

Dublin City Council, Fingal County Council, South Dublin County Council  
and Dun Laoghaire-Rathdown County Council

# Dublin Region Air Quality Plan 2021

Air Quality Plan to improve Nitrogen Dioxide levels in Dublin Region



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## 1.0 Introduction – Setting the context

### 1.1 Why is this air quality plan for nitrogen dioxide for Dublin necessary and what is its purpose?

Ireland as an EU member state is obliged to implement EU Directive [2008/50/EC](#) on ambient air quality and cleaner air for Europe (also referred to as the CAFÉ Directive). One element of the implementation of this Directive involves carrying out air quality monitoring for a number of specified air pollutants at a network of air quality monitoring stations throughout the country. These requirements were transposed into national legislation in Ireland by the Air Quality Standards Regulations 2011 (S.I.180/2011).

In 2019, there was an exceedance of the annual permissible limit value for one of these pollutants – nitrogen dioxide - at one monitoring station in Dublin. There were no other exceedances recorded elsewhere for nitrogen dioxide or any other specified air pollutant during 2019.

Under the national legislation, if this occurs the relevant local authorities are obliged to prepare an air quality plan to identify the root causes and formulate measures to address the exceedance of that pollutant for submission to the EU within two years of the exceedance being reported. For the purposes of air quality assessment and management in Ireland, the country is divided into a number of zones, one of which is *Agglomeration A - the Dublin Conurbation*. This consists of the functional areas of Dublin City Council, South Dublin County Council, Dun Laoghaire – Rathdown County Council and most of Fingal County Council. For the purposes of readability of this plan, the term *Dublin Region* will be used in the text to describe this legally defined area.

The reasoning behind the legal obligation for the four local authorities preparing this plan together include:

- The root causes for an exceedance of the permissible limit for a given pollutant at one location may be influenced by regional as well as local factors.
- It is crucial that measures taken to address an exceedance in one location do not inadvertently displace the burden of pollution elsewhere.

This last point is particularly relevant in this instance as nitrogen dioxide is an air pollutant primarily associated with transport emissions. Therefore, the purpose of this plan is to address reducing nitrogen dioxide emissions from transport in the Dublin region.

## 1.2 Arrangement and layout of this air quality plan for nitrogen dioxide

One of the legal obligations under the Air Quality Standards Regulations 2011 on local authorities in preparing this air quality plan is to ensure that it is “clear, comprehensible and accessible”.

Therefore the flow of this plan is to firstly give an overview of the reasons for and purpose of preparing this plan (see above); then give the a contextual overview of the area covered by the plan in terms of physical geography , demography population and climate.

The plan will then describe the policies and legislation dealing with air quality in Ireland and then address the origin, occurrence and health impacts of nitrogen dioxide.

It will also deal with relevant transport and land use plans. It will then describe the emissions and dispersion modelling carried out for this plan and from this elaborate the proposed measures and actions required to achieve the target of bringing nitrogen dioxide levels back into compliance with legal limit values.

## 1.3 Overview of the Dublin region

### Geographic and Population Profile

The Dublin Region occupies an area of 92,200 hectares and is situated on the east coast of Ireland on the River Liffey, which discharges into Dublin Bay and the Irish Sea. The region is a relatively low-lying area with rich pastures to the west and north of the city. In addition to the River Liffey, two other major rivers run through the region and include the River Tolka from the north west and the River Dodder from the south west. The latter rises in the Wicklow Mountains that together with the smaller Dublin Mountains are located to the south west of Dublin City. The highest peaks in the Dublin Mountains extend to around 750metres, where those in the Wicklow Mountains extend to above 1000 metres in places. The mountains are known to have an influencing effect on the weather in Dublin, primarily reducing precipitation that falls extensively over the mountain ranges. In addition, the region also contains two canals linking the city centre to the River Shannon in the Midlands.

The population of the Region was 1,347,359 in the 2016 census that represented approximately 28% of the State's population.

The overall Dublin Region consists of four local authority administrative areas - Dublin City Council, Dun Laoghaire Rathdown, Fingal County, and South Dublin County. With the exception of Dublin

City, each of the county administrative areas has a mix of rural and urban Electoral Districts. The population of each of these functional areas as determined in the 2016 Census is as follows:

<u>Area</u>	<u>2016 Population</u>
Dublin City	554,554
Dún Laoghaire-Rathdown	218,018
Fingal	296,020 (161,548 inside the Dublin Region)
South Dublin	278,767

Of the above, 110,000 people live within the canal cordon formed by the Grand and Royal Canals. It should also be noted that the population living in the Electoral Areas where (or adjacent) the exceedance at St. John Rd West was recorded is 29,423 persons. (CSO Census Data 2016)

Dublin is both a vibrant and a historic region, whose heritage is complemented by being a major centre for multinational operations Information and communications technology; it has also seen significant ongoing transport and urban renewal activities over the past decade.

The Region includes an International Airport and two main seaports, one of which is the largest in the State.

As the population of Ireland increased by 3.8% between 2011 and 2016, the largest increase was at a regional level – with Dublin at 5.8% followed by the Mid-East region at 5.3%

In 2016, 28.3% of the population of Ireland lived in Dublin while 14.5% lived in the Mid-East. Thus, just under 43% of all Irish people lived in the Dublin or the Mid-East regions in 2016. Recently published data by the Central Statistics Office indicate that while the national population topped over 5 million people for the first time in over 150 years, population growth in Dublin has now actually levelled out.

#### Climate of the Dublin region

The climate of a region and day-to-day changes in weather profoundly influence air quality in that region. Weather determines how quickly pollutants are dispersed, diluted or blown by the wind from their source. Conversely, pollutants can also be trapped close to the ground. If wind speeds are weak and the air close to the ground cools down this can result in warm air moving over it.

This creates an “inversion” condition that keeps pollutants close to the surface. Such inversions typically occur on clear, dry, still nights.

Poor air quality can also result from high temperatures. In hot, sunny weather, photochemical smog can form through complex chemical reactions involving a range of air pollutants such as nitrogen

oxides, ozone, and volatile organic compounds. Air pollution can also be washed out by rain, fog or snow.

The climate of Dublin is oceanic (due to the influences of the Atlantic Ocean), cool and humid throughout the year. Consequently, it does not experience the extremes of temperature experienced by many other countries at similar latitude.

The average temperature ranges from 5 °C in January and February to 15.5 °C in July and August. While Dublin is on the drier coast of the island of Ireland total precipitation does amount on average to a total 750 millimetres per year. This means that certain amounts of air pollutants are washed out of the atmosphere in the course of a year. The table below demonstrates the typical variation seen in terms of temperature and rainfall in Dublin over the course of a year.

Table: 1.1 Dublin - Average temperatures   Dublin - Average precipitation

Month	Min (°C)	Max (°C)	Mean (°C)	Millimetres	Days of rain
January	2	8	5	65	13
February	2	8	5	50	10
March	3	10	6.5	55	11
April	5	12	8.5	55	11
May	7	15	11	60	11
June	10	18	14	65	10
July	12	20	16	55	11
August	12	19	15.5	75	12
September	10	17	13.5	60	10
October	7	14	10.5	80	12
November	5	10	7.5	75	12
December	3	8	5.5	75	13
Year	6.5	13.3	9.9	760	135

Source: [Climates to travel](#) - World climate guide



## 2.0 Air Quality Assessment and Management in Ireland under the CAFÉ Directive

### 2.1 Air Quality Assessment in Ireland

#### Overview

The European Commission originally launched the Clean Air for Europe (CAFE) programme in 2001, with the aim of reviewing the EU's air quality policies and assessing progress towards attainment of the EU's long-term air quality objectives. Amongst a number of milestones in this ongoing programme was the adoption by the Member States of the EU Directive [2008/50/EC](#) on ambient air quality and cleaner air for Europe (the CAFÉ Directive)

The provisions of this Directive were transposed into Irish law by The Air Quality Standards Regulations [SI 180 of 2011](#) . These regulations established the Environmental Protection Agency (EPA) as the competent authority for assessing air quality in Ireland.

The regulations stipulate the:

- Air quality standards to be met in common by all Member States.
- Requirements for national networks of air quality monitoring stations
- Establishment of distinct air quality zones for assessing and managing air quality
- Requirement for short-term action plans in the event of certain kinds of acute exceedances of permitted limit values
- Requirement for Air Quality Plans to be made to bring air quality into compliance in the event of more exceedances.

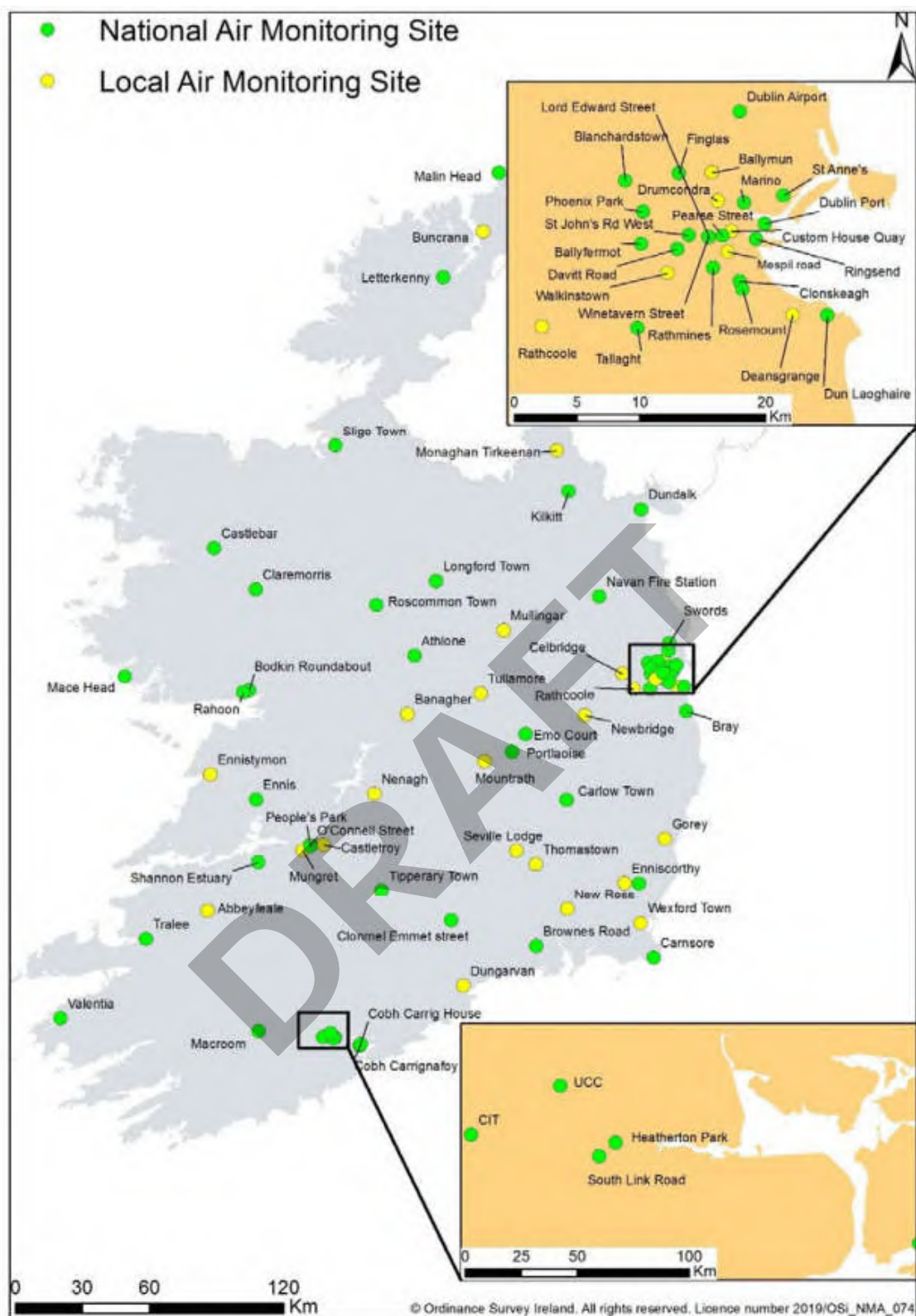
The Environmental Protection Agency as the competent authority, in cooperation with a number of partners, (such as some local authorities and third level institutes) operate the National Ambient Air Monitoring Programme (NAAMP). This programme includes a national network air quality monitoring stations, reporting data on a continuous, real-time basis. The raw data on air quality gathered is open to public access on a number of platforms including <https://airquality.ie/>. This data is subject to rigorous quality control and assurance. Following this process the final air quality data for the previous calendar year is reported on an annual basis to the EU Commission (usually in the third quarter of the year). If any exceedances of mandatory limits are recorded during a calendar year this triggers a process under the CAFÉ Directive whereby a member State has to prepare an action plan to address such exceedances.

As well as the national monitoring stations network, there are a growing number of “local” air quality monitoring stations. These utilise lower cost monitoring equipment that give a rapid indication of air quality in a locality.

In addition to the national and local monitoring network, the EPA (again in conjunction with some partners) also carry out indicative air quality monitoring campaigns (i.e. using basic low cost sensors over a period of time varying from several months to a year) to identify potential air quality “hot spots” where it may be necessary to establish permanent monitoring stations.

As last reported by the EPA that there are 95 monitoring stations (national and local combined) in Ireland. In 2019 alone there were 24 new stations established (9 national and 15 local) and further expansion is ongoing. The map below shows the general geographical spread nationally of these monitoring stations.

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**Figure: 2.1 National Ambient Air Quality Monitoring Network in Ireland 2020**

*(Source -EPA – Air Quality in Ireland 2019)*

## 2.2 Air Quality Standards under the CAFÉ Directive

Each of the pollutants monitored in the national network in Ireland have associated legal limit values assigned to them, which if exceeded, require action to be taken by the relevant authorities. These legal limit values are focussed on the protection of human health and are based on the World Health Organisation Air Quality Guidelines Global Update 2005.

Before setting out the air quality standard for nitrogen dioxide, a very brief overview of the monitoring method is useful to explain the context.

Each nitrogen dioxide analyser in the network continuously monitors nitrogen dioxide levels in the air and every hour it calculates the one-hour average concentration of that pollutant.

Therefore in a complete calendar year, there would be a maximum 8760 one-hour results (i.e. the number of hours in a calendar year). In practice there is some tolerance (10%) built in to allow for analyser servicing, calibrations and unscheduled stoppages (power cuts or breakdowns)

**The first legal limit value** stipulates that a concentration of 200 micrograms per cubic metre should not be exceeded more than 18 times in a calendar year. In other words, no more than 18 of all the one-hour values recorded in a calendar year may exceed this level. This first limit value is important if there are short episodes of very high nitrogen dioxide levels over a number of days. In practice, these kinds of pollution episodes have not been experienced in Ireland.

**The second legal limit value** stipulates that the average of all the one hourly results in a calendar year must not exceed 40 micrograms per cubic metre. This limit value is focused on the long-term exposure to nitrogen dioxide, and is of relevance to the air quality picture in Ireland.

Apart from nitrogen dioxide, there is a range of other air pollutants monitored under the CAFÉ Directive. While these are not the subject of this plan, for the sake of completeness they are listed below:

Sulphur dioxide, Carbon monoxide, Ozone, Polycyclic Aromatic Hydrocarbons, Particulates (PM10 and PM2.5), and dioxins. As stated previously in this plan, the levels of these pollutants are within legal limit values in Ireland.

## 2.3 Health Effects of Nitrogen dioxide

The EU air quality standards above are based on the criteria for the protection of human health set down in the World Health Organisation [Air Quality Guidelines Global Update 2005](#).

The World Health Organisation issued New WHO Global Air Quality Guidelines (AQGs) on 22 September 2021 [see more here](#). These new guidelines recommend new air quality levels to protect the health of populations, by reducing levels of key air pollutants, some of which also contribute to climate change. The goal of the guideline is for all countries to achieve recommended air quality levels. Conscious that this will be a difficult task for many countries and regions struggling with high air pollution levels, WHO has proposed interim targets to facilitate stepwise improvement in air quality and thus gradual, but meaningful, health benefits for the population.

It has been signalled in 2021 by the European Commission that closer alignment of the EU air quality standards with improving scientific knowledge including these latest findings of the World Health Organization (WHO) are a priority action.

### **Nitrogen dioxide and general health effects**

One of the group of air pollutants of concern are nitrogen oxide gases (or NO<sub>x</sub> for short) and from a human health perspective, one of that group - nitrogen dioxide is the one of most concern as it has been demonstrated to be associated with number of health effects including

- increased inflammation of the airways;
- Worsened cough and wheezing;
- Reduced lung function;
- Increased asthma attacks including a likely cause asthma in children
- Greater likelihood of emergency department and hospital admissions.

Nitrogen dioxide can also react with other chemicals in the air to form other pollutants such as particulate matter and ozone.

## 2.4 Nitrogen dioxide and health in Ireland

Longer exposures to elevated concentrations of nitrogen dioxide may contribute to the development of asthma and potentially increase susceptibility to respiratory infections. People with asthma, as well

as young children and older adults have increased sensitivity to its effects and are generally at greater risk for the health effects of nitrogen dioxide. Asthma is of particular importance in the Irish context. The Asthma Society of Ireland in its 2019 report has estimated:

- That 1 in 13 people in Ireland have asthma.
- Asthma affects at least 1 in 5 Irish children at some stage of their life
- There are 2.4 million asthma GP consultations in Ireland annually.

Recent EPA sponsored research in Ireland among over 50's found an association between local air pollution and asthma among older adults at relatively low concentrations of NITROGEN DIOXIDE. The study drew its sample from the Irish Longitudinal Study on Ageing (TILDA) and used estimated levels of ambient pollution i.e. local nitrogen dioxide concentrations at each participant's residential address. The results found a positive association between local air pollution generally and the probability of suffering from asthma for a large representative sample of older adults in Ireland.

Another study by Quintyne et al (2019) used routine available data to examine the relationship between poor air quality and hospital admissions due to cardiovascular and respiratory diseases in Dublin City & County between 2014 and 2018. The study findings indicated significant rises in admissions with change in AQIH from good to very poor for asthma, chronic obstructive airways disease and heart failure.

A number of other Irish health studies on the relationship between nitrogen dioxide and health are either ongoing or planned, and these provide a valuable benchmark not only in terms of estimating current health burdens but will also in terms of assessing the effectiveness of interventions that will be introduced over time.

## 2.5 The Air Quality Index for Health (AQIH) for Ireland

This index was devised by the Environmental Protection Agency in collaboration with the Health Service Executive and is accessible at [www.airquality.ie](http://www.airquality.ie) where it is an integral element of how air quality monitoring data is presented to the public.

The Air Quality Index for Health (AQIH) is essentially a map of Ireland, showing the colour/number coded air quality (ranging from green for "good" to red for "poor") at each monitoring station so a viewer can quickly see what air quality is like in their area. The index has specific health advice for

those who are more sensitive to air pollution – for example, people with heart or lung conditions. The advice includes guidance to the public on what to do if air quality is poor in their area.

## 2.6 Air Quality Management in Ireland

### Overview

This section of the plan will provide an over view of the administrative arrangements and policies in place in Ireland regarding air quality management. There is also a wider European Union dimension to some of these polices which will also be addressed.

### Role of national government and agencies

**The Department of Communications, Climate Action and Environment (DCCAE)** is the government department charged with the protection of the natural environment and its impact on the health and wellbeing of citizens. It creates policies and measures to prevent and minimise activities that cause environmental damage such as air, water and land pollution.

**The Environmental Protection Agency (EPA)** as stated earlier, is the competent authority for all matters dealt with in the Air Quality Standards Regulations 2011. The EPA also have wider enforcement powers including oversight of the performance of local authorities of their statutory functions in relation to environmental protection under the Air Pollution Act 1987 and the Environmental Protection Agency Act 1992.

### Role of local authorities

**Local authorities** are the enforcement agencies for the Air Pollution Act 1987, which covers a wide range of matters including addressing air pollution incidents, regulating sales of solid fuels, issuing permits for specified facilities and preparation of air quality plans. A number are also engaged in air quality monitoring under the auspices of the EPA.

## 2.7 EU Level Policies relevant to air quality

### 2013 Clean Air for Europe

This further iteration of the original Clean Air for Europe (CAFE) programme 2001 provides for national emission reduction targets set in the National Emission Ceilings Directive for the main transboundary air pollutants: sulphur oxides, nitrogen oxides, ammonia, volatile organic compounds and particulate matter. It also addresses emission standards for the main sources of pollution, from motor vehicles

and ships to power generation and industry. These standards are defined at EU level in legislative acts targeting industrial emissions, emissions from power plants, vehicles and fuels, as well as the energy performance of products.

## Fit for 55 – European Green Deal

In July 2021, the European Commission adopted a package of proposals to make the EU's climate, energy, land use, transport and taxation policies fit for reducing net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels. Achieving these emission reductions in the next decade is crucial to Europe becoming the world's first climate-neutral continent by 2050 and making the European Green Deal a reality. With these proposals, the Commission is presenting the legislative tools to deliver on the targets agreed in the European Climate Law and fundamentally transform the EU economy and society for a fair, green and prosperous future.

### 2.7.1 National Level Policies relevant to air quality

#### National Clean Air Strategy

The Department of Communications, Climate Action and Environment (DCCAE) is developing a national Clean Air Strategy with the aim of promoting clean air policies to enhance and protect air quality. The National Clean Air Strategy will set out a framework for how all government departments can work to reduce air pollution and promote cleaner air. It will work alongside other plans, such as the National Air Pollution Control Programme and the National Energy and Climate Plan, to tackle the key challenges of air pollution. These include:

- Transport emissions, especially road transport emissions of Nitrogen Oxide (NO<sub>x</sub>) and fine particulate matter (PM 2.5)
- Emissions from industry, agriculture, and shipping
- The persistent problem of “smoky” emissions from burning solid fuel in home

It is anticipated this Strategy will be published in 2021.

#### Climate Action Plan 2019 and the Climate Action Act 2021



Given the sources involved, there is an obvious synergy between developing measures to address ambient nitrogen dioxide levels and addressing the wider climate action and carbon reduction agenda. While The **Climate Action Plan 2019** deals with a wider range of issues ( of which air quality is but one) , it does sets out an ambitious course of action for each sector within Ireland to achieve the targets needed to adhere to the Paris Agreement. For the transport sector, the target is a reduction of 45-50% in transport related emissions by 2030, with a significant reduction expected in the latter half of the decade. This will require a significant modal shift from car to public transport and active travel, as well as a significant uptake of electric vehicles and increased use of biofuels.

Action 81 of the Plan is of particular relevance to this plan as it commits to: *Develop a regulatory framework on low emission zones and parking pricing policies, and provide local authorities with the power to restrict access to certain parts of a city or a town to zero emission vehicles only. Examine the role of demand management measures in Irish cities, including low emission zones and parking pricing policies.”*

**The Climate Action and Low Carbon Development (Amendment) Act 2021** was signed into law on 23 July 2021. Amongst a wide range of measures, this Act provides a statutory basis for:

- The approval of plans by the Government in relation to climate change for the purpose of pursuing the transition to a climate resilient, biodiversity rich and climate neutral economy by no later than the end of the year 2050
- Carbon budgets and a sectoral emissions ceiling to apply to different sectors of the economy;
- Local authority climate action plans
- Local authorities shall, when making development plans, to take account of their climate action plans

### 2.7.2 Regional level measures and policies

**Dublin Regional Air Quality Management Plan for improvement in levels of nitrogen dioxide in ambient air quality.**

In September 2010, the Environmental Protection Agency informed the City and County Managers in the Dublin Region that an exceedance of nitrogen dioxide levels had occurred at the Winetavern Street monitoring station during 2009.

Accordingly, the four local authorities prepared a plan to address these matters, which was submitted to the Environmental Protection Agency in 2011. In the intervening decade, nitrogen dioxide levels recorded at the monitoring stations in the Dublin region were within EU limit values up to the exceedance recorded in 2019.

## 2.8 Air Quality Assessment in the Dublin Region – Practice and Results

While an overview of general air quality assessment in Ireland has been addressed earlier in this Chapter, the specific practice of air quality monitoring in Dublin and the knowledge gained from that is central to the narrative in this plan.

Local authorities in the Dublin region have carried out air quality monitoring since 1973. The knowledge gained from that monitoring was instrumental in providing the evidence base that led to the introduction of the bituminous coal ban in Dublin in 1990. Following the establishment of the Environmental Protection Agency in 1992, these authorities have worked closely with the EPA in developing and expanding the national monitoring network in the Dublin region as well as developing local monitoring networks.

Under the National Ambient Air Monitoring Programme (NAAMP), the following national monitoring stations have been established in the Dublin region:

Table: 2.1 Monitor Locations and Pollutant Measured

<b><u>No.</u></b>	<b><u>Location</u></b>	<b><u>Pollutants Monitored</u></b>
1	Ballyfermot Library – Dublin 10	Particulate (PM10 &2.5), Nitrogen dioxide
2	Blanchardstown – Dublin 15	Particulate (PM10 &2.5), Nitrogen dioxide
3	-Davitt Rd Inchicore Dublin 8	Particulate (PM10 &2.5), Nitrogen dioxide
4	Dublin Airport Swords Co Dublin	Particulate (PM10 &2.5), Nitrogen dioxide, Ozone, Sulphur dioxide
5	Dublin Port – Dublin 1	Particulate (PM10 &2.5), Nitrogen dioxide, Sulphur dioxide
6	Dun Laoghaire Co Dublin	Particulate (PM10 &2.5), Nitrogen dioxide
7	Pearse St Dublin 2	Nitrogen dioxide. Ozone
8	Ringsend Dublin 4	Particulate (PM10 &2.5), Nitrogen dioxide, Sulphur dioxide
9	Rathmines Dublin 6	Particulate (PM10 &2.5), Nitrogen dioxide, Sulphur dioxide , Ozone
10	St Johns Rd West D8	Particulate (PM10 &2.5), Nitrogen dioxide
11	Swords Co Dublin	Nitrogen dioxide, Ozone
12	Tallaght Dublin 4	Particulate (PM10 &2.5), Nitrogen dioxide
13	Winetavern St Dublin 8	Nitrogen dioxide, Sulphur dioxide, Carbon monoxide, Particulate (PM10)
14	Phoenix Park	Particulate (PM10 &2.5)
15	Marino	Particulate (PM10 &2.5)
16	St. Anne’s Park	Particulate (PM10 &2.5)
17	Finglas	Particulate (PM10 &2.5)
18	Clonskeagh	Particulate (PM10 &2.5), Ozone

The geographic distribution of these monitoring stations can be seen on the map below – this can be view in more detail [here](#).

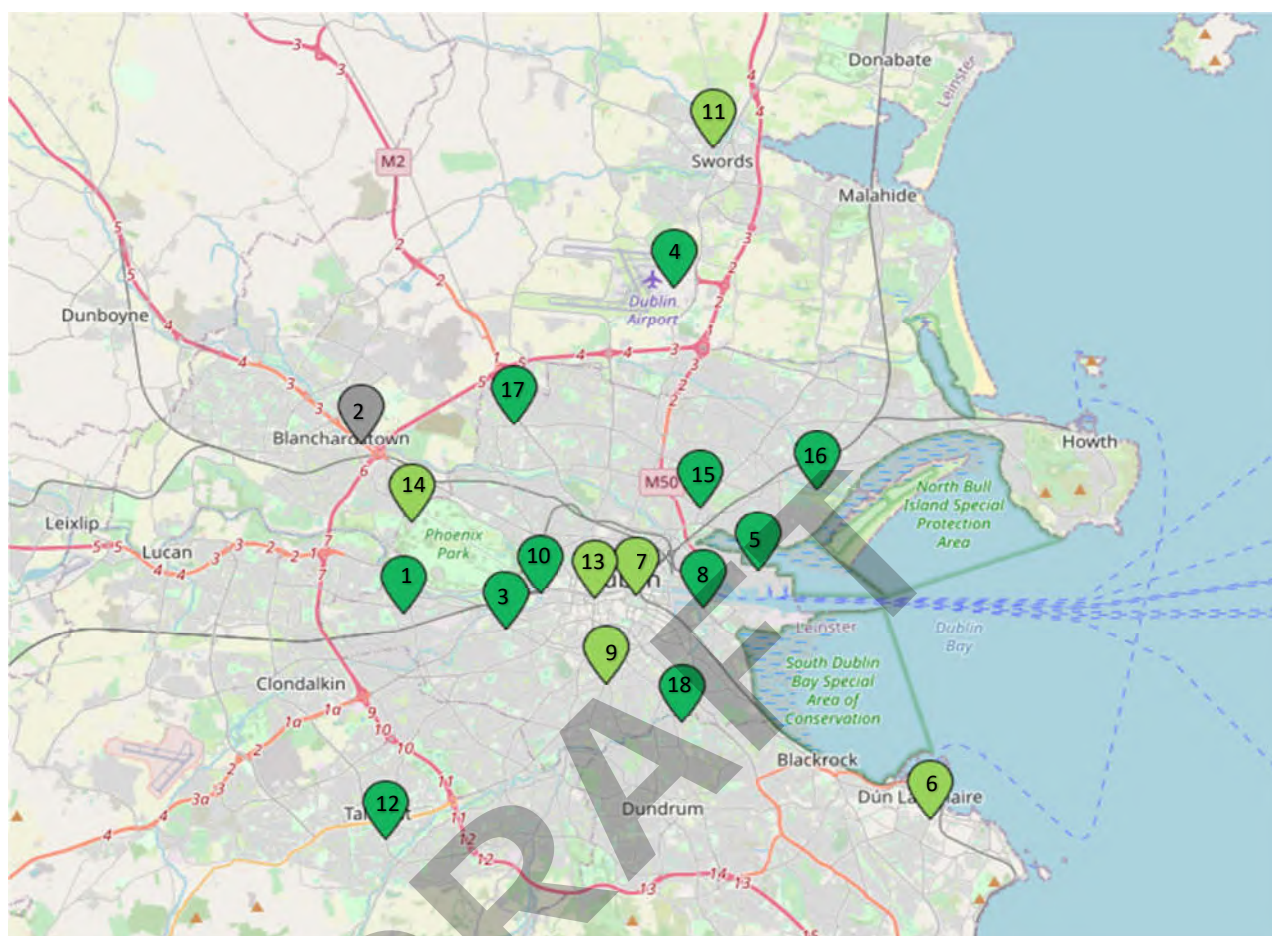


Figure: 2.2 Map of Monitoring Station Locations in Dublin Region

## 2.9 Nitrogen dioxide monitoring results in Dublin 2011-2019

The levels of nitrogen dioxide in an urban area can vary dramatically over a short distance (a few metres), with the highest concentrations within 10 metres of the roadside. As stated previously, nitrogen dioxide pollution is strongly linked with traffic emissions and the levels decrease significantly with distance from the road carriageway. Levels of nitrogen dioxide also vary depending on factors such as:

- Traffic volume and density
- Ages of vehicles
- Vehicle fuel (diesel vehicles are associated with higher levels of NITROGEN DIOXIDE than petrol engines)
- Speed of vehicles
- Width of streets and their buildings

- Weather conditions

In the context of the Dublin region, The Graph/Chart below illustrates the annual average nitrogen dioxide levels as measured during the period 2011-2019. There are individual graphs/charts provided for each station in the Appendices to this plan. As can be seen, while levels at all stations have been below the legal limit value of 40 micrograms per cubic metres over the period, there is the one exceedance at St. Johns Rd. West for 2019 - which was the first calendar year of monitoring at that location. However, the significance of this exceedance and the reasons for establishing an air quality monitoring station at this location are central to the ongoing efforts of assessing and managing nitrogen dioxide levels in the Dublin region.

