impact is resolved/ additional infrastructure needed to support the uptake of LEVs. The SPG will also look at addressing cumulative impacts derived by planning proposals and look to oppose structures that have the potential to create canyon effect.		All	-	Improved Street Scene	Short (Ongoing)	Existing Budgets

Table 9- Qualitative Assessment of Actions to Deliver Strategic Measures								
Strategic Measure	Action	Additional Information	Air Quality Impact	AQMA/ JAQU Identified Areas	Cost	Non- Air Quality Impacts	Implementation Timescale	Funding
	Supplementary Planning Guidance (SPG) "Managing Transport Impacts & Parking Standards"	Published		All		Reduced Congestion and enhancements to transport schemes due to income generation improving journey time and quality. Increase in physical activity levels.	In Place	Existing Budgets
	Cardiff's Green Infrastructure SPG	Published		All		Increase Green Space and provide a visual enhancement to the area, in particular for townscape and public realm.	In Place	Existing Budgets
Enhance Cardiff's Transportation System	Freight and Delivery Management- Assess and improve where necessary strategic routes for freight timings of planned journeys for in and around City Centre.	-		All		Increased accessibility via reduced congestion.	Medium	Existing Budgets

Table 9- Qualitative Assessment of Actions to Deliver Strategic Measures								
Strategic Measure	Action	Additional Information	Air Quality Impact	AQMA/ JAQU Identified Areas	Cost	Non- Air Quality Impacts	Implementation Timescale	Funding
	Consider establishing a freight quality partnership to provide a forum for discussion with HGV operators.		✓✓	All	£		Short	Existing Budgets
	Implement further speed restrictions and enhance those already established "20mph Zones"	CC has introduced 'signs only' 20mph limits in Cathays and Plasnewydd area. Approach coincides with the Safe Routes to School Programme. Such measures are known to have positive impacts to NOx levels- 24%-31% decrease (Jones & Brunt 2017).	✓	All	£	Safer environment for pedestrians	Short	Existing Budgets
	Cardiff Capital Region Metro	Proposed by WG (Rail and bus based rapid transit routes).	✓✓✓	All	££££		Long	City Deal

Table 9- Qualitative Assessment of Actions to Deliver Strategic Measures								
Strategic Measure	Action	Additional Information	Air Quality Impact	AQMA/ JAQU Identified Areas	Cost	Non- Air Quality Impacts	Implementation Timescale	Funding
	Development of Cardiff's Central Square Interchange	A part of the proposal is a state of the art Bus Interchange.	✓	All	£ £ £ £ £	Increased use of public transport/ reduced congestion/ improvements to accessibility/ improvements to journey time.	Long	WG & Existing Budgets
	Bus Programme- Strategic Bus Network	Improve bus networks and efficiency of the service. Bus lanes have been installed on A470, A4119 & A48. Suggested 400m of bus lane ensures each bus with a time advantage of 5 minutes.	✓ ✓ ✓	All	£ £ £ £ £	Increased use of public transport/ reduced congestion/ improvements to accessibility/ improvements to journey time.	In Place & Ongoing	WG & Existing Budgets
	Park and Ride programme.	Proposals are in place for a park and ride system at Junction 33 which would look to intercept traffic	✓ ✓	All	£ £ £	Increased use of public transport/ reduced congestion/ improvements to accessibility.	Medium	S106 Funded and WG

Table 9- Qualitative Assessment of Actions to Deliver Strategic Measures								
Strategic Measure	Action	Additional Information	Air Quality Impact	AQMA/ JAQU Identified Areas	Cost	Non- Air Quality Impacts	Implementation Timescale	Funding
		on the A470, north Cardiff. Park and ride anticipated for Llantrisant Road and expansion of park and ride on A48.						
Increase the uptake of Sustainable and Active Travel	Cycling Superhighways infrastructure. Cardiff's DRAFT Cycling Strategy. Intergrated Network Map (INM).	Cycling Strategy sets out to double number of cycling trips by 2026; 9.2% modal share in 2015 to 18.4% in 2026. Two new cycle superhighways proposed. The INM prioritises cycling and walking routes over 15 year period.		All		Increase in physical activity and improvements to well-being.	Long	
	Work jointly with bus operators to deliver improvements to the fleet (ULEB and retrofit schemes); prioritise ULEB funded buses on routes impacting AQMAs & outlined routes from the PCM model.	-		All (City Centre AQMA will see the largest impact based on source apportionment analysis)		Improved health and well-being. Associated noise improvements.	Short	OLEV- 75% funding approved

