Sefton Council

2021 Air Quality Annual Status Report (ASR)

In fulfilment of Part IV of the Environment Act 1995

Local Air Quality Management

Date: August 2021

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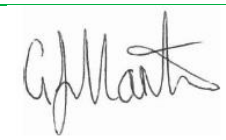
Prepared by	Greg Martin	Principal Environmental Health Officer		08.21
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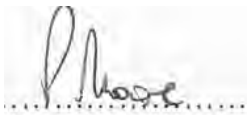
Approved by	Peter Moore	Head of Highways and Public Protection		25.08.21

Executive Summary: Air Quality in Our Area

Air Quality in Sefton

Air pollution is associated with a number of adverse health impacts. It is recognised as a contributing factor in the onset of heart disease and cancer. Additionally, air pollution particularly affects the most vulnerable in society: children, the elderly, and those with existing heart and lung conditions. There is also often a strong correlation with equalities issues because areas with poor air quality are also often less affluent areas[1,2].

The mortality burden of air pollution within the UK is equivalent to 28,000 to 36,000 deaths at typical ages[3], with a total estimated healthcare cost to the NHS and social care of £157 million in 2017[4].

In 2020 Sefton Council continued to undertake detailed air quality monitoring using both automatic air quality monitoring equipment and an extensive network of passive diffusion tubes to determine the levels of certain harmful pollutants that the Council is required to monitor by Government. Through this monitoring, the Council has identified a number of localised areas, all in the south of the Borough, where air quality has exceeded or is currently exceeding national standards.

The two pollutants for which air quality standard objectives have been exceeded in Sefton are Nitrogen Dioxide (NO_2) and historically fine Particulate Matter (PM_{10}). The areas where objectives have not been met are generally located around busy road junctions or near heavily trafficked roads and residents living closest to these junctions and roads are most affected.

The locations where air quality has been identified as a current concern are shown below. The pollutant(s) that have shown exceedance are shown in brackets:

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[1] Public Health England. Air Quality: A Briefing for Directors of Public Health, 2017

[2] Defra. Air quality and social deprivation in the UK: an environmental inequalities analysis, 2006

[3] Defra. Air quality appraisal: damage cost guidance, July 2020

[4] Public Health England. Estimation of costs to the NHS and social care due to the health impacts of air pollution: summary report, May 2018

- Lathom Close, Princess Way, Seaforth (NO_2 Annual Mean).
- Millers Bridge/Derby Road junction, Bootle (Exceedance of the 24 hr Mean Limit - PM_{10} & NO_2 Annual Mean).
- South Road/Crosby Road North junction, Waterloo (NO_2 Annual Mean).
- Hawthorne Road/Church Road junction, Litherland (NO_2 Annual Mean).

These areas where air quality objectives have been exceeded (or likely to be exceeded) have been designated as Air Quality Management Areas (AQMAs) and maps have been produced showing the extent and boundaries of the AQMAs, see Appendix D and also via the following link to DEFRA's website:

https://uk-air.defra.gov.uk/aqma/list?la=S&country=all&pollutant=alllist

Sefton Council is not alone in having declared AQMAs. Currently over 700 AQMAs have been designated by UK local authorities, mostly for NO_2.

In Sefton, road traffic is the main source of NO_2 and PM_{10}, particularly emissions from heavy goods vehicles (HGVs), light goods vehicles (LGVs) and diesel cars. Emissions from industrial activities within the Port of Liverpool have also historically been identified as a source of PM_{10}.

Current Air Quality levels in Sefton

The latest air quality monitoring in Sefton shows that in relation to NO_2 for the year 2020 levels of this pollutant are significantly lower across the Borough than previous years. This is undoubtedly due to the impact of the Covid pandemic and associated lockdowns/social restrictions with much reduced traffic levels during the various lockdowns resulting in significant reductions in NO_2 . NO_2 levels in all 4 of Sefton's AQMA's have shown substantial reductions compared to previous years.

Levels of Particulate Matter have also seen reductions in 2020 compared to previous years but to a lesser degree compared to NO_2. All AQMA's show compliance with the PM_{10} national air quality standard objective. The full monitoring results are discussed in more detail in section 3 of this ASR.

Obviously 2020 was an exceptional year for air quality and it is still unclear whether pollution levels will return to those recorded before Covid or whether some reductions will be longer term with more people working flexibly and/or from home. Air pollution monitoring will continue in 2021 and beyond to determine trends and compliance in future years.

Members of the public can view current and past pollutant levels from all the monitoring locations on Sefton Council's breathing space air quality website at:

http://breathingspace.sefton.gov.uk/Default.aspx?bsPage=air_pollution

Detailed Air Quality Action Plans (AQAPs) have been developed and are in place to address the areas where pollutant levels are high. The Action Plans contain a number of measures to improve air quality within the AQMAs. **N.B As these AQAP's are over 5 years old these plans are due to be updated in the near future with additional actions which are currently ongoing.**

A number of other initiatives and actions are also currently underway/under consideration with the aim of further improving air quality. These are summarised in this section and discussed in more detail later in the report.

Sefton Council's Air Quality Officers continue to work closely with a number of internal and external partners with the objective of collaboratively improving air quality in the Borough. Within Sefton Council an Air Quality Members Reference Group, led by Cabinet Members for Health and Wellbeing and Regulation and Compliance, consisting of Ward Councillors, Senior Officers from Environmental Health, Public Health, Planning, Highways, Economic Development, and Communications teams acts as a strategic steering group to oversee the work being undertaken in respect of Air Quality within the Borough.

Air quality officers regularly work with external partners outside the Council including the Environment Agency, Highways England, Public Health England, Merseytravel and Peel Ports (who operate the Port of Liverpool).

Sefton is currently working with the Driver and Vehicle Standards Agency (DVSA) and John Moores University (JMU) on two innovative projects which will be discussed in more detail later in the ASR.

In addition Sefton Council's Air Quality Officers attend regular scheduled meetings with air quality officers from other local authorities within the Merseyside & Cheshire region, through the Merseyside and Cheshire Air Quality Management Group, to discuss air quality issues and how to improve air quality within the wider Liverpool City Region and Cheshire. This group includes Liverpool City Region air quality officers from Sefton Council, Liverpool City Council, St Helens Council, Knowsley Council, Wirral Council, Halton Borough Council, and officers from Cheshire East, and Cheshire West and Chester Councils.

Actions to Improve Air Quality

Whilst air quality has improved significantly in recent decades, and will continue to improve due to national policy decisions, there are some areas where local action is needed to improve air quality further.

The 2019 Clean Air Strategy[5] sets out the case for action, with goals even more ambitious than EU requirements to reduce exposure to harmful pollutants. The Road to Zero[6] sets out the approach to reduce exhaust emissions from road transport through a number of mechanisms; this is extremely important given that the majority of Air Quality Management Areas (AQMAs) are designated due to elevated concentrations heavily influenced by transport emissions.

Sefton Council has developed and implemented Action Plans for all of its AQMAs.

(please note Sefton's AQAP's are due to be updated) .The plans include two categories of Action Plan measures that are called **site specific measures** and **general measures**.

Site specific measures are targeted measures to address particular site specific air quality issues within an individual AQMA. These measures provide the greatest benefits in terms of air pollutant emissions reductions for an identified source of pollution at each particular AQMA.

General measures are measures that will benefit **all** AQMAs. Individually they may not have the same extent of emissions reduction as site specific measures, but collectively they will bring significant benefits to all AQMAs.

The current AQAPs for Sefton can be viewed at:

http://breathingspace.sefton.gov.uk/Docs/Action_Plans/Draft_AQAP_AQMAs_1-5_2015.pdf

[5] Defra. Clean Air Strategy, 2019

[6] DfT. The Road to Zero: Next steps towards cleaner road transport and delivering our Industrial Strategy, July 2018

Examples of site specific measures that have been included in the Action Plans include:

- A package of measures contained within the A565 Route Management Strategy and Action Plan, which includes junction improvements to the South Road/Crosby Road North/ Haigh Road, Waterloo junction.
- Hurry Call traffic management system to allow HGVs through the Millers Bridge/ Derby Road traffic lights without having to stop/start on the incline at Millers Bridge, thus reducing pollution from this vehicle type.
- Effective regulatory control and monitoring of industrial sites within the Port of Liverpool to minimise their impact on PM_{10} levels.
- A study on HGVs using the A5036, to gain information on destination, age of vehicle & Euro emission standard.
- HGV booking system to improve movement of HGVs within the Port of Liverpool.
- ECO Stars fleet recognition scheme to improve emissions from HGV fleet operators using roads in Sefton and Sefton Council's own fleet of vehicles.
- Port expansion mitigation measures. These include a Defra funded study looking at an alternative fuels strategy (AFS) for HGVs and buses in Sefton and the Liverpool City Region, rather than using diesel as a fuel.

Many of the site specific measures detailed above and in the AQAPs have been completed and were successful in reducing pollutant levels within the AQMAs.

Sefton recognises, however, that dealing with air pollution is an ongoing challenge and continues to invest significant resource to bring about further improvements in air quality.

Current and ongoing air quality improvement initiatives

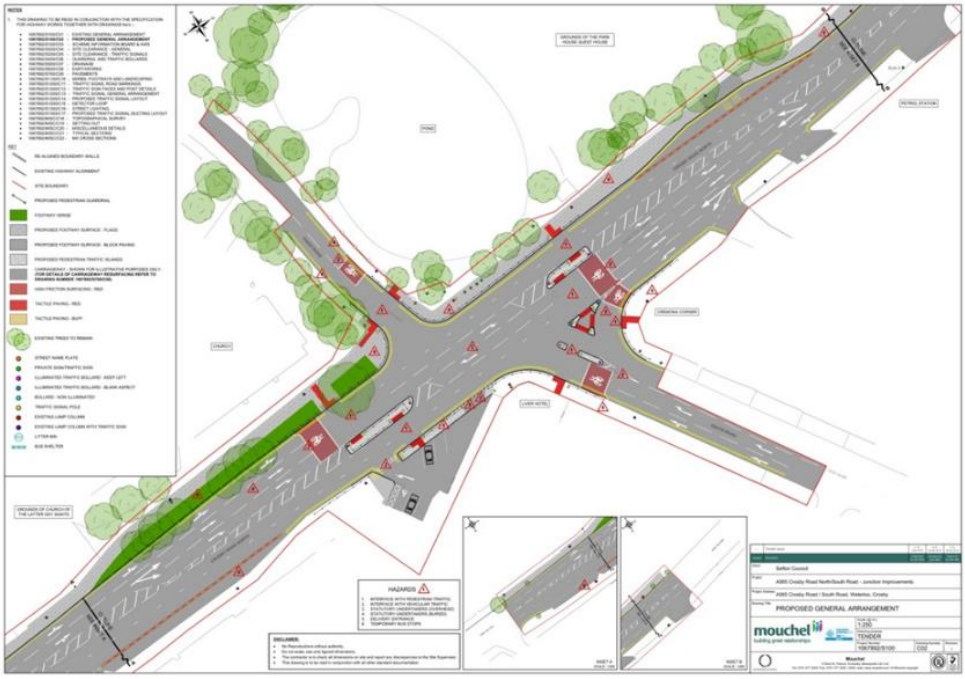
Examples of more recent air quality initiatives and interventions which will be included in the updated AQAP's are detailed below:

South Road/Crosby Road North Junction improvement (AQMA4)

Significant junction improvement works have been completed to improve traffic flow and associated congestion in the area around the South Road/Crosby Road North/ Haigh Road junction in Waterloo. (AQMA 4 was declared in this area). Levels of NO_2 in 2018 and 2019 showed compliance with the NAQS objective at all locations in this AQMA indicating that the works have had a positive effect on lowering pollution. Monitoring data for 2020 has also shown compliance and whilst we are not proposing to revoke this AQMA

currently due to the Covid impact on levels in 2020, it is hoped NO_2 levels in 2021 and beyond will continue to show compliance with the NAQS objectives and we will be in a position to revoke AQMA4 in the not too distant future.