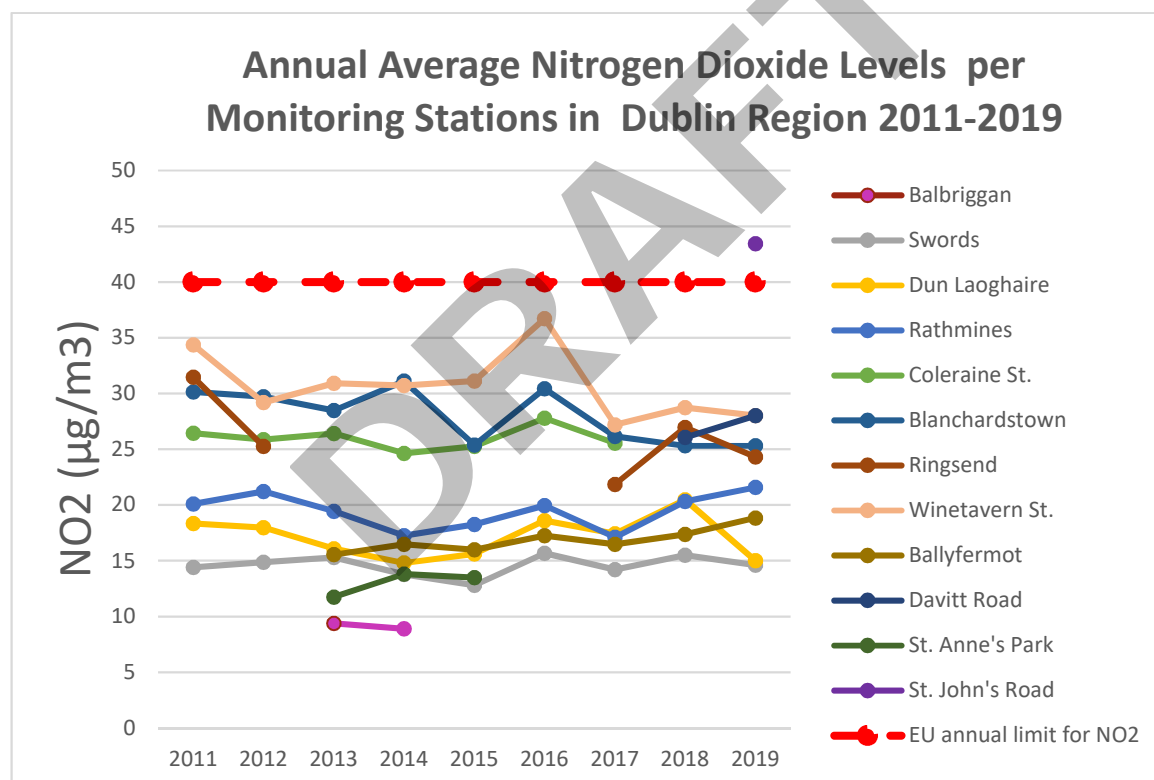


Figure: 2.3 Annual Average Nitrogen Dioxide Levels

	Years								
Stations	2011	2012	2013	2014	2015	2016	2017	2018	2019
Balbriggan			9.38	8.90					
Swords	14.41	14.86	15.31	13.78	12.80	15.67	14.22	15.51	14.60
Dun Laoghaire	18.33	17.98	16.07	14.80	15.61	18.59	17.44	20.47	15.01
Rathmines	20.10	21.20	19.45	17.26	18.27	19.95	17.10	20.32	21.58
Coleraine St.	26.45	25.85	26.42	24.63	25.27	27.79	25.55		
Blanchardstown	30.14	29.71	28.47	31.11	25.37	30.43	26.17	25.31	25.31
Ringsend	31.47	25.25					21.86	26.96	24.32
Winetavern St.	34.36	29.21	30.91	30.73	31.12	36.71	27.20	28.75	28.02
Ballyfermot			15.5	16.5	16.0	17.3	16.5	17.4	18.8
Davitt Road								26.05	28.02
St. Anne's Park			11.75	13.80	13.50				
St. John's Road									43.43

Table: 2.2 Annual Average Nitrogen Dioxide levels across monitoring stations

## 2.10 St. Johns Rd West 2019 results

The data behind the exceedance of the EU limit value for nitrogen dioxide recorded at the St John's Road West site in 2019 is worth further analysis. The actual average nitrogen dioxide concentration measured at the site for the year was 43 micrograms per cubic metre. This level of air pollution is wholly consistent with the levels of heavy traffic passing this monitoring station. The Figure below shows the average nitrogen dioxide concentrations by hour of day observed there over the entirety of 2019. The classic pattern of pollution levels matching commuter traffic flow can be seen between two peaks in pollutant levels- one during the morning and one during the evening rush hours. Also of note is the quite high baseline level of nitrogen dioxide, which suggest quite consistent traffic volumes in this area.

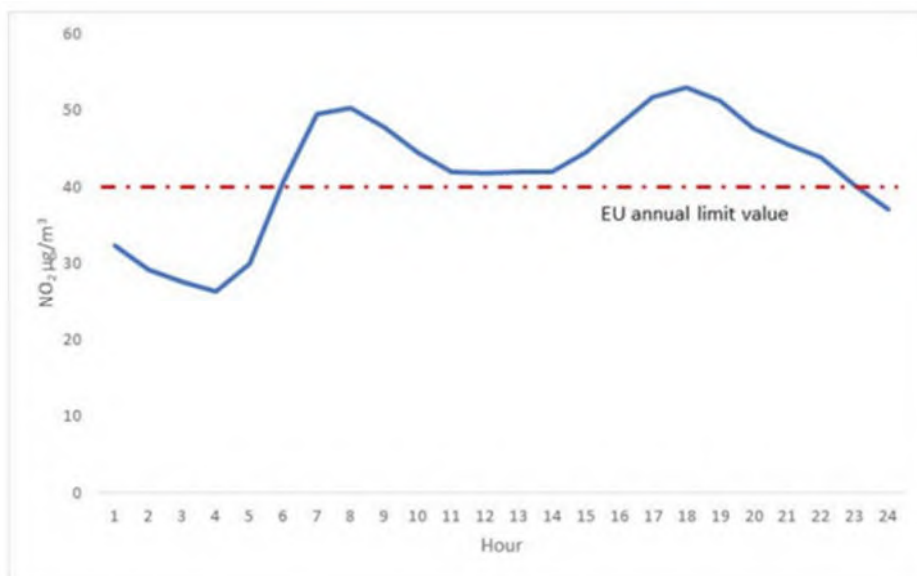


Figure: 2.4 Average NO<sub>2</sub> concentrations by hour of day as St. John's Road West in 2019

## 2.11 The EPA Urban Environmental Indicators: Nitrogen dioxide levels in Dublin

### Report 2019

The reasons behind establishing an air quality station at St. John's Rd West, and other locations, can be traced back to work carried out by the EPA (in collaboration with Dublin City Council) during 2016 and 2017, which was subsequently published in their **Urban Environmental Indicators: Nitrogen dioxide levels in Dublin Report 2019**

This work was prompted by observation by the EPA in annual air quality reports, that nitrogen dioxide levels in urban areas have been steadily increasing and at times in some locations approached the EU limit value.

As part of the National Ambient Air Monitoring Programme, novel approaches and equipment to assess air quality are utilised to complement the national monitoring network. One of these approaches involved carrying out diffusion tube surveys in two phases during 2016 and 2017 in Dublin to investigate nitrogen dioxide levels near both traffic sites and at suburban background sites.

These diffusion tube surveys involve installing plastic tubes mounted vertically on walls or similar structures that contain a chemical that absorbs nitrogen dioxide directly from the air, which can be taken to a laboratory and analysed. They are a relatively inexpensive form of indicative sampling but only give an estimate of longer-term average nitrogen dioxide concentrations.

The national reference stations on the other hand use highly sophisticated methods to provide accurate, continuous and precisely measured nitrogen dioxide concentrations in the field.

In Phase 1, diffusion tubes were sited at 12 locations close to existing reference stations to compare their levels. Once satisfied with tube performance the numbers of sampling sites were expanded to include in phase 2 a number of heavily trafficked locations.

In Phase 2, 25 locations were used during 2017. Of these 11 locations indicated a potential breach of EU limit values. In general, concentrations of nitrogen dioxide were highest at urban traffic locations, clearly showing the impact of traffic on busy roads from nitrogen dioxide. The report also utilised mathematical modelling to predict nitrogen dioxide levels across the rest of the Dublin region.

The three key findings of the Urban Environmental Indicators Report were as follows;

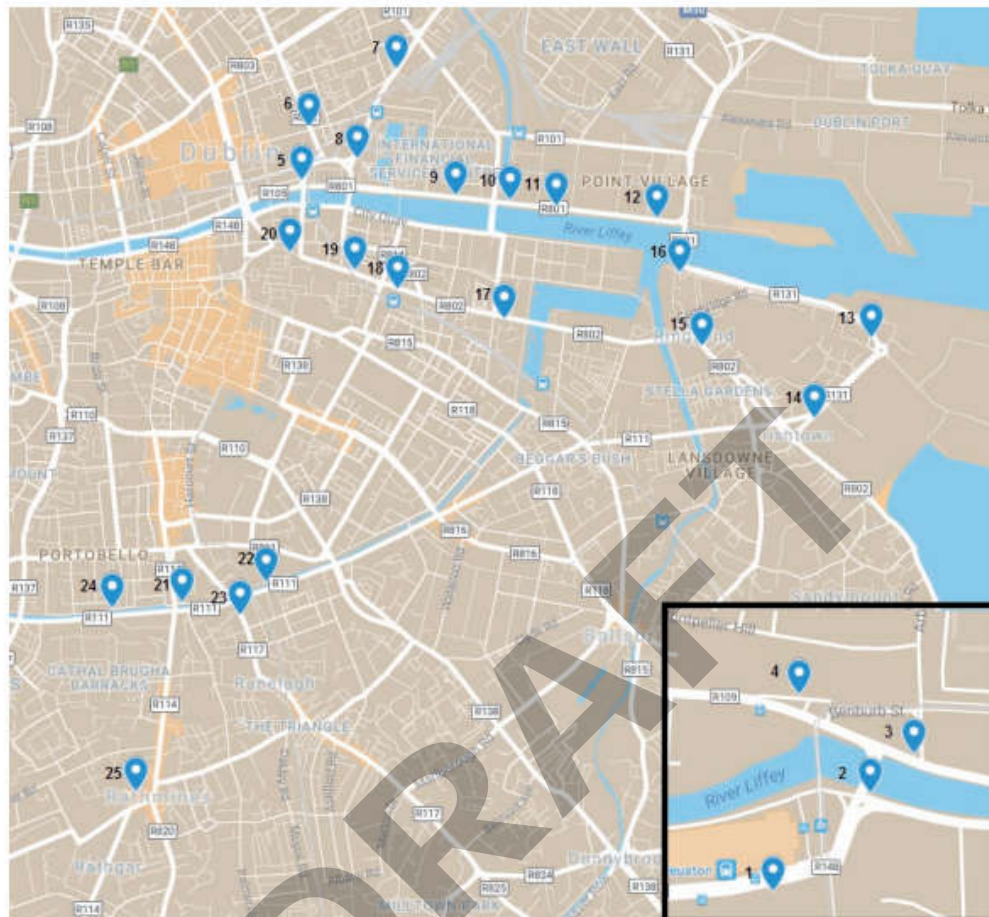
1. Highest levels of nitrogen dioxide are at locations with heavier traffic. This clearly shows the impact traffic has on the levels of nitrogen dioxide in areas close to busy roads in Dublin.
2. There are many areas where nitrogen dioxide is problematic – In some locations the NO<sub>2</sub> levels were high which indicates an increased risk that EU limits could be exceeded. Some areas of concern include:
  - certain city centre streets,
  - the M50 motorway, and
  - the entrance to and exit from the Dublin Port Tunnel.
3. Levels of nitrogen dioxide are well within the EU limits in many residential areas – Away from busy roads the levels of nitrogen dioxide drop significantly and are well beneath the recommended EU limits in many residential areas.

As a direct consequence of these diffusion tube studies, nitrogen dioxide monitoring stations were subsequently established at St John's Road West (commenced first full year of monitoring in 2019), Pearse Street (commenced first full year of monitoring in 2020) and Dublin Port (commencing first full year of monitoring in 2020). It is worth noting that the measured exceedance at St. Johns Rd. West in 2019 confirmed the predicted exceedance presented in the EPA's Urban Environmental Indicators Report. This in turn led to the necessity to prepare this plan and underlines the importance and value of such studies.



The two figures below indicate

- i. the geographic spread of the diffusion tubes deployed in Dublin during 2017
- ii. the results obtained



- |                          |                                 |                      |
|--------------------------|---------------------------------|----------------------|
| 1. Dr Steevens' Hospital | 10. North Wall Quay 2           | 19. Pearse Street 3  |
| 2. Victoria Quay         | 11. North Wall Quay 3           | 20. Pearse Street 4  |
| 3. Wolfe Tone Quay       | 12. North Wall Quay 4           | 21. Charlemont Mall  |
| 4. Benburb Street        | 13. 13 Pigeon House Road        | 22. Charlemont Place |
| 5. Old Abbey Street      | 14. Sean Moore Road             | 23. Ranelagh Road    |
| 6. Gardiner Street Lower | 15. Ringsend Fitzwilliam Street | 24. Kingsland Parade |
| 7. Amiens Street North   | 16. York Street                 | 25. Wynnefield Road  |
| 8. Amiens Street South   | 17. Pearse Street 1             |                      |
| 9. North Wall Quay 1     | 18. Pearse Street 2             |                      |

Figure 2.5: Location of diffusion tube sampling sites (2017)

With respect to the results below, it should be noted that the diffusion tubes were dispersed in groups (or clumps) in close proximity to each in different locations. Therefore, as might be expected, the results for each location in each group would be broadly similar. In deciding where to subsequently locate a national reference air quality monitoring station in a given general area (i.e. around St. Johns

Rd. West or Pearse St., due regard to the siting criteria in the Air Quality Standards Regulations 2011 was necessary.

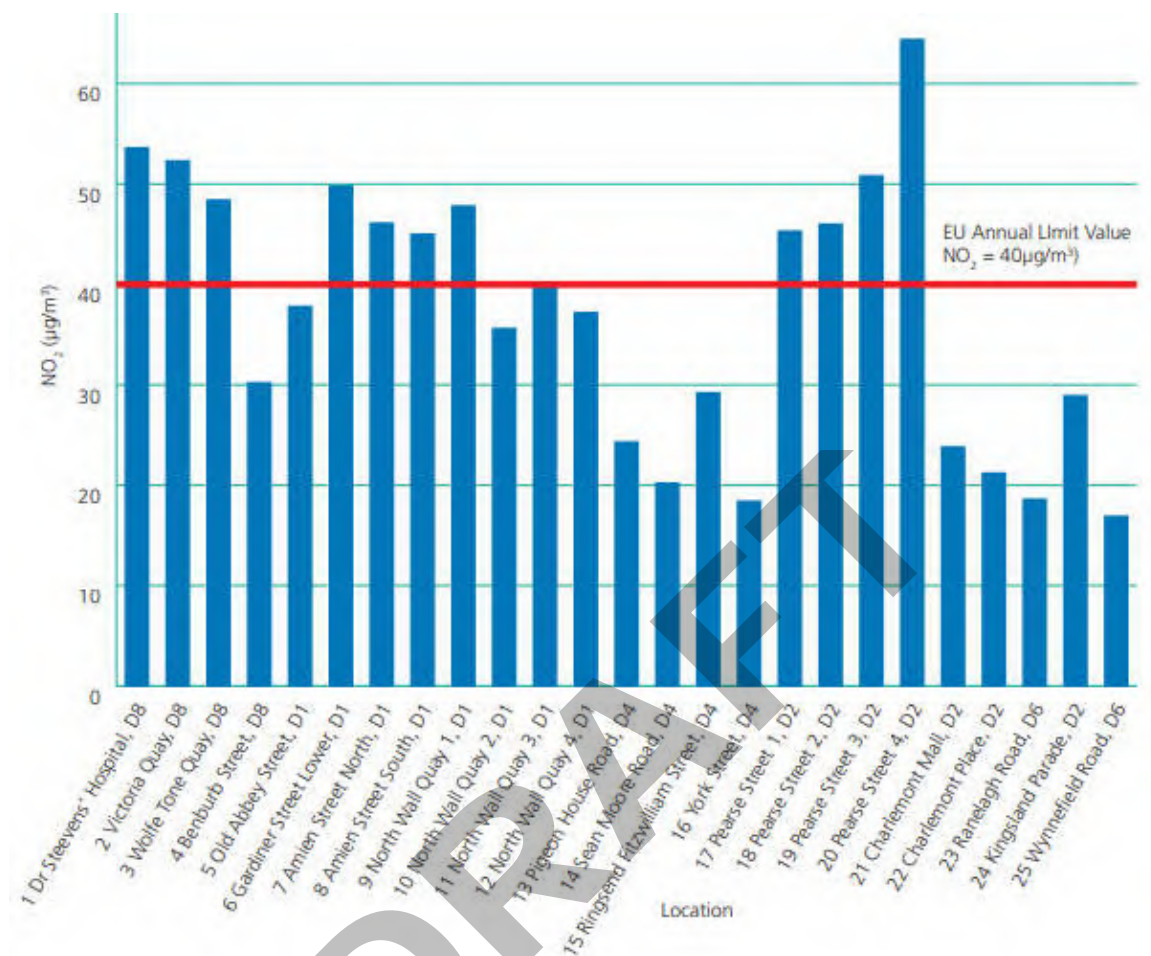


Figure 2.6: Nitrogen dioxide diffusion tube results (2017)

## 2.12 Follow Up Steps - Urban Transport Related Air Pollutants (UTRAP) Working Group.

The Environmental Protection Agency formally informed the European Commission on 30 September 2020 of the exceedance recorded at St. John Rd West for 2019, and outlined the procedure that would be followed to address this matter. It is crucial to make clear at this juncture, that as a direct result of the findings of the *EPA Urban Environmental Indicators: Nitrogen dioxide levels in Dublin Report*, the Department of the Environment, Climate and Communications (DECC) and the Department of Transport (DoT) established the Urban Transport-Related Air Pollution (UTRAP) Working Group in late 2019. [See here for more on UTRAP](#)

The UTRAP group includes representatives from the Department of Health, Department of Finance, Department of Public Expenditure and Reform, National Transport Authority, Transport Infrastructure Ireland, Environment Protection Agency, Dublin City Council, South Dublin County Council, Dublin Bus, Bus Eireann, Health Services Executive, Road Safety Authority and the Climate Action Regional Office.

The Terms of Reference or UTRAP are as follows:

1. Enhance awareness of clean air legislation and its requirements generally, and specifically in relation to nitrogen dioxide and other transport related air pollutants, amongst relevant stakeholder organisations;
2. Provide a forum to enhance understanding of the causes and the health and environmental impacts of nitrogen dioxide air pollution and other transport related air pollutants in conurbations;
3. Identify developments that may impact on nitrogen dioxide levels and other transport related air pollutants in conurbations, e.g. evolving technical standards, and quantify the impact under likely future scenarios;
4. Identify examples of best practice in combatting nitrogen dioxide air pollution and other transport related air pollutants in conurbations, particularly road traffic-related air pollution, assess applicability and any barriers to their implementation in an Irish context;
5. Consider a range of options for potential measures and any associated actions and supports required to facilitate their effective uptake to address nitrogen dioxide and other air pollution; identify measures most suitable to Ireland and appropriate implementation bodies; and
6. Present the final UTRAP recommendations to both Ministers for consideration by Government.

An interim progress report has been issued and the UTRAP group will issue a final report later in 2021. This report will detail the final suite of recommendations designed to support a decrease in nitrogen dioxide levels in the urban environment and set out a timeline for implementation. The group will continue to meet to support the implementation phase.

This initiative of establishing UTRAP is a clear recognition that addressing nitrogen dioxide levels in the Dublin region involves multiple stakeholders, each playing their respective roles to the full.

The Dublin local authorities are a crucial element in preparing this plan for this purpose, have key roles in its implementation, and as will be borne out by the measures proposed, are equally reliant on the collaboration of all the stakeholders to achieve shared goals.

## 3.0 Sources of NOx Emissions

### 3.1 Introduction

Many areas of activity impact on air quality, power plants, industry, gas and oil boilers, however in relation to urban areas it is largely transport activities and the internal combustion engine which cause exceedances of NO<sub>2</sub>. Accordingly, this plan is focused on road transport emissions.

The EPA report on national air pollution emissions as part of Ireland's obligations under the Convention on Long Range Transboundary Air Pollution and the National Emissions Ceiling Directive. Below is a breakdown of the sources of NO<sub>x</sub> and the trend in transport NO<sub>x</sub> emissions for Ireland as reported by the EPA to the European Environment Agency. Table 3.1 below shows the breakdown of overall national emissions. Emissions from road transport will be a higher percentage in urban Areas, which is the focus of this plan; however, it is informative of the overall emissions and sources of NO<sub>x</sub>.

Figure 3.1 2019 NO<sub>x</sub> Emissions Ireland

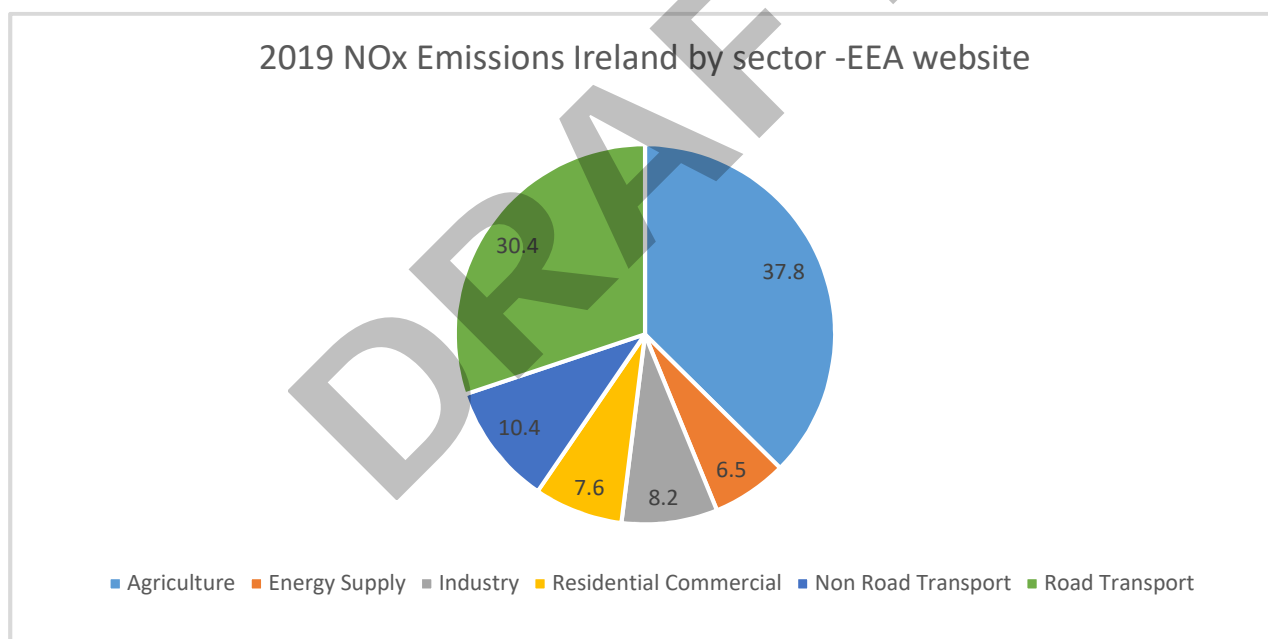


Figure 3.2 below shows transport emissions have halved over a period of 30 years despite an increase in traffic volumes.

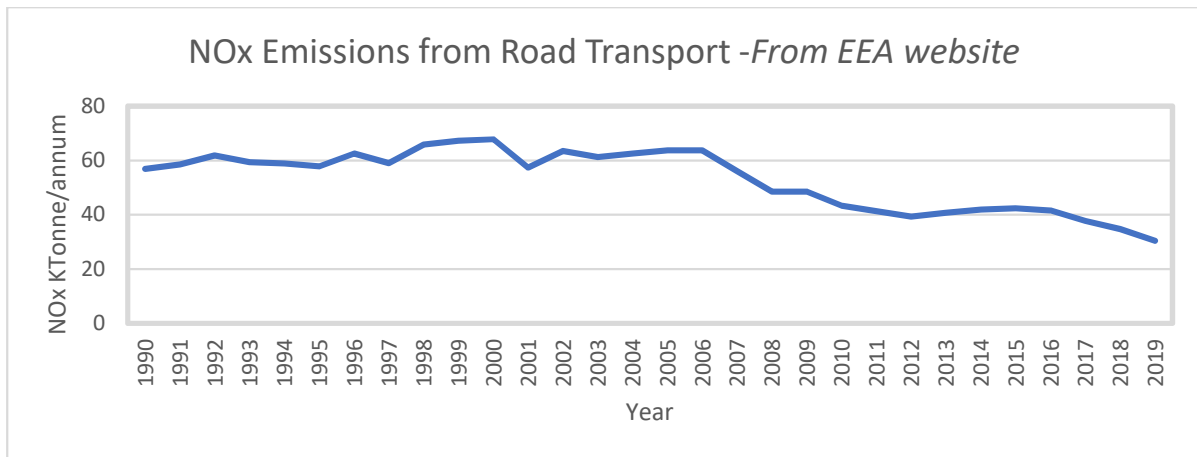
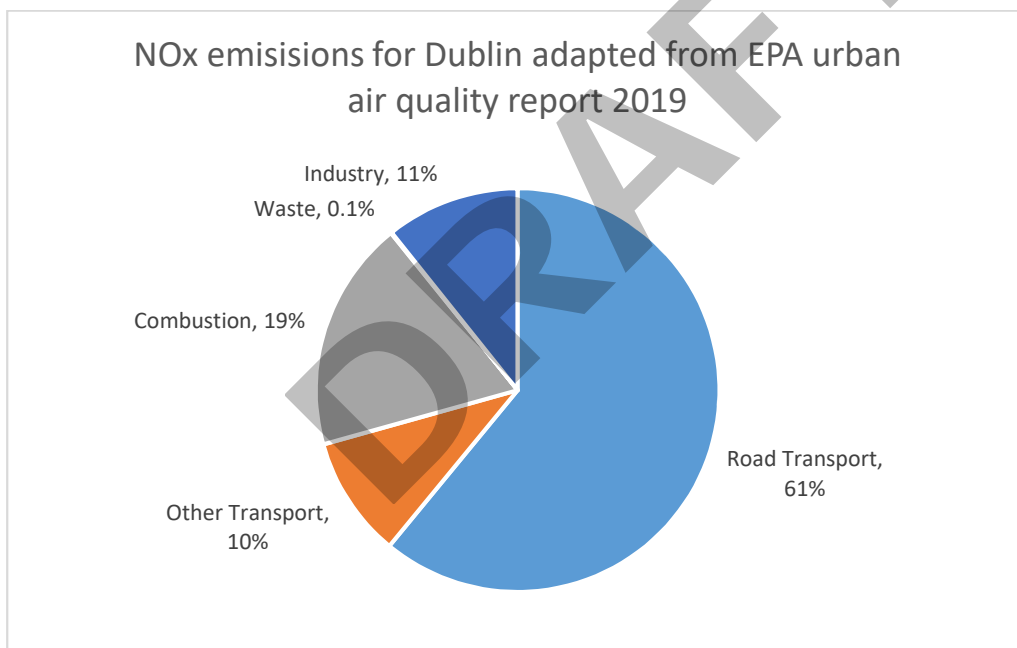


Figure 3.2 NOx Emissions from Road Transport

The EPA also published a study on Urban Air Quality Modelling of Dublin July 2019 that calculated reported on NOx emissions in the Dublin Area and is shown below in Figure 3.3

Figure 3.3 NOx Emissions for Dublin



### 3.2 Vehicle Emissions Standards

Vehicle emission standards road vehicles are governed by EU directives and regulations - Regulation (EC) No. 715/2007 and it's implementing Regulation (EC) No. 692/2008, as amended) Table 3.1 below shows the limits for the range of pollutants for the various Euro standards. There has been controversy over the NOx standards for diesel vehicles in that real driving emissions are sometimes a factor of 10 greater than the laboratory conformity test in the regulations. Figure 3.4 below shows the discrepancy. In addition, defeat devices to cheat the test were discovered to have been installed by a



number of manufacturers. This led to a revision of the standards and the inclusion of a RDE (Real Driving Emissions) conformity test. The emissions from the RDE test were allowed to exceed the standard for an interim period that expired in January this year.

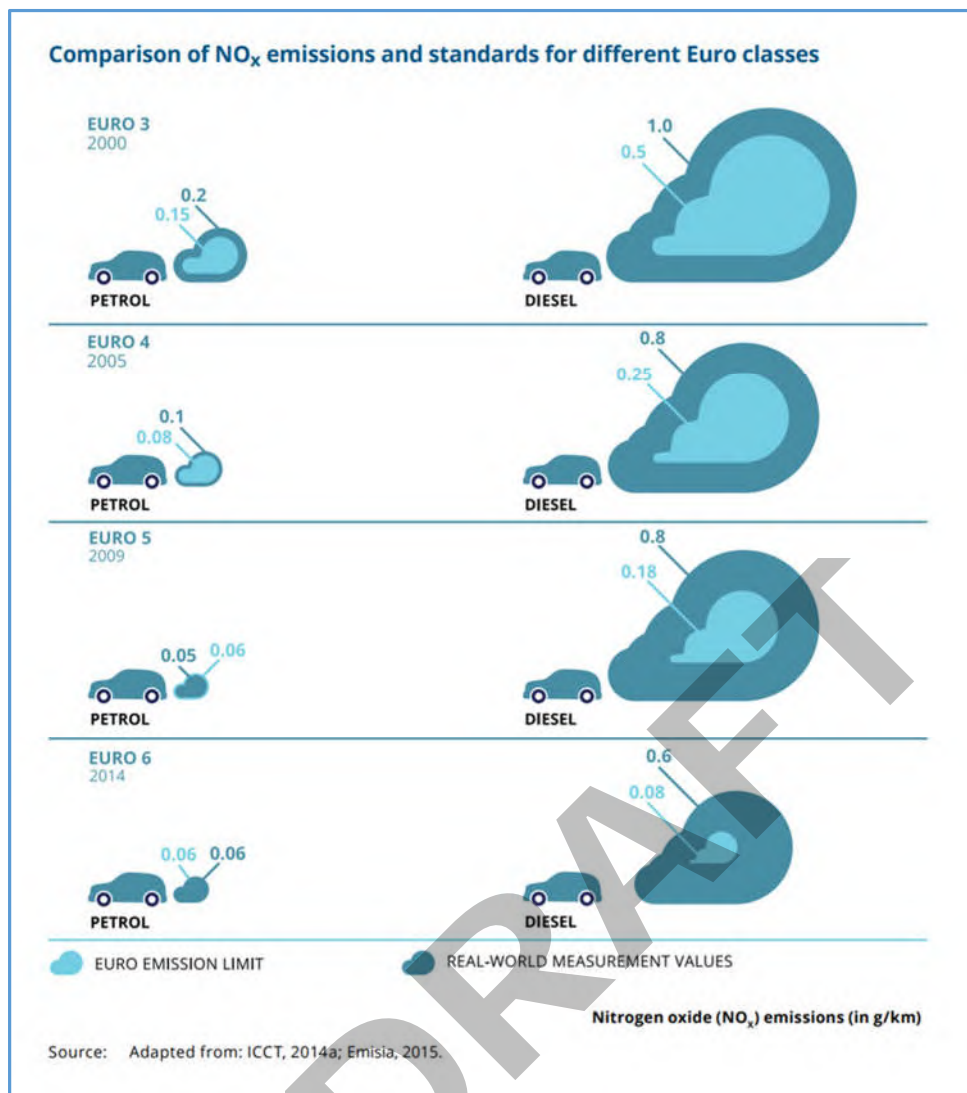
Table 3.1 from European Environment Agency 2016<sup>1</sup>

**Emission limits (g/km) of the successively introduced Euro emission standards for passenger vehicles**

Diesel	Date	CO	NMHC	NO <sub>x</sub>	HC + NO <sub>x</sub>	PM	PN
Euro 1	July 1992	2.72	–	–	0.97	0.14	–
Euro 2	January 1996	1.0	–	–	0.7	0.08	–
Euro 3	January 2000	0.64	–	0.50	0.56	0.05	–
Euro 4	January 2005	0.50	–	0.25	0.30	0.025	–
Euro 5a	September 2009	0.50	–	0.180	0.230	0.005	–
Euro 5b	September 2011	0.50	–	0.180	0.230	0.005	6.0 × 10 <sup>11</sup>
Euro 6	September 2014	0.50	–	0.080	0.170	0.005	6.0 × 10 <sup>11</sup>
Petrol	Date	CO	NMHC	NO <sub>x</sub>	HC + NO <sub>x</sub>	PM	PN
Euro 1	July 1992	2.72	–	–	0.97	–	–
Euro 2	January 1996	2.2	–	–	0.5	–	–
Euro 3	January 2000	2.3	–	0.15	–	–	–
Euro 4	January 2005	1.0	–	0.08	–	–	–
Euro 5	September 2009	1.0	0.068	0.060	–	0.005	–
Euro 6	September 2014	1.0	0.068	0.060	–	0.005	6.0 × 10 <sup>11</sup>

<sup>1</sup> Explaining road transport emissions, a non-technical guide, EEA 2016

Figure 3.4 (EEA 2016)



## EU emissions standards for vehicles

A useful document explaining the revision of standards was published by the European Environment Agency “[Explaining road transport emissions” 2016](#) .

Vehicle emissions are speed dependent and congestion causing slow speeds, engine idling and acceleration can increase emissions.

## 5 Cities Demand Management Study

The 5 Cities Demand Management Study undertook a survey of cars entering the city centre to establish the average emission factor using real driving emissions calculation, the study also predicted changes to the average emission factor over this decade based on existing policy measures and

emission standards. The forecast shows a drop in the emission factor in Dublin from 0.284 g/km in 2019 to 0.123 g/km in 2030, a reduction of 57%.