Table 9- Qualitative Assessment of Actions to Deliver Strategic Measures								
Strategic Measure	Action	Additional Information	Air Quality Impact	AQMA/ JAQU Identified Areas	Cost	Non- Air Quality Impacts	Implementation Timescale	Funding
	Schools' Active Travel Plans	Corporate commitment for every school in Cardiff to have an active travel plan by April 2022. CC engagement with 'Living Streets' charity who have developed a 'WOW' (Walk Once a Week) scheme in 7 allocated schools in Cardiff.		All		Reduced congestion; enhanced safety; improved fitness & health; raised awareness & behaviour change.	In place/ Ongoing	Existing Budgets & WG Funding (Healthy and Active Fund)
	Car Clubs	-		All		Reduced Congestion and improved journey times	Short	Existing Budgets
	Development of the Staff Healthy Travel Charter.	To be launched in April 2019.		All		Improved health and well-being. Reduced congestion	Short	Existing Budgets

Table 9- Qualitative Assessment of Actions to Deliver Strategic Measures								
Strategic Measure	Action	Additional Information	Air Quality Impact	AQMA/ JAQU Identified Areas	Cost	Non- Air Quality Impacts	Implementation Timescale	Funding
						and improved journey times.		
Implement Renewable Fuels Strategy	Improve and promote the uptake of low emission vehicles by enhancing Cardiff's EV infrastructure and identify opportunities to promote awareness.	Encourage the public and businesses to increase switch to alternative fuels. The Council has been successful in obtaining a bid from the Office of Low Emission Vehicles (OLEV) 36 charge points in 21 locations across the city and accessible to the public by 31st March 2019.		All			Short-medium	Existing Budgets & OLEV
	Ensure that procurement for Councils fleet considers alternative fuelled vehicles.	Council to fund the hire lease costs of 56 new EVs in 2019/20 (replacing existing petrol/diesel		All			Short	Existing Budgets

Table 9- Qualitative Assessment of Actions to Deliver Strategic Measures								
Strategic Measure	Action	Additional Information	Air Quality Impact	AQMA/ JAQU Identified Areas	Cost	Non- Air Quality Impacts	Implementation Timescale	Funding
		vehicles) and 37 vehicles in 2020/21.						
Public Information and Behaviour Change Initiatives	Promotion and Communication of the benefits surrounding active travel.	Only 25% of Cardiff residents meet physical activity guidelines and 53% are obese or overweight (Welsh Health Survey 2010 and 2011).	-	All		Reduced Congestion and improved journey times	Short	Existing Budgets
	Show council support to local air quality awareness campaigns in Cardiff.	Look at various avenues to collaborate with campaigners and other professional bodies.		All	-		Short	Professional bodies/ External investors
	Collaborative working with key stakeholders, such as Public Service Boards (PSBs) & WG	Ensure that any marketing campaigns designed to encourage a modal shift are interconnected with communications	-	All	-		Short	Existing Budgets

Table 9- Qualitative Assessment of Actions to Deliver Strategic Measures								
Strategic Measure	Action	Additional Information	Air Quality Impact	AQMA/ JAQU Identified Areas	Cost	Non- Air Quality Impacts	Implementation Timescale	Funding
		teams with PSBs to ensure consistency with marketing themes.						
	Increase public's capabilities to access air quality data via the integration of a smart cities approach.	-	-	All	£		Short	Existing Budgets/ WG funding
Additional Regulatory Interventions	Improvement of Taxi Licensing Policy - Target older taxi vehicles and look to amend policy guidance	WG considering minimum welsh standard for taxis which could be adopted in Cardiff. Cardiff currently has in place an 'exceptional condition' policy which looks to extend taxi licenses once past an age of 10 years. Currently there are 2,261 hackney carriage/private	✓✓	All	£		Short	Existing Budgets & WG funding