Plan showing Junction improvement works -AQMA4



Millers Bridge Junction Improvement Works (AQMA 3)

As part of the North Liverpool Key Corridor scheme (NLKC) significant works to improve traffic flow and reduce congestion in the Millers Bridge area (AQMA 3) have recently been completed (spring 2020).

Due to the impact of the Covid pandemic on reducing pollution levels it has been hard to quantify how effective these junction works have been on reducing pollution in this area. It is therefore likely that any positive effects will only become apparent once traffic flows return to pre Covid levels.

DEFRA GRANT - Domestic Solid Fuel Behaviour Change Project

Sefton is concerned that the increased use of domestic solid fuel is potentially adding to particulate matter levels in the Borough especially $PM_{2.5}$. Sefton, like all Local Authorities has new duties with regard to $PM_{2.5}$ and the reduction of this particular airborne pollutant. Sefton successfully obtained a £100,000 grant from DEFRA to undertake a Solid Domestic Fuel behaviour change project which is almost with the primary aim to minimise the Particulate Matter (PM) contribution from domestic solid fuel use in Sefton. A new dual particulate monitor was also installed as part of the project as shown in the picture below:

Regent Road dual PM10/PM2.5 Background monitor

The behaviour change element of the project was heavily impacted on by the Covid pandemic as engagement with business, fuel suppliers and members of the public etc was extremely challenging and difficult for obvious reasons. A number of positive outcomes have however resulted from the project which along with the specific challenges will be discussed in more detail later in the ASR.

Sefton's Clean Air Plan

Sefton recognises that there are still challenges ahead, with regard to reducing levels of NO_2 in some of Sefton's AQMAs particularly those impacted by traffic entering and leaving the Port of Liverpool. Following the outcome of a Preliminary Clean Air Zone (CAZ) feasibility study, which indicated that a CAZ type B could have a positive effect on reducing NO_2 exceedances in and around the AQMA's, the Council committed to undertaking a more detailed assessment and commenced the development of an Outline Business Case (OBC) for Sefton looking at air quality interventions including a Sefton based CAZ under an overarching Sefton Clean Air Plan. This work commenced in 2020 but unfortunately was heavily impacted upon by the Covid Pandemic. The outline business case is now however almost complete and will be presented to Councillors in August / September 2021. Further detail on Sefton's Clean Air Plan and OBC is provided later on in the ASR.

$PM_{2.5}$ Monitoring

Although Sefton Council monitors PM_{10} at a number of locations in the Borough, there is now clear evidence that even smaller particles with an aerodynamic diameter of 2.5µm or less, known as PM $_{2.5}$, have a significant impact on human health. A new dual PM_{10}/PM $_{2.5}$ monitor was installed in July 2017 at the Millers Bridge monitoring site with data being used to provide accurate levels of PM $_{2.5}$ in the area to assist in providing data for the Councils new role in reducing levels of PM $_{2.5}$. As detailed above a further $PM_{2.5}$ monitor was installed in Autumn 2020 as part of a DEFRA AQ grant to monitor urban background levels of this pollutant. Monitoring data for the period monitored is reported later in the ASR.

Dual PM_{10}/$PM_{2.5}$ dual particulate monitor at Millers Bridge

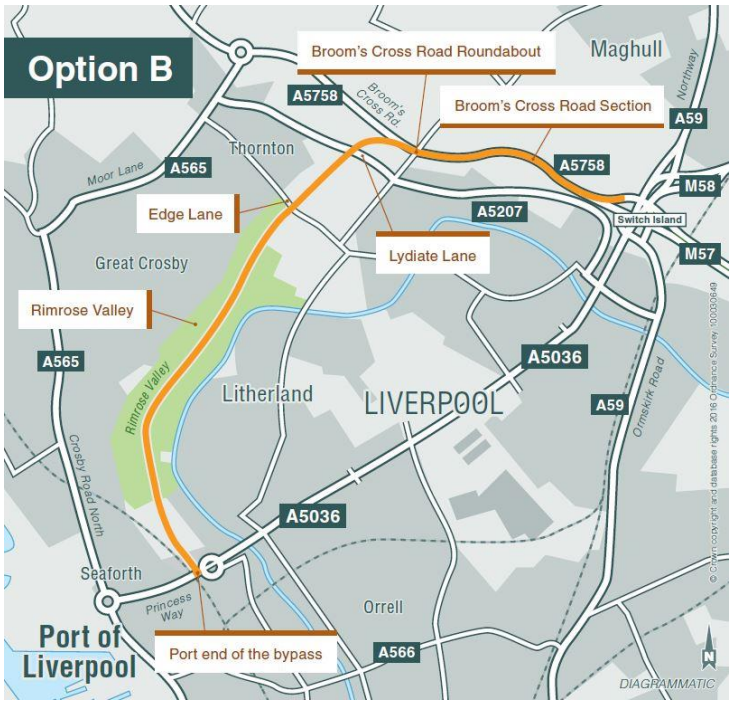
Conclusions and Priorities

As in last year's ASR the main on-going priority in Sefton for the coming years is to fully understand the effects that the predicted increase in HGVs due to port expansion will have on air quality and how this can be mitigated. This is undoubtedly the most significant challenge for the Council in terms of air quality impact in the Borough at the present time, due to the scale of the expansion and the potential for this to impact on air quality in existing AQMAs and impact on public exposure at residential receptors on port access routes.

Although port expansion will bring significant economic benefits to the region, it is also predicted to lead to a significant increase in HGVs using the A5036, the main port access route, and to a lesser extent the A565, and will pass through three of Sefton's AQMAs, potentially leading to a worsening of air quality in areas that are already identified as having poor air quality and congestion, particularly on the A5036.

Highways England are currently progressing a Port of Liverpool Access Improvement Scheme (POLAS) which entails the construction of a new carriageway through the

Rimrose Valley (see map below), linking to Brooms Cross Road (Thornton to Switch Island Link) and once operational will hopefully alleviate congestion on parts of the A5036 and wider network.



The next stages in the process are

- **Development phase**. Focus at this stage is on the design and environmental assessment of the selected option, taking it through all statutory processes to where the decision to build can be made. This includes preliminary design, community consultation, statutory procedures and powers, construction preparation and commitment to construct.
- **Construction phase**. This stage involves construction of the chosen option, commissioning, handover for operation and opening of the road to traffic.

The route improvement works have been further delayed due to Covid and work is predicted now to start in 2025. This however is still a number of years away and assessing the impact increased traffic flow may have on air quality between now and when the new road opens is also being undertaken by Sefton as part of the Clean Air Plan and development of Sefton's outline Business case.

Other priorities for Sefton include understanding the ongoing impact Covid will have on air quality in the coming years. During 2020 levels of NO_2 fell significantly at all monitoring

sites undoubtedly due to the impact of Covid on our daily lives. Compliance with NAQS objectives in Sefton was observed at all but one monitoring location, something that has never been observed before. Monitoring will obviously continue to determine future trends in the coming years which will be used to inform our action planning.

A further priority is to allocate sufficient resource to update Sefton's Air Quality Action Plans. They are now over 5 years old and in line with DEFRA guideline require updating.

Local Engagement and How to get Involved

2020 has been a challenging year with regard to engagement due to the restrictions on meeting socially etc and officers have had to look at different methods to engage with the community.

Sefton has previously used online consultation and engagement methods successfully. Sefton has recently developed air quality pages on the Your Sefton Your Say (YSYS) consultation and engagement hub to engage with the community in a Covid safe manner.

As detailed within the ASR Officers are currently undertaking a complex study into the potential use of a Clean Air Zone in Sefton under an overarching Clean Air Plan. information about the study and general air quality matters can currently be found on the YSYS hub via the following link:

https://yourseftonyoursay.sefton.gov.uk/seftoncleanairplan/

As the study progresses the intention is to use the YSYS Hub as a consultation platform to engage and seek views from the community on the outcomes and proposals in regard to the Clean Air Zone study and wider air quality matters.

Real time data from Sefton's monitoring network can be viewed by the public using Sefton's Breathing Space website. Historical information and air quality reports are also available.

Link to website http://breathingspace.sefton.gov.uk/

Further information on air quality is also available on Defra's air quality website:

https://uk-air.defra.gov.uk/

Sefton's AQ officers have been undertaking a DEFRA AQ grant funded domestic solid fuel behaviour change project with the aim of reducing particulate emissions from the burning of this fuel. Whilst a number of the project outputs have been affected by the Covid pandemic one successful element was the development of the 'smoke control sefton' public website which provides information and advice on this topic for residents who may be using solid fuel stoves/fires and businesses selling stoves and/or fuels.

Link to website https://smokecontrolsefton.co.uk/

Sefton continues to utilise social media to engage with the community and promote the working currently ongoing and number of social media and press releases were utilised around this years Clean Air Day

Simple actions that all can take to help reduce air pollution

There are a number of things the public can do to help improve air quality in their area. These include:

- Reducing the use of your car and consider cycling, walking or using public transport more. 55% of car journeys are less than five miles. Many of these trips could be walked or made by bike or public transport.

- Consider car sharing. When two or more people share a car and travel together, it allows people to benefit from the convenience of the car, sharing travel costs, whilst helping to reduce congestion and air pollution.

- When using your car consider taking an 'eco-driving' approach. This can not only save you money in reduced fuel costs but also reduce emissions of air pollutants and impact on climate change. This includes:

  - Regular maintenance and servicing of your vehicle according to the manufacturers schedule to maintain the engine's efficiency.
  - Making sure your tyres are inflated to the manufacturer's recommended pressures. Under-inflated tyres create more rolling resistance and so use more fuel.
  - Removing unused roof racks or roof boxes to reduce wind resistance and not overloading your vehicle or carrying unnecessary weight.
  - Reducing your use of air conditioning which increases fuel consumption at low speeds.
  - Avoid warming up your car while stationary this can consume more fuel and increase pollution. If you start driving immediately, the engine will reach its working temperature quicker.
  - Avoiding unnecessary idling of your car engine when in traffic or waiting to pick up people.
  - Driving smoothly and avoiding sharp acceleration and harsh braking.
  - Shifting into a higher gear as soon as possible; Maintaining a steady speed, using the highest gear possible as soon as possible between 2000rpm and 2500rpm to keep your engine working most efficiently.
  - The faster you go, the greater the fuel consumption and pollution. For example, driving at 70mph uses up to 9% more fuel than at 60mph and up to 15% more than at 50mph.

- Consider purchasing a lower emissions, hybrid or electric vehicle or high efficiency petrol vehicle.
- If possible, avoid driving during the morning and evening peak times as levels of congestion and therefore air pollution will be highest.
- If stationary in a traffic jam, traffic lights or at a pelican crossing for example for over 30 seconds switch off your engine to reduce air pollution.

Other things you can do:

- Don't burn garden or domestic waste. This not only releases pollutants into the atmosphere, it can also cause a nuisance to your neighbours. All waste should be either disposed of or recycled. Details of waste and recycling facilities in Sefton can be found here https://www.sefton.gov.uk/bins-recycling/.aspx

- Should I burn wood? Air pollution affects the health of everyone in Sefton. Along with emissions from transport and construction, burning wood and other solid fuels can contribute to this air pollution problem. The main pollutant emitted by solid fuel burning is ultra-fine particulate matter, also known as $PM_{2.5}$. This pollutant is not visible to the naked eye, so even "smokeless" fuels and appliances may be causing pollution.

- If you need to burn solid fuels to heat your home, choosing what you burn and how you burn it can make a big difference to the pollution it creates.

- Parts of Sefton are designated as Smoke Control Areas and the type of fuel and/or appliance you are allowed to use is restricted in these locations. You can check if your property is in one of Sefton's Smoke Control Areas by clicking on the following link https://www.sefton.gov.uk/environmental-protection/pests,-pollution-and-food-hygiene/pollution/smoke-control-areas.aspx

- Open fireplaces are the most polluting way to burn solid fuels. Using a well-designed, properly installed stove or appliance can make a big difference.