#### Potential Changes to EU Emissions standards

The European Green Deal foresees a proposal for more stringent emission standards to be adopted in 2021 (Euro 7),

#### Electric Vehicles Strategy

The national climate change strategy has a target of 936,000 electric vehicles by 2030. This will require additional measures to incentivise electric vehicles or disincentivise internal combustion engine vehicles. The abovementioned reduction in average emission factors does not take into account the climate change target, the achievement of which will lead to a further substantial reduction in vehicle emissions beyond the 57% reduction forecast for 2030.

The Dublin Climate Change Action Plan has included an action to improve the roll out of electric vehicle chargers especially for dwellings without driveways to charge their own vehicles. A recent study has estimated the charging requirement based on various scenarios for the roll out of electric vehicles. Policy measures to achieve targets for EVs remain uncertain; however, a more rapid replacement of internal combustion engines by electric vehicles will lead to a more rapid improvement in air quality in the city including NO<sub>2</sub>

#### Low Emission zones

Low emission zones are zones that charge entry into a zone based on emission factors for individual vehicles. These are being examined by the 5 cities demand management study and have the potential to target reductions in NO<sub>2</sub> in urban areas and are dealt with further in chapter 5



#### London Ultra Low Emission Zone

In 2019, a low emission zone was introduced in central London. A daily charge of £12.50 is imposed on the following vehicles

- Motorbikes that do not meet Euro 3 standards (most vehicles pre-2007)
- Petrol cars and vans that do not meet Euro 4 standards (most vehicles pre-2006)
- Diesel cars and vans that do not meet Euro 6 standards (most vehicles pre-2015)

This will in the future apply to residents of the zone and is in addition to the congestion charge

A daily charge of £100 is imposed on Buses, Coaches and Lorries that do not meet Euro VI standards

Compliant vehicles increased from 39% February 2017(announcement of the charge) to 75% after the first four months of operation. [Central London Ultra Low Emission Zone - Four Month Report](#)

#### Road Transport Emission Inventories

Road traffic modelling calculating, traffic flows and speeds for different classes of vehicles combined with emission factor functions are used to calculate total emissions by link, grid or area. This modelling allows for the air quality assessment of different future transport scenarios and vehicle emissions standards. Final results of recent modelling are not fully available to show the impact of proposed public transport measures to 2030; however, it is likely that there will be significantly greater reduction due to changes to the fleet emissions compared to reductions in traffic volumes.

## 4.0 Transport, Vehicle Emissions and Land USE and their impact on Air Quality

### 4.1 Introduction

Transport related emissions of NO<sub>x</sub> are the product of vehicle emission factors and volume of vehicles on the road. Vehicle emission factors are not static but are related to speed and can be increased due to traffic congestion. Table 4.1 below shows the canal cordon count for the previous 11 years and shows a small drop in car usage and a large increase in walking and cyclists and a more modest increase in buses.

Mode	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Bus	1,680	1,740	1,814	1,704	1,688	1,539	1,503	1,539	1,504	1,528	1,652	1,637	1,837	1,852
Car	58,664	58,686	58,897	58,232	58,047	55,745	55,343	54,458	53,033	53,064	51,908	50,158	48,820	46,388
Taxi	3,825	4,583	5,079	4,980	4,809	4,862	5,277	5,458	4,955	4,699	4,779	4,098	4,399	4,292
Walk	17,114	18,594	18,360	14,618	15,092	14,551	17,070	17,495	19,711	18,727	21,473	24,936	23,858	24,691
Cycle	4,839	5,676	6,143	6,326	5,952	6,870	7,943	9,061	10,349	10,893	12,089	12,447	12,227	13,131
Goods	2,291	1,445	1,223	1,087	993	1,176	1,099	1,045	1,087	1,096	1,093	1,024	1,153	983
M.Bike	2,395	2,429	2,375	2,060	1,656	1,485	1,425	1,423	1,372	1,390	1,464	1,532	1,477	1,485

### 4.2 Transport Strategy for the Greater Dublin Area 2016-2035 (GDA transport strategy)

The key framework document for transportation is the Transport Strategy for the Greater Dublin Area 2016-2035 (GDA Transport Strategy) and its associated 6-year integrated implementation plan 2019-2024. This strategy was prepared by the National Transport Authority and was approved by the Minister for Transport and laid before the Oireachtas. Transport planning is closely tied up with land use plans and in this regard, Local Authorities in granting permission for development must ensure that it is consistent with the transport strategy.

The strategy aims to accommodate population growth and economic development in the GDA over 20 years and aims to:

- Shift more journeys from cars to public transport, cycling and walking
- Integrate with land use planning
- Investment in heavy rail, metro and luas
- Investment in bus orbital routes and improved bus services (now incorporated into Busconnects)

- Improved cycling facilities
- Investment in roads outside the M50

The strategy forecasts an increase in trips generated in the GDA of 30% due population growth. With the strategy in place, it is predicted that car trips will increase by 6% but without the strategy they would increase by 25%. Recently there has been accelerated investment in active travel (cycling & walking). In the main, this infrastructure is not additional to the plans in the GDA transport strategy and included in the assessment of future traffic flows by the National Transport Authority.

Similarly, the proposed Busconnects project is included in the strategy (orbital bus routes in the GDA transport strategy). Busconnects is aimed at improving bus journey times and other aspects of the service but might not lead to improved air quality on its own due to slower traffic speeds. Further Metro, Luas and Heavy Rail investment are beyond the time horizon of this plan and accordingly are not considered as an air pollution reduction measure in this plan.

Measures to reduce traffic volumes beyond those in the strategy further restrictions on traffic entering the areas of high NO<sub>2</sub> levels eg. parking controls, congestion charging, may be required to accelerate the reduction in NO<sub>2</sub> levels, however recommendations on further public transport infrastructure to reduce the emissions are beyond the scope of this plan and would require a change to the Transport Strategy and further environmental and economic assessment.

Closure of streets to traffic or classes of traffic might be an effective measure however, the impact of displacement or additional pollution due to congestion would have to be assessed. Two measures in the 5 Cities Demand Management Study are options, congestion charging and/or Low Emissions Zones

#### 4.3 5 Cities Demand Management Study

The Department of Transport commission Systra to undertake a study on traffic in the cities of Dublin, Cork, Galway, Limerick and Waterford titled “Five Cities Demand Management Study” a phase 1 recommendations report was published in March this year to provide a *“focused and evidence based approach to addressing the carbon, congestion and air quality challenges facing our cities”*. The report list and assess options for addressing the challenges. Further work is due to be published quantifying the impacts of the options. Many of the measures discussed in chapter 5 are taken from this study

#### 4.4 Remote Working

Remote working has the potential to reduce the demand for travel and lead to a reduction in NO<sub>x</sub> emissions. Government Policy is for a degree of remote working in the public service and many firms are setting policies that would allow some remote working. It is too early to quantify the longer-term level of remote working and therefore assess the impact on air quality. The reduction in commuting due to remote working might be offset by a reluctance to use public transport and any road space freed up by remote working might be taken up by public transport users transferring to car transport. Remote working might encourage trend where live further away from their place of employment, travelling to work fewer days a week but for a longer distance.

#### 4.5 Land Use Planning

The four Dublin Authorities are responsible for the preparation of county and city development plans and local area plans at a sub county level. The development plans are required to be consistent with the GDA Transport Strategy and are assessed by the National Transport Authority in this regard. This plan has not identified any changes to land use plans.

#### 4.6 Bus and taxis

In the city centre area buses and taxis are a significant portion of NO<sub>x</sub> emissions. On a per passenger basis

Euro 6d buses have an emission factor (Coper 5.4) of 0.597 g NO<sub>x</sub>/km compared to 0.17g/km for a small diesel car. The bus however would be much lower emitter on a per passenger basis.

Dublin Bus have a number of hybrid buses and announced a trial purchase of hydrogen buses and have a relatively modern diesel engine fleet. There is an action in the 2019 climate action plan to evaluate fully electric buses as part of bus procurement. The NO<sub>x</sub> emissions from the private bus fleet is also an areas for NO<sub>x</sub> reduction especially as this fleet is likely to have a higher proportion of older diesel engines which are higher emitters of NO<sub>x</sub>

Similarly, for Taxis. A proportion of the Taxi fleet will be higher emitters of NO<sub>x</sub> and additional regulation to remove these from the Taxi fleet in the city centre area would lead to a reduction in NO<sub>x</sub>

## 4.7 Heavy Duty Vehicles

Similarly to cars and buses Euro standards apply to heavy duty vehicles, however further regulation of deliveries and heavy duty vehicles in the city centre is an option to be considered in particular a low emission zone which could apply to these vehicles alone to speed up the replacement of older vehicles using the city centre which could be combined with the current regulation of 5 axle vehicles using the city centre.

DRAFT

## 5.0 Measures to be adopted to reduce nitrogen dioxide in Dublin

### 5.1 introduction

This Chapter will address the measures and actions required to address nitrogen dioxide levels in the Dublin Region. These measure and actions are proposed are to be implemented over varying times scales and will require specific interventions by a range of stakeholders. In considering the measures required to reduce nitrogen dioxides level in the Dublin region, it must be emphasised that no single body has exclusive ownership of those measures. The measures are purposely presented in a “bottom up” fashion to support the principle that local authorities can take actions that have a definitive influence on air quality , albeit that may need using legal powers available under other legislation. This is particularly relevant in Ireland as the powers currently delegated to them in air quality plans are limited.

### 5.2 Measures

#### **Measure 1**

##### **Integrate “15 Minute Neighbourhoods” concept in City and County Development Plans**

The Five Cities Demand Management Study (<https://www.gov.ie/en/publication/63517-publication-of-five-cities-demand-management-study-phase-1-report-and-toolkits/>) identifies the introduction of the 15 Minute Neighbourhoods concept as the No. 1 overall ranked intervention to address demand management, decarbonisation, air quality, and urban development.

This concept has been addressed in the Regional Spatial and Economic Strategy (RSES), which sets out the mechanism for delivering the National Planning Framework at a regional level. This concept of mixed-use development envisages a range of community facilities and services being accessible in short walking/ cycling timeframes from homes or accessible by high quality public transport in larger settlements.

In its Review of the Dublin City Development Plan 2016-2022 and the preparation of a City Development Plan for 2022-2028, Dublin City Council posed the question in the Pre – Draft Consultation Process – *Is the 15-minute City an achievable goal?*

Submissions received in the pre consultation process sought a renewed focus on urban living and that the liveability of the City should be an overarching theme of the plan. Submissions sought vibrant urban centres and also that the growth of the city is aligned with the '15 Minute City' concept whereby people's daily requirements can be reached within 15 minutes by foot, bike or public transport. City and County Development Plans are subject to their own SEA process.

**PROPOSED ACTION: Dublin local authorities to adopt as appropriate "15 Minute Neighbourhoods" approach in their 2022-2028 Development Plans**

## **Measure 2**

### **Public Parking Controls**

**The Five Cities Demand Management Study** identifies public parking controls as the Number 4 ranked intervention to address demand management, decarbonisation, air quality, and urban development. Typically, the average car is parked at home for 80% of the time, parked elsewhere for 16% of the time and in active use for the remaining 3-4%.

The local authorities in the Dublin region each have comprehensive policies in their respective Development Plans to control the supply and price of parking in their functional area to achieve sustainable transportation policy objectives. These policies will be reviewed and updated as appropriate following statutory public consultation in the next iteration of City and County Development Plans 2022-2028.

**PROPOSED ACTION: Dublin local authorities to incorporate protection of air quality as appropriate in their 2022-2028 Development Plans with regard to public parking standards.**

## **Measure 3**

### **Residential Parking Standards**

Parking standards for residential developments stipulate the amount of parking (including both car parking and cycle parking) that must be provided as part of new developments. Parking standards for residential developments seek to balance ensuring there is an adequate amount of parking to cater

for potential demand with restricting provision in areas on account of the proximity of various locations to public transport. Reducing residential parking can have a direct impact on car ownership and hence the demand for car travel across all journey purposes.

The Dublin local authorities have developed residential parking standards in their respective City and County Development Plans. These will be reviewed and revised as necessary following statutory consultation and screening in the 2022-2028 Development Plans.

**PROPOSED ACTION: Dublin local authorities to incorporate protection of air quality as appropriate in their 2022-2028 Development Plans with regard to residential parking standards.**

#### **Measure 4**

##### **Workplace Parking Standards**

Similarly to the above, The Dublin local authorities have developed workplace parking standards in their respective City and County Development Plans. These will be reviewed and revised as necessary following statutory consultation and screening in the 2022-2028 Development Plans.

It should be noted that in respect of the removal of parking at workplaces, COVID-19 provides an opportunity to consider reduce parking, as less staff are travelling to work locations. In the context of COVID-19 and greater levels of staff working from home, there may be opportunities to use staff car parking spaces for more sustainable mobility usage.

**PROPOSED ACTION: Dublin local authorities to incorporate protection of air quality as appropriate in their 2022-2028 Development Plans with regard to workplace parking standards.**

#### **Measure 5**

##### **Continued Delivery of the Active Travel Programme**

In February 2021, The National Transport Authority announced a total of €240m to support sustainable transport projects across the country.

The NTA will be tasked with overseeing and supporting the development of the high-quality mobility infrastructure across all projects. The state agency will also ensure that projects are accessible, age-friendly and maximise comfort to people of all ages and abilities.



**PROPOSED ACTION: The local authorities in the Dublin region to continue implementation of the Active Travel Programme**

**Measure 6**

**Electrical Vehicle (EV) Charging Strategy**

The Climate Action Plan 2019 has set ambitious targets for the conversion of the national fleet to EV over the coming decade and beyond.

As part of this overall strategic approach, the Dublin Local Authorities launched their Electric Vehicle Charge Point Draft Strategy.

This Draft Strategy considers the public EV charging needs for a range of vehicle types out to 2030. Detailed stock modelling shows that there would be 140k EVs in the Dublin region by 2030, but only 25% (35k) of these will be reliant on public charging. Rapid hub charging has significant benefits compared to slow on-street charging and is therefore the priority technology recommended.

The Dublin region will require between roughly 500 and 4,000 residential (public) EVCPs by 2030, depending on how many rapid hubs are deployed (as preferred by each local authority).

These results back up the strategic focus on rapid charging – approximately 50 well-located 10-charger hubs could meet all residential demand, compared to thousands of on-street devices. To develop a comprehensive charging network that drives EV uptake, up to approximately 2,500 destination EVCPs and 166 en-route EVCPs will be needed and delivery is expected to be largely private sector led.

Local Authorities are well placed to have a key strategic and enabling role but would not be involved with physical infrastructure delivery or operation. The strategic approach is aligned with best practice in more developed EV markets. Evidence from other cities/regions highlights the benefits of Councils planning and coordinating deployment. It is envisaged that the Dublin LAs collaborate and play a central strategic role in enabling a region-wide charging network.

The Five Cities Demand Management Study indicates that a suite of EV charging measures could deliver a reduction of 49% in nitrogen oxide emissions.

**PROPOSED ACTION: Dublin local authorities to finalise their Electrical Vehicle (EV) Charging Strategy**

## **National - Government Level Measures**

### **Measure 7**

#### **Publication of National Clean Air Strategy**

As mentioned earlier, the Department of Communications, Climate Action and Environment (DCCAE) is developing a National Clean Air Strategy with the aim of promoting clean air policies to enhance and protect the quality of ambient air. The introduction of this strategy, which is due for publication in 2021, is a key measure in underpinning many of the other measure identified in this plan.

**PROPOSED ACTION: Awaiting publication by the Minister for Environment**

### **Measure 8**

#### **Air Quality Enabling legislation**

One of the specific measures that is of fundamental importance in the context of a National Clean Air Strategy is to provide a fit for purpose framework or air quality enabling legislation. Such a framework would include providing for the delegation of legal powers to appropriate bodies, including local authorities to introduce enhanced air quality measures.

**The Five Cities Demand Management Study** indicates that air quality enabling legislation could yield a 60% reduction nitrogen oxides emissions. While legislation in and of itself will not enact measures such as Low Emissions Zones it is expected that the existence of legislation and a framework for interventions will inform the public as to what actions might be taken. This knowledge is likely to inform vehicle purchasing behaviours and result in less demand for vehicles with the poorest air quality standards, e.g. older diesel cars.

The necessity to produce this Plan by the Dublin local authorities clearly highlights that the legislative supports for delivery are complex and that legislation should be provided for the emissions-related regulation of private cars, goods vehicles, taxis and buses.

As has been mentioned earlier in this plan, one direct consequence of the breach of nitrogen dioxide levels in 2019, led to the Department of Transport, together with the Department of Environment,

Climate and Communications, Climate & Communications establishing the multi-stakeholder UTRAP (Urban Traffic-related Air Pollution) working group. The ongoing work of UTRAP will be an important element in considering the development of appropriate air quality enabling legislation.

The Dublin local authorities are represented on UTRAP and will continue to actively engage to work with all stakeholders for going and sustained improvement in urban air quality. Specifically Dublin local authorities will utilise that representation to seek the acquisition of enhanced legislative powers.

**PROPOSED ACTION:** The UTRAP group will publish their final report in late 2021. This report will detail the final suite of recommendations designed to support a decrease in NO<sub>2</sub> levels in the urban environment nationally and set out a timeline for implementation. The group will continue to meet to support the implementation phase. The Dublin local authorities will advocate for enhanced legal powers in respect of air quality management be delegated to them.

## **Measure 9**

### **Introduction of Clean Air Zones/ Low Emission Zones**

While there is no one single additional legal power that will address all potential scenarios, one enhanced legal power deserving of detailed consideration is for local authorities to be given the authority to introduce clean air zones or low emission zones

**The Five Cities Demand Management Study** identifies that the introduction of clean air zones or low emission zones could reduce NO<sub>x</sub> emissions from transport by between 60-71% depending on the approach taken.

This approach has been used successfully in countries across Europe to restrict vehicles with higher emissions entering certain zones. The evidence suggests that the introduction of such legislation in itself influences consumer behaviour in terms of vehicle purchase and subsequently on air quality. Currently local authorities in Ireland do not have the legal powers to introduce such zones.

Action 81 of the National Climate Action 2019 gives a commitment to:

- *Develop a regulatory framework on low emission zones and parking pricing policies, and provide local authorities with the power to restrict access to certain parts of a city or a town to zero emission vehicles only.*
- *Examine the role of demand management measures in Irish cities, including low emission zones and parking pricing policies*

The nearest existing approximation to such powers under the Air Pollution Act 1987, enable the Minister for Environment as follows:

**53.—(1)** The Minister, for the purpose of preventing or limiting air pollution, may make regulations in relation to—

- ( a ) the standard, specification, composition and contents of any fuel of a type which is used in mechanically propelled vehicles or in mechanically propelled vehicles of a particular class or description or mechanically propelled vehicles in a particular area or a particular class of areas;

The enactment of primary and secondary legislation is subject to Statutory Impact Assessment by the appropriate Government Department introducing such legislation.

**PROPOSED ACTION: Local authorities be delegated powers to introduce Clean Air Zones/ Low Emission Zones as appropriate. This action is contingent on enabling legislation to permit local authorities to introduce such zones being introduced. This can be achieved either by amendment to existing legislation i.e. Section 53(1) (a) of Air Pollution 1987, or the introduction of new legislation.**

## **Measure 10**

### **Flexible Working**

#### **Making Remote Work – National Remote Work Strategy 2021**

The European Environment Agency reported that lockdown measures introduced during the Covid-19 pandemic had led to levels of nitrogen dioxide falling by more than 60% in April 2020. While this gave some insight into the potential air quality benefits of reducing work related commuting it does not reflect the impact of recent patterns of home working as part of the response to the COVID-19 pandemic on long-term travel demands

Recent studies suggest that a large majority of respondents favour a hybrid model where time working remotely blended with time in the workplace.

In January 2021, the Government announced the new 'National Remote Work Strategy' to ensure that remote working is a permanent feature in the Irish workplace in a way that maximises economic, social and environmental benefits. The strategy includes proposals for the following:

- Mandating that home and remote work should be the norm for 20 percent of public sector employment.
- Reviewing the treatment of remote work for the purposes of tax and expenditure in the next Budget.
- Mapping and investing in a network of remote working hubs across Ireland
- Legislating for the right to request remote working.

**PROPOSED ACTION: Implementation of National Remote Work Strategy. As part of that implementation local authorities are commencing a process to considerations for flexible work arrangements for their own work force**

## **Measure 11**

### **Enhanced Air Quality Monitoring and Modelling**

#### **National Ambient Air Quality Monitoring Programme (AAMP)**

Following a review of ambient air quality monitoring in Ireland, a national ambient air quality monitoring programme commenced at the end of 2017. The AAMP provides real-time air quality information from a total of 95 monitoring stations (national and local combined) nationwide of which 24 were installed in 2019. This network of stations monitor a range of important air quality parameters including particulates, heavy metals, inorganic and organic gases.

The national ambient air quality monitoring programme is built around three key pillars:

- A greatly expanded national monitoring network with automatic monitoring stations, providing enhanced real-time information to the public.
- Modelling and forecasting capability, to provide an ongoing air quality forecast to the public.
- Encouraging greater understanding and involvement of the public in air quality issues utilising citizen engagement and citizen science initiatives.

One of the direct results of the AAMP was the establishment of the monitoring station at St. John's Road West in Dublin.

The Five Cities Demand Management Study suggests that that increased air quality monitoring will lead to earlier action on air quality limit exceedances, which will contribute to driving a switch in the fleet away from older, more polluting vehicles. The Study further suggests this measure could contribute to a decrease of 48% in nitrogen dioxide levels as a result of driving this switch.

It is planned to establish a further multipollutant (including nitrogen dioxide) monitoring station in the Dublin north inner city area in the very near future, and ongoing indicative monitoring is being carried out to establish further suitable sites.

While air quality monitoring is a central pillar of air quality management, modelling is another important tool. In 2019, the EPA published their 'Urban Environmental Indicators Report'. This report that was based on data from the year 2015, included dispersion modelling techniques that showed that the concentrations of NO<sub>2</sub> were highest around:

- the M50 motorway in Dublin,
- certain city centre streets,
- the entrance / exit of the Dublin Port tunnel.

The LIFE Emerald project (see below) and the expansion of the modelling carried out in preparing this Plan (see Chapter 7) will be central to enhancing air quality surveillance in the Dublin region.

#### **PROPOSED ACTION:**

1. Additional national air quality monitoring station to be established in Dublin north inner city.
2. On completion of the indicative nitrogen dioxide campaign (end 2021) being carried by the EPA carried out by, The Dublin local authorities will work with the EPA to establish additional monitoring stations in the Dublin region as required in line with findings
3. The Dublin local authorities will collaborate with the EPA on ongoing indicative monitoring across the Dublin region
4. Air quality modelling - The work carried out on the limited modelling incorporated in the preparation of this plan highlights both the challenge required to complete that task and the necessity of having that level of detail available . Concurrently the Dublin local authorities are also commencing the process of gathering data for the preparation of noise actions plans in compliance with the EU Environmental Noise Directive. In order to make best use of the data available within local authorities, other public bodies and other sources, the Dublin local authorities will investigate in conjunction with the EPA the feasibility of establishing regional air quality modelling capacity within the local authorities.

## **Measure 12**

### **Air Quality - Citizen Engagement**

Ireland has a significant track record in successful citizen engagement in the area of environment, health and air quality. The successful introduction and ongoing extension of the ban on the burning of bituminous coal in cities and towns nationwide is one clear and internationally cited example of how public engagement has led and shaped public policy. In terms of building and strengthening public engagement in improving air quality in Dublin, it is vital to build on the high levels of support for continued roll out of air quality monitoring stations and citizen engagement programmes. The Five Cities Demand Management Study reported that stakeholders noted these measures could contribute to better quality of life, place making, improved air quality and the Smart City concept. There was also a suggestion that engagement programmes should emphasise and promote active travel as a solution to air quality issues, with awareness of such issues being high. In that context there a number of current citizen engagement initiatives that are central to the success of this plan.

### **LIFE EMERALD**

In 2021, the EPA commenced the *LIFE EMERALD* project aimed at improving understanding of Ireland's air quality. This 3-year project that will improve the level of air quality information available to the public and policy makers in Ireland.

The main objectives are:

an operational 3-day ambient air quality forecast;

near real-time mapping of the main air pollutants throughout the country and in major cities and towns;

annual mapping of air pollutants across the country

The project will support Irish citizens in making decisions that positively benefit their health on a day-to-day basis. The LIFE EMERALD project will also improve Ireland's ambient air quality management capabilities, by using an air quality modelling system to gain a better understanding of the factors contributing to poor air quality and develop a system that will provide better information to the public.

The EPA will work with a number of main project partners, namely the Department of the Environment, Climate and Communications, the Health Service Executive, the Asthma Society of Ireland, University College Cork and the Belgian research institute VITO. The project will also involve consultation and co-operation with other national stakeholders, namely the Department of Health, the Department of Transport, the Department of Agriculture, Food and the Marine, Met Éireann, Dublin City Council, An Taisce, The Central Statistics Office, Teagasc, Transport Infrastructure Ireland, the ESRI and The Irish Heart Foundation.

### **GLOBE Project**

The Global Learning and Observations to Benefit the Environment (**GLOBE**) Programme is an international science and education programme that provides school students with the opportunity to participate in citizen science. In Ireland, GLOBE is managed by An Taisce in partnership with the EPA. Participating schools learn about air quality and the weather by making scientific measurements and using their data to carry out research.

The GLOBE Air Quality Campaign is specifically a citizen science project to assess traffic-related air pollution at schools. The campaign measures nitrogen dioxide gas in the air, and is designed to raise awareness about air pollution and showcase the potential of citizen science to gather unique datasets and insights in the environment. To date, 100 schools have participated in the GLOBE Air Quality



campaigns, collecting over 350 nitrogen dioxide measurements. The campaign also provides a collaborative platform for schools to share their research and insights.

### **Airview Project**

In May 2021, Google and Dublin City Council launched “Airview Dublin” - a partnership initiative to capture Dublin’s air quality street by street as part of the Smart Dublin programme.

The initiative will see Google’s first electric Street View car, deployed around the city measuring air quality for one year. In Ireland, this is the first time a Google Street View car has been used to capture air pollution measurements, in addition to Google Maps Street View imagery. The car has been equipped with specialised mobile air sensors that can measure nitrogen dioxide (NO<sub>2</sub>), nitrous oxide (NO), carbon dioxide (CO<sub>2</sub>), carbon monoxide (CO), fine particulate matter (PM<sub>2.5</sub>), and ozone (O<sub>3</sub>).

The air pollution measurements will be used to develop maps of street-level air pollution. These, in addition to air quality pollution data insights, will be available for use by city authorities and by the public.

This project was born from a clear and urgent need for hyperlocal insights on air quality and the overall objective of the initiative is to make air pollution data and insights available to city and government authorities, the scientific community, not for profit organizations, and the public.

Google and Dublin City Council are hopeful that access to this data will encourage more people to join the conversation around air quality and enable people to make small but informed daily changes to contribute to its improvement.

In particular, the data will provide valuable insights to walkers, cyclists and outdoor enthusiasts to help them find the healthiest routes and locations for their commutes, trips and activities.

### **Clean Air Together Project**

This project aims to measure levels of nitrogen dioxide across Dublin. It will involve recruiting between 1000 and 1200 participants to deploy nitrogen dioxide diffusion tubes across the region in late 2021.

The five primary objectives of the project are to:

- Develop and deliver a methodology for large-scale citizen-based air quality monitoring of NO<sub>2</sub>.
- Generate data will provide input to the validation of EPA air quality models.
- Increase public knowledge and engagement with the topic of air quality.
- Assess the impacts of citizen-based air quality monitoring on awareness, attitudes and the potential for this to lead to behaviour change.
- Inform policy-change by working in partnership with stakeholders.

#### **PROPOSED ACTION:**

1. **Dublin City Council to establish public dashboard on Airview study results for Dublin City**
2. **Dublin local authorities to explore with other stakeholders such as An Taisce, or the Asthma Society on the establishment of a public consultative process or forum on air quality.**

#### **Measure 13**

##### **Air Quality and Health Research**

As part of its range of functions the Environmental Protection Agency manages an environmental research programme to deliver essential scientific support for environmental policy development, implementation and broader decision-making. Since 1994, the EPA has funded research that has increased national understanding of the environment, the challenges it faces and responses to these. EPA Research focuses on achieving environmental objectives, informing policy and bringing together researchers and research users. In the context of this plan, there are two EPA funded research projects ongoing of particular interest, whose findings will be of particular interest in informing and shaping public discourse and policy in relation to nitrogen dioxide levels nationally and in particularity in the Dublin region.

##### **Project 1: Impact of NO<sub>2</sub> on Health with particular emphasis on vulnerable groups**

A team of engineers, hospital consultants and environmental scientists from Trinity College Dublin are collaborating on this EPA funded project to examine the impacts of nitrogen dioxide (NO<sub>2</sub>) on health

and quality of life. Although it is possible that, to some extent, NO<sub>2</sub> acts as a marker for the effects of other traffic-related pollutants, the epidemiological and mechanistic evidence elsewhere now suggests that it would be sensible to regard NO<sub>2</sub> as causing some impact on health and quality of life. Research on this topic is particularly important in the context of very significant challenges across Europe in meeting targets for the reduction of NO<sub>x</sub> emissions from the transport sector.

The TCD team will assess how the recent findings elsewhere in relation to the associations between NO<sub>2</sub> and health impacts pertain to Ireland, with particular emphasis on vulnerable groups including children, the elderly and the socio-economically disadvantaged. Using currently available air pollution measurements, and recent research results on the influence of meteorological and source parameters (including transport vehicle and population mobility demands), they will identify a set of characteristics for the locations in Ireland that are at most risk of experiencing high levels of NO<sub>2</sub>.

They will also examine the HSE-Primary Care Reimbursement Service (PCRS) prescribing database to establish much needed baseline data linking NO<sub>2</sub> levels with the prescription of drugs used to treat asthma and chronic obstructive airways disease with the intention to consider methodologies to facilitate the collection of prospective data in the future.

Other databases, such as the Growing up in Ireland (GUI) and the Irish Longitudinal Study on Ageing (TILDA), subject to their availability, will be explored to investigate if relationships between prevalence of respiratory symptoms in vulnerable groups and NO<sub>2</sub> levels exist. Finally, the team will review policies and strategies being implemented by other countries to bring NO<sub>2</sub> within compliance levels and identify a set of effective and efficient solutions to reduce and mitigate the impact of the transport sector on NO<sub>2</sub> levels in Ireland, given its predominance in the output of NO<sub>2</sub> emissions.

## **Project 2: Redmap Project**

This project involves measuring and modelling emissions from in-use vehicles in Dublin. The project is funded by EPA-Ireland and co-funded by the Department of Transport, Tourism and Sport (DTTAS). The REDMAP project team comprises engineers from Trinity, University College Dublin and Ricardo from the UK. The team will measure and model real-world emissions using Remote Sensing (RS) and Portable Emission Measurement Systems (PEMS) from more than 150,000 vehicles at four locations over a 16-week period in Dublin. Emissions from real-world driving are often higher than estimated

emission levels calculated based on Euro emissions standards and laboratory tests. This has given rise to widely published controversy and consequently, the air quality in cities has not improved as much as was originally anticipated from stringent emission regulations in European regions and associated renewals of vehicle fleets. Due to the high density of on-road vehicles and proximity of pollutant generation to high density urban dwellings the impact of air pollution is higher in urban areas such as Dublin, so it is imperative that projects such as REDMAP accurately assess the true levels of traffic emissions.”

The real emission contribution of different vehicles considering Euro standard, fuel type, make, and categories and vehicle modifications will be utilised to improve the existing emission inventory generated using literature values. A new traffic-emission model and paired air quality model estimating pollutant concentrations will be formulated based on real-world emission factors (RD-EF). The modelling framework will illustrate the potential environmental, economic and health impacts of real emission due to new Real-Driving Emission (RDE) legislation, related policy changes and future growth considering scenario-based modelling. The project will generate guidelines on measures and opportunities to reduce actual vehicular emission on roads in Dublin.

#### **PROPOSED ACTION:**

**Dublin local authorities to formally engage with above research teams on their emerging findings and to collaborate on the formulation of practical measures and guidelines from this research.**

#### **Measure 14**

##### **Behavioural Change Campaigns to cleaner fleets**

**The Five Cities Demand Management Study** identifies this measure of targeted behavioural change campaigns to encourage low emission vehicle purchase as being highly effective and enjoying general support. – estimated that a 60% reduction in nitrogen oxides emissions is achievable. Stakeholder feedback to the study highlighted COVID-19 as creating an opportunity for change in behaviour. The results from the modelling carried in the preparation of this plan also indicate that the graduated move towards cleaner vehicles will have a significant influence on nitrogen dioxide levels in the Dublin region during the remainder of this decade. The modelling, based on a graduated move towards a cleaner fleet suggests a 25 % reduction in the St. Johns Rd. West area, separate from other interventions (see Chapter 7).