Table 9- Qualitative Assessment of Actions to Deliver Strategic Measures								
Strategic Measure	Action	Additional Information	Air Quality Impact	AQMA/ JAQU Identified Areas	Cost	Non- Air Quality Impacts	Implementation Timescale	Funding
		hire drivers, 902 hackney carriages and 1,150 private hire vehicles in Cardiff.						
	Enforce vehicle idling charges	Under Road Traffic (Vehicle Emissions) (Fixed Penalty) Regulations 2003, CC has the power to implement "no vehicle idling" areas. CC will need to assess the feasibility and likely benefits of these suggested areas.		All			Short	Existing Budgets
	Increase the monitoring capabilities of the council with investment in more real time monitoring.	Two real time monitoring stations on Frederick Street and Richard's Terrace, Newport Road provides real time data as	-	-			Short	Existing Budgets OR Successful bid proposals made to WG for improved Infrastructure

Table 9- Qualitative Assessment of Actions to Deliver Strategic Measures								
Strategic Measure	Action	Additional Information	Air Quality Impact	AQMA/ JAQU Identified Areas	Cost	Non- Air Quality Impacts	Implementation Timescale	Funding
		part of AURN network.						
	Encourage/ Facilitate homeworking	Cardiff Council is one of the largest employers in Wales and therefore could look to adopt more flexible/ agile working patterns		All		Quality of life improvements, saved costs on office space, eliminate time lost travelling to office meaning shorter working days, reduced congestion during peak times	Short	Existing Budgets

8.4 Stakeholder Engagement

In order to ensure that Cardiff Council implements a solution that not only delivers compliance in the shortest possible time, but ensures that such a solution is supported and welcomed by citizens, businesses and visitors to Cardiff it will be vitally important to fully engage and work with the public and businesses to ensure that the preferred option implemented meets the citizens expectations.

8.4.1 Consultation on the Green Paper on Transport and Clean Air

At the end of March 2018 the Council launched a Green Paper on Transport and Clean Air[30]. The paper set out a number of proposals/ ambitions termed as 'Big Ideas' on measures to improve transport and air quality in Cardiff. Fundamentally the paper focused on the need to tackle congestion and offer active travel options to discourage unnecessary private car use, keeping the city moving and ensuring the health of citizens. The paper enabled members of the public, businesses and other organisations a chance to score the proposals in terms of preference of them being implemented in Cardiff.

Consultation on the Cardiff's Transport and Clean Air Green Paper was open from the 26th March to the 1st July 2018.

The consultation centred on an electronic survey, with a communication campaign conducted via social media.

The survey received 3,580 total valid survey responses (including 266 partial responses)
The total number of surveys collected from schools was 285. At the time of writing this report the full detailed assessment of the consultation responses is ongoing but some key headline data can be extracted from this survey.

The Top 3 'Big Ideas' were:

- Integrated Ticketing
- Zero Carbon Bus Fleet
- Improving the digital network and user information (for public transport).

The lease favourable 'Big Ideas' were:

- Autonomous Vehicles
- Parking Levies (increase parking charged and or work place parking levies)
- A Total City 20mph Zone

The information above does indicate that there is a desire for an increase use in Public Transport given that the 'top 3' all relate to improvements in public transport measures. Consideration of the outcome of this consultation has informed the refinement of the shortlist of measures.

8.5 Shortlist of Local Measures

In line with the Direction received from WG and for the purpose of addressing air quality concerns in the four specified AQMAs the long list of measures derived by Table 9 will be

[30] https://www.cardiff.gov.uk/ENG/resident/Parking-roads-and-travel/transport-and-clean-air-green-paper/Documents/Cardiff%27s%20Transport%20and%20Clean%20Air%20Green%20Paper.pdf

subjected to further appraisal which will reflect the requirements of the HM Treasury Guidance (Green Book), the wellbeing of future generations legislation, and also the Welsh Transport Appraisal Guidance (WelTAG).

The shortlist of measures will be assessed in detail via air quality and transport modelling which will quantify the level of impact to air quality within the designated AQMAs and Defra's modelled road links. As detailed in Section 8.2 this level of detail was outlined in the Initial Plan submitted prior to the 30th September 2018 deadline.

The summarise the long list of measures are;

8.5.1 Enhance Local Planning Policy

M1: Implementation and consideration of existing Local Development Plan (LDP) policies (KP18 & EN13) during any planning application process.

M2: Development of a Supplementary Planning Guidance (SPG) for Planning for Health and Well-being .The SPG is supplementary to Policies KP14 and C6 of the adopted LDP.