- As a minimum, you should make sure that your stove meets the legal requirements, but even approved stoves can emit high levels of pollution. The Stove Industry Alliance has recently introduced the "Eco-design Ready" label.

- An Eco-design Ready stove can emit up to 80 per cent less pollution than a normal Defra approved appliance. An up to date list of these stoves can be found on the HETAS website. https://www.hetas.co.uk/ecodesign-ready/

- Any stove or fireplace should also be properly maintained, and your chimney should be swept regularly.

- If you are using an open fireplace it is recommended that you should only burn smokeless fuels, if in doubt ask your supplier.

- If you are using a stove or other appliance you can usually use normal wood as well as smokeless fuels. Usually wood that has been kiln dried or seasoned to have a lower moisture content will be much less polluting, as much as 50 per cent less pollution than emitted from burning fresh logs. Drier wood is also more efficient, producing more heat per log.

- Wood that has the Woodsure Ready to Burn label is certified to have a low moisture content, for a full list of suppliers see the list on the Woodsure website. https://woodsure.co.uk/

- You should not burn old pallets, furniture or scrap wood as it may contain contaminants that can be harmful to your health and the environment.

- It is important to store your fuels correctly to make sure your wood does not get damp from the rain or damp in the ground.

- Further advice on using solid fuel in domestic properties can be found on Sefton's dedicated 'smoke control sefton' public website which provides information and advice on this topic for residents who may be using solid fuel stoves/fires and businesses selling stoves and/or fuels.

  Link to website https://smokecontrolsefton.co.uk/

- Additional information on the use of solid fuels and how to reduce pollution can be found here https://www.burnright.co.uk/ BurnRight is a national consumer awareness campaign which seeks to address the issue of domestic combustion and unnecessary air pollution. It is particularly concerned with the issues concerning wood burning stoves.

Table of Contents

Figures

Tables

1 Local Air Quality Management

This report provides an overview of air quality in Sefton during 2020. It fulfils the requirements of Local Air Quality Management (LAQM) as set out in Part IV of the Environment Act (1995) and the relevant Policy and Technical Guidance documents.

The LAQM process places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are likely to be achieved. Where an exceedance is considered likely the local authority must declare an Air Quality Management Area (AQMA) and prepare an Air Quality Action Plan (AQAP) setting out the measures it intends to put in place in pursuit of the objectives. This Annual Status Report (ASR) is an annual requirement showing the strategies employed by Sefton Council to improve air quality and any progress that has been made.

The statutory air quality objectives applicable to LAQM in England are presented in Table E.1.

2 Actions to Improve Air Quality

Air Quality Management Areas

Air Quality Management Areas (AQMAs) are declared when there is an exceedance or likely exceedance of an air quality objective. After declaration, the authority should prepare an Air Quality Action Plan (AQAP) within 12 months setting out measures it intends to put in place in pursuit of compliance with the objectives.

A summary of AQMAs declared by Sefton Council can be found in Table 2.1. The table presents a description of the 4 AQMA(s) that are currently designated within Sefton Council. Appendix D: Map(s) of Monitoring Locations and AQMAs provides maps of AQMA(s) and also the air quality monitoring locations in relation to the AQMA(s). The air quality objectives pertinent to the current AQMA designation(s) are as follows:

- NO_2 annual mean;
- PM_{10} 24-hour mean;

Table 2.1 – Declared Air Quality Management Areas

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
AQMA2 Princess Way	2009	NO_2 Annual Mean	An area encompassing a number of residential properties from the Ewart Road flyover, Princess Way (A5036) up to and including the roundabout and flyover at the junction with Crosby Road South (A565).	YES	45.8 µg/m^3	32.1 µg/m^3	Draft Air Quality Action Plan for Sefton Council, 2015	http://breathingspace.sefton.gov.uk/Docs/Action_Plans/Draft_AQAP_AQMAs_1-5_2015.pdf
AQMA3, Millers Bridge	2009	NO_2 Annual mean	An area encompassing a number of residential properties around the junction of Millers Bridge (A5058) and Derby Road (A565)	NO	60 µg/m^3	41.3 µg/m^3	Draft Air Quality Action Plan for Sefton Council, 2015	http://breathingspace.sefton.gov.uk/Docs/Action_Plans/Draft_AQAP_AQMAs_1-5_2015.pdf

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
AQMA4, South Road	2012	NO2 Annual Mean	An area encompassing the Liver Hotel and a number of residential properties around the junction of Crosby Road North (A565) and South Road.	No	48 µg/m^3	33.9 µg/m^3	Draft Air Quality Action Plan for Sefton Council, 2015	http://breathingspace.sefton.gov.uk/Docs/Action_Plans/Draft_AQAP_AQMAs_1-5_2015.pdf
AQMA5 Hawthorne Road	2012	NO_2 Annual mean	An area encompassing a number of residential properties around the junction of Hawthorne Road (B5058) and Church Road (A5036).	yes	42.6 µg/m^3	35 µg/m^3	Draft Air Quality Action Plan for Sefton Council, 2015	http://breathingspace.sefton.gov.uk/Docs/Action_Plans/Draft_AQAP_AQMAs_1-5_2015.pdf
AQMA3, Millers Bridge	2009	PM_{10} 24 Hour Mean	An area encompassing a number of residential properties around the junction of Millers Bridge (A5058) and	NO	46	2	Draft Air Quality Action Plan for Sefton Council, 2015	http://breathingspace.sefton.gov.uk/Docs/Action_Plans/Draft_AQAP_AQMAs_1-5_2015.pdf

AQMA Name	Date of Declaration	Pollutants and Air Quality Objectives	One Line Description	Is air quality in the AQMA influenced by roads controlled by Highways England?	Level of Exceedance: Declaration	Level of Exceedance: Current Year	Name and Date of AQAP Publication	Web Link to AQAP
			Derby Road (A565)					

☒ **Sefton Council confirm the information on UK-Air regarding their AQMA(s) is up to date .**

☒ **Sefton Council confirm that all current AQAPs have been submitted to Defra .**

Progress and Impact of Measures to address Air Quality in Sefton

Sefton has taken forward a number of direct measures during the current reporting year of **2021** in pursuit of improving local air quality. A summary of all measures completed, in progress or planned are set out in table 2.2.

More detail on these measures can be found in their respective Action Plans.

Sefton Council Draft Action Plan measures consist of 11 general measures that are applicable to all AQMA's and a number of site specific measures that are applicable to each individual AQMA. General measures GM1 - GM11 have all been implemented.

Please note in addition to the actions detailed in the AQAP's further actions are also underway which are discussed in more detail below. The AQAP is due to be updated to include these additional measures.

Key site specific measures that have been completed/ongoing since last year's ASR reporting year are as follows:

AQMA 2 Princess Way, Seaforth

- Port expansion mitigation measures: (i) Highways England - Port of Liverpool Port Access Road Scheme (POLAS) progressing. Stage 1 study completed. Offline route option through Rimrose valley chosen. Further detailed assessment and design of this option now underway by Highways England and their appointed consultant. Highways England reported significant delays in the process due to Covid, however the various studies and assessment have now recommenced. Further details regarding the project and progress can be found via the following link:

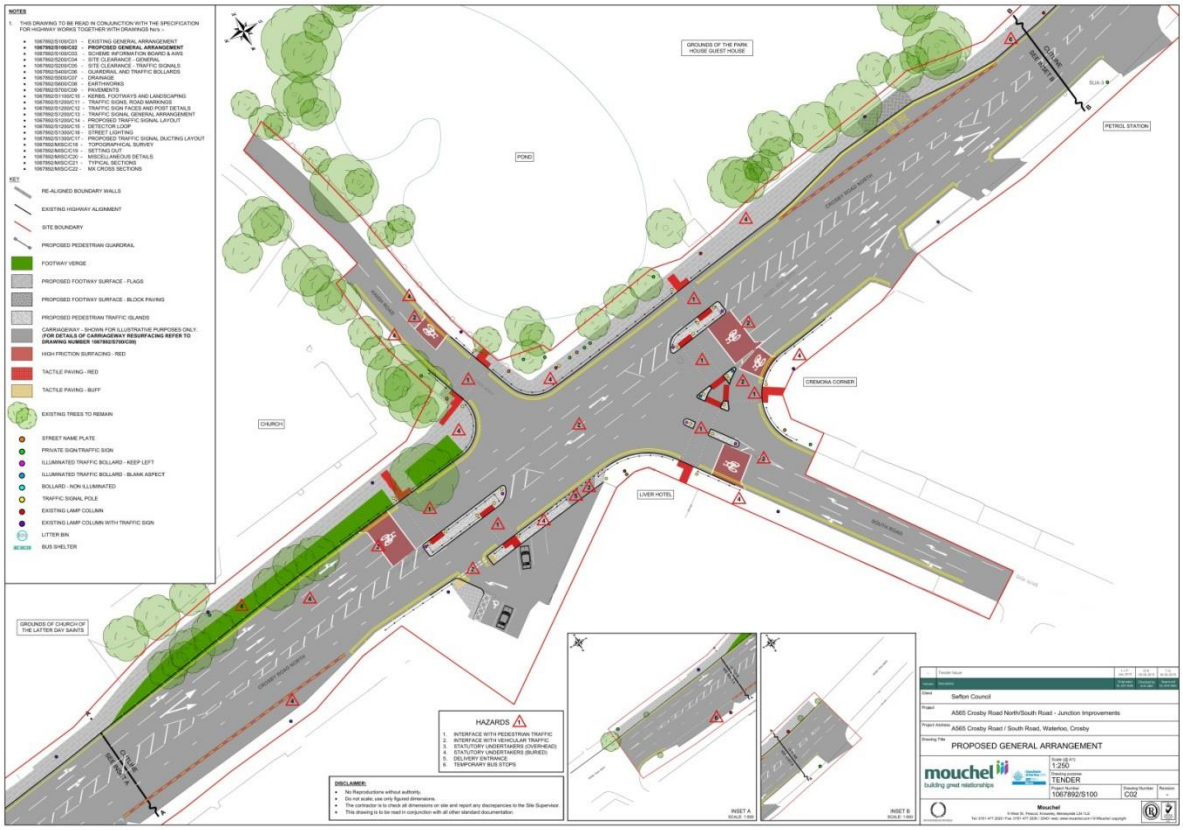
  https://highwaysengland.co.uk/our-work/north-west/a5036-port-of-liverpool-access/

AQMA 3 Millers Bridge, Bootle

- Hurry Call traffic light management system to allow HGVs passage through traffic lights at Millers Bridge during non-peak hours without having to stop/start implemented and continues to operate.

AQMA 4 South Road, Waterloo

- Work on the South Road/ Crosby Road North/Haigh Road junction improvements has been completed.



- With regard to **AQMA4 Waterloo** declared for NO_2 Annual Mean exceedances, the junction improvement work detailed above continues to have a positive effect on reducing levels of NO_2 within the AQMA boundary. NO_2 Levels at all receptors within the AQMA in 2018, 2019 and 2020 were below the NAQS objective. Obviously in 2020 Covid had a 'additional' positive impact on NO_2 in this AQMA due to reduced traffic levels. Whilst it is anticipated that even without the impact of Covid levels of NO_2 in 2020 would have followed a similar trend as in 2018 and 2019, we do feel it is appropriate to hold off revoking the AQMA until a further years data is analysed.

AQMA 5 Hawthorne Road, Litherland

- As AQMA 2

Further Air Quality Improvement Actions

In addition to those measures detailed above and specified in the AQAPs a number of additional actions and interventions aimed at improving air quality in Sefton are currently underway. **These are due to be included in the specific AQAPs when they are updated**.

Preliminary CAZ Feasibility Study

Despite the positive effects of Covid on reducing levels of air pollution in 2020 Sefton believes once traffic flows/levels return to normal there will still be significant challenges ahead with regard to reducing levels of NO_2 in some of Sefton's AQMAs particularly those impacted by traffic entering and leaving the Port of Liverpool.