It is also clear that a significant number of the measures in this plan will be dependent on achieving necessary levels of behavioural change and it is the cumulative effect of these measures that will improve air quality.

#### **PROPOSED ACTIONS:**

- 1. Commuter/Travel surveys carried out by public bodies to include determining public attitudes towards air quality measures and commuting behaviour.**
- 2. Air quality forum (see Measure 12) to address and gauge public attitudes on behaviour change to improve air quality.**
- 3. Public consultation on City and County Development Plans to include eliciting feedback on public view on introduction of cleaner fleets and clean air/low emission zones.**

### **5.3 Framework for Measures and Actions**

The following table provides a synthesis of the measures and actions detailed above in respect of their time scale for implementation and the level (i.e. local authority, national etc.,) for that implementation.

The definition of timescales used below are referenced from the Five Cities Demand Management study whereby “Short Term” indicates implemented by 2025, “Medium Term” indicates by 2030 and Long Term indicates by 2040.

These timescales need to be considered in the context of a dynamically evolving wider environmental management priorities not least of which is the delivery of the climate action agenda.

The Five Cities Demand Management Study also provides a framework for consideration of measures in the context of an Avoid/Reduce- Shift-Improve- Manage approach as follows:

**Avoid/Reduce Demand** – avoid or reduce the need to travel.

**Shift Demand** – to more sustainable transport modes.

**Improve** – environmental sustainability of residual vehicular traffic.

**Manage** – day to day efficiency of the transport network.

**Where the** Five Cities Demand Management Study has predicted an estimate for the potential reduction in nitrous oxides (NOx) associate with such a measure this has also been included for information.

No.	Measure /Action	5 City Demand ref. if applicable	Time scale to implementation	Estimated NOx reduction (if available)
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#### Local Authority Measures

1	"15 Minute Neighbourhoods"	PP08 <b>Avoid/Reduce Demand</b> & <b>Shift Demand</b>	Short (commencement) To (ongoing) Long	
2	Public Parking controls	PTM04 <b>Avoid/Reduce Demand</b> & <b>Shift Demand</b>	Short (commencement) To (ongoing) Long	
3	Residential parking standards	PTM08 <b>Avoid/Reduce Demand</b>	Short	
4	Workplace Parking standards	PTM09 <b>Avoid/Reduce Demand</b>	Short	
5	Continued Delivery of the Active travel programme			
6	Electrical Vehicle Charging Strategy	PTM02 <b>Improve</b>		-49%

#### National - Government Level Measures

7	Introduction of National Clean Air Strategy	n/a	Short (commencement) To (ongoing) Long	
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8	Air Quality	AQ1	Short	-60%
	Enabling legislation	<b>Manage &amp; Improve</b>		
9	Clean Air Zones/	AQ4	Short	-71 %
	Low Emission Zones	<b>Manage &amp; Improve</b>		
10	Flexible Working	BC05		
		<b>Manage</b>		
		<b>Shift Demand</b>		

#### National Agencies in cooperation with Local Authorities

11	Air Quality Monitoring and Modelling	AQ2	Short	-48%
		<b>Shift Demand</b>		
12	Air Quality Citizen Engagement	AQ3	Short	
		<b>Shift Demand</b>		
13	Research		Sort to medium	
14	Behavioural Change Campaigns to cleaner fleets	BC10	Medium to long	-60%
		<b>Improve</b>		

## 6.0 Measures or Project Planned or Envisaged for the Long Term

In addition to those measures dealt with in the previous chapter there are a number of other emerging or future measures that merit consideration for the long term. These include:

- Modelling capacity at local authority level
- Research Funding
- Resourcing/Capacity Building

### 6.1 Modelling Capacity at local authority level

The value of modelling as a predictive tool for air quality management, with inputs based on known and predicted traffic volumes, vehicle types and profiles, is universally recognised. While there are measures planned by the Environmental Protection Agency to enhance their air quality modelling within the context of the National Ambient Air Quality Monitoring Programme, as described in the previous chapter, it has become evident in the preparation of this plan that having analogous modelling capacity at local authority level would be beneficial, not only for air quality management but also across a number of other sectors such as noise mapping and city planning.

#### Recommendation:

The Dublin local authorities to carry to a feasibility study on developing modelling capacity for air quality management and noise mapping

## 6.2 Research Funding

Air quality and health research have played an important role in developing public policy in Ireland. The EPA, as part of their Research Programme 2021-2030, recently launched their Research Call 2021. Amongst the research topics included in the call, two have particular relevance to nitrogen dioxide in the Dublin region:

**Topic Title: Review of emerging technologies / novel approaches for detection and quantification of the levels for Nitrogen Dioxide (NO<sub>2</sub>)**

“In Ireland and in much of the EU, NO<sub>2</sub> is monitored by using a certified ‘Indirect Monitoring’ technique. The EU is currently reviewing the use of ‘Direct Monitoring’ techniques that measure only NO<sub>2</sub>. Research in emerging air quality monitoring technologies and novel approaches that are EU compliant could help further tackle Ireland’s issues in relation to increases in air pollutants (existing and emerging) from transport that is resulting in exceedances in NO<sub>2</sub>. Research would allow Ireland to explore mechanisms for achieving the highest international air quality standards. This research is considered an opportunity to improve monitoring and assessment, inform regulatory decision making, assist in the development of technologies and identify solutions to reduce unnecessary exposure to poor air quality, for Ireland.”



**Topic Title: An international best practice review of the localised and wider pollutant contribution of large railway hubs on air quality, in large urban centres**

This innovative research project will gather information on the best international practice in assessing the impact of rail emissions at large railway hubs and the impact on the localised air quality in high-density residential/urban centres. It will allow the provision of the best evidence-based advice to the public and other stakeholders. The proposed research project should also ensure alignment with the Urban Transport-Related Air Pollution (UTRAP) Working Group process.

Proposals are invited to:

- Undertake a comprehensive review of best EU practice and apply to Irish data on how to mitigate against/reduce high contributions of harmful emissions.
- Apply this assessment of best international practice to Ireland by ground truthing on selected Irish sample sectoral sites/case studies to pilot.

Recommendation: Dublin local authorities to request the EPA to grant them representation on the Technical Steering Committees of these projects

### 6.3 Resourcing/Capacity Building

#### Local Authority Resources

The Programme for Government provides a commitment to develop a regional approach to air quality and noise enforcement. This approach could also consider possibility of developing capacity for air quality monitoring, modelling and management at a regional level in the Dublin Agglomeration.

Such an approach, with appropriate resources in place could be fundamental in the successful implementation of this plan and has other positive benefits in complementary areas such as noise mapping and noise action planning.

#### Urban Traffic Management Centres

The Five Cities Demand Study identifies urban traffic management as an effective traffic demand management tool. Dublin City Council operate Dublin's Traffic Management Centre in collaboration with Dublin Bus, AA Roadwatch and An Garda Síochána.

Using over 300 CCTV cameras and SCATS signalling technology, traffic volumes at hundreds of junctions are monitored and junction timings are adjusted dynamically depending on traffic flows. When traffic accidents occur, traffic light timings can be overridden to reduce congestion. Investment is ongoing to use the data gathered to drive further automation and incident detection.

Further integration of traffic management with public transport operation will take place when Dublin City Council's Traffic Management Centre is co-located with the recently approved new National Train Control Centre to be constructed at Heuston Station.

This control centre will oversee management of all train traffic in the country and all road transport in Dublin. There are potential benefits for continued NTA investment in control centres for all public transport modes in each of the cities, as public transport supply increases through the delivery of the planned city strategies.

Such a traffic control centres has a key role in more efficiently managing the capacity of the existing transport network, smoothing demand through integrated partnership working and the pushing out of key disruption information combined with travel alternatives. They offer substantial congestion management benefits, with correlating benefits for reducing carbon and improving air quality and the urban environment.

These traffic management systems can also integrate environmental monitoring as one of the criteria in traffic management and the evolution of the next generation of reliable and relatively low cost air quality sensors opens up the possibility of developing this capacity.

## 7.0 Air Quality Modelling Results

### 7.1 Introduction and Overview

As part of the production of this Air Quality Plan (AQP), the Environmental Protection Agency (EPA) supported the four Dublin local authorities by specifically modelling nitrogen dioxide levels for a number of scenarios, involving a base year and four future scenarios.

To inform the AQP, the EPA assessed monitoring and modelling data to get a wider understanding of the current and future air quality situation around the local area of the measured exceedance. The area of assessment within the vicinity of St Johns Road West is the area covered by the bold rectangle in Figure 7.1 below. Completing Air Quality modelling across the Dublin Region would be a significant undertaking beyond the timeframe available for the production of this Air Quality Plan and has thus not been possible at this time. However, at the time of drafting of this Plan it is known that the EPA are progressing wider air quality modelling of Dublin and this will be published in 2022.

The approach adopted for this AQP thus makes best use of the work underway by the EPA and focuses output at the location of the St John's Road West monitoring station to demonstrate the positive impacts that predicted future changes to transportation fleet, and emissions from same, is likely to have on air quality in the vicinity of the St John's Road West monitoring station.

A copy of the EPA report is available in Appendix E.

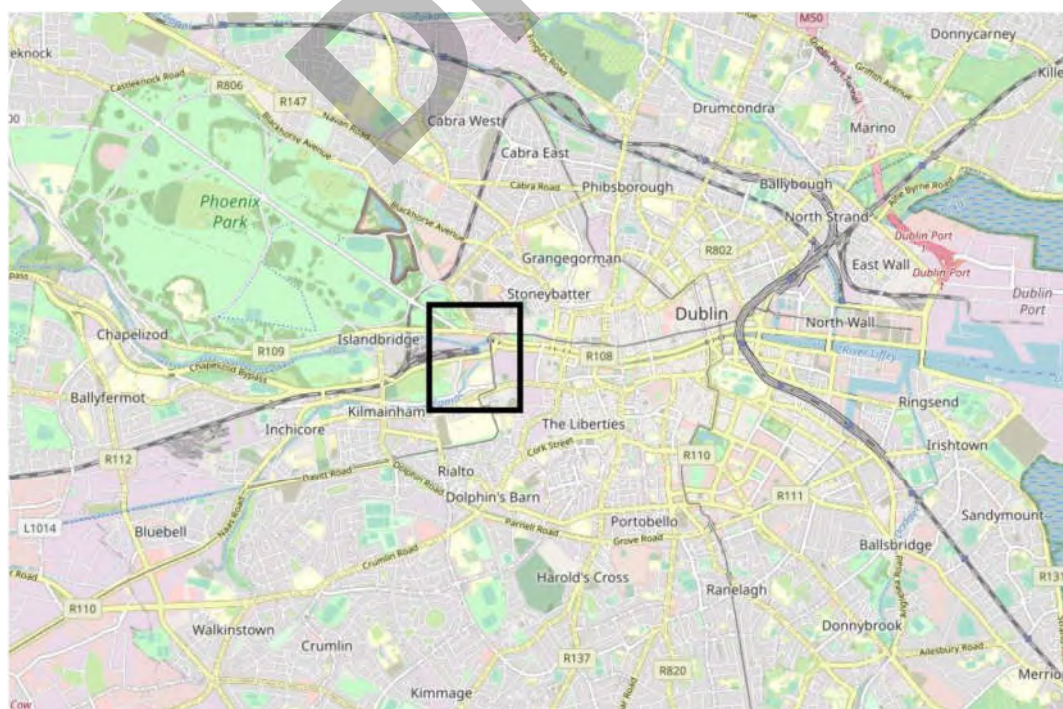


Figure 7.1 – Area of Air Quality Modelling Assessment (Marked in Bold)

## 7.2 Methodology

The EPA completed the air quality modelling of the assessment area using the urban scale model ADMS-Urban and the outputs have been evaluated and verified by the EU DELTA tool in conjunction with the model developers own model evaluation tool kit, see EPA report in Appendix E.

As noted above the modelling was completed for a base year and four future scenarios. These scenarios were chosen by the four Dublin Local Authorities and are set out below;

- 2019 Basecase scenario
- 2028 Business as Usual scenario
- 2028 Intervention scenario
- 2030 Business as Usual scenario
- 2030 Intervention scenario

The traffic data and emission factor forecasts in relation to fleet growth and changes have been taken from existing national traffic models (National Transport Authority (NTA) Regional Modelling System) and relevant transport demand management studies (Five Cities Demand Management Study). For example, the Five Cities Demand Management Study identified a measure of targeted behavioural change campaigns to encourage low emission vehicle purchase as being highly effective to contribute to achieving greater emission reductions. This behavioural change is reflected in measure 14 set out earlier in chapter 5 of this Air Quality Plan.

The business as usual case reflects the change to fleet profiles based around forecasted car sales and changes to fuel/emissions profile of this changing fleet. The intervention scenario included additional measures aimed around electrification of the various elements of the fleet to demonstrate the effect that further incentives to drive accelerated electrification might have on air quality. The measures included in this sensitivity intervention scenario include;

- 50% electrification of the taxi fleet
- 50% electrification of the bus fleet
- 20% electrification of the passenger car fleet
- 

## 7.3 Results

The modelled results for each of the five scenarios is set out in the table below;

Scenario	Modelled Annual Average NO <sub>2</sub>  St John's Road Receptor  (µg/m <sup>3</sup> )	Measured Annual Average NO <sub>2</sub>  St John's Road Receptor  (µg/m <sup>3</sup> )	Absolute NO <sub>2</sub> Concentration Reduction  (µg/m <sup>3</sup> )	Percentage NO <sub>2</sub> Reduction from 2019 Basecase Scenario (%)
2019 Basecase	39.0	43.4	-	-
2028 Business as usual	31.3	-	7.7	19.7
2028 Intervention	29.4	-	9.6	24.6
2030 Business as usual	30.6	-	8.4	21.5
2030 Intervention	29.0	-	10.0	25.6

As can be seen from the above results the model output for 2019 is very close to that which was measured at this location in 2019. The results are within 10% of the measured.

The results from the scenarios all show significant reduction in the nitrogen dioxide concentrations when compared to the 2019 basecase scenario with the results for the business as usual case showing reductions of 21.5% out to 2030 and up to 25.6% where the further interventions outlined are achieved within this timeframe. These scenarios all bring the predicted annual average air quality values for NO<sub>2</sub> at this location back within the legal limit of 40 µg/m<sup>3</sup>. This would remain the case even if an allowance for the 10% discrepancy between modelled and measured values was applied as indicated by the modelling of the baseline case.

Based on the modelling results, it would be reasonable to conclude that the realisation of the anticipated "business as usual" fleet changes, together with additional interventions that may result from the range of measures proposed by this Plan and other National strategies, will have a beneficial effect on reducing NO<sub>2</sub> levels across the Dublin Region, although it is acknowledged that the actual reductions will vary across the region depending on local traffic patterns. The EPA modelling of the Dublin region will provide additional clarity on this in 2022.

It is thus reasonable to conclude, based on the modelling results that the Dublin agglomeration will be compliant with the NO<sub>2</sub> limits by 2028 or earlier. Measures may be required to accelerate the timeline to achieve compliance such as those set out in chapter 5 and in particular, incentives to move to lower emission vehicles such as financial incentives or the introduction of low emissions zones.

DRAFT

## 8.0 Public & Stakeholder Consultation

### 8.1 Overview of legislative requirements

The Ambient Air Quality and Cleaner Air For Europe (CAFE) Directive (2008/50/EC) sets air quality standards for European Union member states and has been transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No 180 of 2011 as amended). The directive and regulations records air quality standards in Ireland and other member states for a number of pollutants. One element of the implementation of this Directive involves carrying out air quality monitoring for a number of specified air pollutants at a network of air quality monitoring stations throughout Ireland. These Regulations also provide for the dissemination of public information, including information on any exceedances of the target values, the reasons for the exceedances, the area(s) in which they occurred and appropriate information regarding effects on health and impact on the environment.

As mentioned in Chapter 1 of this Air Quality plan, in 2019 there was an exceedance of the annual permissible limit value for Nitrogen dioxide at one of the monitoring stations in Dublin. As a result of this exceedance, under the national legislation, the relevant local authorities are obliged to prepare an air quality plan to identify the root causes and formulate measures to address the exceedance of that pollutant. One of the legal obligations under the Air Quality Standards Regulations 2011 on local authorities in preparing this air quality plan is to ensure that it is “clear, comprehensible and accessible”.

However, within the regulations, there is no mention of a requirement to go to Public Consultation with the Air Quality Plan. The legislation does include a requirement to consult with a list, set out in Schedule 17, of Prescribed Bodies as follows: The Minister for Health, The Health Service Executive, Local Authorities, An Bord Pleanála, Cystic Fibrosis Association of Ireland, The Asthma Society of Ireland, Met Éireann, Teagasc.

Notwithstanding this the Dublin Local Authorities are aware of their obligations to encourage and promote public engagement and consultation and enable citizens’ voices to be heard, though such instruments as the Aarhus Convention on Access to information, Public Participation in Decision-Making and Access to Justice in Environment Matters (Directive 2003/4/EC on Public Access to Environmental Information). Therefore, in the interests of involving the public and seeking engagement and consultation with the public a decision was made to engage members of the public

and go to Public Consultation for a four-week period on the 18<sup>th</sup> October 2021. Our methodology for public consultation is set out below in Section 8.2.

## 8.2 Methodology adopted

One of the legal obligations under the Air Quality Standards Regulations 2011 on local authorities in preparing this air quality plan is to ensure that it is “clear, comprehensible and accessible”.

Despite there being no legal requirement for public consultation a 2-step approach to Consultation was adopted for both Stakeholder/Prescribed Bodies and with members of the Public.

### **Stakeholder/Prescribed Bodies Consultation:**

The initial approach towards engagement with Prescribed bodies, as listed in Schedule 17 of the Air Quality Standards Regulations 2011 (S.I.180/2011) involved writing to each of them to notify them of the Air Quality Plan and invite them to a consultation meeting/workshop on to discuss same. In addition to the prescribed bodies an invitation was extended to An Taisce who had previously expressed an interest in the drafting of the Air Quality Plan. A positive response was received and on 1<sup>st</sup> September 2021 held a consultation meeting/workshop with the following prescribed bodies and An Taisce;

- o Asthma Society of Ireland
- o Health Service Executive – Public Health
- o Health Service Executive – Environmental Health
- o Teagasc
- o Met Eireann
- o An Taisce (not a Prescribed Body)

The consultation meeting/workshop took the form of a presentation and discussion around the drafting of the Air Quality Plan to improve levels of nitrogen dioxide (NO<sub>2</sub>) in ambient air in Dublin. Initial feedback was sought at the workshop and the participants were advised of our plans for formal consultation with the Public later in the year.



### **Public Consultation:**

Regarding Public Consultation, the public were initially notified through the media, a Newspaper advert was published on 23<sup>rd</sup> July 2021 and also published on Social media. This notification advised that the four Local Authorities (Dublin City Council, Fingal County Council, Dun Laoghaire Rathdown County Council and South Dublin County Council) were together preparing a new Air Quality Plan to address a single exceedance of the annual NO<sub>2</sub> level. It advised that the draft Plan would be subject to a period of public consultation later in the year and that it must be submitted to the European Union by the end of 2021. The notification invited members of the public at this initial stage to submit their views on the exceedance of Air Quality in the Dublin Region and the drafting of the Plan.

Following this initial step, a period of formal Public Consultation commenced on the 18<sup>th</sup> October 2021 for a 4 week period. The Public Consultation was hosted online on Dublin City Council's online Consultation hub on behalf of all four Local Authorities. Each of the four Local Authorities advertised the public consultation on their own websites and social media accounts and provided a direct link to the Dublin City Council Consultation hub.

A summary of the responses and issues raised by the public consultation process are detailed in section 8.3 below.

### **8.3 Summary of responses and replies**

To be completed post consultation period.

### **8.4 Conclusions and proposed actions arising from public consultation**

To be completed post consultation period.

## 9.0 Strategic Environmental Assessment (SEA) and Appropriate Assessment (AA) Screening

### 9.1 Overview of legislative requirements

The Dublin Regional Air Quality Action Plan to improve levels of nitrogen dioxide (NO<sub>2</sub>) in ambient air in Dublin has been prepared in accordance with the requirements of the Planning and Development (Strategic Environmental Assessment) Regulations 2004 and Article 6 of the Habitats Directive 92/43/EEC.

The SEA and AA process, carried out in tandem with the preparation of the Dublin Regional Air Quality Action Plan to improve levels of nitrogen dioxide (NO<sub>2</sub>) in ambient air in Dublin, have ensured full integration and consideration of environmental issues throughout the action plan preparation process.

These are available as separate documents, to be read in conjunction with this Dublin Regional Air Quality Action Plan to improve levels of nitrogen dioxide (NO<sub>2</sub>) in ambient air in Dublin.

The SEA Screening Report and Screening Statement in support of the AA and Natura Impact Report are included in the Appendices of this Plan. The SEA Determination is available in Appendix D.

### 9.2 Conclusion

The Screening of the Dublin Air Quality Plan shows that the plan will not result in land use activities that have the potential to result in negative impacts to the qualifying features of interest of European Sites occurring within or surrounding the plan area and will not have the potential to compromise the achievement of the conservation objective of these European Sites. The examination of the plan has found that the plan will have the potential to contribute to the conservation management of European Sites within and surrounding the plan area and will thus have positive implications for the conservation objectives of these European Sites.

In light of the findings of this report, it is the considered view of the authors of this Screening Report for Appropriate Assessment that it can be concluded by the Dublin Region Local Authorities that the Plan is not likely, alone or in combination with other plans or projects, to have a significant effect on any European Sites in view of their Conservation Objectives and on the basis of best scientific evidence and there is no reasonable scientific doubt as to that conclusion.

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## 10.0 Proposed framework for improving ambient nitrogen dioxide level

### 10.1 Overview

The preparation of this plan and the elaboration of measures (already in progress or proposed) highlights that addressing air quality involves a wide range of stakeholders working with common purpose as the measures identified include a raft of policy, legislative, and behavioural interventions. In practice, this requires ongoing action at national as well as regional and local level as well as a high level of engagement with the public. The following sets out the main elements of the framework required to address these matters.

### 10.2 National level

As mentioned earlier in this plan, one direct consequence of the breach of nitrogen dioxide levels in 2019, was the establishment of the multi-stakeholder UTRAP (Urban Traffic-related Air Pollution) working group by the Department of Transport and the Department of Environment, Climate and Communications, Climate & Communications

The UTRAP Working Group was established to achieve the following six objectives:

1. Enhance awareness of clean air legislation and its requirements generally, and specifically in relation to NO<sub>2</sub> and other transport related air pollutants, amongst relevant stakeholder organisations
2. Provide a forum to enhance understanding of the causes and the health and environmental impacts of NO<sub>2</sub> air pollution and other transport related air pollutants in conurbations
3. Identify developments that may impact on NO<sub>2</sub> levels and other transport-related air pollutants in conurbations, e.g. evolving technical standards, and quantify the impact under likely future scenarios
4. Identify examples of best practice in combatting NO<sub>2</sub> air pollution and other transport-related air pollutants in conurbations, particularly road traffic-related air pollution, assess applicability and any barriers to their implementation in an Irish context

5. Consider a range of options for potential measures and any associated actions and supports required to facilitate their effective uptake to address NO<sub>2</sub> and other air pollution; identify measures most suitable to Ireland and appropriate implementation bodies

6. Present the final UTRAP recommendations to the Minister for consideration by Government

The Interim Report issued by UTRAP in March 2021 [see more here](#) made 23 Recommendations and in the context of providing a framework for oversight of the implementation of this plan this working group provides a platform for bringing appropriate stakeholders together.

Two of the recommendations made address this specific role i.e.

#### **Recommendation 22**

UTRAP Group to reconvene and review the findings and 'Road map' of the Five Cities Traffic Demand Management Study to support local authorities in implementing suitable traffic demand management measures identified for specific cities.

#### **Recommendation 23**

UTRAP Group to continue to meet at least bi-annually to monitor the implementation of the recommendations until completed.

### **10. 3 Local/Regional level**

#### **Local level**

The Environmental Protection Agency (EPA) has designed a performance framework to measure the performance of local authorities in delivering their environmental enforcement activities. Local authorities provide data and plans annually to the EPA for the purposes of assisting implementing programmes of continual improvement in the areas of environmental enforcement and inspection. By providing local and national comparative data, a local authority can benchmark their own enforcement processes and plan for making performance improvements.

The plan submitted to the EPA is known as the Recommended Minimum Criteria for Environmental Inspections (RMCEI) Plan.

The potential of adopting a regional approach to air quality management in the Dublin Agglomeration has been addressed elsewhere in this plan. One important consideration is the current resourcing of a quality functions within the Dublin local authorities.

The most recent evaluation published by the EPA in 2021 of the plans submitted by all local authorities emphasises the need to enhance capacity on a regional basis in terms of air quality management in order to protect public health [see more here](#)

On the basis of data provided by each of the local authorities in Dublin to the EPA (RMCEI Plan 2021) on their respective inspection and compliance plans for 2021, a total of 603 working days will be utilised for routine air quality inspections including air quality monitoring (90% of this accounted for by Dublin City Council which maintains its own extensive air quality monitoring network ) and 1175 days for reactive inspections related to public complaints for both air and noise issues (77% of this accounted for by Dublin City Council).

There is a compelling need to address capacity issues in the next iteration of RMCEI Plans for 2022 by the local authorities.

#### 10.4 Enhancing Public Engagement

The role of the public, both individually and collectively is critical in terms of addressing air quality issues across the board. Addressing air quality issues cuts across a wide spectrum of other issues that are of public concern including climate action and transport policy. Rather than being a “tick box” exercise, enhanced public engagement can be the driver for change on matters that appear to be politically challenging. The convening of Citizen Assemblies to consider and ultimately address societal issues have been used to good effect in Ireland.

The Citizens Assembly on how the State can make Ireland a leader in tackling climate change made a number of recommendations that have a direct bearing on reducing nitrogen dioxide levels namely:

93% of the Members recommended that the number of bus lanes, cycling lanes and park and ride facilities should be greatly increased in the next five years, and much greater priority should be given to these modes over private car use.

96% of the Members recommended that the State should immediately take many steps to support the transition to electric vehicles.

92% of the Members recommended that the State should prioritise the expansion of public transport spending over new road infrastructure spending at a ratio of no less than 2-to-1 to facilitate the broader availability and uptake of public transport options with attention to rural areas.

In terms of implementing the measures in this plan, it could be argued that in terms of their thinking the public are ahead of progress on policy. A number of the measures identified in this plan are the basis of the framework to promote informed involvement and decision making by the public.

In particular, the proposed measure to explore with other stakeholders such as An Taisce, or the Asthma Society on the establishment of a public consultative process or forum on air quality will be a crucial initiative in this plan.

### 10.5 Integration/Cross Cutting Actions (Noise, Climate Action etc.)

Addressing nitrogen dioxide levels in Dublin in the coming years should be considered in the context of a number of other actions that come within the remit of local authorities. These include:

#### **Environmental Noise Directive**

The four Dublin local authorities are also classed as one agglomeration for the purposes of the European Communities (Environmental Noise) Regulations 2018, which implements the EU Environmental Noise Directive 2002/49/EC (END). The END requires the preparation and publication every 5 years, of strategic noise maps and noise management action plans for transport noise sources (i.e. roads, railways and airports) and industry.

Currently Round 4 of this noise mapping and action planning cycle (2020–2025) is underway which entails completing noise mapping during by mid-2022 and preparation and approval of noise action plans by mid-2023.

As this plan is primarily focused on addressing transport, related noise there is clear potential for cross over actions to promote and facilitate quieter and cleaner modes of transport.

#### **Dublin Local Authorities Climate Change Action Plans 2019 – 2024**

The urgency of the climate action agenda – as articulated in the most recent report from the Intergovernmental Panel on Climate Change (IPCC) [see more here](#) underlines the need for urgent action on climate change by all sectors of society.

The report stated, strong and sustained reductions in carbon dioxide (CO<sub>2</sub>) and other greenhouse gases would limit change and as a result, benefits for air quality would come quickly.

Dealing with the transport sector is central to implementing climate action and while challenging it also presents opportunities to address wider environmental issues in the round including reducing nitrogen dioxide emissions

The four Dublin Local Authorities local authorities have produced Climate Action Plans for 2019 — 2024.

The four Dublin Local Authorities launched Dublin's first Climate Action Week (DCAW21), which ran from Monday 13<sup>th</sup> to Sunday 19 September 2021

The agreed shared objectives of the initiative were:

- Demonstrate progress on the implementation of the four Dublin local authority Climate Change Action Plans, and a regional approach to climate action;
- Engage with a full range of partners to share knowledge on efforts and innovation across sectors;
- Make climate action a 'reality' allowing citizens to see what climate action looks like;
- Promote this initiative so as to fully engage with EU and international cities and our climate peers; and
- Create a legacy so that this initiative can carry forward to subsequent years in a variety of ways.



## 11.0 Conclusions and Recommendations

### 11.1 Conclusions

- I. The 14 Measures set out in chapter 5 of this Plan has been screened for both Strategic Environmental Assessment and Appropriate Assessment and the conclusions of these screening assessments are that the Plan will not result in land use activities that have the potential to result in negative impacts on the qualifying features of interest of European Sites occurring within or surrounding the plan area and will not have the potential to comprise the achievement of the conservation objectives of these European Sites. In this regard the four Local Authorities have made a determination under section 9 (3) of S.I. No. 435/2004 – European Communities (Environmental Assessment of Certain Plans and Programmes) regulations 2004, that this Air Quality Plan for NO<sub>2</sub> is not likely to have significant effects on the environment and thus does not require the completion of a Strategic Environmental Assessment.
- II. Levels of nitrogen dioxide in the ambient air have been in compliance with European Union limit values except for an exceedance in 2009 and again in 2019, when the limit value was exceeded at one location in these years. There is no room for complacency as levels recorded at various times and locations over a number of years have approached this limit value. There is a strong possibility that the limit value could be exceeded in subsequent years unless existing initiatives continue and additional appropriate measures are considered and implemented.
- III. It is generally accepted that the dominant primary source of nitrogen dioxide in ambient air in the Dublin Region is vehicular traffic. While individual vehicle engines have become less polluting and more efficient over time, the population increases, the number of vehicles and their pattern of movement have given rise to continuing elevated levels of nitrogen dioxide.
- IV. The overriding concern with regard to an exceedance of the European limit value for nitrogen dioxide is the public health dimension. The Clean Air for Europe Directive prioritises the need to reduce pollution to levels that minimise harmful effects on human health, paying particular attention to sensitive populations. The evidence base from previous experience in the Dublin Region of health effects from pollution from bituminous fuels is a clear reminder that timely action is of the essence to protect public health when air pollution levels are elevated. A recent 2020

study concluded that when the AQIH (Air Quality Index for Health) deteriorates, there is an impact on hospital admissions for individuals with asthma, chronic obstructive airways disease and heart failure.

- V. The EU air quality standards are based on the criteria for the protection of human health set down in the World Health Organisation Air Quality Guidelines Global Update 2005. These legal limit values are focussed on the protection of human health and are based on the World Health Organisation Air Quality Guidelines Global Update 2005.
- VI. The World Health Organisation issued New WHO Global Air Quality Guidelines (AQGs) on 22 September 2021. These new guidelines recommend new air quality levels to protect the health of populations, by reducing levels of key air pollutants, some of which also contribute to climate change. The goal of the guideline is for all countries to achieve recommended air quality levels. Whilst acknowledging that this may be a difficult task for some countries, WHO has proposed interim targets to facilitate stepwise improvement in air quality and thus gradual, but meaningful, health benefits for the population.
- VII. In the 2020 “State of the Environment Report “ the Environmental Protection Agency reported that “The publication and implementation of the planned National Clean Air Strategy is needed to protect Ireland’s air quality. The adoption of the World Health Organization guideline values as national air quality standards within the strategy would provide for a higher level of public health protection. Integrating air pollution controls, noise mitigation measures and climate action, for example in transport management, can bring multiple benefits.” The report also stated that measures to address NO<sub>2</sub> could include those used in other European cities, such as promoting the use of public transport, cycling and walking, and restricting more polluting vehicles from central areas. The announcement that Dublin has become the first Irish city to sign up to the WHO Breathe Life campaign, which entails making a commitment to meeting the WHO guideline values by 2030 (Breathe Life, 2020), is a positive step.
- VIII. Land use and transportation planning strategies to deliver sustainable living, need to be continued and supported. They will also need to rigorously demonstrate how and to what degree their air quality benefits are to be achieved.