M3: Develop Supplementary Planning Guidance (SPG) to provide a specific guidance for air quality in accordance with new developments;

M4: Develop Supplementary Planning Guidance (SPG) "Managing Transport Impacts & Parking Standards; and

M5: Publish Green Infrastructure SPG.

8.5.2 Enhance Cardiff's Transportation System

M6: Freight and Delivery Management- Assess and improve where necessary strategic routes for freight timings of planned journeys for in and around City Centre;

M7: Establishment of a freight quality partnership to provide a forum for discussion with HGV operators;

M8: Implement further speed restrictions and enhance those already established "20mph Zones;

M9: Cardiff Capital Region Metro*;

M10: Development of Cardiff's Central Square Interchange;

M11: Bus Network Programme- Strategic Bus Network to improve bus networks and efficiency of services via increased and improved bus lanes; and

M12: Accelerated Park and Ride programme in NW & NE Cardiff; NW delivery of P&R in north west of Cardiff – J33/ Llantrisant Road – 750 P&R at J33 and 250 P&R off Llantrisant Rd & NE expansion of P & R on the A48.

*** Metro not considered further owing to the fact that Cardiff Council is not able to influence the timescales for implementing this project.**

8.5.3 Increase the Uptake of Sustainable and Active Travel

M13: Development of Cycling Superhighways infrastructure with Integrated Network Map (INM). Minimum of Two cycle superhighways proposed;

M14: Work jointly with bus operators to deliver improvements to the fleet, by securing OLE Buses and priorities such buses on routes impacting AQMAs; and

M15: Development of further School Travel Plans, by continued engagement with 'Living Streets' charity who have developed a 'WOW' (Walk Once a Week) scheme, which is currently undertaken in 7 schools in Cardiff.

M16: Development of Car Clubs in Cardiff, to encourage car sharing schemes.

M17: Promotion and Communication of the benefits surrounding active travel.

8.5.4 Renewable Fuels Strategy and Improve EV/ 0EV Infrastructure

M18: Roll out EV charging locations or identify alternative fuel supplies;

M19: Ensure that procurement for Councils fleet considers alternative fuelled vehicles; and

M20: Through the Public Service Board encourage procurement of alternative fuelled vehicles.

8.5.5 Regulatory Interventions

M21: Improvement of Taxi Licensing Policy, to set minimum vehicle emissions standards;

M22: Implement and Enforce non vehicles idling areas;

M23: Review car parking and car permit charges and allow for reduced rates for EV/OLEV, and increased rates for <Euro 6; and

M24: Increase the monitoring capabilities of the council with investment in more real time monitoring; and

M25: Implementation of a Charging Clean Air Zone.

8.5.6 Public Information and Behaviour Change Initiatives

M26: Increase air quality awareness campaigns in Cardiff, such as Car Free Day;

M27: Collaborative working with key stakeholders, such as Public Service Boards (PSBs) & WG;

M28: Increase public's capabilities to access air quality data via the integration of a smart cities approach; and

M29: Implement a Green Infrastructure/ Living Wall Installation Programme

8.6 Timeline for Delivery of Assessment and Implementation of Preferred Measures

Figure 13 below sets out a time line of the next phases of work that Cardiff will undertake in order to assess the long list of measures to try and demonstrate how we will achieve compliance in the shortest time possible. In addition the timeline shows further dates for which additional work streams will be finalised and implemented. The dates presented are estimated based on our current understanding from Welsh Government.

Figure 13- Proposed Timeline to Develop and Implement Measures to Achieve Compliance for NO_2

Chapter 9 Performance Monitoring and Measurement

In order for the Council to assess whether the overarching aim of the Clean Air Strategy is being or likely to be met the following are the key targets for which we will assess the measurement of the success of this Strategy:

- Achieve all statutory air quality standards in shortest time possible;
- Deliver an ongoing reduction in NO_2 and particulate levels for the duration of this strategy, thus improving air quality beyond statutory requirements;
- Demonstrate a reduction in NO_2 and particulate emissions derived from CC activities;
- Reduce the fraction of mortality attributable to air pollution in Cardiff (and Vale HB);
- Increase the proportion of journeys to work and school made by public transport or active travel methods; and
- Increase in the uptake and use of ultra-low and zero emission vehicles in the City.