Officers from Environmental Health, Public Health and Transport teams, overseen by the Air Quality Member Reference Group, commissioned environmental consultants AECOM to undertake a Clean Air Zone (CAZ) feasibility study, to assess the feasibility of implementing CAZs in Sefton to reduce traffic related emissions. A copy of the report (May 2019) can be found here https://www.sefton.gov.uk/media/1611489/Sefton-Clean-Air-Zone-Feasibility-Study.pdf

AECOM's report concluded that given the current and projected make-up of the traffic in the four AQMA areas, a Charging CAZ could deliver more rapid improvements in NO_2 emissions than existing measures, taking account of forecast improvements in the emissions profile of the vehicles on Sefton's roads. The study predicted that in 2020 if no further improvement actions took place there would still be 70 point NO_2 exceedances in the south of the Borough. The key study outcomes indicated the following:

- A CAZ would achieve reduced emissions within the defined zone.
- A CAZ B (HGVs, taxis, buses), including the junction of A5036/A565, would potentially achieve the most significant benefits.
- Further analysis would be necessary to identify the type and location of the CAZ.

CAZ Outline Business Case (OBC)

Following on from the Preliminary CAZ feasibility study Sefton's Cabinet gave approval for Officers to progress the development of a detailed Outline Business Case (OBC) for the creation of a Sefton Based CAZ, in line with the approach recommended by DEFRA.

AECOM were commissioned in May 2020 to undertake the additional air quality and transport modelling work needed and prepare a draft OBC in conjunction with Council Officers.

The development of the OBC forms part of the Council's wider AQ programme overseen by the AQ Cabinet Member Reference Group.

A temporary CAZ Project Manager has been seconded into the Council on a part-time basis, since May 2020, to oversee and input into AECOM's work in conjunction with the CAZ Steering Group/Project Group, in addition to supporting wider tasks such as the Communication and Engagement strategy for Sefton's overarching Clean Air Plan

Outline Business Case – Progress and Actions – May-December 2020

The **aim** of Sefton's CAZ Outline Business Case is to identify the best value CAZ option to meet the objectives set out by the Council.

Four key overarching strategic **Objectives** have been set for the OBC, as follows:

- To improve air quality and achieve compliance with national standards in the shortest possible time in known hotspot areas i.e. within four AQMAs
- To promote improved air quality in the wider area (outside AQMAs) through more rapid switch over to vehicles with minimal exhaust emissions
- To reduce human exposure to air pollution and thus improve public health, particularly for areas with high deprivation
- To reduce emissions relating to the A5036 for HGV vehicle travel, particularly around high-density residential areas.

Key OBC Outputs and Progress to Date:

- The Outline Business Case process is a systematic approach. It establishes the case for change, evaluates affordability, and aims to identify a commercially viable option or options that offer best value for money and is practically deliverable. The Council is using the Government approved "5 Case" Business Case model, which is also the framework being used in other local authority areas where a CAZ is being considered, as it enables effective risk management and strengthens rigour, transparency and objectivity in decision-making. Investment in this approach is commensurate with the magnitude of costs, benefits and risks that attend future decisions about a CAZ in Sefton.

- Sefton is currently testing four charging potential CAZ scenarios against a 'No-CAZ' (Baseline 2023) option to define a preferred/best-value option and this complex work is currently progressing. For each CAZ option the scenario assessments will identify compliance/non-compliance of NO_2 levels and PM_{10} levels at numerous receptor points across South Sefton in the assessment years.
- Once all options testing has been completed and a preferred option identified an evidence-based OBC will be developed which will identify the preferred CAZ option for consideration by Members (guided by the detailed traffic and air quality modelling). The OBC will indicate the benefits the CAZ can bring in terms of improved air quality, thus resulting in the protection of public health and a reduction in inequalities i.e. the worst air quality is recorded in the most disadvantaged areas of Sefton where the AQMAs are defined.
- The formal business case will include the development of a project plan, risk register, resource costings using recognised project management frameworks, and is aligned to an appropriate communications and engagement plan, as set out below. An outline scheme design will be provided for the preferred CAZ option and the outline scheme costs will be quantified.

Aligned Communication and Engagement Strategy

An appropriate Communication and Engagement Strategy has been developed to support the CAZ OBC process.

- Internal communication and engagement focus on regular routine engagement with key internal stakeholders including
    - Informal Policy Cabinet
    - Executive Leadership Team (ELT)
    - Growth Board
    - Air Quality Members Reference Group
    - Overview and Scrutiny Committee (Regulatory, Compliance and Corporate Services)

Internal updates will also be provided, in due course, to the Strategic Capital Investment Group (SCIG) and to wider internal committees, groups and departments as appropriate.

- External communication and engagement so far has focussed on priority external stakeholders. The strategy is split into 3 stages of Communication and Engagement, as follows:

- Phase 1 (Sept 2020 – March 2021) – will raise awareness and seek to gain support in principle for the Clean Air Plan. It will also explore the best way to engage stakeholders going forward;

  Priority

  - Highways England
  - Liverpool City Council
  - Peel Ports
  - *Other:* Local authorities, Sefton Youth, Registered Providers, Sefton CVS, Taxi Provider Forum, Bus/Freight companies

- Phase 2 (to be confirmed) – wider consultation on the OBC (above plus public, local businesses, taxi drivers, schools);

- Phase 3 (to be confirmed) – communication on CAP decisions and any implications for key stakeholders (all of the above).

To assist with the consultation and engagement process a dedicated Clean Air Plan page has being developed on Sefton's *YourSeftonYourSay* Platform. This will set the scene and raise general awareness of the project in the first instance.
https://yourseftonyoursay.sefton.gov.uk/seftoncleanairplan/

Timescales / Programme

The Covid pandemic has had a significant impact on the progress of the development of the Outline Business Case. Unfortunately the programme is approximately 9 months behind schedule as a result of Covid impact.

The current timeline for the OBC programme is as follows:

OBC Work Area	Status
Air Quality and traffic modelling work	Completed Feb 2021
Define preferred option (Options Appraisal Report)	Completed April/May 2021
Outline Design and Costing of Preferred Option	Ongoing. Completion expected Aug 2021
OBC draft completion	Expected September 2021
Internal review and presentation to Cabinet	Expected Sept/Oct 2021

The full outcome of the OBC will be reported in next year's ASR and included as part of the updated AQAP's

Millers Bridge Junction Improvements (AQMA3)

A project aimed at improving congestion in the area around Millers Bridge and the A565 heading into Liverpool commenced in 2019 and is summarised below.

The **North Liverpool Key Corridor** (NLKC) project is a major joint scheme between Sefton Council and Liverpool City Council which will create a modern fully 'dualled' road link on the A565 Great Howard Street and Derby Road between Sefton and Liverpool.

New and improved cycling routes on Regent Road, reduced congestion, improved local access and better east-west movement will also strengthen the connections between Liverpool and Sefton.

The scheme will also support the development projects being undertaken as part of Liverpool Waters, North Liverpool Regeneration and the SuperPort.

As part of this project significant improvements are also to be made to the Millers Bridge junction which is designed to improve traffic flow through this area.

It is hoped that on completion of these works levels of NO_X and NO_2 within AQMA 3 will reduce.

The Millers Bridge junction improvement element of the scheme was completed in spring 2020. Due to the completion of this intervention during the Covid pandemic it has not been possible to assess whether the works have resulted in any quantifiable improvements in air quality as traffic and air pollution levels were much reduced in 2020 as a result of the associated lockdowns and restrictions. Monitoring will obviously continue in the area but it may prove difficult to determine whether any improvements have occurred because of the redesigned junction as the ongoing impact of Covid on traffic levels and pollution is still unknown.

Intensive Road Washing (AQMA2, AQMA3, AQMA5)

Although there are currently no PM exceedances of the NAQS objectives within Sefton, visual inspections of road and pavement conditions within AQMA2, AQMA3 and AQMA5 has showed continued large accumulations of debris and road grime. This has led to concerns regarding the potential re-entrainment of this material in drier conditions.

Following a previous successful intensive road washing exercise where levels of PM were actively reduced, preparation of a further project began in 2019. The project was planned to start following the completion of the Millers Bridge Junction improvement works, however the junction improvement was only completed in spring 2020 and then due to the Covid pandemic the project was put on hold. We are now looking to commence this project in late 2021/early 2022.

Joint Sefton MBC DVSA Emissions Enforcement Project

As reported in last year's ASR a joint emissions enforcement project with The Driver and Vehicles Standards Agency (DVSA) was planned in 2020 to identify vehicles fitted with emission control cheat devices following an initial project undertaken by DVSA. A mobile air quality monitoring vehicle was to be utilised to assist in identifying vehicles fitted with emission cheat devices or emission control systems that had been tampered with. Unfortunately due to the Covid pandemic the supplier of the monitoring vehicle made the decision to cease offering the vehicle out during 2020 so the project had to be temporarily suspended.

The monitoring vehicle is now available and arrangements are again being made to undertake the project in October /November this year - the results will be detailed in next year's ASR . The project brief is detailed below:

Project Summary

Following discussions with enforcement officers from Sefton and DVSA the Mobile Air Quality Monitoring Vehicle will be utilised to help identify HGV's travelling on the A5036 that may be emitting higher than expected levels of NO_x and PM therefore potentially indicating the presence of an emission cheat device or tampered emissions control system.

This would then allow the DVSA inspectors to undertake more detailed investigations to determine the presence of any cheat devices.

Initial agreement has been reached to undertake a preliminary study with DVSA whereby Sefton has agreed to provide approx. £5000 to fund the cost of the monitoring vehicle and trained operator for a period of 3 days to assist in the dynamic detection of high pollutant emitting vehicles.

The monitoring vehicle will be used on the A5036 in live traffic taking real time air quality samples. Should vehicles being followed show unusually high levels of NOx and PM compared with other vehicles the registration and description of vehicle will be radioed on to inspectors at the DVSA checkpoint at Switch Island, who will then require the vehicle to stop and be subject to detailed inspection.

DVSA will carry out an initial visual inspection of the vehicle, paying particular attention to the emissions control systems and engine warning lights. The OBD equipment will be used to identify any fault codes and to carry out diagnostic tests on the emissions control system. The DPF tester and DSM will be used to carry out an exhaust emissions tailpipe test.

Co-location Monitoring Project Sefton Council and John Moores University (JMU)

Sefton Council and John Moores University (JMU) are currently undertaking a joint air quality monitoring co-location project which commenced in June 2021 and is looking to determine how accurate lower cost air pollution sensors are, compared to Sefton's own automatic monitoring equipment.

The study is underway at our Millers Bridge monitoring site. In collaboration with JMU 3 lower cost sensors provided by JMU have been installed alongside our automatic monitors.

The 3 sensors currently being trailed are:

- Libelium Smart Cities Plug & Sense (NO_2)
- Aeroqual AQY (NO_2, $PM_{2.5}$ and PM_{10})
- Earth Sense Zephyr (NO, NO_2, PM_1, $PM_{2.5}$ and PM_{10})

Comparison of NO/NO_2/PM_{10}/$PM_{2.5}$ data has commenced and the project is planned to continue for 12 months. Details of the results of the project and how monitor outputs compare will be presented in next year's ASR.

Progress on DEFRA AQ Grants

Air Quality Behaviour Change Educational Project

Officers from Sefton's Suitability and Environmental Health teams were successful in obtaining a DEFRA AQ grant of £122,500 to undertake an educational behaviour change project. The Project commenced in April 2021 and is planned to run for 2 years.

The overall aim of this project is to raise awareness of Air Quality and in turn encourage behavioural changes that will have immediate and long- term positive impacts on Air Quality in Sefton.

Sefton has 4 AQMA areas and some of the highest levels of childhood asthma and respiratory disease in the country. Therefore, in partnership with Sefton Councils Educational Staff based in the Eco Centre, a termly programme of AQ support and learning will be offered to all Sefton Primary schools (and in turn the wider local community) during 21/22 academic year, with a particular focus on schools within or close to one of Sefton's four Air Quality Management Areas (AQMAs).