- IX. Many of the proposed transport infrastructure measures currently under consideration have considerable lead-in times, and funding for these measures needs to remain secured for these projects. Under these circumstances, there is also a need to harness public information measures and pro-active encouragement of behaviour change in transport usage.
- X. There are real choices available to individual transport users and commuters in terms of their personal contribution to air emissions. While some initiatives have clearly been successful in demonstrating this, much still remains to be done. Linking such initiatives to potential savings in transport fuel costs for individuals would strike a chord in current economic circumstances.
- XI. Given the advances in technology, it is now feasible and timely to consider measures to integrate real time air quality monitoring, predictive air quality modelling, and traffic management systems.
- XII. There is a compelling need for the local authorities in the Dublin region to review capacity issues in respect of air quality monitoring and management and in particular explore the added value of engaging in air quality modelling on an ongoing basis.
- XIII. The emission modelling undertaken under the 5 City Demand Management Study and the dispersion modelling carried out by the EPA indicate that the agglomeration will be in compliance with the nitrogen dioxide limit by 2030 if not earlier. If the timescale to reach compliance is to be accelerated the most likely measures to achieve this acceleration will be to reduce emission factors from vehicles in particular cars. This can be achieved by:
- financial incentives to remove older diesel vehicles,
  - incentives to increase the percentage of Electric Vehicles,
  - or the introduction of low emission zones.
- XIV. Dispersion modelling assessments complement existing monitoring techniques and can help to accurately predict pollution levels throughout the Dublin region and better inform decision making about how local areas might identify and tackle any rise in pollution levels. Any future

expansion of the national monitoring network will depend on the results of nearby monitoring stations, indicative sampling and dispersion modelling assessments.

- XV. Modelling capacity at local authority level would complement the EPA's modelling activities and would produce useful data not only for air quality management purposes but also for other sectors such as noise mapping and city planning.
- XVI. With publicly funded research it is imperative that the Dublin local authorities have a say in precisely what areas need to be researched and must be invited to participate on research steering groups.
- XVII. No one agency or authority can bring about and sustain a reduction of nitrogen dioxide levels in ambient air in the Dublin region. Each key agency needs to maintain air quality to the forefront of their programmes.
- XVIII. Efforts have been made to incorporate ambient air quality considerations in a range of national, regional, and local transport strategies in the Dublin Region by a variety of agencies. It is imperative that these agencies continue to appraise their contribution to ensure air quality is prioritised, given the possibility of further exceedances of European Union limit values.
- XIX. With indications that levels of NO<sub>2</sub> were approaching EU limit values in certain areas of Dublin the Urban Transport Related Air Pollution Working Group (UTRAP) was formed in 2019. UTRAP brings together for the first time all the key stakeholders including Government departments and agencies in the transportation sphere as well as local authorities and other key stakeholders. UTRAP provides a forum to enhance understanding of the causes and the health and environmental impacts of NO<sub>2</sub> air pollution and how to combat NO<sub>2</sub> and other air pollution levels.
- XX. The establishment of the UTRAP group is recognition that no one stakeholder can address all aspects of rising transport related pollution levels and that the activities of all the key stakeholders need to be coordinated. Any shortcomings or failures by any one key stakeholder could be detrimental to the success of this plan.
- XXI. Public interest and concern in relation to air quality in Ireland is very significant and there is genuine buy in from the public in addressing air quality challenges. A number of projects and

initiatives are underway to build on this public interest, and it is evident that the measures proposed in this plan depended on public cooperation and behavioural change over the long term. This plan identifies a number of ways in which public participation can be harnessed in a proactive rather than a reactive manner to reduce nitrogen dioxide levels and provide the opportunity to improve air quality generally.

## 11.2 Recommendations

Chapter 5 of this Plan sets out a number of specific measures and actions for consideration, this section sets out to provide a number of overarching recommendations to facilitate the further implementation and development of those measures and actions. This will require continued engagement across a range of local regional and national stakeholders.

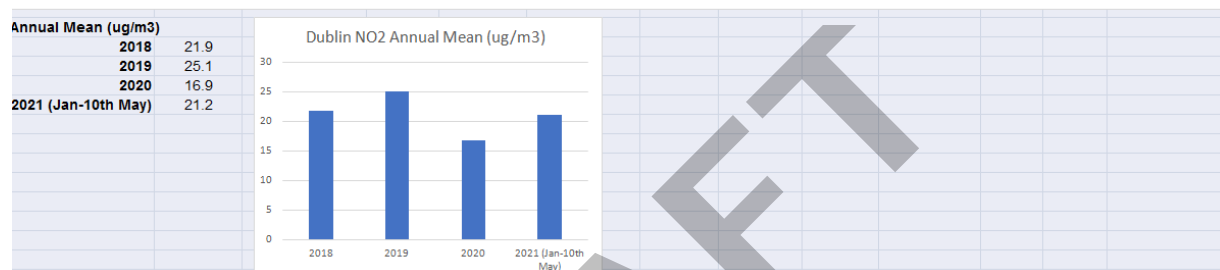
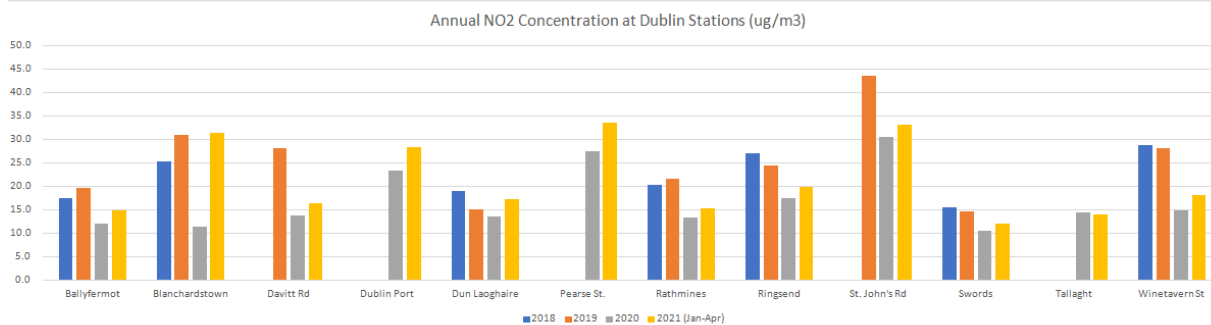
- i. The measures and actions identified in this plan highlight the absolute necessity for concerted action by the various agencies with input to national, regional, and local policy that influence reducing nitrogen dioxide levels in ambient air in the Dublin Region.  
It is recommended that the Urban Transport-Related Air Pollution Steering Group (UTRAP) should remain in place to ensure that there is a forum to harness and direct that concerted action.
- ii. It is recommended that a coherent framework for addressing air quality matters generally will be best served by the publication of the National Clean Air Strategy, and this strategy should incorporate reference to the most recent World Health Organization air quality guideline values for an enhanced level of public health protection.
- iii. It is recommended that the incorporation of “10/15 minute neighbourhoods” ( or similar) concept in City and County Development Plans be considered given the overall benefit that will accrue in terms of air quality generally and nitrogen dioxide levels in particular. **The Five Cites Demand Management Study** identifies the introduction of this concept as the No. 1 overall ranked intervention to address demand management, decarbonisation, air quality, and urban development.
- iv. It is recommended that future public, residential and commercial parking controls be considered with specific reference to their impact on ambient nitrogen dioxide levels

- v. It is recommended that legislation be introduced to allow local authorities to establish Clean Air Zones/Low Emissions Zones
- vi. It is recommended that the Local Authorities Electrical Vehicle (EV) Charging Strategy, which is currently being elaborated, be completed to support the growth of EVs to at least 800,000 by 2030 and set a target for the supply of infrastructure to stay sufficiently ahead of demand.
- vii. Citizen engagement is a key element in improving air quality. As well as the initiatives currently underway it is recommended that Dublin local authorities to explore with other stakeholders such as An Taisce, the Asthma Society and others as relevant, on the establishment of a public consultative process or forum on air quality.
- viii. It is recommended that local authorities in the Dublin Region intensify their collaboration with the EPA to expand real time air quality monitoring in the region and also to develop air quality modelling and forecasting capacity.
- ix. It is recommended that the local authorities be engaged as partners and/or advisers in air quality research being funded by the EPA on projects in the Dublin region.
- x. This plan demonstrates the wide variety of policies, strategies and initiatives that address ambient nitrogen dioxide levels. Continued delivery of the objectives of these policies and strategies needs to be maintained. It is recognised that government policy seeks to include environmental criteria in initiatives such as the National Development Plan. It is recommended that the development of air quality and other criteria needs to include input from a wide range of stakeholders including the public and local authorities.

## Appendix A - Air Quality Monitoring Data/Graphs

### Annual Mean – Dublin Stations (ug/m3)

	Ballyfermot	Blanchardstown	Davitt Rd	Dublin Port	Dun Laoghaire	Pearse St.	Rathmines	Ringsend	St. John's Rd	Swords	Tallaght	Winetavern St
2018	17.4	25.3			18.9		20.3	27.0		15.5		28.7
2019	19.7	31.0	28.0		15.0		21.6	24.3	43.4	14.6		28.0
2020	12.1	11.5	13.7	23.3	13.5	27.4	13.3	17.5	30.4	10.6	14.4	14.8
2021 (Jan-Apr)	14.8	31.4	16.4	28.3	17.2	33.5	15.4	19.8	33.0	12.0	13.9	18.0



## Appendix B - Public Consultation Report

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## Appendix C - SEA and AA Screening Reports

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# SCREENING FOR STRATEGIC ENVIRONMENTAL ASSESSMENT

## **Dublin Air Quality Plan 2021**

Prepared for: Dún Laoghaire-Rathdown County  
Council, Fingal County Council, Dublin City Council  
and South Dublin County Council

DRAFT

SLR Ref: 501.00591.00002  
Version No: Final  
August 2021



## BASIS OF REPORT

This document has been prepared by SLR Consulting Ireland with reasonable skill, care and diligence, and taking account of the manpower, timescales and resources devoted to it by agreement with Dún Laoghaire-Rathdown County Council, Fingal County Council, Dublin City Council and South Dublin County Council (the Client) as part or all of the services it has been appointed by the Client to carry out. It is subject to the terms and conditions of that appointment.

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## 1.0 Introduction

### 1.1 Purpose of this document

The purpose of this document is to consider the need for a Strategic Environmental Assessment (SEA) for the Dublin Air Quality Plan 2021, which is being prepared by Dún Laoghaire-Rathdown County Council, Fingal County Council, Dublin City Council and South Dublin County Council, in accordance with the requirements of the Strategic Environmental Assessment Directive.

Therefore, the document will be structured as follows:

- **Background to Dublin Air Quality Plan 2021**, providing context to the need for an Air Quality Plan;
- **Objective and Requirement to carry out an SEA**, providing an outline of its purpose, the legislation and requirements, and how it links to the Air Quality Plan;
- **Screening**, providing justification for whether SEA is necessary or screened out; and
- **Conclusion**, for a summary and closure of this document.

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## 2.0 Background to the Dublin Air Quality Plan 2021

The Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC) was transposed into Irish legislation by the Air Quality Standards Regulations 2011 (S.I. No. 180 of 2011). The directive and regulations set down air quality standards in Ireland and the other member states for a wide variety of pollutants. This includes how we should monitor, assess and manage ambient air quality.

In summary, the *S.I. No. 180/2011 - Air Quality Standards Regulations 2011* aims to establish limit values and alert thresholds for concentration of certain pollutants in ambient air, provide for the obtaining of adequate information on concentrations of certain pollutants in ambient air and ensure that it is made available to the public, and provide for the maintenance of ambient air quality, in Europe. In addition, the Regulations also highlight the '*Measures to ensure compliance with ozone target values and to maintain good air quality*'. For convenience, the regulations' scope and compliance measures are referenced in full in Appendix 2.

In accordance with the Regulations, the Dublin Air Quality Plan 2021 must identify the cause(s) and source(s) behind the previously mentioned reported exceedance and the actions required over time to bring ambient air quality back in line with EU limit values.

In preparing the Dublin Air Quality Plan, the Dublin local authorities, led by Dún Laoghaire-Rathdown County Council, will be assisted by the Environmental Protection Agency with the modelling components required. The stakeholders in the Urban Transport Related Air Pollutants Working Group (UTRAP), will also provide support as many of the actions required to address air quality in the Dublin region are inextricably linked with regional transport and mobility policy and management under their authority.

### 2013 Clean Air for Europe

The 2013 Clean Air for Europe program reaffirmed the will to bring the whole EU into full compliance with current air quality standards as soon as possible and sets targets for 2020 and 2030. The European Union's policy in this area is based on three main pillars.

1. The **first pillar** consists of the ambient air quality standards defined in the Ambient Air Quality Directives with regard to ground-level ozone, particulates, nitrogen oxides, hazardous heavy metals and a number of other pollutants. All Member States had to meet these air quality standards throughout their territory from 2005 or 2010, depending on the pollutant. **In the event that the limit values set are exceeded, Member States are required to adopt air quality plans providing for appropriate measures to ensure that the period of exceedance is as short as possible.**
2. The **second pillar** includes the national emission reduction targets set in the National Emission Ceilings Directive for the main transboundary air pollutants: sulphur oxides, nitrogen oxides, ammonia, volatile organic compounds and particulate matter. The national emission reduction targets have recently been revised to include new limits to be respected in 2020 and 2030 and an additional pollutant: fine particles (PM 2.5). Member States must establish national air pollution control programs by 2019 to meet their emission reduction commitments.
3. The **third pillar** consists of emission standards for the main sources of pollution, from motor vehicles and ships to power generation and industry. These standards are defined at EU level in legislative acts targeting industrial emissions, emissions from power plants, vehicles and fuels, as well as the energy performance of products.

In accordance with the first pillar of the 2013 Clean Air for Europe program, the Dublin local authorities, including Dún Laoghaire-Rathdown County Council as lead authority, are required under the Air Quality Standards

Regulations 2011 to prepare an air quality plan by the end of 2021, to address the exceedance of ambient nitrogen dioxide limit values in the Dublin agglomeration during 2019 as reported to the EU Commission.

The prescribed information to be included in the Air Quality Plan is detailed in Schedule 15 of the Air Quality Standards Regulations 2011. For convenience Schedule 15 is also quoted in full in Appendix 2.

### Measures Proposed in the Draft Air Quality Plan 2021

The Draft Air Quality Plan 2021 will propose a suite of measures to be adopted to reduce nitrogen dioxide in the Dublin region. The measures are designed to support the principle that local authorities will select actions that are the most appropriate to their circumstance and will have a definitive influence on air quality in their locality. In most cases, the measures when selected will be adopted by means of the statutory plan i.e. the city or county development plan which is subject of a mandatory and standalone SEA. In some cases measures may only be undertaken using legal powers available under other legislation. This is particularly relevant in Ireland as the powers currently delegated in air quality plans are limited.

The proposed measures are:

#### Local/Regional measures

- Measure 1 - Integrate “15 Minute Neighbourhoods” concept in City and County Development Plans
- Measure 2 - Public Parking Controls
- Measure 3 - Residential Parking Standards
- Measure 4 - Workplace Parking Standards
- Measure 5 - Introduction of Clean Air Zones/ Low Emission Zones
- Measure 6 - Electrical Vehicle (EV) Charging Strategy

#### National - Government Level Measures

- Measure 7 - Publication of National Clean Air Strategy
- Measure 8 - Air Quality Enabling legislation
- Measure 9 - Flexible Working
- Measure 10 - Enhanced Air Quality Monitoring and Modelling
- Measure 11 - Air Quality - Citizen Engagement
- Measure 12 - Air Quality and Health Research
- Measure 13 - Behavioural Change Campaigns to cleaner fleets
- Measure 14 - Continued Delivery of the Active travel programme

## 3.0 Objective and Requirement to carry out a Strategic Environmental Assessment

This section of the report sets out the main objectives of the SEA and its Directive and the legislative basis for 'Screening' which is a means of deciding whether or not a plan or programme would require the preparation of a Strategic Environmental Assessment (SEA).

### 3.1 Objective of SEA

The European Parliament Directive (2001/42/EC) and the European Council decision 27th June 2001 (on the assessment of the effects of certain plans and programmes on the environment) introduced a requirement for SEA to be carried out on all plans and programmes across multiple sectors. The main objective of the Directive, also known as the SEA Directive, is

*'to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development, by ensuring that, in accordance with this Directive, an environmental assessment is carried out of certain plans and programmes which are likely to have significant effects on the environment.'*

This document has been prepared in accordance with legislative requirements (detailed below in point 3.2) as set out in both directives which have subsequently been transposed into Irish Law.

### 3.2 Legislative Requirements to carry out a SEA

The SEA Directive was transposed into Irish Law through the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (Statutory Instrument Number (S.I. No. 435 of 2004) and the Planning and Development (Strategic Environmental Assessment) Regulations 2004 (SI No. 436 of 2004). These two statutory instruments have been in operation since 21st July 2004.

Further amendments to these statutory instruments have occurred through the European Communities (Environmental Assessment of Certain Plans and Programmes) (Amendment) Regulations 2011 (SI No. 200 of 2011) and the Planning and Development (Strategic Environmental Assessment) (Amendment) Regulations 2011 (SI No. 201 of 2011).

The SEA Directive applies to "plans and programmes", defined in the regulations as *'plans and programmes, as well as any modifications to them:*

- (a) which are subject to preparation and/or adoption by an authority at national, regional or local level or which are prepared by an authority for adoption, through a legislative procedure by Parliament or Government, and*
- (b) which are required by legislative, regulatory or administrative provisions;'*

The European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (Statutory Instrument Number (S.I. No. 435 of 2004) is the relevant regulatory instrument for the purposes of Screening the Dublin Air Quality Plan 2021. These regulations state that the following exclusions apply:

*'3. (1) The provisions of these Regulations shall not apply to:*

- (a) plans or programmes the sole purpose of which is to serve national defence or civil emergency, or*
- (b) financial or budget plans and programmes, or*



*(c) plans or programmes co-financed under the programming periods for Council Regulation (EC) No. 1260/1999 and Council Regulation (EC) No. 1257/1999.*

As previously mentioned, the Dublin local authorities are required to prepare an Air Quality Plan by the end of 2021 under the Air Quality Standards Regulations 2011. Thus, according to the criteria, the Dublin Air Quality Plan 2021 would be subject to the SEA Directive Regulations as a plan that is '*(a) (...) subject to preparation and/or adoption by an authority at regional or local level (...) and (b) (...) required by legislative, regulatory or administrative provisions*'. Therefore, none of the exemptions apply.

### 3.3 Methodology

Screening is the process of deciding whether a plan or programme requires an SEA based on whether it would or would not be likely to have significant effects on the environment. The criteria by which the need for an SEA is determined is laid out within S.I. No. 435/2004 - European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 and consists of the following:

*'Requirement to carry out environmental assessment'*

9. (1) *Subject to sub-article (2), an environmental assessment shall be carried out for all plans and programmes*

*(a) which are prepared for agriculture, forestry, fisheries, energy, industry, transport, waste management, water management, telecommunications and tourism, and which set the framework for future development consent of projects listed in Annexes I and II to the Environmental Impact Assessment Directive<sup>1</sup>, or*

*(b) which are not directly connected with or necessary to the management of a European site but, either individually or in combination with other plans, are likely to have a significant effect on any such site.*

*(2) A plan or programme referred to in sub-article (1) which determines the use of a small area at local level or a minor modification to a plan or programme referred to in sub-article (1) shall require an environmental assessment only where the competent authority determines that it is likely to have significant effects on the environment and, for this purpose, the competent authority shall make any necessary determination.*

*(3) A competent authority shall determine whether plans and programmes other than those referred to in sub-article (1), which set the framework for future development consent of projects, are likely to have significant effects on the environment.'*

*(4) A competent authority shall, in determining on a case-by-case basis under sub-article (2) or (3) whether a plan or programme, or modification to a plan or programme, would or would not be likely to have significant effects on the environment, take account of relevant criteria set out in Schedule 1 and any submission or observation received in response to a notice under sub-article (5).*

As part of this screening, the Dublin Air Quality Plan 2021 is to be tested against the relevant criteria listed above. This is done in further detail in Section 4 Screening and Figure 1 below shows a decision tree / flow diagram of the screening process applied.

#### Notice to the Environmental Authorities

*(5) Prior to making a decision under sub-article (2) or (3), a competent authority shall give notice in accordance with sub-article (6) to the following environmental authorities—*

*(a) the Environmental Protection Agency,*

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<sup>1</sup> See Appendix 3 for projects listed in Annexes I and II to the Environmental Impact Assessment Directive.

*(b) where it appears to the competent authority that the plan or programme, or modification to a plan or programme, might have significant effects in relation to the architectural or archaeological heritage or to nature conservation, the Minister for the Environment, Heritage and Local Government,*

*(c) where it appears to the competent authority that the plan or programme, or modification to a plan or programme, might have significant effects on fisheries or the marine environment, the Minister for Communications, Marine and Natural Resources.*

**(6) A notice under sub-article (5) shall—**

*(a) state that the competent authority proposes to prepare a plan or programme, or to modify a plan or programme,*

*(b) state that the competent authority must decide whether the plan or programme, or modification to a plan or programme, would or would not be likely to have significant effects on the environment and that, in so doing, it must take account of relevant criteria set out in Schedule 1, and*

*(c) indicate that a submission or observation in relation to whether the proposed plan or programme, or modification to a plan or programme, would or would not be likely to have significant effects on the environment may be made to the authority within a specified period which shall be not less than 4 weeks from the date of the notice.*

#### **Screening Determination**

**(7) As soon as practicable after making a determination under sub-article (2) or (3), the competent authority shall—**

*(a) make a copy of its decision, including, as appropriate, the reasons for not requiring an environmental assessment, available for public inspection at the offices of the competent authority during office hours, and*

*(b) notify its decision to any environmental authority which was notified under subarticle (5).'*

In summary, the authority shall consult the relevant environmental authorities and when a decision, determined on a case-by-case basis, is reached, a copy of the determination shall be made available for public inspection and the environmental authorities shall be notified once again.

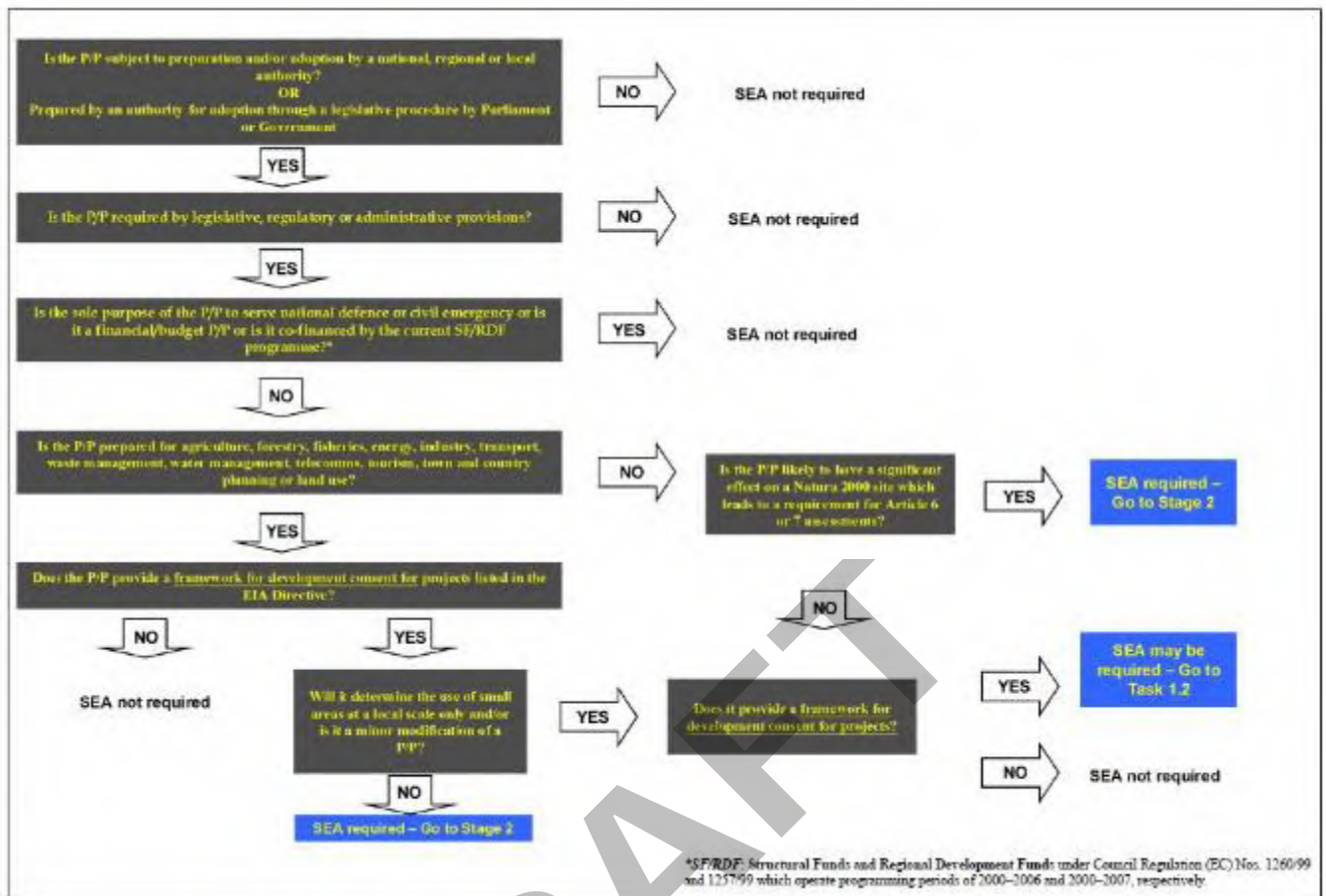


Figure 1 - Flow Diagram of the Screening Process (Source: Development of Strategic Environmental Assessment (SEA) Methodologies for Plans and Programmes in Ireland (2001-DS-EEP-2/5), Environmental Protection Agency, Ireland, 2003)

## 4.0 Screening

In the first instance, it is important to establish whether the plan in question, the Dublin Air Quality Plan 2021, is subject to the SEA Directive Regulations. Given that it is a plan required under the Air Quality Standards Regulations 2011, this satisfies the SEA Directive criteria of a plan which is *'(a) (...) subject to preparation and/or adoption by an authority at regional or local level (...) and (b) (...) required by legislative, regulatory or administrative provisions'*. The plan also does not meet any of the detailed exemptions.

Further to this, the Dublin Air Quality Plan 2021 is tested against the most relevant *'requirements to carry out environmental assessment'*. The first relevant criteria 9 (1)(a) relates to plans *'which are prepared for agriculture, forestry, fisheries, energy, industry, transport, waste management, water management, telecommunications and tourism, and which set the framework for future development consent of projects listed in Annexes I and II to the Environmental Impact Assessment Directive'*.

The Dublin Air Quality Plan 2021 does not come under any of the sectors specifically listed namely *'agriculture, forestry, fisheries, energy, industry, transport, waste management, water management, telecommunications and tourism'*.

Although the Dublin Air Quality Plan 2021 may refer to other plans and projects in order to capture the current baseline position in each of the relevant local authorities, the Plan does not identify or provide the framework for the delivery of these plans and projects. The projects as well as the proposed measures to be listed in Section 5.7 of the draft Plan can only be delivered through inclusion of dedicated objectives in the relevant statutory plans which are subject to SEA in their own right. In some cases, measures also require the provision of enabling legislation. The Plan will therefore not *'set the framework for future development consent of projects'* listed in Annexes I and II<sup>2</sup> to the Environmental Impact Assessment Directive<sup>3</sup>.

The second relevant criteria 9 (1)(b) relates to plans *'which are not directly connected with or necessary to the management of a European site but, either individually or in combination with other plans, are likely to have a significant effect on any such site.'* The Dublin Air Quality Plan 2021 either individually or in combination with other plans, is not likely to have a significant effect on any European site for reasons outlined in the AA Screening Report.

Given that the Dublin Air Quality Plan 2021 is not within any of the categories established in the criteria, it is concluded that an SEA is not required. However, for completeness the plan was assessed further in relation to criteria 9(3) which states *'A competent authority shall determine whether plans and programmes (...) are likely to have significant effects on the environment'*. This is established by criteria set out in Schedule 1 of the SEA regulations. A table detailing the environmental significance is presented in Appendix 1.

As the measures within the Draft Plan are intended to secure compliance with targets in the Air Quality Standards Regulations 2011, the Ambient Air Quality and Cleaner Air for Europe (CAFE) Directive (2008/50/EC) and the 2013 Clean Air for Europe programme they will have an overall positive effect on air quality, and therefore as per Appendix 1, the Plan is not considered likely to have quantifiable effects on the environment in its own right; rather its effects will be mediated through other plans and programmes which may be the subject of SEA and/or AA.

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<sup>2</sup> The Annex I and Annex II projects have been transposed into Section 5 (Parts 1 and 2) of the Planning and Development Regulations 2001, as amended.

<sup>3</sup> Environmental Impact Assessment Directive (EIA Directive) means Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment as amended by Directive 2014/52/EU of the European Parliament and of the Council of 16 April 2014.

## 5.0 Conclusion

The Dublin Air Quality Plan 2021 underwent a Screening for Strategic Environmental Assessment (SEA) and following the thorough tests against all relevant criteria in the regulations it is considered that SEA is not required.

It is established that the Dublin Air Quality Plan 2021 is subject to the SEA Directive regulations, however it does not qualify for the requirements to carry out environmental assessment. To clarify, this screening report indicates that the plan:

- will not come under any of the sectors specifically listed ('agriculture, forestry, fisheries, energy, industry, transport, waste management, water management, telecommunications and tourism')
- will not 'set the framework for future development consent of projects', and
- Is not, either individually or in combination with other plans, likely to have a significant effect on any European Site.

For completeness the plan was also assessed against the criteria in Schedule 1 of the SEA Directive. This assessment set out in Appendix 1 concludes that the Plan is not likely to have significant effects on the Environment.

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## APPENDIX 1 SCHEDULE 1 ARTICLE 9 OF THE SEA DIRECTIVE

‘Criteria for determining whether a Plan or Programme (or Modification thereto) is likely to have significant effects on the Environment.’

### 1. The characteristics of the plan or programme, or modification to a plan or programme, having regard, in particular, to

Criteria	Dublin Air Quality Plan 2021
The degree to which the plan or programme, or modification to a plan or programme, sets a framework for projects and other activities, either with regard to the location, nature, size and operating conditions or by allocating resources.	<p>The purpose of the Air Quality Plan 2021 is to address the exceedance of ambient nitrogen dioxide limit values in the Dublin agglomeration during 2019 as reported to the EU Commission.</p> <p>In accordance with the S.I. No. 180/2011 - Air Quality Standards Regulations 2011, the Dublin Air Quality Plan must identify the cause(s) and source(s) behind the previously mentioned reported exceedance and the actions required over time to bring ambient air quality back in line with EU limit values.</p> <p>The Plan will <u>not</u> set a framework for future development consent of projects listed in Annexes I and II of the Environmental Impact Assessment Directive (85/337/EC) as amended, or likely to have significant environmental effects on European Sites. The framework for future development consent of projects is set by hierarchy of statutory plans including the NPF, RSES as well as City and County Development Plans.</p>
The degree to which the plan or programme, or modification to a plan or programme, influences other plans including those in a hierarchy.	<p>The Air Quality Plan 2021 is being formulated to identify the cause(s) and source(s) behind the reported exceedance and the actions required over time to bring ambient air quality back in line with EU limit values.</p> <p>Existing measures are drawn from plans and programmes, which are subject to SEA/ SEA screening in their own right; the environmental impacts of any additional measures will be evaluated in land use plans or other sectoral plans, which may be subject to SEA and/or AA as appropriate. In some cases, the incorporation of clean air issues has been implicitly part of the SEA of pre-existing plans and programmes.</p> <p>Specific examples of national plans and programmes referred to in Air Quality Plan 2021 which have had full SEA/AA undertaken include;</p> <ul style="list-style-type: none"> <li>• National Policy Framework on Alternative Fuels Infrastructure for Transport in Ireland – DoT</li> <li>• The National Planning Framework, 2040 - DHPLG</li> <li>• Regional Spatial and Economic Strategy (RSES) for the Eastern and Midlands Region</li> <li>• Dublin City Council Development Plan – 2016 - 2022</li> <li>• Dun Laoghaire Rathdown County Council Development Plan 2016 – 2022</li> <li>• South Dublin County Council Development Plan 2016 – 2022</li> </ul>

Criteria	Dublin Air Quality Plan 2021
	<ul style="list-style-type: none"> <li>Fingal County Council Development Plan 2017 – 2023</li> </ul> <p>City and County Development Plans will evolve over time to address updates to national and regional policy.</p>
The relevance of the plan or programme, or modification to a plan or programme, for the integration of environmental considerations in particular with a view to promoting sustainable development.	The plan identifies measures which may be committed to, across a range of plans and programmes. The promotion of sustainable development and measures to improve air quality will be considered in those other plans.
Environmental problems relevant to the plan or programme, or modification to a plan or programme.	While the cumulative effect of air pollution emissions can manifest locally as problems with ambient air quality or impacted ecosystems, the focus of the plan is not to manage these local environmental problems directly. Rather, the plan supports the achievement of EU Commission air quality targets by outlining a suite of possible measures that can be implemented at national, regional and local level.
The relevance of the plan or programme, or modification to a plan or programme, for the implementation of European Union legislation on the environment (e.g. plans and programmes linked to waste management or water protection).	The Dublin Air Quality Plan 2021 is being developed to comply with the EU Air Quality Directive. It is consistent with the implementation of this European Union Directive which is directly related to protection of the environment and human health.