The educational staff at the Eco Centre have been operating for over 15 years and have strong, established and trusted relationships with all schools in Sefton. In addition, they

have already created in-house an air quality website aimed at children www.cleanaircrew.co.uk.

The programme will consist of;

- A dedicated Educational officer to support schools with a termly programme of AQ support and learning all linking to core national curriculum subjects. Including lesson plans, activity sheets, homework booklets, campaigns (walk to school, anti-idling), activities, how to guides
- Expansion of the Clean Air Crew website, including also making it appeal to KS3/4 (Secondary schools)
- Development of higher level online AQ training course for parents/ teachers/ Sefton Staff/ residents
- Installation of a state of the art, digital technology immersive room at the Eco Centre and the development of 2 immersive experiences based on AQ. This will be accessed by both schools and the wider community. It will also be managed by the educational staff after the programme has finished leaving a legacy of the project for years to come.
- A programme of NO_2 monitoring at participating schools in the Borough.

Over 24,000 primary school children, plus their teachers and parents will receive a broad but thorough introduction to AQ issues. The above campaigns will mean that direct action is being taken immediately by over 70 schools, resulting in air quality benefits in the next 2 years and beyond.

Evaluation will consist of the questionnaires before and after the programme, numbers of schools/ children that participated, number of campaigns ran, number of people completing the online course, number of hits on the website, number of behavioural change pledges and the number of schools, children, wider community using the immersive room and AQ experiences.

In addition, approximately 20 schools in the AQMA areas will be provided with an AQ monitoring pack and training of how to use it (including 12 monthly NO_2 diffusion tubes that will provide localised AQ evidence of any immediate improvements).

Domestic Solid Fuel Behaviour Change Project

Sefton was successful in securing a £100,000 DEFRA AQ grant to fund a domestic solid fuel behaviour change project with the overall goal of reducing PM emissions from the use of domestic solid fuel in the borough. A summary of the project objectives, achievements and challenges is provided below.

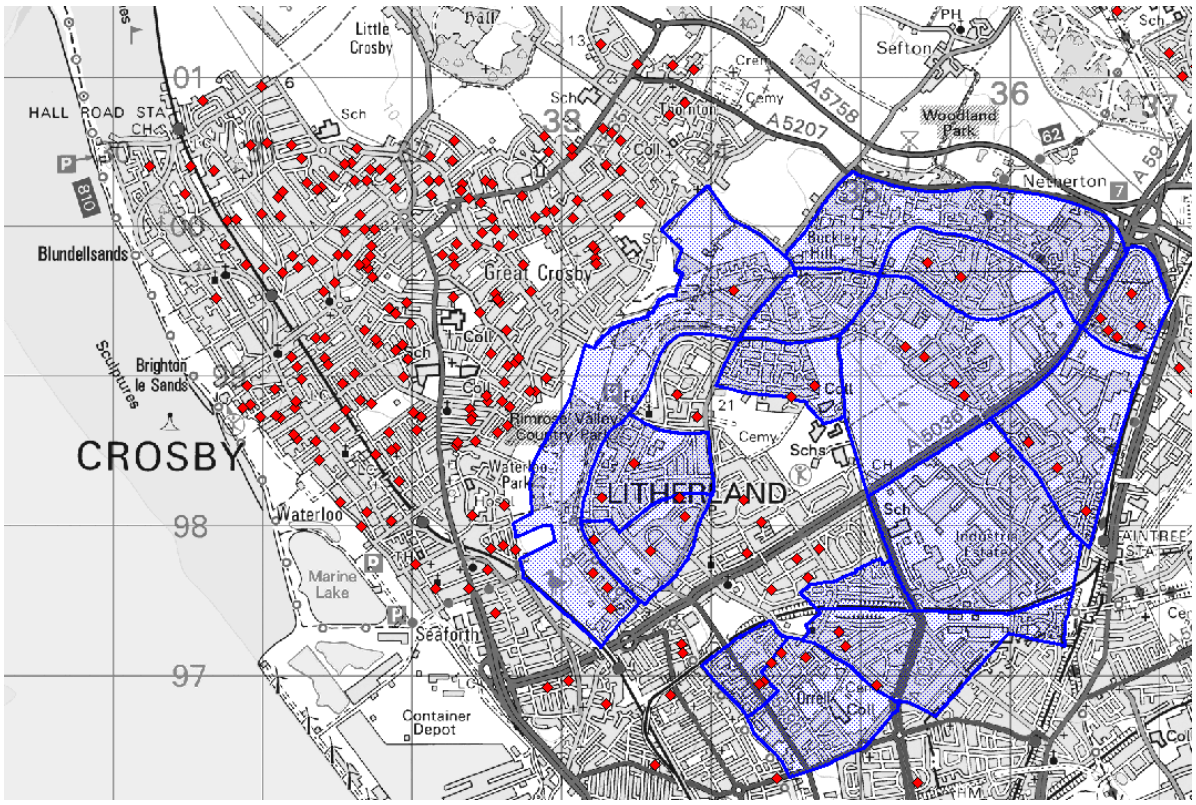
Objectives

- Improve understanding and awareness of the extent and impact of domestic solid fuel use in Sefton – through evidence gathering on number and location of properties using solid fuel and the monitoring of particulate matter.
- Reduce emissions of particulate matter from domestic solid fuel use in Sefton – by raising awareness of the issues and by communicating and promoting good practice in partnership with stove suppliers, fuel suppliers and chimney sweeps.
- Improve public health – by reducing exposure to particulate matter from domestic solid fuel use and encouraging behaviour change among users of solid fuel.
- Improve the regulatory measures for control of domestic emissions – through a review and possible extension of Sefton's Smoke Control Areas.

Outputs/Achievements/Successes

Stove use mapping

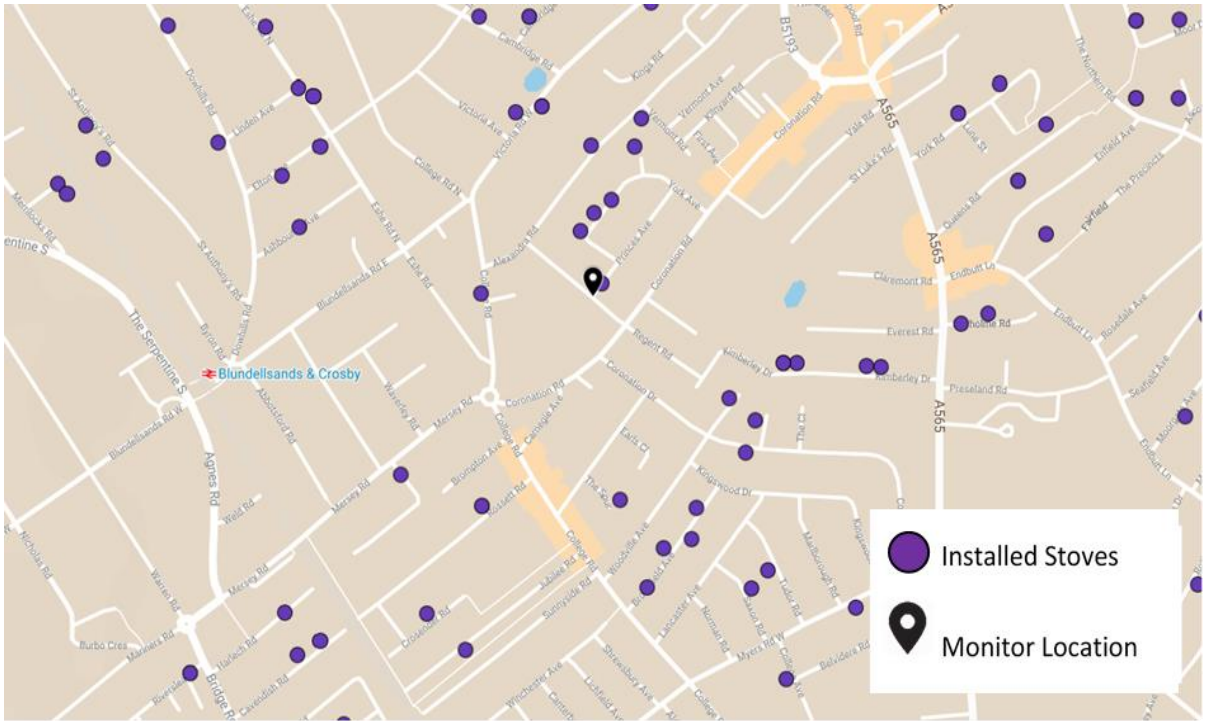
As part of the project a dual particulate monitor was to be installed to monitor levels of PM associated with domestic solid fuel use and a suitable location for the monitor needed to be identified. An initial mapping exercise was therefore undertaken to plot the location of wood burning / multifuel stoves already installed in Sefton which were likely to be in use. Information was provided by Sefton's Building Control team and included stoves installed in the past 5 years which were either installed by a competent person or were signed off by building control. This mapping was then used to inform the location where the monitor should be installed based upon the higher density areas of stove installations with areas of Crosby, Formby and Ainsdale found to have high concentrations of stove installations. Following a review of the mapping the decision was made to install the monitor in Crosby as this area had the highest concentration and there were a number of suitable locations for the monitor. An example of the mapping outputs is provided on the following page .



The red dots show the location of the stoves installed within the last 5 years and the blue areas are current smoke control area's within Sefton.

Monitor Installation

The chosen monitoring device, a FIDAS Dual PM_{10}/$PM_{2.5}$ monitor, was installed within a high stove use area on Regent Road, Crosby and became operational in September 2020. The location of the monitor along with stove installations in the locality is shown below.



Community Engagement

Sefton Wood Allotment Association

As part of the project a meeting was arranged with the Sefton Wood Allotment Association (SWAA) who as volunteers undertake forestry clearance work for Green Sefton and are able to utilise the wood as fuel in their homes. It was considered that this group would be a good focus group for the project and allow us to better understand the level of knowledge with regard to stove use and practices around seasoning of wood etc.

The SWAA were asked to complete a survey to investigate their knowledge and habits in regard to solid fuel burning within the home, there was a prize draw of five moisture meters to encourage participation. The survey was required to pass an internal consultation and engagement panel before being issued to the group, this ensured that the survey was of a sufficient quality, relevant, fair and simple enough for all of the general public.

Responses to the questionnaire showed that in general, all members of the SWAA were concerned with current environmental issues and only half the respondents suggested that receiving free wood to burn was their main reason for attending SWAA sessions, with all others suggesting that they were more interested in the environmental benefit of their actions and the fact that the wood they receive is from a sustainable source. Whilst the surveys showed that members generally understood the need to season wet wood and store it correctly some of the more technical aspects of stove use were less well understood. Not all members of the group knew about HETAS, Smoke control areas, the difference between stoves (eco-design and DEFRA approved) and how regularly their chimney should be swept. This indicates to us that the general public may be even less aware of these factors than this focus group. The results of the surveys and engagement were used to help inform the design and focus of the website and promotional/engagement materials going forwards.

Public Survey

Following the focused SWAA survey a public survey was designed and launched on Sefton's consultation hub website, with the aim of reaching as many residents as possible to gain an understanding of their knowledge and views on the overall topic of domestic

solid fuel, stove use and smoke control etc. The survey had again been authorised by the internal consultation and engagement panel.

Some of the results from the public survey were quite positive and showed reasonably high levels of understanding and knowledge such as

- 94% of respondents being able to identify that wood needs to be dried/seasoned correctly to ensure it burns efficiently .
- Majority of respondents understood the health impacts of particulate matter pollution
- 64% understood what $PM_{2.5}$ is.

Whereas in other areas a much lower level of knowledge was observed:

- Only 35% of respondents could identify the correct way to start a fire in an average stove,
- Less than half – 47% – of respondents could identify what would be classed as a smokeless fuel.
- Only 6% of respondents identified the correct frequency for chimney sweeping if you have a wood burning stove.