## 2. Characteristics of the effects and of the area likely to be affected, having regard, in particular, to

Criteria	Dublin Air Quality Plan 2021
The probability, duration, frequency and reversibility of the effects.	The measures within the Plan aim to have an overall positive effect on air quality and consequently human health and the environment in the long term.
The cumulative nature of the effects.	The Plan draws on other national plans and programmes and identifies a suite of measures for potential inclusion in City and County Development Plans. The environmental impact of the selected measures will be evaluated in those other plans, which in the case of Development Plans will be subject of mandatory SEA and AA. The



Criteria	Dublin Air Quality Plan 2021
	cumulative nature of the effects will be generally beneficial but can only established at that stage.
The transboundary nature of the effects.	The Plan will have no direct transboundary effects of its own account.
The risks to human health or the environment (e.g. due to accidents).	The Dublin local authorities are committed to enhancing the health of citizens by meeting current legal air quality standards and working towards further improvements in line with health gain and evolving legal standards in the coming decade. There are no expected risks to human health or the environment as a result of the Plan.
The magnitude and spatial extent of the effects (geographical area and size of the population likely to be affected).	Effects may flow from measures identified in the Plan, which are drawn from other plans and programmes. Their application and therefore the magnitude and spatial extent of the effects will depend on the local context. The responsibility for assessing the magnitude and spatial effects will fall to other plans and programmes.
<p>The value and vulnerability of the area likely to be affected due to:</p> <ul style="list-style-type: none"> <li>(a) special natural characteristics or cultural heritage,</li> <li>(b) exceeded environmental quality standards or limit values,</li> <li>(c) intensive land-use.</li> </ul>	The Plan identifies measures from and for other plans and programmes which will reduce air pollution emissions in Ireland. The effect of these measures should be beneficial on the environment nationally and will be applied to address the exceedance of ambient nitrogen dioxide limit values in the Dublin agglomeration during 2019.
The effects on areas or landscapes which have a recognised national, European Union or international protection status.	The Plan identifies measures which will reduce air pollution emission levels across the Dublin agglomeration. The net effect of these measures, which are subject to environmental assessment in their own right, is likely to be positive on areas or landscapes which have a recognised national, European Union or international protection status.



## APPENDIX 2 AIR QUALITY STANDARDS REGULATIONS 2011

### *S.I. No. 180/2011 - Air Quality Standards Regulations 2011*

#### **Scope**

#### **4. These Regulations:**

- (a) make provisions necessary for the implementation of Directive 2008/50/EC on ambient air quality and cleaner air for Europe;
- (b) establish limit values and, as appropriate, alert thresholds for concentrations of certain pollutants in ambient air intended to avoid, prevent or reduce harmful effects on human health and the environment as a whole;
- (c) provide for the assessment of concentrations of certain pollutants in ambient air on the basis of methods and criteria common to the Member States of the European Communities;
- (d) provide for the obtaining of adequate information on concentrations of certain pollutants in ambient air and ensure that it is made available to the public, inter alia by means of alert thresholds; and
- (e) provide for the maintenance of ambient air quality where it is good and the improvement of ambient air quality in other cases with respect to certain pollutants.'

#### **Measures to ensure compliance with ozone target values and to maintain good air quality**

15. (1) The Minister, the Agency and the local authority shall take all necessary measures not entailing disproportionate costs to ensure that ozone target values and long-term objectives, as specified in Schedule 7, are attained.
- (2) In zones and agglomerations in which a target value for ozone is exceeded the Agency and the local authority, or local authorities as appropriate, shall ensure that the programme prepared pursuant to Article 6 of Council Directive 2001/81/EC on national emission ceilings for certain atmospheric pollutants is implemented in order to attain target values save where not achievable through measures not entailing disproportionate costs.
- (3) For zones and agglomerations in which the levels of ozone in ambient air are higher than the long-term objectives but below, or equal to, the target values, the Minister, the Agency and the local authority shall prepare and implement cost-effective measures with the aim of achieving the long-term objectives. Those measures shall, at least, be consistent with all the air quality plans and the programme referred to in Regulation 15(2).
- (4) For the purpose of ensuring continued compliance with ozone target values and long-term objectives in zones or agglomerations the Agency shall identify the measures by which such values can be attained and the means

by which the best ambient air quality standards may be preserved, insofar as factors including the transboundary nature of ozone pollution and meteorological conditions permit,

(5) The Agency shall advise the relevant local authority, or local authorities as appropriate and any statutory agency or body with relevant functional responsibility of any such measures identified under Regulation 15(4).

(6) The Agency and the local authority, or local authorities as appropriate, shall through proportionate measures promote the preservation of best ambient air quality compatible with sustainable development and a high level of environmental and human health protection.

### **Schedule 15**

Information to be included in the local, regional or national air quality plans for improvement in ambient air quality

#### **A. Information to be provided under article 23 (air quality plans)**

##### **1. Localisation of excess pollution**

- (a) region;
- (b) city (map);
- (c) measuring station (map, geographical coordinates).

##### **2. General information**

- (a) type of zone (city, industrial or rural area);
- (b) estimate of the polluted area (km<sup>2</sup>) and of the population exposed to the pollution;
- (c) useful climatic data;
- (d) relevant data on topography;
- (e) sufficient information on the type of targets requiring protection in the zone.

##### **3. Responsible authorities**

Names and addresses of persons responsible for the development and implementation of improvement plans.

##### **4. Nature and assessment of pollution**

- (a) concentrations observed over previous years (before the implementation of the improvement measures);
- (b) concentrations measured since the beginning of the project;
- (c) techniques used for the assessment.

##### **5. Origin of pollution**

- (a) list of the main emission sources responsible for pollution (map);
- (b) total quantity of emissions from these sources (tonnes/year);
- (c) information on pollution imported from other regions.

##### **6. Analysis of the situation**

- (a) details of those factors responsible for the exceedance (e.g. transport, including cross-border transport, formation of secondary pollutants in the atmosphere);
- (b) details of possible measures for the improvement of air quality.

7. Details of those measures or projects for improvement which existed prior to 11 June 2008, i.e:

- (a) local, regional, national, international measures;
- (b) observed effects of these measures.

8. Details of those measures or projects adopted with a view to reducing pollution following the entry into force of this Directive:

- (a) listing and description of all the measures set out in the project;
- (b) timetable for implementation;
- (c) estimate of the improvement of air quality planned and of the expected time required to attain these objectives.

9. Details of the measures or projects planned or being researched for the long term.

10. List of the publications, documents, work, etc., used to supplement information required under this Schedule.

B. Information to be provided under article 22(1)

1. All information as laid down in Section A.

2. Information concerning the status of implementation of the following Directives:

1. Council Directive 70/220/EEC of 20 March 1970 on the approximation of the laws of the Member States on measures to be taken against air pollution by emissions from motor vehicles (1);

2. Directive 94/63/EC of the European Parliament and of the Council of 20 December 1994 on the control of volatile organic compound (VOC) emissions resulting from the storage of petrol and its distribution from terminals to service stations (2);

3. Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control (3);

4. Directive 97/68/EC of the European Parliament and of the Council of 16 December 1997 on the approximation of the laws of the Member States relating to measures against the emission of gaseous and particulate pollutants from internal combustion engines to be installed in non-road mobile machinery (4);

5. Directive 98/70/EC of the European Parliament and of the Council of 13 October 1998 relating to the quality of petrol and diesel fuels (5);

6. Council Directive 1999/13/EC of 11 March 1999 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain activities and installations (6);

7. Council Directive 1999/32/EC of 26 April 1999 relating to a reduction in the sulphur content of certain liquid fuels (7);

8. Directive 2000/76/EC of the European Parliament and of the Council of 4 December 2000 on the incineration of waste (8);

9. Directive 2001/80/EC of the European Parliament and of the Council of 23 October 2001 on the limitation of emissions of certain pollutants into the air from large combustion plants;

10. Directive 2001/81/EC of the European Parliament and of the Council of 23 October 2001 on national emission ceilings for certain atmospheric pollutants;

11. Directive 2004/42/EC of the European Parliament and of the Council of 21 April 2004 on the limitation of emissions of volatile organic compounds due to the use of organic solvents in certain paints and varnishes and vehicle refinishing products (9);

12. Directive 2005/33/EC of the European Parliament and of the Council of 6 July 2005 amending Directive 1999/32/EC as regards the sulphur content of marine fuels (10);

13. Directive 2005/55/EC of the European Parliament and of the Council of 28 September 2005 on the approximation of the laws of the Member States relating to the measures to be taken against the emission of gaseous and particulate pollutants from compression-ignition engines for use in vehicles, and the emission of gaseous pollutants from positive-ignition engines fuelled with natural gas or liquefied petroleum gas for use in vehicles (11);

14. Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services (12).

(1) OJ L 76, 6.4.1970, p. 1. Directive as last amended by Directive 2006/96/EC (OJ L 363, 20.12.2006, p. 81).

(2) OJ L 365, 31.12.1994, p. 24. Directive as amended by Regulation (EC) No 1882/2003 (OJ L 284, 31.10.2003, p. 1).

(3) OJ L 24, 29.1.2008, p. 8.

(4) OJ L 59, 27.2.1998, p. 1. Directive as last amended by Directive 2006/105/EC.

(5) OJ L 350, 28.12.1998, p. 58. Directive as amended by Regulation (EC) No 1882/2003.

(6) OJ L 85, 29.3.1999, p. 1. Directive as last amended by Directive 2004/42/EC of the European Parliament and of the Council (OJ L 143, 30.4.2004, p. 87).

(7) OJ L 121, 11.5.1999, p. 13. Directive as last amended by Directive 2005/33/EC of the European Parliament and of the Council (OJ L 191, 22.7.2005, p. 59).

(8) OJ L 332, 28.12.2000, p. 91.

(9) OJ L 143, 30.4.2004, p. 87.

(10) OJ L 191, 22.7.2005, p. 59.

(11) OJ L 275, 20.10.2005, p. 1. Directive as last amended by Regulation (EC) No 715/2007 (OJ L 171, 29.6.2007, p. 1).

(12) OJ L 114, 27.4.2006, p. 64.

3. Information on all air pollution abatement measures that have been considered at appropriate local, regional or national level for implementation in connection with the attainment of air quality objectives, including:

(a) reduction of emissions from stationary sources by ensuring that polluting small and medium sized stationary combustion sources (including for biomass) are fitted with emission control equipment or replaced;

(b) reduction of emissions from vehicles through retrofitting with emission control equipment. The use of economic incentives to accelerate take-up should be considered;

(c) procurement by public authorities, in line with the handbook on environmental public procurement, of road vehicles, fuels and combustion equipment to reduce emissions, including the purchase of:

new vehicles, including low emission vehicles,

cleaner vehicle transport services,

low emission stationary combustion sources,

low emission fuels for stationary and mobile sources,

(d) measures to limit transport emissions through traffic planning and management (including congestion pricing, differentiated parking fees or other economic incentives; establishing low emission zones);

(e) measures to encourage a shift of transport towards less polluting modes;

(f) ensuring that low emission fuels are used in small, medium and large scale stationary sources and in mobile sources;

(g) measures to reduce air pollution through the permit system under Directive 2008/1/EC, the national plans under Directive 2001/80/EC, and through the use of economic instruments such as taxes, charges or emission trading.

(h) where appropriate, measures to protect the health of children or other sensitive groups.'

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# Dublin Air Quality Plan 2021

## Screening Report for Appropriate Assessment

16<sup>th</sup> August 2021

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### Dublin Air Quality Plan 2021

### Screening Report for Appropriate Assessment

Document Stage	Document Version	Prepared by	Approved by
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This report has been prepared by DEC Ltd with all reasonable skill, care and diligence.

Information report herein is based on the interpretation of data collected and has been



accepted in good faith as being accurate and valid.

This report is prepared for the Dublin Region Local Authorities and we accept no responsibility to third parties to whom this report, or any part thereof, is made known. Any such party relies on the report at their own risk.

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## 1.1 Introduction

The Dublin Region Local Authorities are required under the Air Quality Standards Regulations 2011 to prepare an air quality plan by the end of 2021 (referred to hereafter as the Dublin Air Quality Plan or the 'Plan'). DEC Ltd. have been appointed by the Dublin Region Local Authorities to prepare a Screening Report for Appropriate Assessment for the proposed plan.

The function of this report is to identify whether or not the plan has the potential to result in likely significant effects to European Sites and to provide information so that the Dublin Regional Local Authorities can determine whether a Natura Impact Statement and Appropriate Assessment is required for the Dublin Air Quality Plan.

## 1.2 Habitats Directive Assessment

Article 6(3) of the Habitats Directive requires an assessment of the potential effects of a land use plan or project on one or more Natura 2000 (N2K) Sites. It is noted that a Habitats Directive Assessment (HDA) is commonly referred to as an "Appropriate Assessment" (Dodd *et al*, 2007). However, "Appropriate Assessment" forms only one stage of the HDA process (all stages making up the assessment process are outlined in detail below). The EU Habitats Directive provides the legislative framework for the protection of habitats and species throughout Europe through the establishment of a network of designated conservation areas known as the N2K network. The N2K network includes sites designated as Special Areas of Conservation (SACs), under the EU Habitats Directive and Special Protection Areas (SPAs) designated under the EU Birds Directive. Under the European Communities (Birds and Natural Habitats Regulations 2011, as amended) SACs and SPAs are referred to as European Sites. SACs are designated in areas that support habitats listed on Annex I and/or species listed on Annex II of the Habitats Directive. SPAs are designated in areas that support: 1% or more of the all-Ireland population of bird species listed on Annex I of the EU Birds Directive; 1% or more of the population of a migratory species; and more than 20,000 waterfowl.

Articles 6(1) & (2) of the Habitats Directive set out provisions for the conservation management of European Sites. Articles 6(3) and 6(4) of this Directive set out a series of procedural steps to test whether or not a plan or project is likely to affect a European Sites. Article 6(3) also establishes the requirement for an HDA:

*"Any plan or project not directly connected with or necessary to the management of the (European) site but likely to have a significant effect thereon, either individually or in combination with other plans and projects, shall be subjected to appropriate assessment of its implications for the site in view of the site's conservation objectives. In light of the conclusions of the assessment of the implication for the site and subject to the provisions of paragraph 4, the competent national authorities shall agree to the plan or project only after having ascertained that it will not affect the integrity of the site concerned and, if appropriate, after having obtained the opinion of the general public".*

Therefore, the objective of this Screening is to identify whether or not any land use measures that may be supported by the Plan will have the potential to negatively affect the Conservation Objectives of European Sites. Such a conclusion will be arrived at by assessing the implications of future land use activities that could be implemented or supported by the Plan on each European Site occurring within its zone of influence.

The HDA is underpinned by the precautionary principle. Therefore, if the risk of negative impacts to the conservation objectives of a European Site cannot be ruled out it is assumed that the potential

for an adverse impact will exist. Where such uncertainties are identified during the assessment, measures will be proposed to avoid or mitigate the risk of adverse impacts occurring.

The Screening was undertaken with reference to the following guidance documents on Habitats Directive Assessments:

- Appropriate Assessment of Plans and Projects in Ireland – Guidance for Planning Authorities (2009). DEHLG.
- Managing Natura 2000 Sites – The provisions of Article 6 of the Habitats directive 92/43/EEC. European commission (2018).
- Assessment of Plans and Projects Significantly Affecting Natura 2000 sites – Methodological Guidance of the Provisions of Article 6(3) and (4) of the Habitats directive 92/43/EEC. European Commission (2001).

### 1.3 Stages of the Habitats Directive Assessment

The European Commission (2001) Guidance has outlined a staged process for the completion of an HDA.

- Stage 1 – Screening: This stage defines the proposed plan, establishes whether the proposed plan is necessary for the conservation management of the European Site and assesses the likelihood of the plan to have a significant effect, alone or in combination with other plans or projects, upon a European Site.
- Stage 2 – Appropriate Assessment: If a plan or project is likely to have a significant effect an Appropriate Assessment must be undertaken. In this stage, the impact of the plan or project on the Conservation Objectives of the European Site is assessed. The outcome of this assessment will establish whether the plan will have an adverse effect on the integrity of the European Site.
- Stage 3 – Assessment of Alternative Solutions: If it is concluded that, subsequent to the implementation of mitigation measures, a plan has an adverse impact upon the integrity of a European Site it must be objectively concluded that no alternative solutions exist before the plan can proceed.
- Stage 4 – Where no alternative solutions exist and where adverse impacts remain but imperative reasons of overriding public interest (IROPI) exist for the implementation

of a plan or project an assessment of compensatory measures that will effectively offset the damage to the Natura site 2000 will be necessary.

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## 2.0 Screening methodology

The function of the Screening Assessment is to identify whether the Plan will have a likely significant effect on European Sites. In this context “likely” means a risk or possibility of effects occurring that **cannot** be ruled out based on objective information and “significant” means an effect that would undermine the conservation objectives of the European sites, either alone or in-combination with other plans and projects (Office of the Planning Regulator (OPR), 2021).

The nature of the likely interactions between the Plan and the Conservation Objectives of European Sites will depend upon the:

- the ecological characteristics of the species or habitat, including their structure, function, conservation status and sensitivity to change; *and/or*
- the character, magnitude, duration, consequences and probability of the impacts arising from land-use activities associated with the plan, in combination with other plans and projects.

The European Commission Guidelines (2001) outline the stages involved in undertaking a Screening assessment of a plan or project that has the potential to have likely significant effects on European Sites. The methodology adopted for the Screening of the Plan is informed by these guidelines and was undertaken in the following stages:

- A brief description of the Plan is provided and determine whether it is necessary for the conservation management of European Sites;
- Identification of European Sites occurring within the zone of influence of the Plan;
- Identification of potential likely significant effects to European Sites; and
- Identification of other plans or projects that, in combination with the Plan, have the potential to affect European Sites.

### 3.0 description of the Dublin Air Quality Plan 2021

#### 3.1 introduction

The Dublin Air Quality Plan aims to address the exceedance of ambient nitrogen dioxide limit values in the Dublin agglomeration during 2019 as reported to the EU Commission. An overview of the new Dublin Air Quality Plan 2021 is provided below and a detailed presentation on key elements of the plan is provided in Annex A to this report.

#### 3.2 Overview of Dublin Air Quality Plan 2021

This Screening Report focuses on the local measures and policies that have been proposed in Chapter 5- 'Policies and Measures for Improvement in Air Quality' of the draft Dublin Air Quality Plan. The overall aim of the Dublin Air Quality Plan is as follows:

*“To enhance the health of citizens by meeting current legal air quality standards and working towards further improvements in line with health gain and evolving legal standards in the coming decade.”*

Section 5.7 of the draft Plan provides 14 local/regional and national measures which are as follows:

- Measure 1: Integrate “15 Minute Neighbourhoods” concept in City and County Development Plans
- Measure 2: Public Parking Controls
- Measure 3: Residential Parking Standards
- Measure 4: Workplace Parking Standards
- Measure 5: Introduction of Clean Air Zones/ Low Emission Zones
- Measure 6: Electrical Vehicle (EV) Charging Strategy
- Measure 7: Publication of National Clean Air Strategy
- Measure 8: Air Quality Enabling legislation
- Measure 9: Flexible Working- Making Remote Work – National Remote Work Strategy 2021
- Measure 10: Enhanced Air Quality Monitoring and Modelling- National Ambient Air Quality Monitoring Programme (AAMP)
- Measure 11: Air Quality - Citizen Engagement
- Measure 12: Air Quality and Health Research
- Measure 13: Behavioural Change Campaigns to cleaner fleets
- Measure 14: Continued Delivery of the Active travel programme

These are detailed in Annex A of this report and are accompanied by a commentary in relation to potential environmental effects.

#### 4.0 Identification of European Sites within the zone of influence of the Plan

Current guidance (OPR, 2021) informing the approach to screening for Appropriate Assessment defines the zone of influence of a proposed development/plan as the geographical area over which it could affect the receiving environment in a way that could have significant effects on the Qualifying Interests of a European site. It is recommended that this is established on a case-by-case basis using the Source-Pathway-Receptor (SPR) framework.

As a first step in identifying the European Sites that could be connected to the project via SPR pathways, all European Sites occurring in the wider surrounding area that could be conceivably connected to the Plan area (administrative areas of the four Local Authorities) were identified. Figures 4.1 and Figure 4.2 presented at the end of this chapter show the European Sites located within and in close proximity of the four local authorities and the details of these sites are provided in Section 4.2. As the zone of influence comprises of the combined zone of influence of all the four local authorities the potential for a connection between the local authorities and these European Sites requires further examination. All other European Sites are located at a remote distance from the local authorities and are not connected to it via any SPR pathways and as such are excluded from further examination.

Under the SPR model the Plan, as described above, represents the source. Potential impact pathways are restricted to air pathways as the plan proposes strategic measures to influence the air quality of the four local authorities. However, it is noted that the proposed plan is mostly strategic in nature and does not involve any significant land use activities that will have the potential to result in likely significant effects on European Sites. Other pathways that can typically function as impact pathways to sensitive ecological receptors such as hydrological pathways, noise or disturbance through the presence of humans is also not considered relevant given the nature of the proposed plan and the absence of physical land-use interventions in the plan measures.

The receptors represent European Sites and their associated qualifying features of interest. European Sites and their associated qualifying features are likely to occur in the zone of influence of the project only where the above pathways establish a link between the study area and European Sites or where the project site is likely to play an important role in supporting populations of mobile species that are listed as special conservation interests/qualifying species for surrounding European Sites.

As the Plan measures encompass mainly local and national strategies and policies, some of which are still in development, and which in themselves do not contain significant development proposals, specific potential hydrological pathway and wastewater pathways are not envisaged. Where significant developments are subsequently proposed to deliver against these strategies and policies, the specific potential hydrological pathway and wastewater pathway that will arise during any construction or operation will be identified in separate AA screenings prior to the commencement of such developments.

#### 4.1 conservation objectives of European Sites

Generic conservation objectives for all European Sites have been established by the National Parks and Wildlife Service (NPWS). The generic conservation objective for the habitats occurring within the



zone of influence of the project is to maintain the favourable conservation status of these habitats. The favourable conservation status of these habitats is achieved when

- its natural range, and area it covers within that range, are stable or increasing, and
- the specific structure and functions which are necessary for its long-term maintenance exist and are likely to continue to exist for the foreseeable future, and
- the conservation status of its typical species is favourable.

The generic conservation objective for the qualifying species occurring within the zone of influence of the project is to maintain or restore the favourable conservation status of these species. This is achieved when:

- population dynamics data on the species concerned indicate that it is maintaining itself on a long-term basis as a viable component of its natural habitats, and
- the natural range of the species is neither being reduced nor is likely to be reduced for the foreseeable future, and
- there is, and will probably continue to be, a sufficiently large habitat to maintain its populations on a long-term basis.

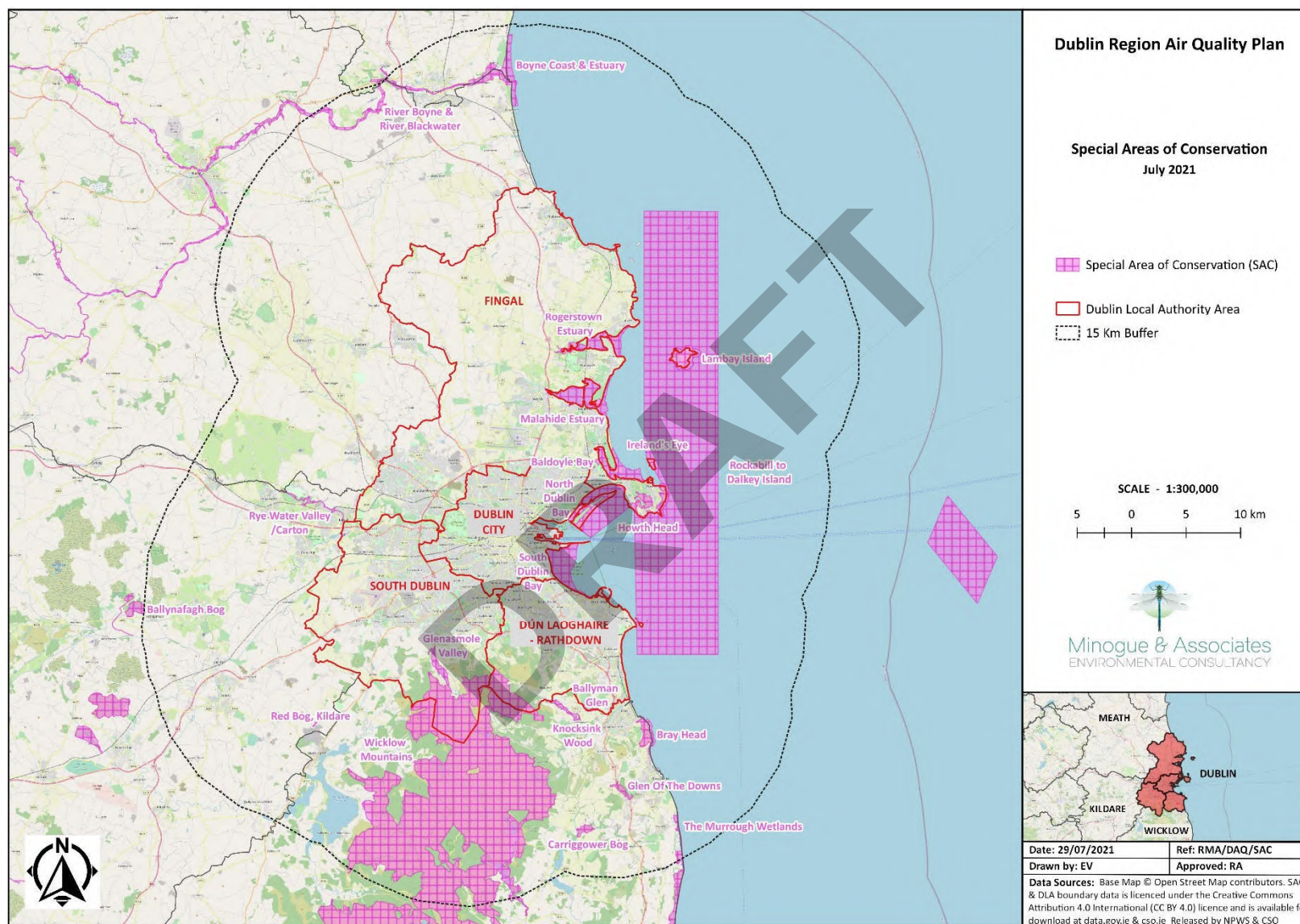
Site-specific conservation objectives of European Sites have been identified for many of the European Sites occurring within the plan area and the details of these site-specific conservation objectives are provided by the NPWS at <https://www.npws.ie/protected-sites/conservation-management-planning/conservation-objectives>.

#### 4.2 European Sites within and in the surrounding of the Plan area

A total number of eighteen European Sites, comprising ten SACs and eight SPAs occur within the Plan Area (see Figure 4.1 and Figure 4.2). In addition to these European Sites, a total of 12 SACs and 9 SPAs occurs within the wider area (15km) surrounding the Plan Area. There is no official requirement for a buffer zone of 15km, however, it is in line with good practice and is shown in figures 4.1 and 4.2 for spatial context.

Table 4.1 lists the qualifying features of interest of the SAC and the special conservation interests of the SPAs occurring within and surrounding the Plan area. In addition, the broad habitat types and species for which each site is designated are also outlined

**Figure 4.1: SACs within and surrounding the four Local Authorities**





**Figure 4.2: SPAs within and surrounding the four Local Authorities**

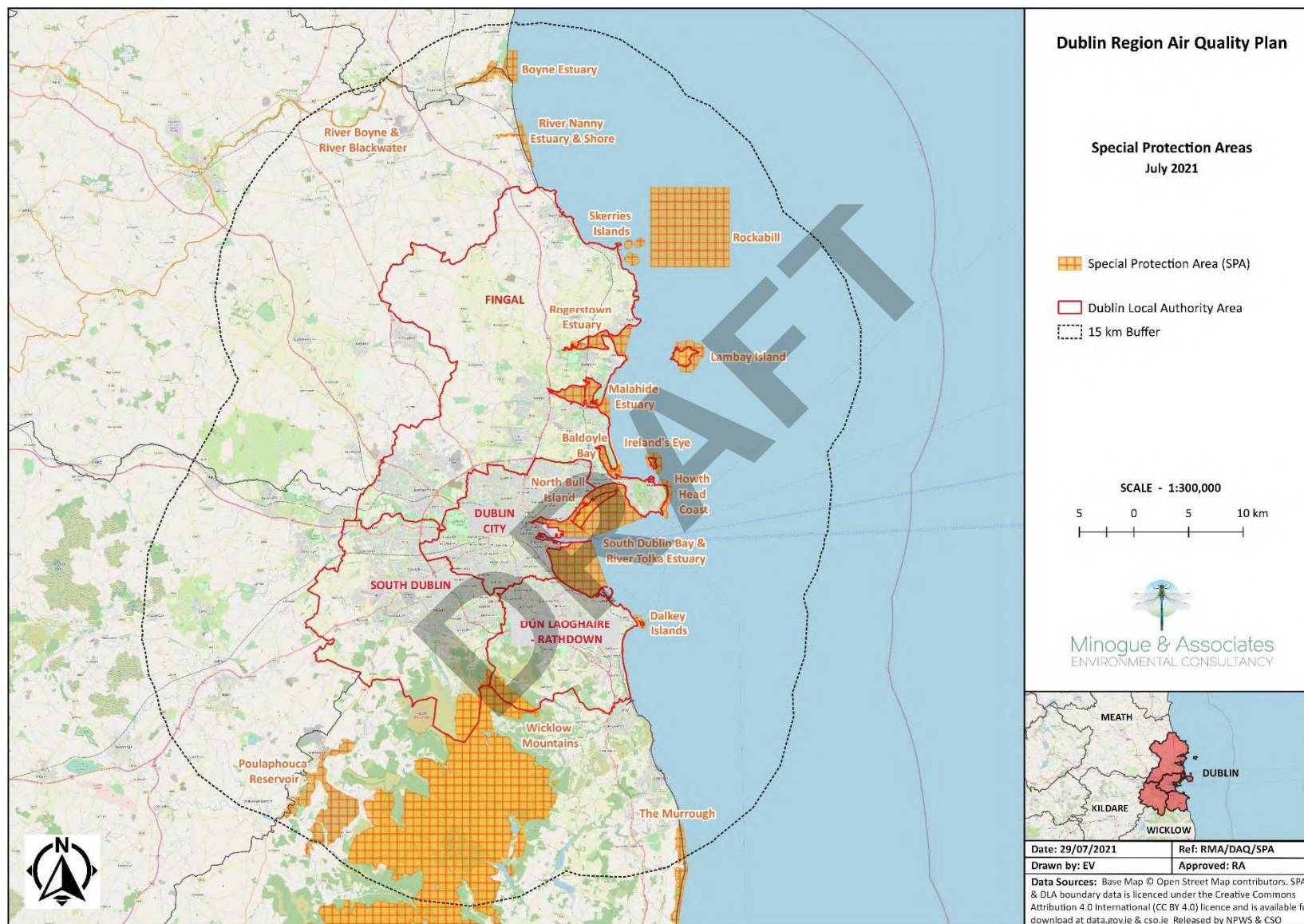


Table 4.1: European Sites within the Plan Area

European Sites	Distance from Plan Area	Qualifying Features of Interest/Special Conservation Interests	Broad QI/SCI Category
Rogerstown Estuary SAC	Within Plan area	<p>Estuaries [1130]</p> <p>Mudflats and sandflats not covered by seawater at low tide [1140]</p> <p>Salicornia and other annuals colonising mud and sand [1310]</p> <p>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330]</p> <p>Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]</p> <p>Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]</p> <p>Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]</p>	Coastal Habitats
Malahide Estuary SAC	Within Plan area	<p>Mudflats and sandflats not covered by seawater at low tide [1140]</p> <p>Salicornia and other annuals colonising mud and sand [1310]</p> <p>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>) [1330]</p>	Coastal Habitats

European Sites	Distance from Plan Area	Qualifying Features of Interest/Special Conservation Interests	Broad QI/SCI Category
		Mediterranean salt meadows ( <i>Juncetalia maritimi</i> ) [1410]  Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]  Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	
Baldoye Bay SAC	Within Plan area	Mudflats and sandflats not covered by seawater at low tide [1140]  Salicornia and other annuals colonising mud and sand [1310]  Atlantic salt meadows ( <i>Glauco-Puccinellietalia maritimae</i> ) [1330]  Mediterranean salt meadows ( <i>Juncetalia maritimi</i> ) [1410]	Coastal habitats
Howth Head SAC	Within Plan area	Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]  European dry heaths [4030]	Terrestrial exposed rock and peatland habitats
North Dublin Bay SAC	Within Plan area	Mudflats and sandflats not covered by seawater at low tide [1140]  Annual vegetation of drift lines [1210]	Coastal habitats  Plant species (Petalwort liverwort)

European Sites	Distance from Plan Area	Qualifying Features of Interest/Special Conservation Interests	Broad QI/SCI Category
		<p>Salicornia and other annuals colonising mud and sand [1310]</p> <p>Atlantic salt meadows (<i>Glauco-Puccinellietalia maritima</i>) [1330]</p> <p>Mediterranean salt meadows (<i>Juncetalia maritimi</i>) [1410]</p> <p>Embryonic shifting dunes [2110]</p> <p>Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]</p> <p>Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]</p> <p>Humid dune slacks [2190]</p> <p><i>Petalophyllum ralfsii</i> (Petalwort) [1395]</p>	
South Dublin Bay SAC	Within Plan area	<p>Mudflats and sandflats not covered by seawater at low tide [1140]</p> <p>Annual vegetation of drift lines [1210]</p> <p>Salicornia and other annuals colonising mud and sand [1310]</p> <p>Embryonic shifting dunes [2110]</p>	Coastal habitats

European Sites	Distance from Plan Area	Qualifying Features of Interest/Special Conservation Interests	Broad QI/SCI Category
Glenasmole Valley SAC	Within Plan area	<p>Semi-natural dry grasslands and scrubland facies on calcareous substrates (<i>Festuco-Brometalia</i>) (* important orchid sites) [6210]</p> <p>Molinia meadows on calcareous, peaty or clayey-silt-laden soils (<i>Molinion caeruleae</i>) [6410]</p> <p>Petrifying springs with tufa formation (Cratoneurion) [7220]</p>	<p>Terrestrial grassland and peatland habitat</p> <p>Groundwater dependent habitat</p>
Ballyman Glen SAC	Within Plan area	<p>Petrifying springs with tufa formation (Cratoneurion) [7220]</p> <p>Alkaline fens [7230]</p>	Groundwater dependent habitats
Wicklow Mountain SAC	Within Plan area	<p>Oligotrophic waters containing very few minerals of sandy plains (<i>Littorelletalia uniflorae</i>) [3110]</p> <p>Natural dystrophic lakes and ponds [3160]</p> <p>Northern Atlantic wet heaths with <i>Erica tetralix</i> [4010]</p> <p>European dry heaths [4030]</p> <p>Alpine and Boreal heaths [4060]</p> <p>Calaminarian grasslands of the <i>Violetalia calaminariae</i> [6130]</p>	<p>Surface water dependent habitats</p> <p>Terrestrial grassland, peatland, woodland and exposed rock habitat</p> <p>Mammals (otters)</p>

European Sites	Distance from Plan Area	Qualifying Features of Interest/Special Conservation Interests	Broad QI/SCI Category
		<p>Species-rich <i>Nardus</i> grasslands, on siliceous substrates in mountain areas (and submountain areas, in Continental Europe) [6230]</p> <p>Blanket bogs (* if active bog) [7130]</p> <p>Siliceous scree of the montane to snow levels (<i>Androsacetalia alpinae</i> and <i>Galeopsietalia ladani</i>) [8110]</p> <p>Calcareous rocky slopes with chasmophytic vegetation [8210]</p> <p>Siliceous rocky slopes with chasmophytic vegetation [8220]</p> <p>Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles [91A0]</p> <p><i>Lutra lutra</i> (Otter) [1355]</p>	
Knocksink Woods SAC	Within Plan area	<p>Petrifying springs with tufa formation (Cratoneurion) [7220]</p> <p>Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> (Alno-Padion, Alnion incanae, Salicion albae) [91E0]</p>	Groundwater dependent habitats
Rogerstown Estuary SPA	Within Plan area	Greylag Goose ( <i>Anser anser</i> ) [A043]	<p>Wintering coastal waterbirds</p> <p>Coastal habitats</p>



European Sites	Distance from Plan Area	Qualifying Features of Interest/Special Conservation Interests	Broad QI/SCI Category
		Light-bellied Brent Goose ( <i>Branta bernicla hrota</i> ) [A046]  Shelduck ( <i>Tadorna tadorna</i> ) [A048]  Shoveler ( <i>Anas clypeata</i> ) [A056]  Oystercatcher ( <i>Haematopus ostralegus</i> ) [A130]  Ringed Plover ( <i>Charadrius hiaticula</i> ) [A137]  Grey Plover ( <i>Pluvialis squatarola</i> ) [A141]  Knot ( <i>Calidris canutus</i> ) [A143]  Dunlin ( <i>Calidris alpina</i> ) [A149]  Black-tailed Godwit ( <i>Limosa limosa</i> ) [A156]  Redshank ( <i>Tringa totanus</i> ) [A162]  Wetland and Waterbirds [A999]	
Malahide Estuary SPA	Within Plan area	Great Crested Grebe ( <i>Podiceps cristatus</i> ) [A005]  Light-bellied Brent Goose ( <i>Branta bernicla hrota</i> ) [A046]  Shelduck ( <i>Tadorna tadorna</i> ) [A048]  Pintail ( <i>Anas acuta</i> ) [A054]  Goldeneye ( <i>Bucephala clangula</i> ) [A067]	Wintering coastal waterbirds  Coastal habitats

European Sites	Distance from Plan Area	Qualifying Features of Interest/Special Conservation Interests	Broad QI/SCI Category
		Red-breasted Merganser ( <i>Mergus serrator</i> ) [A069] Oystercatcher ( <i>Haematopus ostralegus</i> ) [A130] Golden Plover ( <i>Pluvialis apricaria</i> ) [A140] Grey Plover ( <i>Pluvialis squatarola</i> ) [A141] Knot ( <i>Calidris canutus</i> ) [A143] Dunlin ( <i>Calidris alpina</i> ) [A149] Black-tailed Godwit ( <i>Limosa limosa</i> ) [A156] Bar-tailed Godwit ( <i>Limosa lapponica</i> ) [A157] Redshank ( <i>Tringa totanus</i> ) [A162] Wetland and Waterbirds [A999]	
Baldoye Bay SPA	Within Plan area	Light-bellied Brent Goose ( <i>Branta bernicla hrota</i> ) [A046] Shelduck ( <i>Tadorna tadorna</i> ) [A048] Ringed Plover ( <i>Charadrius hiaticula</i> ) [A137] Golden Plover ( <i>Pluvialis apricaria</i> ) [A140] Grey Plover ( <i>Pluvialis squatarola</i> ) [A141] Bar-tailed Godwit ( <i>Limosa lapponica</i> ) [A157]	Wintering coastal waterbirds Coastal habitats

European Sites	Distance from Plan Area	Qualifying Features of Interest/Special Conservation Interests	Broad QI/SCI Category
		Wetland and Waterbirds [A999]	
Howth Head Coast SPA	Within Plan area	Kittiwake ( <i>Rissa tridactyla</i> ) [A188]	
North Bull Island SPA	Within Plan area	<p>Light-bellied Brent Goose (<i>Branta bernicla hrota</i>) [A046]</p> <p>Shelduck (<i>Tadorna tadorna</i>) [A048]</p> <p>Teal (<i>Anas crecca</i>) [A052]</p> <p>Pintail (<i>Anas acuta</i>) [A054]</p> <p>Shoveler (<i>Anas clypeata</i>) [A056]</p> <p>Oystercatcher (<i>Haematopus ostralegus</i>) [A130]</p> <p>Golden Plover (<i>Pluvialis apricaria</i>) [A140]</p> <p>Grey Plover (<i>Pluvialis squatarola</i>) [A141]</p> <p>Knot (<i>Calidris canutus</i>) [A143]</p> <p>Sanderling (<i>Calidris alba</i>) [A144]</p> <p>Dunlin (<i>Calidris alpina</i>) [A149]</p> <p>Black-tailed Godwit (<i>Limosa limosa</i>) [A156]</p> <p>Bar-tailed Godwit (<i>Limosa lapponica</i>) [A157]</p> <p>Curlew (<i>Numenius arquata</i>) [A160]</p>	<p>Wintering coastal waterbirds</p> <p>Coastal habitats</p>

European Sites	Distance from Plan Area	Qualifying Features of Interest/Special Conservation Interests	Broad QI/SCI Category
		Redshank ( <i>Tringa totanus</i> ) [A162] Turnstone ( <i>Arenaria interpres</i> ) [A169] Black-headed Gull ( <i>Chroicocephalus ridibundus</i> ) [A179] Wetland and Waterbirds [A999]	
Dalkey Island SPA	Within Plan area	Roseate Tern ( <i>Sterna dougallii</i> ) [A192] Common Tern ( <i>Sterna hirundo</i> ) [A193] Arctic Tern ( <i>Sterna paradisaea</i> ) [A194]	Breeding waterbirds
South Dublin Bay & Tolka Estuary SPA	Within Plan area	Light-bellied Brent Goose ( <i>Branta bernicla hrota</i> ) [A046] Oystercatcher ( <i>Haematopus ostralegus</i> ) [A130] Ringed Plover ( <i>Charadrius hiaticula</i> ) [A137] Grey Plover ( <i>Pluvialis squatarola</i> ) [A141] Knot ( <i>Calidris canutus</i> ) [A143] Sanderling ( <i>Calidris alba</i> ) [A144] Dunlin ( <i>Calidris alpina</i> ) [A149] Bar-tailed Godwit ( <i>Limosa lapponica</i> ) [A157] Redshank ( <i>Tringa totanus</i> ) [A162]	Wintering coastal waterbirds Breeding Terns Coastal habitats

European Sites	Distance from Plan Area	Qualifying Features of Interest/Special Conservation Interests	Broad QI/SCI Category
		Black-headed Gull ( <i>Chroicocephalus ridibundus</i> ) [A179] Roseate Tern ( <i>Sterna dougallii</i> ) [A192] Common Tern ( <i>Sterna hirundo</i> ) [A193] Arctic Tern ( <i>Sterna paradisaea</i> ) [A194] Wetland and Waterbirds [A999]	
Wicklow Mountain SPA	Within Plan area	Merlin ( <i>Falco columbarius</i> ) Peregrine ( <i>Falco peregrinus</i> )	Breeding raptor bird species
European Sites within 15km of the Plan area	Approximate distance from Plan Area	Qualifying Features of Interest/Special Conservation Interests	Broad QI/SCI Category
Boyne Coast & Estuary SAC	7.7 km to the north	Estuaries [1130] Mudflats and sandflats not covered by seawater at low tide [1140] Annual vegetation of drift lines [1210] Salicornia and other annuals colonising mud and sand [1310] Atlantic salt meadows ( <i>Glauco-Puccinellietalia maritimae</i> ) [1330]	Coastal Habitats

European Sites	Distance from Plan Area	Qualifying Features of Interest/Special Conservation Interests	Broad QI/SCI Category
		Embryonic shifting dunes [2110]  Shifting dunes along the shoreline with <i>Ammophila arenaria</i> (white dunes) [2120]  Fixed coastal dunes with herbaceous vegetation (grey dunes) [2130]	
River Boyne & River Blackwater SAC	10.4 km to the north	Alkaline fens [7230]  Alluvial forests with <i>Alnus glutinosa</i> and <i>Fraxinus excelsior</i> ( <i>Alno-Padion</i> , <i>Alnion incanae</i> , <i>Salicion albae</i> ) [91E0]  <i>Lampetra fluviatilis</i> (River Lamprey) [1099]  <i>Salmo salar</i> (Salmon) [1106]  <i>Lutra lutra</i> (Otter) [1355]	Groundwater dependent habitats  Mammals (otters)
Lambay Island SAC	4.3 km to the east	Reefs [1170]  Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]  <i>Halichoerus grypus</i> (Grey Seal) [1364]  <i>Phoca vitulina</i> (Harbour Seal) [1365]	Marine Habitat  Terrestrial exposed rock and peatland habitats  Marine mammal
Rockabill to Dalkey Island SAC	0.35 km to the east	Reefs [1170]  <i>Phocoena phocoena</i> (Harbour Porpoise) [1351]	Marine Habitat  Marine mammal

European Sites	Distance from Plan Area	Qualifying Features of Interest/Special Conservation Interests	Broad QI/SCI Category
Ireland's Eye SAC	1.07 km to the north east	Perennial vegetation of stony banks [1220] Vegetated sea cliffs of the Atlantic and Baltic coasts [1230]	Terrestrial peatland habitats
Bray Head SAC	1.9km to the south	Vegetated sea cliffs of the Atlantic and Baltic coasts [1230] European dry heaths [4030]	Terrestrial exposed rock and peatland habitats
Glen Of The Downs SAC	6.3km to the south	Old sessile oak woods with Ilex and Blechnum in the British Isles [91A0]	Terrestrial woodland habitats
The Murrough Wetlands SAC	11.1 km to the south	Annual vegetation of drift lines [1210] Perennial vegetation of stony banks [1220] Atlantic salt meadows ( <i>Glauco-Puccinellietalia maritimae</i> ) [1330] Mediterranean salt meadows ( <i>Juncetalia maritimi</i> ) [1410] Calcareous fens with <i>Cladium mariscus</i> and species of the <i>Caricion davallianae</i> [7210] Alkaline fens [7230]	Groundwater dependent habitats Groundwater/surface water dependent species
Carriggower Bog SAC	10.5 km to the south	Transition mires and quaking bogs [7140]	Terrestrial peatland habitats
Red Bog, Kildare SAC	5.8km to the south	Transition mires and quaking bogs [7140]	Terrestrial peatland habitats

European Sites	Distance from Plan Area	Qualifying Features of Interest/Special Conservation Interests	Broad QI/SCI Category
Ballynafagh Bog SAC	15km to the west	Transition mires and quaking bogs [7140]	Terrestrial peatland habitats
Rye Water Valley/ Carton SAC	1.04km to the west	Petrifying springs with tufa formation (Cratoneurion) [7220]  <i>Vertigo angustior</i> (Narrow-mouthed Whorl Snail) [1014]  <i>Vertigo moulinsiana</i> (Desmoulin's Whorl Snail) [1016]	Groundwater dependent habitat  Molluscs
Boyne Estuary SPA	10km to the north	Shelduck ( <i>Tadorna tadorna</i> ) [A048]  Oystercatcher ( <i>Haematopus ostralegus</i> ) [A130]  Golden Plover ( <i>Pluvialis apricaria</i> ) [A140]  Grey Plover ( <i>Pluvialis squatarola</i> ) [A141]  Lapwing ( <i>Vanellus vanellus</i> ) [A142]  Knot ( <i>Calidris canutus</i> ) [A143]  Sanderling ( <i>Calidris alba</i> ) [A144]  Black-tailed Godwit ( <i>Limosa limosa</i> ) [A156]  Redshank ( <i>Tringa totanus</i> ) [A162]  Turnstone ( <i>Arenaria interpres</i> ) [A169]  Little Tern ( <i>Sterna albifrons</i> ) [A195]	Wintering coastal waterbirds  Breeding Terns  Coastal habitats



European Sites	Distance from Plan Area	Qualifying Features of Interest/Special Conservation Interests	Broad QI/SCI Category
		Wetland and Waterbirds [A999]	
River Nanny Estuary & Shore SPA	2 km to the north	Oystercatcher ( <i>Haematopus ostralegus</i> ) [A130] Ringed Plover ( <i>Charadrius hiaticula</i> ) [A137] Golden Plover ( <i>Pluvialis apricaria</i> ) [A140] Knot ( <i>Calidris canutus</i> ) [A143] Sanderling ( <i>Calidris alba</i> ) [A144] Herring Gull ( <i>Larus argentatus</i> ) [A184] Wetland and Waterbirds [A999]	Wintering Coastal Waterbirds
River Boyne & River Blackwater SPA	13.6km to the north	Kingfisher ( <i>Alcedo atthis</i> ) [A229]	Waterbirds
Lambay Island SPA	4.39km to the east	Fulmar ( <i>Fulmarus glacialis</i> ) [A009] Cormorant ( <i>Phalacrocorax carbo</i> ) [A017] Shag ( <i>Phalacrocorax aristotelis</i> ) [A018] Greylag Goose ( <i>Anser anser</i> ) [A043] Lesser Black-backed Gull ( <i>Larus fuscus</i> ) [A183] Herring Gull ( <i>Larus argentatus</i> ) [A184] Kittiwake ( <i>Rissa tridactyla</i> ) [A188]	Wintering coastal waterbirds

European Sites	Distance from Plan Area	Qualifying Features of Interest/Special Conservation Interests	Broad QI/SCI Category
		Guillemot ( <i>Uria aalge</i> ) [A199] Razorbill ( <i>Alca torda</i> ) [A200] Puffin ( <i>Fratercula arctica</i> ) [A204]	
Rockabill SPA	2.92km to the east	Purple Sandpiper ( <i>Calidris maritima</i> ) [A148] Roseate Tern ( <i>Sterna dougallii</i> ) [A192] Common Tern ( <i>Sterna hirundo</i> ) [A193] Arctic Tern ( <i>Sterna paradisaea</i> ) [A194]	Wintering Coastal Waterbirds Breeding Terns
Skerries Islands SPA	0.3km to the east	Cormorant ( <i>Phalacrocorax carbo</i> ) [A017] Shag ( <i>Phalacrocorax aristotelis</i> ) [A018] Light-bellied Brent Goose ( <i>Branta bernicla hrota</i> ) [A046] Purple Sandpiper ( <i>Calidris maritima</i> ) [A148] Turnstone ( <i>Arenaria interpres</i> ) [A169] Herring Gull ( <i>Larus argentatus</i> ) [A184]	Wintering Coastal Waterbirds
Ireland's Eye SPA	1.34km to the east	Cormorant ( <i>Phalacrocorax carbo</i> ) [A017] Herring Gull ( <i>Larus argentatus</i> ) [A184] Kittiwake ( <i>Rissa tridactyla</i> ) [A188]	Terrestrial peatland habitats

European Sites	Distance from Plan Area	Qualifying Features of Interest/Special Conservation Interests	Broad QI/SCI Category
		Guillemot ( <i>Uria aalge</i> ) [A199] Razorbill ( <i>Alca torda</i> ) [A200]	
The Murrough SPA	12.5km to the south	Red-throated Diver ( <i>Gavia stellata</i> ) [A001] Greylag Goose ( <i>Anser anser</i> ) [A043] Light-bellied Brent Goose ( <i>Branta bernicla hrota</i> ) [A046] Wigeon ( <i>Anas penelope</i> ) [A050] Teal ( <i>Anas crecca</i> ) [A052] Black-headed Gull ( <i>Chroicocephalus ridibundus</i> ) [A179] Herring Gull ( <i>Larus argentatus</i> ) [A184] Little Tern ( <i>Sterna albifrons</i> ) [A195] Wetland and Waterbirds [A999]	Wintering waterbirds Breeding Terns
Poulaphouca Reservoir SPA	7.05km to the south	Greylag Goose ( <i>Anser anser</i> ) [A043] Lesser Black-backed Gull ( <i>Larus fuscus</i> ) [A183]	Winter waterbirds

## 5.0 Impacts ON European Sites

The next step of this report is to identify whether or not the plan has the potential to damage, disturb or result in the loss of qualifying habitat or qualifying species/special conservation interests of European Sites and undermine the conservation objectives of the European Sites listed in Table 4.1 above.

Table 5.1 identifies the overall aim and measures of the plan and evaluates the potential for each to result in likely significant effects on European Sites. Where objectives and actions have the potential to result in positive implications for European Sites, such implications are recognised in Table 5.1.

Table 5.1: Evaluation of the Local and National Measures of the **Dublin Air Quality Plan**

### Overall Aim and Measures under Dublin Air Quality Plan 2021

### Examination of Likely Significant Effects

**Aim:** *To enhance the health of citizens by meeting current legal air quality standards and working towards further improvements in line with health gain and evolving legal standards in the coming decade.*

**Measures:** The following 14 measures are identified in this Dublin Air Quality Plan:

### Evaluation

<b>Measure 1:</b> Integrate “15 Minute Neighbourhoods” concept in City and County Development Plans	The integration of the 15-minute neighbourhoods or village concept in the four City/County Development Plans will promote sustainable neighbourhoods that will facilitate the decentralisation of the regional economy to neighbourhood areas that will be accessible to local residents within 15 minutes via sustainable modes of transport such as walking and cycling. The incorporation of this concept into County Development Plans will have the potential to result in positive implications for the environment, particularly in terms of air quality, and will have the potential to result in neutral to positive
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implications for European Sites within and surrounding the Plan area.

**Measure 2: Public Parking Controls**

This measure involves minor measures in relation to encouraging a modal shift to more sustainable forms of transport and movement such as cycling and walking. Therefore, this measure will not result in land-use activities with the potential to result in likely significant effects on European Sites.

**Measure 3: Residential Parking Standards**

The residential parking standards will be reviewed and revised in the upcoming Development Plans which will be subjected to SEA and AA screening. This measure will not involve land use activities with the potential to result in likely significant effects on European Sites.

**Measure 4: Workplace Parking Standards**

The workplace parking standards will be reviewed and revised in the upcoming Development Plans which will be subjected to SEA and AA screening. This measure will not involve land use activities with the potential to result in likely significant effects on European Sites.

**Measure 5: Introduction of Clean Air Zones/ Low Emission Zones**

The introduction of clean air zones or low emission zones can help with significant NO<sub>x</sub> reduction and therefore will have the potential to result in positive implications for the environment and air quality in particular. Such positive implications for the environment, in general, will result in neutral to positive impacts for European Sites within and surrounding the Plan area.

- Measure 6:** Electrical Vehicle (EV) Charging Strategy  
The strategic role of Dublin Local Authorities in enabling a region-wide charging network is a positive measure. The land-use effects to European Sites resulting from this measure are not identified as significant.
- Measure 7:** Publication of National Clean Air Strategy  
The preparation and publication of this National Plan will not in itself have the potential to result in land-use effects. Once drafted this Plan will be subjected to the SEA and AA process.
- Measure 8:** Air Quality Enabling Legislation  
Enabling air quality legislation with relevant parameters and thresholds should contribute to meeting higher air quality standards and therefore is a positive measure. This measure will have the potential to result in positive implications for the environment and air quality in particular. Such positive implications for the environment, in general, will result in neutral to positive impacts for European Sites within and surrounding the Plan area.
- Measure 9:** Flexible Working- Making Remote Work – National Remote Work Strategy 2021  
The National Remote Work Strategy aims to ensure the permanence of remote working features that should contribute to air quality benefits with the reduction of work-related commuting. This measure is positive and will not involve land use activities with the potential to result in likely significant effects on European Sites.
- Measure 10:** Enhanced Air Quality Monitoring and Modelling- National Ambient Air Quality Monitoring Programme (AAMP)  
This measure is overall positive for a better understanding of the air quality of the Dublin Region. This measure will not involve land use activities with the potential to result in likely significant effects on European Sites.

**Measure 11: Air Quality - Citizen Engagement**

This measure will lead to greater awareness and engagement which is positive in relation to understanding and addressing air quality. This measure will not involve land use activities with the potential to result in likely significant effects on European Sites.

**Measure 12: Air Quality and Health Research**

This measure is overall positive for a better understanding of the air quality of the Dublin Region. This measure will not involve land use activities with the potential to result in likely significant effects on European Sites.

**Measure 13: Behavioural Change Campaigns to cleaner fleets**

This measure will focus on behavioural change to encourage low emission vehicle purchase which is positive in relation to enhancing air quality. This measure will not involve land use activities with the potential to result in likely significant effects on European Sites.

**Measure 14: Continued Delivery of the Active travel programme**

This measure aims to provide green sustainable transport options and develop high-quality walking and cycling facilities to encourage more people to switch to active travel. This measure, therefore, is positive and will not involve land use activities with the potential to result in likely significant effects on European Sites.

## 5.1 Examination of the Plan's potential to result in negative impacts to European Sites within the Plan area

European Sites and their associated qualifying features and associated conservation objectives are likely to be compromised by the plan only where the actions of the plan have the potential to result in land-use activities that could result in damage or disturbance to qualifying habitat, qualifying species and or special conservation interests and the processes that they rely upon to maintain their favourable conservation status. As identified in Section 5.0 above the Plan will not result in the

implementation of land use activities that will have the potential to result in negative impacts on European Sites and their conservation objectives. On the contrary, the overall aim and the measures of the plan have been identified as having the potential to result in positive implications for the environment and air quality in particular and neutral to positive implications for European Sites and their conservation status.

The implementation of the Dublin Air Quality Plan will have the potential to enhance the air quality of the four local authorities. The measures outlined in the Dublin Air Quality Plan that aim to effectively tackle the NO<sub>x</sub> emissions will also have the potential to contribute to the conservation management of the other European Sites that occur within the wider area surrounding the Dublin Region. The implementation of these measures will also ensure that a deleterious trajectory in air quality in the Dublin Region is avoided. This in turn will contribute to the conservation status of European Sites and particularly any qualifying interests of European Sites that are sensitive to poor air quality and nitrogen deposition such as the bryophyte communities of the North Dublin Bay SAC humid dune slacks that support Petalwort and the petrifying spring habitats and associated brown moss communities of the woodland SACs (e.g. Glenasmole and Knocksink) in the south of the region.

#### 5.1 In-Combination Effects with other Plans & Projects

As part of the Habitats Directive Article 6(3) assessment process consideration must be given to the potential for the Plan to combine with other plans or projects to result in cumulative negative effects to European Sites. The Dublin Air Quality Plan has been prepared in order to enhance the health of citizens by meeting current legal air quality standards and working towards further improvements in line with health gain and evolving legal standards in the coming decade. The Dublin Air Quality Plan will contribute to positive environmental and biodiversity management through measures that aim to enhance the air quality of the region of the four local authorities. The implementation of the plan will have the potential to result in a positive effect for European Sites within and surrounding the county and will not have the potential to combine with other plans to result in cumulative negative effects to European Sites. Additionally, any Strategy/Plan upon which it relies will be subject to separate AA/SEA.

#### 5.2 Screening conclusion

The Screening of the Dublin Air Quality Plan as set out above shows that the plan will not result in land use activities that have the potential to result in negative impacts to the qualifying features of interest of European Sites occurring within or surrounding the plan area and will not have the potential to compromise the achievement of the conservation objective of these European Sites. The examination of the plan has found that the plan will have the potential to contribute to the conservation management of European Sites within and surrounding the plan area and will thus have positive implications for the conservation objectives of these European Sites.

In light of the findings of this report, it is the considered view of the authors of this Screening Report for Appropriate Assessment that it can be concluded by the Dublin Region Local Authorities that the Plan is not likely, alone or in combination with other plans or projects, to have a significant effect on any European Sites in view of their Conservation Objectives and on the basis of best scientific evidence and there is no reasonable scientific doubt as to that conclusion.



## References

Department of the Environment Heritage and Local Government (DEHLG) (2010). *Appropriate Assessment of Plans and Projects in Ireland: Guidance for Planning Authorities*. Second Edition, February, 2010.

European Commission (2002). *Assessment of plans and projects significantly affecting Natura 2000 sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*. Luxembourg.

European Commission (2006). *Explanatory Notes and Guidelines for the Assessment, Monitoring and Reporting under Article 17 of the Habitats Directive*. Luxembourg.

OPR (2021). *Appropriate Assessment Screening for Development Management*. OPR Practice Note PN01. Office of the Planning Regulator.

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## Appendix D – SEA Determination

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# SEA Determination

Strategic Environmental Assessment (SEA Screening Determination under: European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (Statutory Instrument Number (S.I. No. 435 of 2004), as amended by S.I. No. 200/2011 - European Communities (Environmental Assessment of Certain Plans and Programmes) (Amendment) Regulations 2011.

## Dublin Region Air Quality Plan 2021

An SEA Screening determination as to whether the Dublin Region Air Quality Plan 2021 is likely to have significant effects on the environment is being made under the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (Statutory Instrument Number (S.I. No. 435 of 2004), as amended by S.I. No. 200/2011 - European Communities (Environmental Assessment of Certain Plans and Programmes) (Amendment) Regulations 2011.

The Dublin Region Air Quality Plan 2021 has been tested against the relevant criteria 'requirements to carry out environmental assessment'. The first relevant criteria 9 (1)(a) relates to plans 'which are prepared for agriculture, forestry, fisheries, energy, industry, transport, waste management, water management, telecommunications and tourism, and which set the framework for future development consent of projects listed in Annexes I and II to the Environmental Impact Assessment Directive.

The Dublin Region Air Quality Plan 2021 does not come under any of the sectors specifically listed namely 'agriculture, forestry, fisheries, energy, industry, transport, waste management, water management, telecommunications and tourism'. Although the Dublin Region Air Quality Plan 2021 may refer to other plans and projects in order to capture the current baseline position in each of the relevant local authorities, the Plan does not identify or provide the framework for the delivery of these plans and projects.

The projects as well as the proposed measures listed in the Dublin Region Air Quality Plan 2021 can only be delivered through inclusion of dedicated objectives in the relevant statutory plans which are subject to SEA in their own right. In some cases, measures also require the provision of enabling legislation. The Plan will therefore not 'set the framework for future development consent of projects' listed in Annexes I and II to the Environmental Impact Assessment Directive.

The Dublin Region Air Quality Plan 2021 is consistent with other key relevant higher-level plans and programmes and aligns with national environmental commitments. In this context, the relevant objectives and policy commitments of the National Planning Framework and the Eastern and Midlands Regional Spatial and Economic Strategy have been considered, as appropriate.

The second relevant criteria 9 (1)(b) relates to plans 'which are not directly connected with or necessary to the management of a European site but, either individually or in combination with other plans, are likely to have a significant effect on any such site.' The Dublin Region Air Quality Plan 2021 either individually or in combination with other plans, is not likely to have a significant effect on any European site for reasons outlined in the Appropriate Assessment (AA) Screening Report.

In making the determination, the information contained in the accompanying SEA Screening Report (including information provided by environmental authorities and an examination of the need to undertake SEA against relevant criteria set out in Schedule 2A 'Criteria for determining whether a plan is likely to have significant effects on the environment' of the above Regulations) has been taken into account. That information has been carefully considered and its reasoning and conclusion agreed with and adopted — allowing a determination to be made that the Dublin Region Air Quality Plan 2021 would not be likely to result in significant environmental effects.


Taking into account all of the above, SEA is not required to be undertaken on the Dublin Region Air Quality Plan 2021.

Signatories:

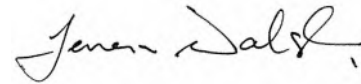
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**Date: October 2021**

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Dublin Air Quality Plan  
EPA modelling report  
September 2021



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## SUMMARY

In 2019 one of the air quality monitoring stations in the EPA managed National network, St. John's Road West, measured an exceedance of the annual nitrogen dioxide level ( $43.4\mu\text{g}/\text{m}^3$  versus the EU limit value of  $40\mu\text{g}/\text{m}^3$ ). Under the EU CAFE Directive there is a requirement to produce an Air Quality Plan (AQP) to address the exceedance. The Dublin Local Authorities are producing the Air Quality Plan (AQP) and the EPA are supporting them by specifically modelling nitrogen dioxide levels for a number of scenarios.

Five modelling scenarios (2019 basecase and four future scenarios) were chosen by the four Dublin Local Authorities. The EPA has modelled the five scenarios using the ADMS-Urban model and the outputs have been evaluated and verified by the EU DELTA tool in conjunction with the model developers own model evaluation tool kit.

All four modelled future scenarios show a significant reduction in nitrogen dioxide concentrations. It is predicted that there will be reductions of 19.7% to 25.6% in nitrogen dioxide concentrations in the modelled area by 2030.

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## INTRODUCTION

The EPA have a wide range of responsibilities as the competent authority for the implementation of ambient air legislation in Ireland. The air quality monitoring network has 96 monitoring stations strategically located across the country. Information from the network is available at [www.airquality.ie](http://www.airquality.ie).

One of these monitoring stations, St. John's Road West in Dublin City Centre (Figure 1), measured an annual nitrogen dioxide (NO<sub>2</sub>) level in 2019 of 43.4µg/m<sup>3</sup>. The measured level is an exceedance of the EU limit value of 40µg/m<sup>3</sup>.