As with the SWAA results, the results of this survey were used to help inform the design and focus of the website and promotional/engagement materials.

Industry survey

An industry survey was also designed to target and engage key professionals working within Sefton, this included

- Chimney sweeps
- Stove retailers
- Stove installers
- Fuel retailers

It was originally intended to be used as part of an in person interview but unfortunately had to be changed to postal survey due to the Covid pandemic. The survey had again been authorised by the internal consultation and engagement panel.

Unfortunately due to change to a postal survey the return rate was quite poor and drawing conclusions from the completed questionnaires was difficult.

Some positive conclusions were able to be drawn in that all respondents were aware of the Clean Air Strategy 2019 and a number of respondents were either registered with HETAS or Chimney Sweep associations.

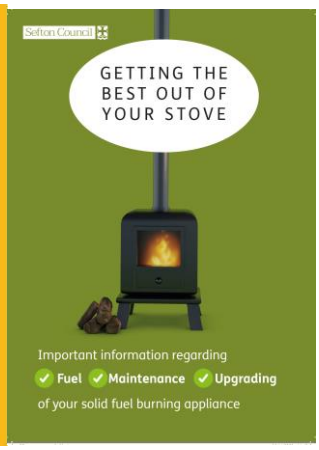
Communications

Leaflets

A number of leaflets were created for the project and designed in house. The points of focus were:

- Families – Issued by family health services/ nurses/ midwifes to expectant mothers and families with young children focusing on the impacts of air pollution on children.
- Current owners – Information on stove use, maintenance and fuel choice.
- Prospective owners – a more concise version of the above 'current owners' leaflet, this also includes information on installation.
- Indoor Air Pollution – Focusing on the impacts of pollution from solid fuel burning directly within the home, rather than just what is taken up the chimney.
- Poster – Issued by building control when a new solid fuel burning appliance is installed and registered. This should provide key information on solid fuel burning in an easy to digest form, the poster will also refer the reader to the website for more information.

Examples are provided below:



Website

Significant resource was assigned to developing the website for the project. The website has been designed to act as a communication hub with lots of detailed information on all aspects of the project.

Although the website contains a lot of information overall, it is presented in smaller sections and across many pages. The website was kept visually appealing through this breaking up of text but also through the use of colour, imagery and videos. The text was kept simple in order to be inclusive.

Videos included on the website were sourced from Burn Right, we were fortunate to be offered the use of these during a meeting with one of the co-founders of the organisation. Having access to these videos allows us to effectively reach more users as some people learn better through an audio or visual format rather than just reading.

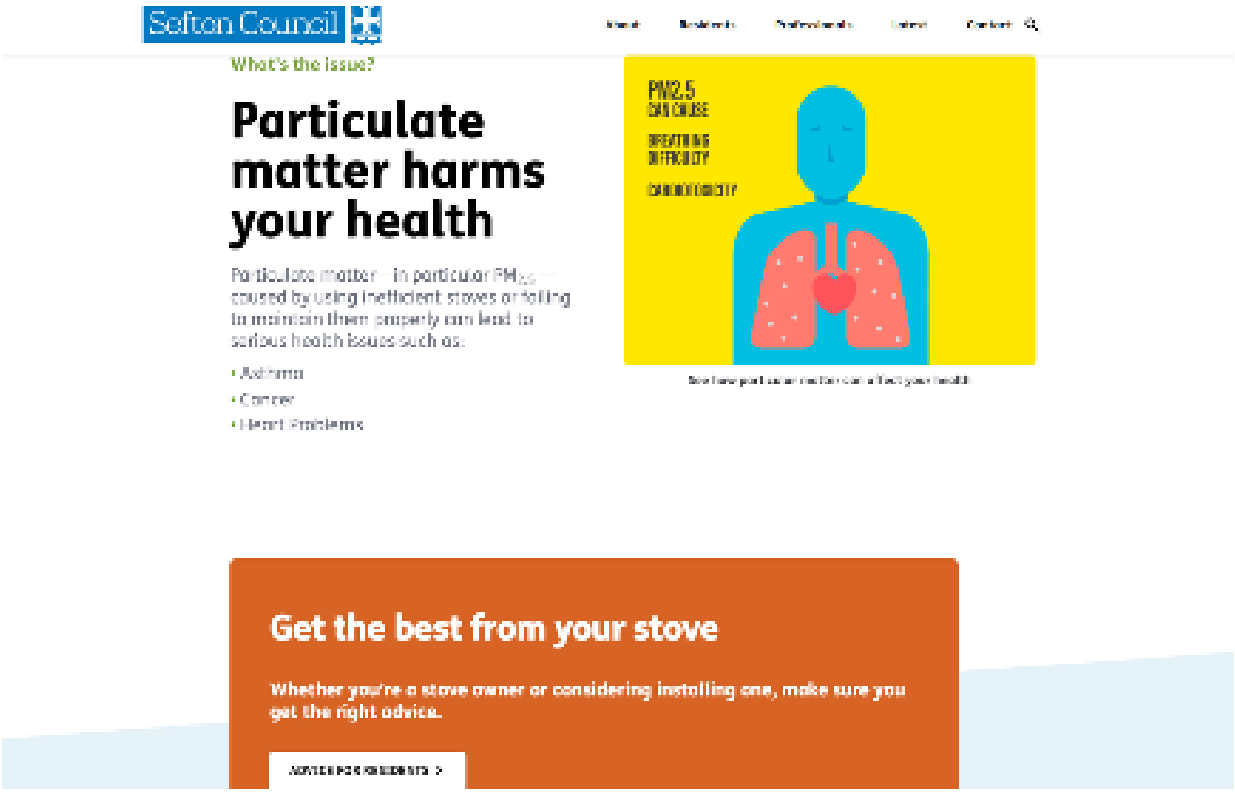
Other interactive features were created for the website such as the smoke control area (SCA) look-up, this allows visitors to search their postcode and discover if they live in a current SCA, if yes then the page directs them to information around this. We opted to use a look-up rather than show the areas on a map in order to make it as simple as possible for the user.

Another page which is particularly useful is the ‘news’ webpage, this page gives users a reason to keep returning. As a whole, our understanding of the dangers associated with poor air quality is a focus of many streams of research; this increasing level of understanding leads to better advice being published and new regulations being brought in. Rather than placing them on multiple pages where users would have to search for any new information, the news page allows clear identification of updates.

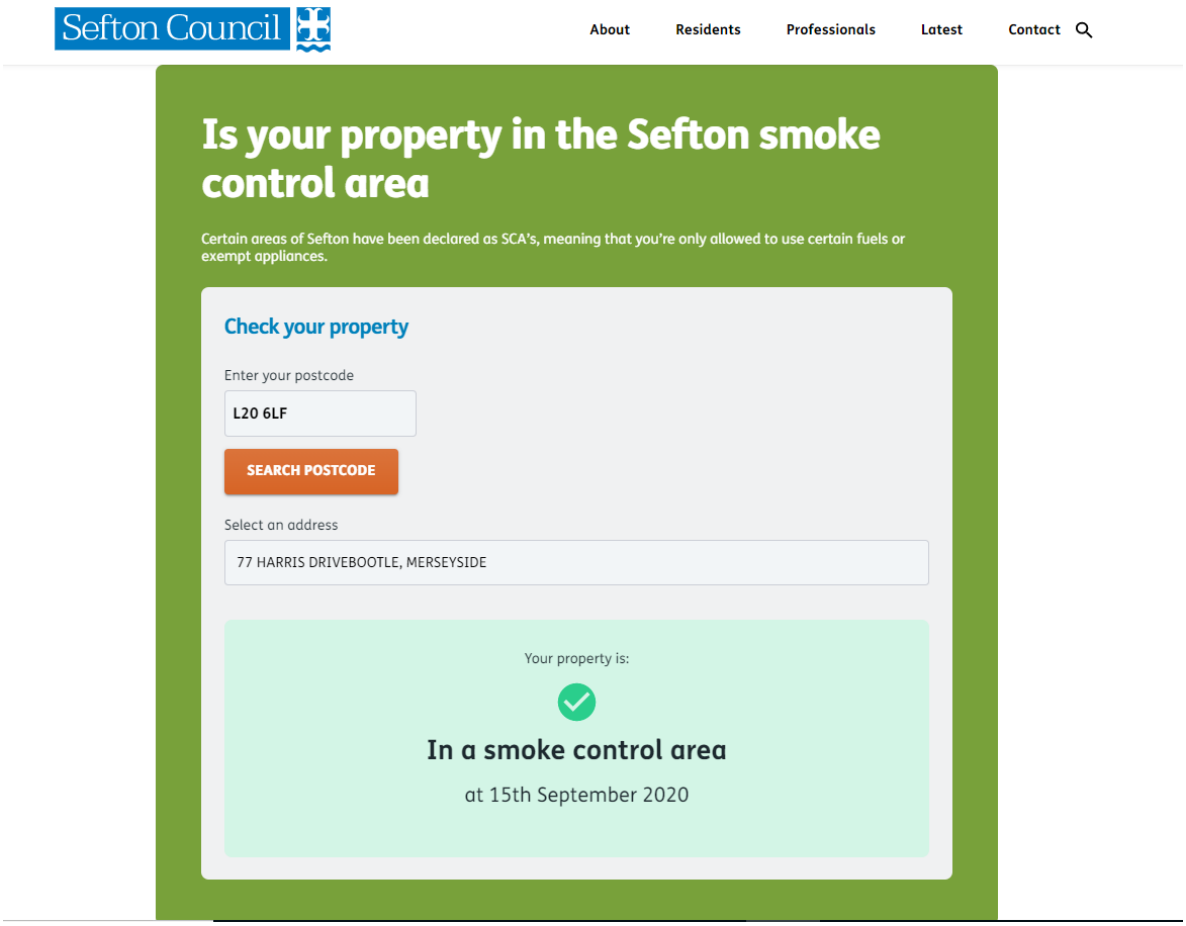
Approximately 37% of all sessions on the website where the user allowed their location to be shared were within the Sefton area. Many of those who were not within Sefton were in neighbouring areas of Liverpool, the Wirral and West Lancashire. Although these areas were not the target of the website, it can still provide useful information for them as not all points were exclusive to Sefton. Providing information to neighbouring areas could in turn improve the wider air quality and so this is not something to discourage.

The choice was made to ensure that the website worked as well on mobile view as it did on a laptop or computer, this choice has been shown as worthwhile as 30% of visitors viewed on their mobiles and 10% on tablets which often use mobile view.