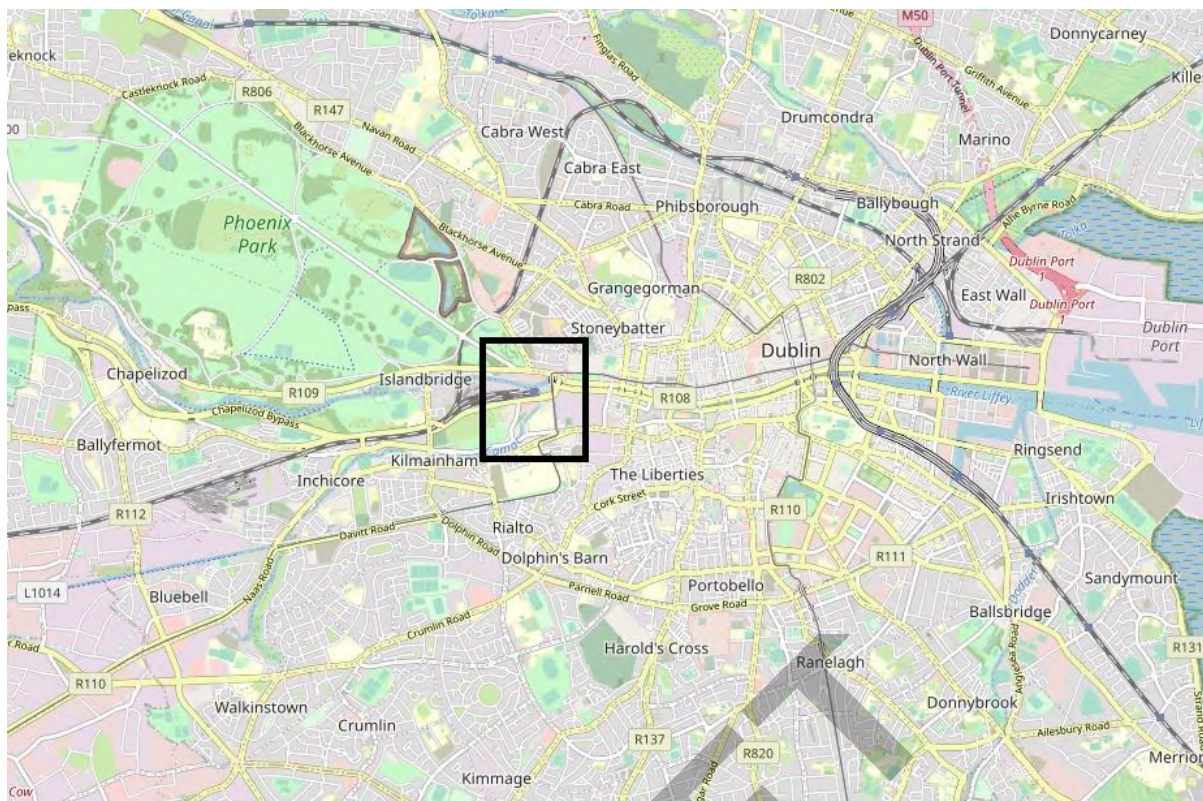
There is a requirement under Directive 2008/50/EC of the European Parliament and of the Council on ambient air quality and cleaner air for Europe (CAFE Directive) to produce an Air Quality Plan (AQP) to address the exceedance at St. John's Road West. The Dublin Local Authorities are producing the AQP and the EPA are supporting them by modelling nitrogen dioxide levels for a number of scenarios.



Figure 1 - St. John's Road West Monitoring Station Location

## ASSESSMENT TECHNIQUES:

To inform the AQP, the EPA assessed monitoring and modelling data to get a wider understanding of the current and future air quality situation around the local area of the measured exceedance. Figure 2 displays the area of assessment within the vicinity of St Johns Road West. The EPA is progressing wider modelling of Dublin, which will be published in 2022.



*Figure 2 – Area of assessment outlined in bold*

### Monitored data

Monitored data from St. John's Road West monitoring station (Figure 1) for the year 2019 was examined using Programme Application R and analysis package Openair (Carslaw et al., 2012). Openair allowed a more critical assessment of the data to take place such as combining with meteorological data. This gives additional information that may be of importance in understanding the overall impacts on local air quality e.g. information on pollutant sources.

### Modelled data

The EPA have used the urban scale model ADMS-Urban to carry out modelling in the area of the exceedance (Figure 1). The model uses detailed input data such as weather information, data on emissions from industry and transport, street and building layout information, and background regional air quality information to calculate nitrogen dioxide levels across the defined assessment area.

The EPA were requested by the 4 Dublin Local Authorities to provide a 2019 basecase and 4 future year scenarios. These are detailed as follows

- 2019 Basecase scenario
- 2028 Business as Usual scenario
- 2028 Intervention scenario
- 2030 Business as Usual scenario
- 2030 Intervention scenario

In the context of this report, the term ‘Business as Usual’ refers to the estimation of future traffic trips in the National Transport Authority (NTA) Regional Modelling System based on the available planning data and other growth assumptions for Dublin and the rest of Ireland. The ‘intervention’ scenarios include the business as usual projected data plus the additional measures as received from the 4 Dublin Local Authorities.

The measures included in the ‘intervention’ scenarios are:

- 50% electrification of the taxi fleet
- 50% electrification of the bus fleet
- 20% electrification of the passenger car fleet

Table 1 outlines the five scenarios modelled by ADMS-Urban along with the providers of the traffic data.

Scenario	Year	Description	Traffic Data Providers
1	2019	Basecase year	National Transport Authority
2	2028	Business as usual	National Transport Authority
3	2028	Intervention <sup>1</sup>	National Transport Authority, Dublin Local Authorities
4	2030	Business as usual	National Transport Authority
5	2030	Intervention <sup>2</sup>	National Transport Authority, Dublin Local Authorities

Table 1 – Scenario’s modelled

Each of the scenarios were compared to the 2019 basecase situation for a number of locations in the vicinity of the measured exceedance. This allowed a percentage change in concentration to be calculated.

The EPA have worked closely with model developers, Cambridge Environmental Research Consultants (CERC), to ensure that the model was applied appropriately in the area being assessed. Verification of the model data has been completed using the EU DELTA tool for assessment. The DELTA tool was developed by the Forum for Air quality Modelling (FAIRMODE)<sup>3</sup>. Additional verification statistics from CERC’s Model Evaluation toolkit have also been applied.

## RESULTS

### Assessment of Monitoring Data

Figure 3 displays the variation of nitrogen dioxide concentrations at the St. John’s Road West monitoring station on an hourly, daily, weekly and monthly basis for 2019. A double peak coinciding with peak time traffic in the morning and evening is measured on weekdays. This is due to normal weekday commuting patterns. The double peak is significantly reduced for Saturday and Sunday.

<sup>1</sup> 2028 Intervention – NTA ‘business as usual’ traffic projections plus 4 Dublin LA’s interventions - proposed fleet changes

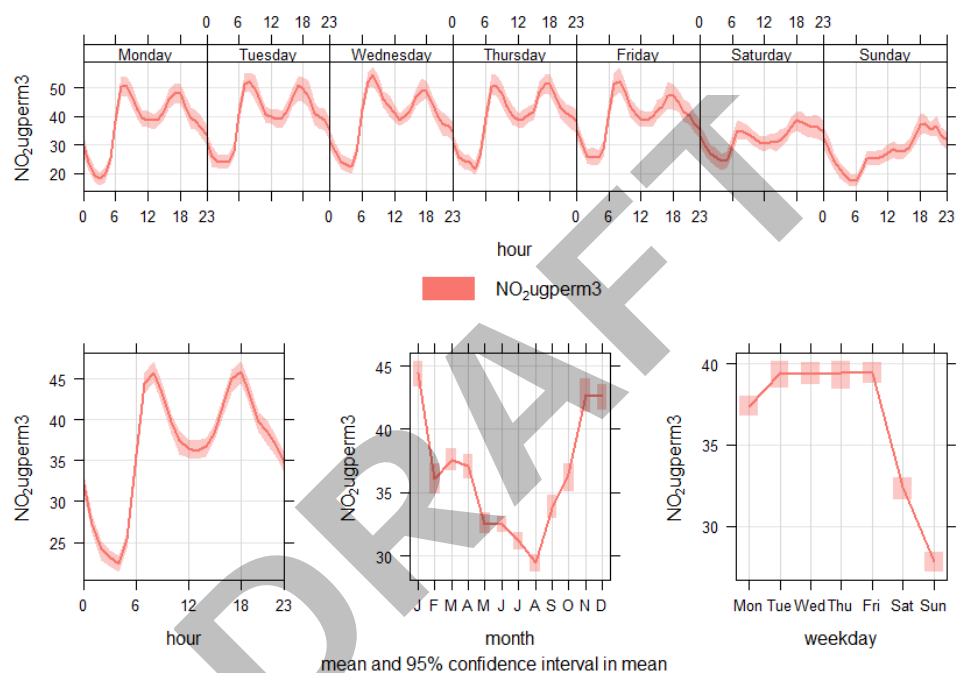
<sup>2</sup> 2030 Intervention – NTA ‘business as usual’ traffic projections plus 4 Dublin LA’s interventions - proposed fleet changes

<sup>3</sup> FAIRMODE - joint response initiative of the European Environment Agency (EEA) and the European Commission Joint Research Centre (JRC)

Highest average monthly concentrations are measured during winter, while concentrations associated with the summer months are lowest. This reflects the impact meteorological conditions, particularly temperature, have on the station.

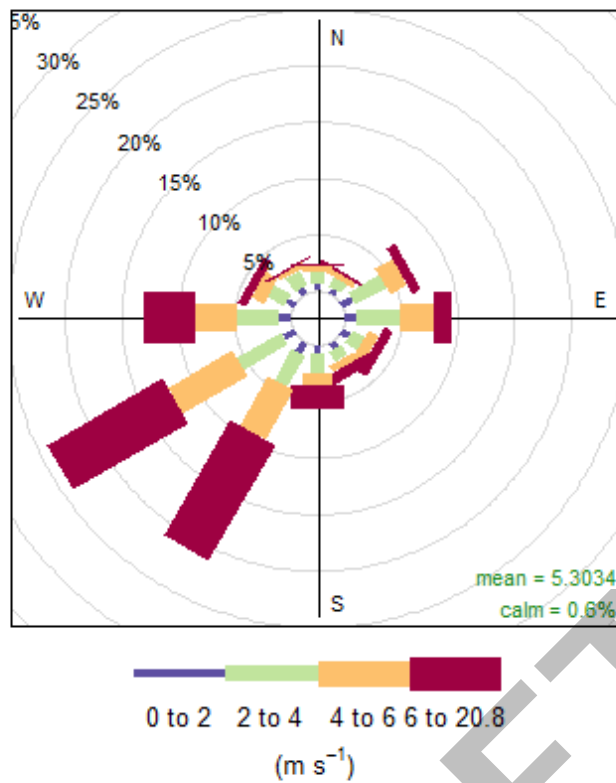
Figure 4 displays a wind rose of the wind speed and associated wind direction at Casement Aerodrome. The overall mean windspeed for 2019 was 5.34 metres per second. The highest frequency of wind directions occurs to the South West, which is typical in Ireland.

Figure 5 displays a polar plot of oxides of nitrogen ( $\text{NO}_x$ ) associated with wind direction and wind speed. As a traffic classified station, the plot reveals the highest concentrations associated with winds from the north, i.e. from the closest road, St. John's Road West. A secondary contribution associated with winds from the north east is also evident in the plot. This is most likely  $\text{NO}_x$  contributions from the uncovered section of the railway station to the north of the road.



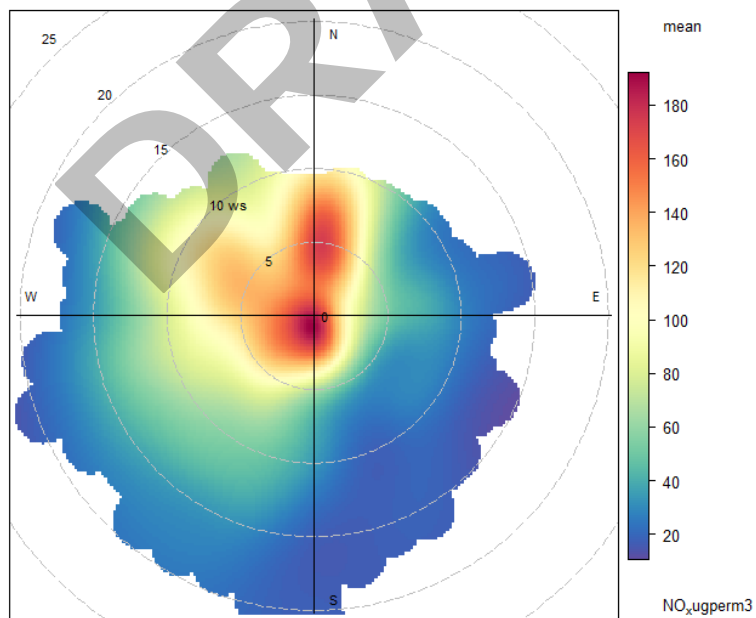
*Figure 3 – Hourly, Daily, Weekly and Monthly Measured Nitrogen Dioxide Profiles at St. John's Road West*





**Frequency of counts by wind direction (%)**

*Figure 4 - Wind Rose for Casement Aerodrome 2019*



*Figure 5 - Polar Plot of NO<sub>x</sub> Concentrations at St. John's Road West 2019*

## Model Verification and Evaluation

To evaluate the performance of the model, the predicted concentration for the 2019 basecase was compared to the measured concentration at St Johns Road West station. The evaluation involves using recognised statistical tests and is a necessary step as it provides confidence that the model is fit for the intended purpose.

To achieve this, two modelling evaluation packages were used – the DELTA tool and the Model Evaluation toolkit. The overall result from the DELTA tool for the model quality indicator for both the hourly and annual model dataset are <1, which deems the model suitable for assessment purposes. The result from the Model Evaluation toolkit confirmed that the model passed a number of key modelling statistical indicators. Detailed results for the Model Verification and Evaluation process are outlined in Appendix 1

## Assessment of ADMS-Urban Model Outputs:

***Please note that this report addresses nitrogen dioxide concentrations only. Assumptions for future concentrations of other pollutants e.g. particulate matter, should not be drawn from this report.***

- Scenario 1 – 2019 Basecase

Table 2 details the annual modelled and measured nitrogen dioxide concentration at the St. John's Road West station. The annual average limit value of  $40\mu\text{g}/\text{m}^3$  was exceeded at the St. John's Road West monitoring station in 2019. The modelled annual concentration was  $39\mu\text{g}/\text{m}^3$ . The modelled result, approaching the limit value, would suggest a significant potential for exceedance in the area. This has been verified by the actual measured exceedance.

Monitoring Station	Annual Modelled NO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	Annual Measured NO <sub>2</sub> ( $\mu\text{g}/\text{m}^3$ )	Modelled Percentage
St. John's Road West	39	43.4	90

Table 2 - Annual Modelled and Measured NO<sub>2</sub> at St. John's Road West 2019

Figure 6 details a contour plot of nitrogen dioxide concentrations for the 2019 basecase for the modelled area. The model predicts elevated annual average concentrations of nitrogen dioxide along St. John's Road West, at Frank Sherwin Bridge and on sections of Conyngham Road. The maximum modelled annual average concentration of  $56\mu\text{g}/\text{m}^3$  nitrogen dioxide occurred along St. John's Road West.

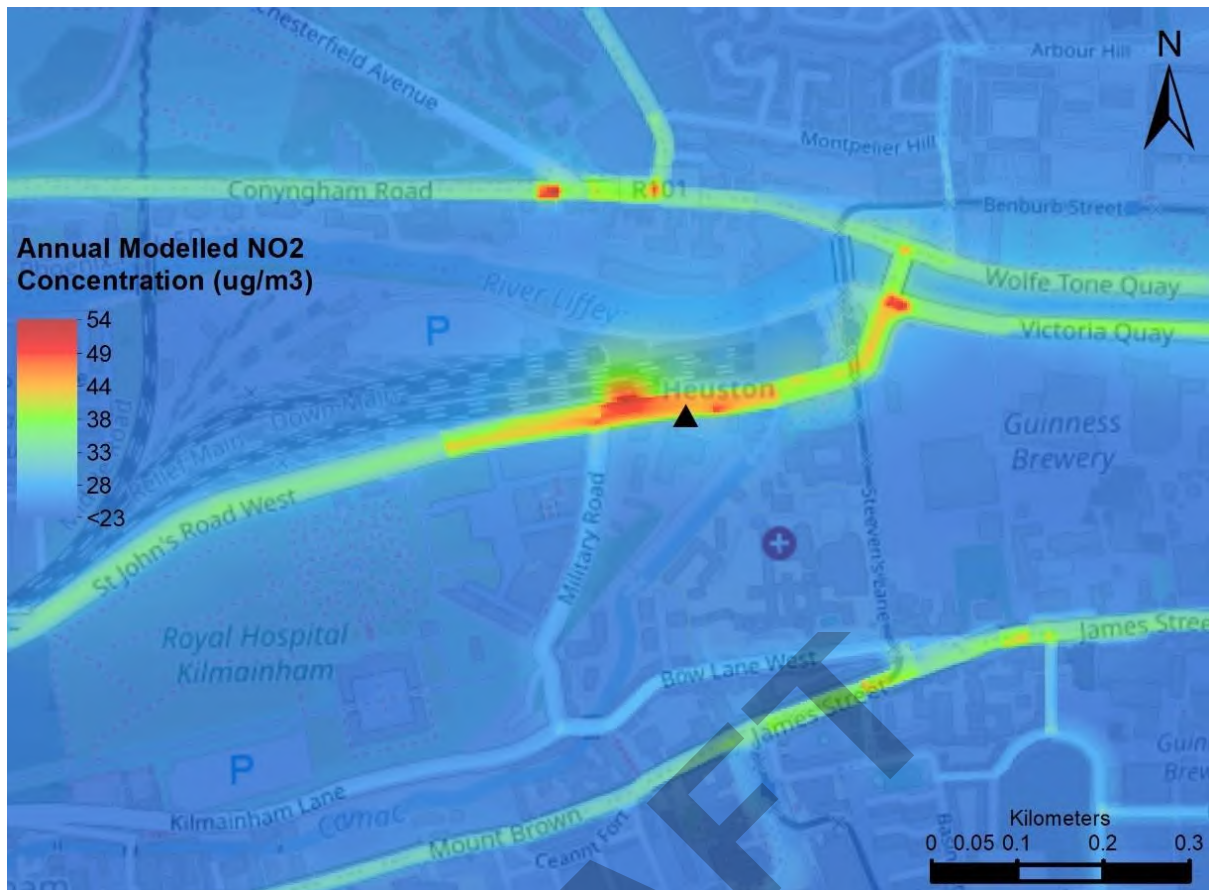


Figure 6 - Modelled Annual Average Nitrogen Dioxide Concentrations,  $\mu\text{g}/\text{m}^3$ , in 2019

- Scenario 2 to 5 –2028, 2030 Business as Usual and interventions

The following section details the modelled results for the future year scenarios of 2028 and 2030 at the St Johns Road West monitoring station.

In the context of this report, the term ‘Business as Usual’ refers to the estimation of future traffic trips in the National Transport Authority (NTA) Regional Modelling System based on the available planning data and other growth assumptions for Dublin and the rest of Ireland. The ‘intervention’ scenarios include the business as usual projected data plus the additional measures as received from the 4 Dublin Local Authorities. Table 4 details the annual average nitrogen dioxide concentrations at St Johns Road West for each of the modelled scenarios.

The predicted nitrogen dioxide concentrations for all four scenarios are less than the 2019 basecase modelled concentration. The largest decreases are seen for the intervention scenarios in 2028 and 2030, with a 24.6% to 25.6% reduction in nitrogen dioxide concentrations relative to the 2019 basecase modelled concentration. The business as usual scenarios show a reduction of 19.7% to 21.5% relative to the 2019 basecase modelled concentration.

The scenarios which included the ‘interventions’, electrification of the passenger fleet, taxi’s and buses, are projected to yield an additional 1.6 – 1.9 $\mu\text{g}/\text{m}^3$  reduction of nitrogen dioxide at the St. John’s Road West monitoring station. Overall, the largest reductions in concentrations of nitrogen dioxide are attributed to the reduced nitrogen dioxide emissions for the future projected traffic fleet.

Scenario	Modelled NO <sub>2</sub> St. John's Road Receptor (µg/m <sup>3</sup> )	Absolute NO <sub>2</sub> concentration attributable to intervention (µg/m <sup>3</sup> )	Absolute NO <sub>2</sub> concentration reduction (µg/m <sup>3</sup> )	Percentage NO <sub>2</sub> reduction from 2019 Basecase scenario (%)
2019 Basecase	39.0	-	-	-
2028 Business as usual	31.3	-	7.7	19.7
2028 Intervention	29.4	1.9	9.6	24.6
2030 Business as usual	30.6	-	8.4	21.5
2030 Intervention	29.0	1.6	10.0	25.6

*Table 4 - Modelled NO<sub>2</sub> concentration, µg/m<sup>3</sup>, for each scenario*

## CONCLUSIONS

As part of the Dublin Air Quality plan, the EPA completed a detailed modelling study of nitrogen dioxide concentrations around the area of the 2019 exceedance at St Johns Road West.

All four future scenarios are showing a significant reduction in nitrogen dioxide concentrations compared to the 2019 basecase scenario. It is predicted that there will be reductions of between 19.7% to 25.6% in nitrogen dioxide concentrations at the St Johns Road West station for the future scenarios modelled.

Business as usual scenarios for 2028 and 2030 are projected to result in 7.7 – 8.4 µg/m<sup>3</sup> reduction in concentrations relative to the modelled 2019 basecase (19.7% – 21.5% reduction). The additional interventions on the traffic fleet, as proposed by the 4 Dublin Local Authorities, are projected to yield an additional 1.6 – 1.9µg/m<sup>3</sup> nitrogen dioxide reduction by 2030. The 2030 scenario with additional interventions as proposed by the 4 Dublin local authorities gave the highest reduction in concentrations relative to the modelled 2019 basecase of 10.0 µg/m<sup>3</sup> or a 25.6% reduction.



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## Appendix 1

### Model Verification and Evaluation

#### DELTA Tool

The DELTA tool (V6.0) is an application developed by the Joint Research Commission (JRC) within the FAIRMODE community. It is aimed at model users in the context of model assessment against Directive 2008/5-/EC of the European Parliament and of the Council on ambient air quality and cleaner air for Europe (CAFE Directive). The tool calculates a cumulative statistical indicator known as the Model Quality Indicator, which is then assessed against the Model Quality Objective value to see if it is fit for purpose. The application also includes several additional statistics, including Root Mean Square Error, Correlation Coefficient, Normalised Mean Bias and Normalised Mean Standard Deviation.

#### Model Evaluation Toolkit:

The model evaluation toolkit, developed by CERC, uses the programme application R, to carry out statistical assessments on the modelled and measured data.

A range of statistics are calculated which include:

- the number of valid observations;
- the measured and modelled mean concentrations;
- the normalised mean square error (NMSE), a positive number for which a value closest to zero is best;
- the correlation coefficient (R), which varies between 0 (worst) and 1 (best);
- the fraction of modelled values within a factor of two of the measured (Fac2), which varies between 0 (worst) and 1 (best);
- the fractional bias (Fb), which can be either positive or negative, with zero being the best value.

Figure 1a displays the output from the DELTA tool. It consists of a target plot and summary statistics. The model quality indicator for both the hourly and annual model dataset are  $<1$ , which deems the model suitable for assessment purposes. The model achieves the 4-time related indicators also.

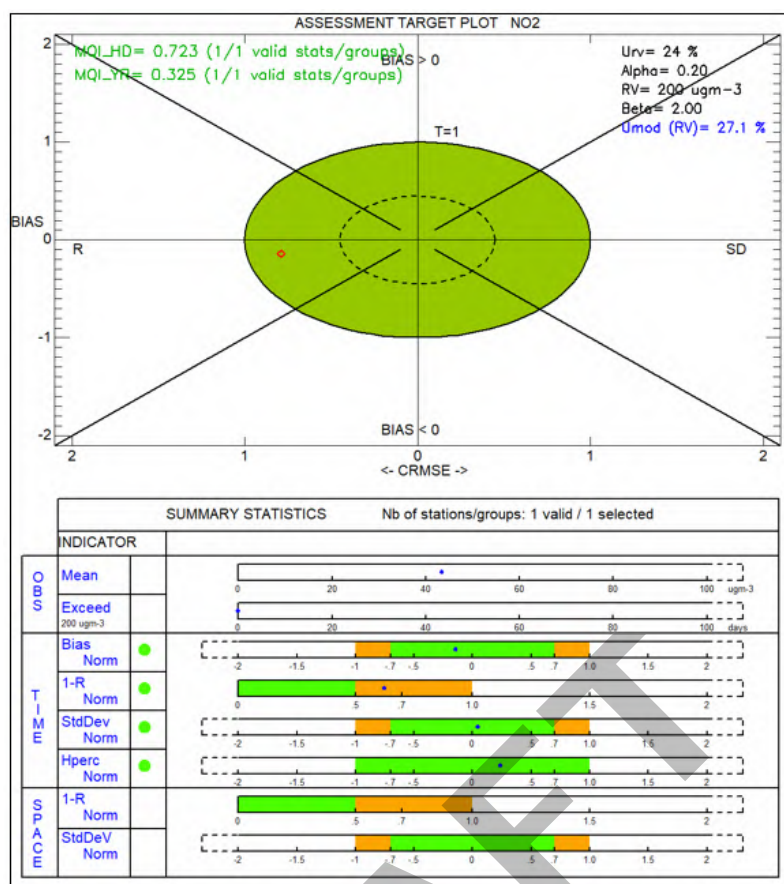
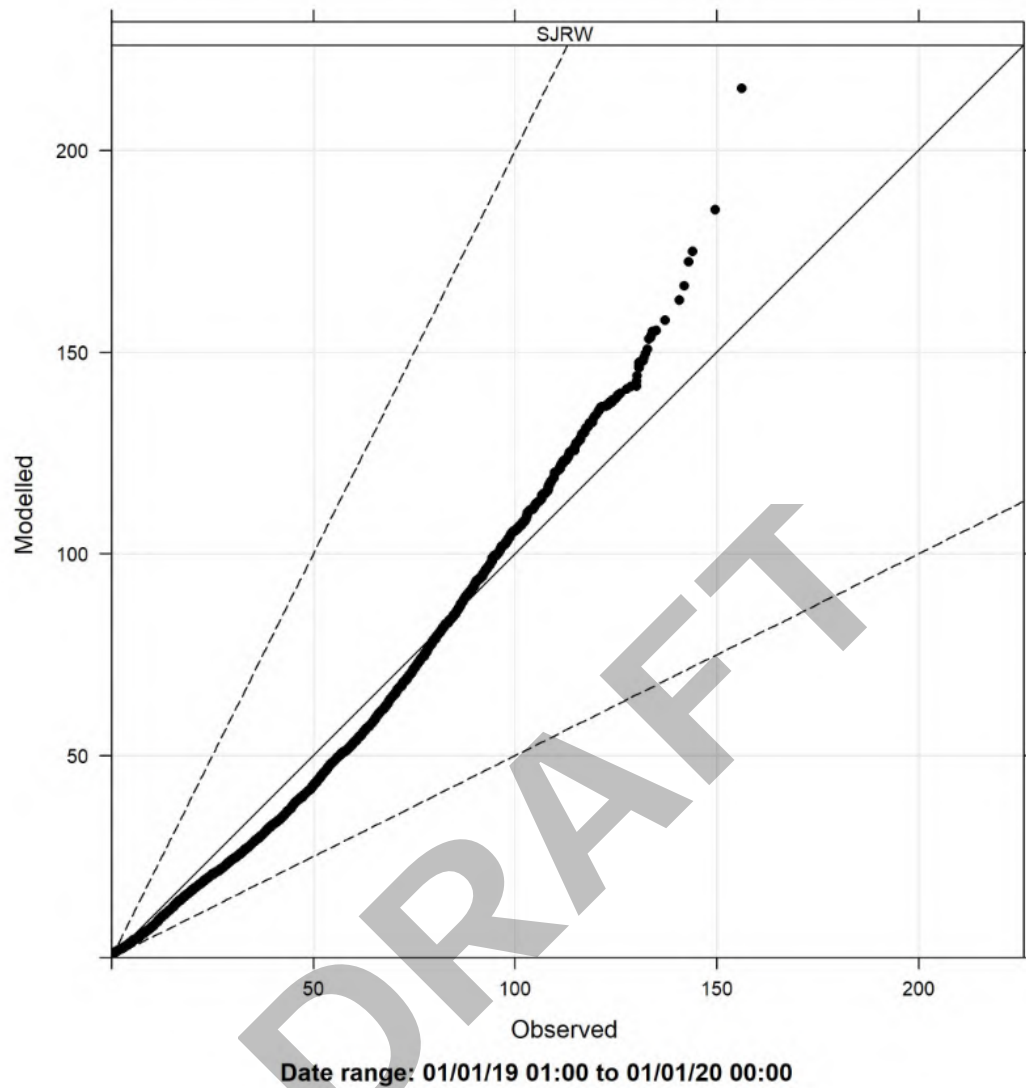


Figure 1a - DELTA Tool Output

Figure 2a displays the Model Evaluation toolkit Quantile – Quantile plot of modelled and measured hourly concentration. This plot compares the modelled and measured concentrations ordered independently from lowest to highest concentration. The dotted lines represent the factor of 2. There is good agreement between points.

Quantile-Quantile Plot: SJRW 2019 BASECASE  
 SJRW, ALL STATIONS, HOURLY MEAN NO<sub>2</sub> (µg m<sup>-3</sup>)



*Figure 2a - Quantile Plot of Measured and Modelled Concentrations at St. John's Road West Monitoring Station*

Figure 3a displays the Model Evaluation toolkit overlay of the measured and modelled concentration for 2019. Overall the model follows similar patterns to the measured concentration. One obvious deviation is for the month of June, where measured concentrations reduced dramatically.

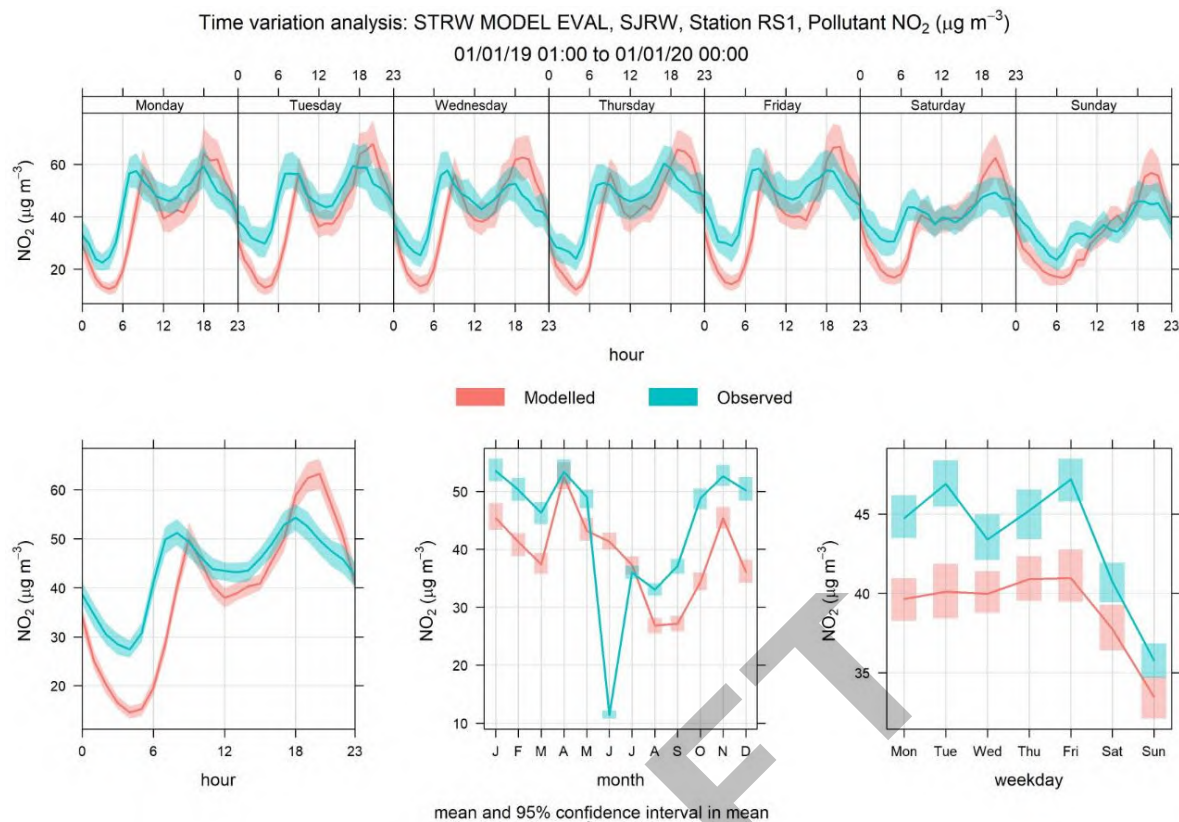


Figure 3a - Model Evaluation Toolkit Plot, Modelled and Measured, St. John's Road West 2019

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