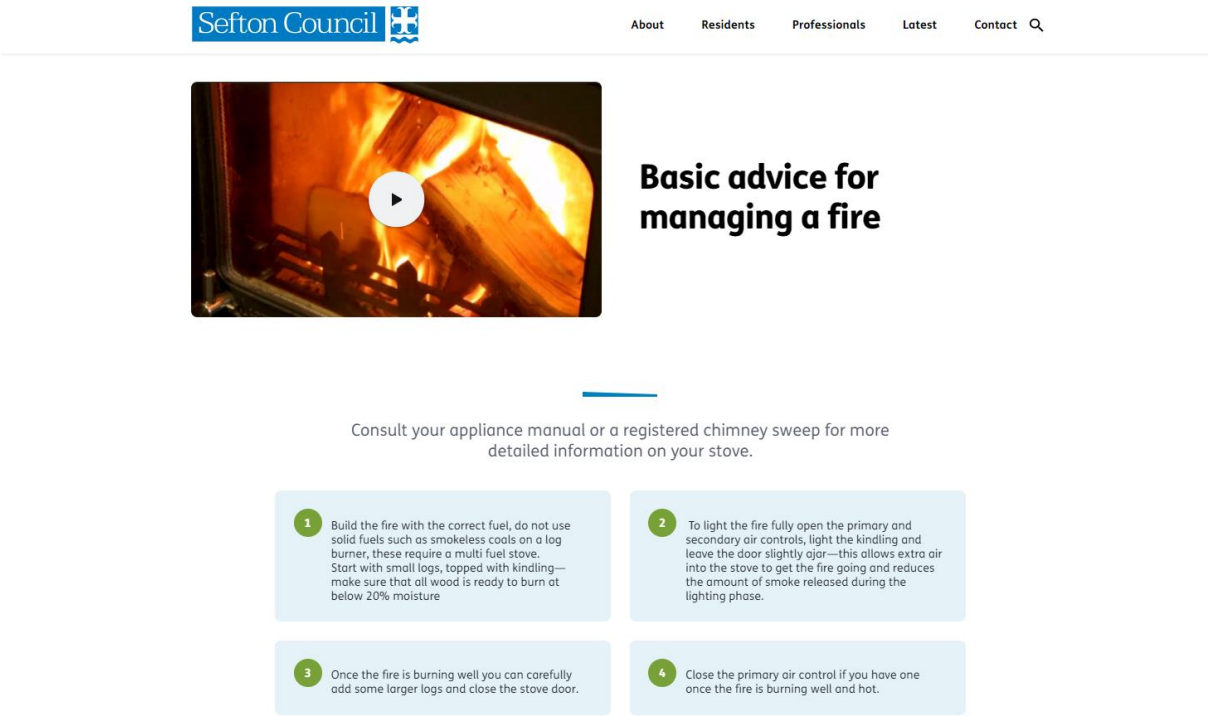
The screenshots below show some pages of the website, you can view the whole website on www.smokecontrolsefton.co.uk



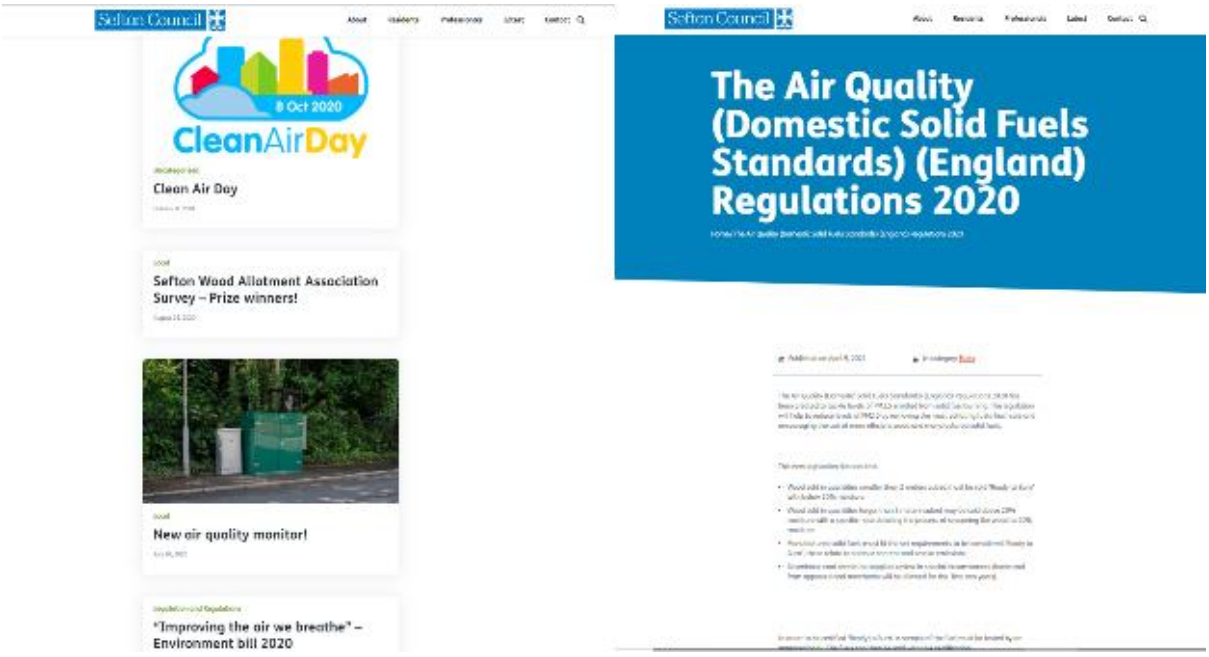
A view of the home page of the website.



The aforementioned Smoke Control Area look up function.



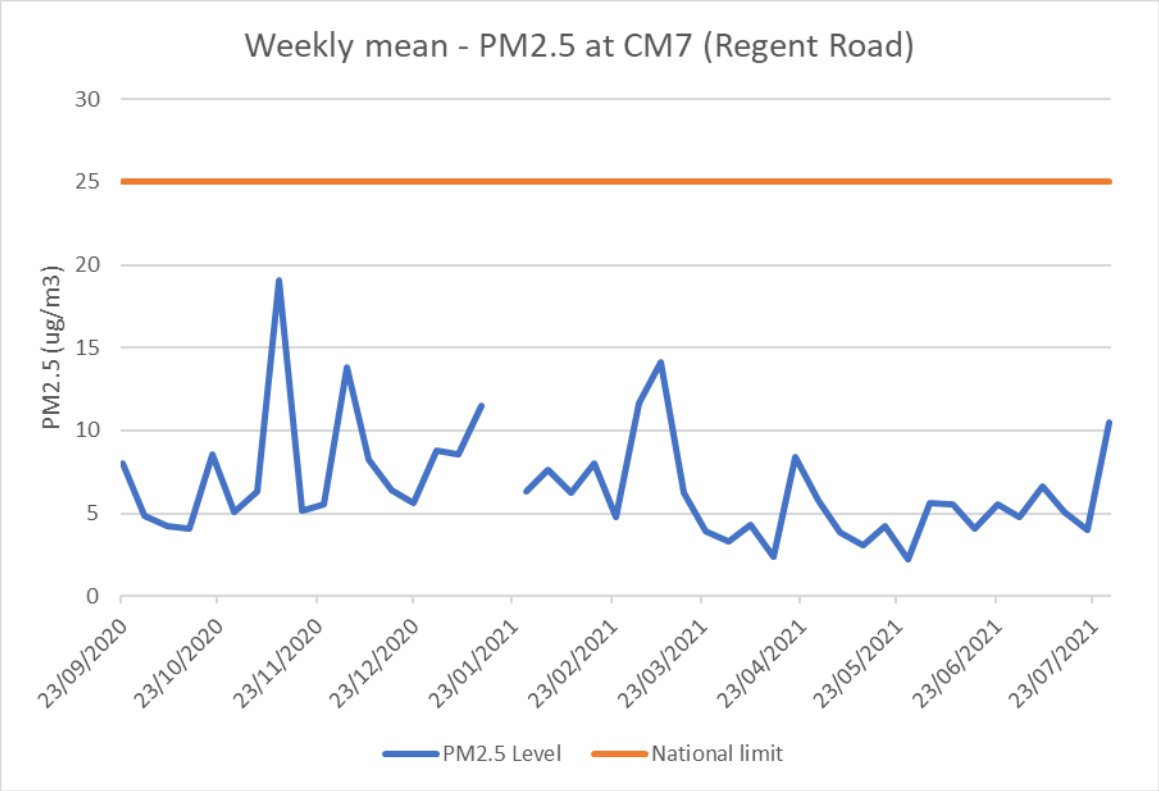
A typical page on the website, this one is within the ‘residents’ section.

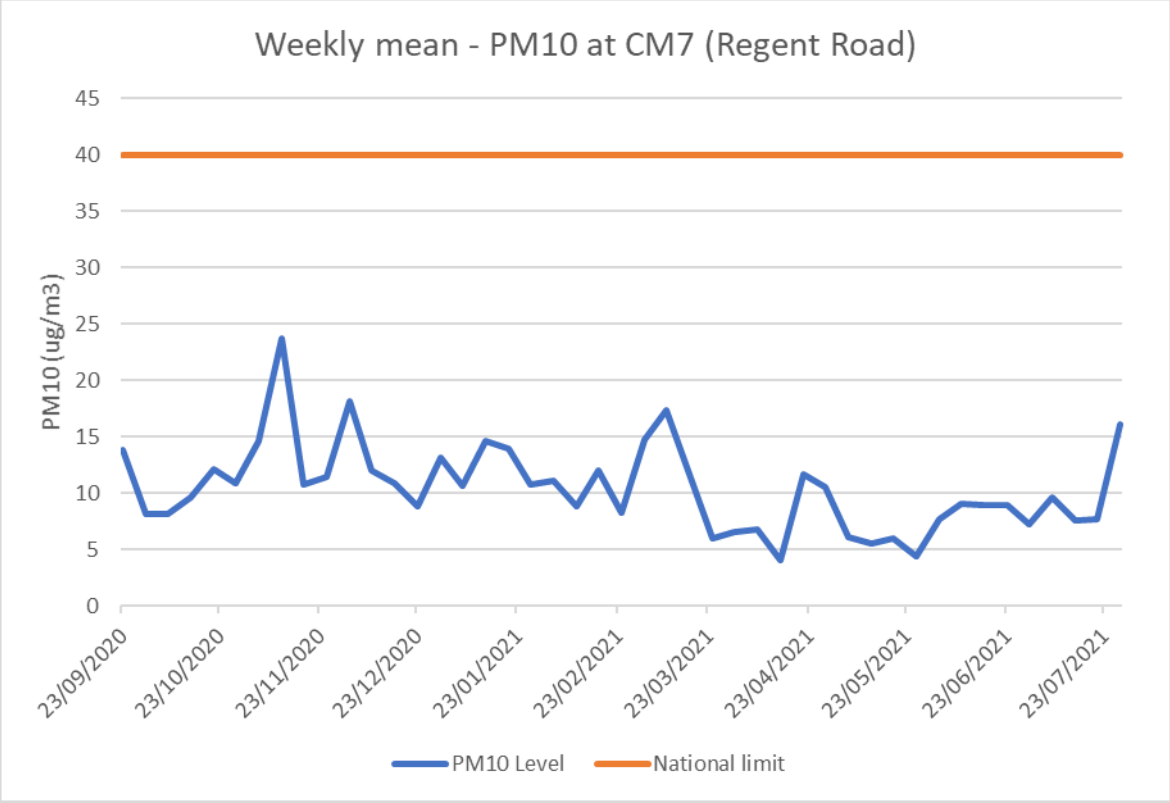


An example of the news section, the left shows how the summary page looks, when you click on a specific article it will be displayed as shown on the right.

Monitoring Results

Unfortunately the monitor installation was heavily delayed due to the Covid pandemic. Initially the monitor was due to be installed in Feb/March 2020 however delays due to lockdowns and contractors' own restrictions, meant that it was only installed and commissioned in September 2020. It is unfortunate that we did not have the opportunity to monitor the particulate matter levels over the early part of the 2020 to compare levels before and after the behaviour change elements of the project . The monitor will however be a permanent legacy of the project and levels and trends with regard to $PM_{2.5}$ in the area will be able to be determined. The results from September to the end of 2020 do show some variation but whilst not directly comparable with the NAQS objectives weekly mean levels are within the 25 ug/m^3 standard throughout winter where levels of stove use would be highest. Analysis of future trends will be undertaken as part of next year's ASR.


Weekly mean - PM2.5 at CM7 (Regent Road)
PM2.5 (ug/m3)
30
25
20
15
10
5
0
23/09/2020
23/10/2020
23/11/2020
23/12/2020
23/01/2021
23/02/2021
23/03/2021
23/04/2021
23/05/2021
23/06/2021
23/07/2021
PM2.5 Level
National limit


Weekly mean - PM10 at CM7 (Regent Road)
PM10 (ug/m3)
45
40
35
30
25
20
15
10
5
0
23/09/2020
23/10/2020
23/11/2020
23/12/2020
23/01/2021
23/02/2021
23/03/2021
23/04/2021
23/05/2021
23/06/2021
23/07/2021
PM10 Level
National limit

Knowledge sharing

The project officer was invited to present to the Air Quality Members Reference Group meeting. This allowed the opportunity to update the councillors and other members of the group on progress of the project and achievements etc. The presentation has been made available for the members of the group to share with any colleagues within the council who they feel it may be relevant for.

A more detailed presentation has also been given to the Regional Air Quality Technical working Group (AQTECH) meeting with members of Liverpool City Region combined authority and all relevant local authorities (Liverpool, Knowsley, Halton, Cheshire East, Cheshire West and Chester, Wirral). Members of the group showed high levels of interest in the project and were keen to hear further progress in the future.

Impact of Covid

The project was unfortunately impacted by COVID-19 in many different ways, see bullet point summary:

- Monitor Install delayed
- Public survey delayed back due to Covid pandemic
- Business Survey changed from in person visit to postal survey
- Website development delays
- Public engagement events/meetings planned not possible/appropriate due to social restrictions

Officers endeavoured to manage these challenges and have completed the project as far as practical within the limitations resulting from the Covid pandemic, with a focus on aspects of the project which will have a lasting legacy in the years to come.

Compliance with National Air Quality Standard Objectives in AQMA's

- With regard to **AQMA 3 Millers Bridge** declared for PM_{10} 24hour mean there has been consistent ongoing compliance with the NAQS objective for a number of years. The Council will be making the necessary arrangements to revoke this particular AQMA declared for PM_{10} 24hour mean.
- With regard to **AQMA4 Waterloo** declared for NO_2 Annual Mean exceedances the junction improvement work detailed above continue to have a positive effect on reducing levels of NO_2 within the AQMA boundary. NO_2 levels at all receptors within the AQMA in 2018, 2019 and 2020 were below the NAQS objective.

  Obviously in 2020 Covid had a positive impact on NO_2 in this AQMA due to reduced traffic levels. Whilst it is anticipated that even without the impact of Covid levels of NO_2 in 2020 would have followed a similar trend as in 2018 and 2019, we do feel it is appropriate to hold off revoking the AQMA until a further years data is analysed.

- Whilst the measures stated above and in table 2.2 will help to contribute towards compliance, Sefton anticipates that further additional measures not yet prescribed will be required in subsequent years to achieve compliance and enable the revocation of **AQMA2 Princess Way** (NO_2 Annual Mean), **AQMA3 Millers Bridge** (NO_2 Annual Mean) and **AQMA5 Hawthorne Road** (NO_2 Annual Mean). As detailed earlier on in this section Sefton is currently preparing an OBC for the development of a Sefton Clean Air Zone. This detailed work builds on the previous CAZ feasibility study and ultimately will determine whether the Council looks to implement a Clean Air Zone in its Borough. Due to the Covid pandemic the progress of this work has been delayed and now projected to be completed by Autumn 2021. The full details of the study will be reported in next year's ASR and incorporated into the updated AQAP's

DEFRA's Appraisal of Sefton's ASR 2020

In addition to reporting on air quality improvement actions Sefton has to provide details of the outcome of DEFRA's appraisal of last year's ASR and advise on any measures taken by Sefton in response.

Defra's appraisal of last year's ASR concluded as follows:

Sefton Metropolitan Borough Council are commended on the thorough detail provided in terms of both monitoring/trend analysis within each of the AQMAs and across the wider borough, the links

presented between $PM_{2.5}$ and health, and also the ongoing deliver of measures to improve air quality within their jurisdiction.

A high level of detail is provided in terms of the ongoing measures that are currently being worked upon within the borough, with an emphasis not just upon NO_2 and PM roadside emissions through road washing, junction improvements and vehicle inspection, but also upon domestic PM emissions through the Domestic Solid Fuel project. Engagement with the local community is a key factor in educating the population in the area of air quality and it is welcomed that Sefton are engaging with schools within the borough to continually develop the Schools Air Quality Project.

It is noted that works are continuing of the development of a revised AQAP, alongside the ongoing Local NO_2 Plan works developing an Outline Business Case for the implementation of a Clean Air Zone within Sefton. Once the AQAP is complete it should be submitted through the RSW to allow appraisal, and an update completed within the 2021 ASR to reference all relevant sections.

The following comments are designed to help inform future reports.

Sefton's response to these comments are shown in bold after each point

1. *The comments made in the 2019 appraisal have been detailed and responded to within the 2020 ASR.*
2. *Distance correction has been completed for all NO_2 monitoring locations, as per TG(16) this only needs to be completed for any monitoring site with an annual mean greater than 36µg/m^3 that are not located at a location of relevant exposure. Example calculations, simply a screen shot from the fall off with distance calculator, would be beneficial to allow an appraisal of the calculations completed.* ***Response: As advised in this year's ASR only sites with NO_2 levels in excess of 36µg/m^3 have been corrected for distance. DEFRA's Diffusion Tube Data Processing Tool has been used to calculate the fall off with distance and details of how this has been used is contained within the QA/QC section***
3. *It is recommended that the calculations for data capture for the monitoring period are checked as a number of these appear incorrect. In addition it would be beneficial to add a footnote to Table B.1 to detail the reasoning for missed months of data capture (i.e. tube missing, contamination, etc). If further explanation is required for the calculations please contact the LAQM helpdesk.* ***Response: Data capture results have been checked for this year's ASR. A footnote is also included to account for any missing data in table B1.***
4. *The Council should move forward with the revocation of AMQA 3 for the 24-hour mean PM_{10} designation, all other AQMA designations should remain in force at the*

current time with reviews completed every year. ***Response: Work on the Revocation of AQMA3 24-hour mean PM_{10} is due to commence. This work element has been delayed due to the Covid Pandemic and staffing resource difficulties -this will be actioned as soon as possible.***

5. *Updates to the revised AQAP are continuing in conjunction with the development of a Business Case to support the implementation of a CAZ within Sefton. It is recommended that the AQAP be completed in conjunction with the Local NO_2 Plan as there will be a high level of cross-over between the two projects. As soon as the AQAP has been completed it should be submitted through the RSW for appraisal with an update to be provided within the 2021 ASR.* ***(Due to the ongoing impact of Covid on staffing resources work on both Sefton's Clean Air Plan and updated AQAP has been delayed. Work is progressing but will not be finalised for inclusion on the 2021 ASR).***
6. *A large number of measures and initiatives are currently being implemented within Sefton by the Council, and based upon the long term monitoring trends the hard work does show improvements in a number of areas across the borough. The level of detail presented throughout the ASR in terms of actions and assessment of compliance is welcomed.*
7. *The bias adjustment factor used within the diffusion tube data should be presented in Table B.1.* ***(The bias adjustment factor used is detailed in the appropriate table within this years ASR).***
8. *It would be beneficial for the Council to complete co-location studies with the NO_2 automatic analysers to ascertain whether the diffusion tube performance within Sefton aligns with the average national performance of Gradko diffusion tubes in terms of bias.* ***(Co-location studies have recommenced in 2021 and will be used as part of next year's ASR)****.*

Table 2.2 – Progress on Measures to Improve Air Quality

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	**Funding Source**	**Defra AQ Grant Funding**	Funding Status	**Estimated Cost of Measure**	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
AQMA2 SS1	Port Booking System	Freight and Delivery Management	Delivery and Service plans	2015	completed	Peel ports	Private	NO	Funded	£50k - £100k	Completed	No Target pollution reduction set-hard to quantify	Feedback on effectiveness of port booking system via port liaison meetings	vehicle booking system introduced and completed in 2009.New L2 terminal operating autogate technology introduced 2015.	Reduced HGV waiting times on the port will reduce pollutant emissions from the port estate affecting AQMA.
AQMA2 SS2	Port expansion mitigation measure No1 Highways England A5036 Road option study	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	not implemented yet	potentially not until 2026 when new road is built	Highways England	HE	NO	Funded	> £10 million	Planning	No Target pollution reduction set-hard to quantify	Compliance with the NO2 air quality objective. New road built to timescales	Stage1 offline option chosen. Detailed assessment underway by HE consultants	Awaiting detailed assessment from consultants
AQMA2 SS2	Port expansion mitigation measure No3. Alternative fuels strategy for HGV's and buses	Vehicle Fleet Efficiency	Other	N/A	completed	Sefton MBC	DEFRA/LA	YES	Funded	£50k - £100k	Completed	N/A	Results of study to inform decision making process	DEFRA AQ grant For Alt fuels refuelling and infrastructure strategy awarded 2014. Consultant appointed 2015. Report issued 2016.	Main recommendation to undertake further CAZ study being undertaken
AQMA2 SS2	Port expansion mitigation measure No4. HGV parking demand study	Transport Planning and Infrastructure	Other	N/A	completed	Sefton MBC	LA	NO	Funded	£50k - £100k	Completed	no Target pollution reduction set-hard to quantify	Robust assessment of HGV parking	Stage 2 report completed. Detailed phase 2 study on preferred HGV parking site underway.	Council to take forward recommendations.
AQMA2 SS3	ECOstars Vehicle fleet recognition scheme	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	ongoing	completed/ongoing	Sefton MBC	LA	NO	Funded	£10k - 50k	Completed	no Target pollution reduction set-hard to quantify	compliance with target to recruit 25 members completed	ECOstars commenced 2013,funded by DEFRA AQ grant, to run initially for 2 years. Formal launch in 2014. Recruited 50 operators	Mainly 4 and 5 star operators recruited. Benefits in context of port expansion low. Scheme however funded for a further 2 years with aim of recruiting a further 15 members.

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	**Funding Source**	**Defra AQ Grant Funding**	Funding Status	**Estimated Cost of Measure**	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
AQMA3 SS1	Hurry Call System	Traffic Management	UTC, Congestion management, traffic reduction	2011	completed	Sefton MBC	LA	NO	Funded	£10k - 50k	Completed	No Target pollution reduction set-hard to quantify	Number of activations of hurry call system	Implemented July 2011. Number of activations of the system per hour reviewed and system continues to show that the system is working well.	Difficult to quantify emissions reduction, but number of activations outside of peak hours indicate successful in facilitating HGV passage through traffic lights and reducing NOx and PM10 emissions.
AQMA3 SS2	Control of dust from industry	Environmental Permits	Other	2011	completed	Sefton MBC	N/A	NO	Not Funded	£50k - £100k	Completed	no Target pollution reduction set-hard to quantify	Compliance results from Local Authority and Environment Agency site inspection visits to permitted industrial sites within the Port of Liverpool and the number of exceedences of the PM10 daily mean standard when predominantly north westerly winds. Compliance results from Local Authority and Environment Agency site inspection visits to permitted industrial sites within the Port of Liverpool and the number of exceedences of the PM10 daily mean standard when predominantly north westerly winds.	Meetings with EMR and EA. New EMR dust management plan produced 2010. Number of exceedences of PM10 24-hour mean when wind direction from the direction of the port continues to remain low.	Compliance with PM10 AQOs achieved. Improved dust control at EMR & relocation of JMD Haulage has significantly contributed to reducing PM10 levels at Millers Bridge.
AQMA5 SS1	Port expansion mitigation measure No 1 Highways England A5036 Road options study	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	Ongoing	Potentially not until 2026 when new road built	Highways England	HE	NO	Funded	> £10 million	Planning	No Target pollution reduction set-hard to quantify	Compliance with the NO2 air quality Objectives... New road built to timescale.	Stage 1 offline option chosen. Detailed assessment underway by HE consultants	Awaiting consultant report on options.

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	**Funding Source**	**Defra AQ Grant Funding**	Funding Status	**Estimated Cost of Measure**	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
AQMA5 SS1	Port expansion mitigation measure No 3 Alternative Fuels Strategy for HGVs & buses	Vehicle Fleet Efficiency	Other	N/A	completed	Sefton MBC	DEFRA/LA	YES	Funded	£50k - £100k	Completed	no Target pollution reduction set-hard to quantify	Results of study to inform decision making process	Defra AQ grant for HGV alternative fuels refuelling infrastructure & strategy awarded 2014. Consultant appointed in 2015. Report issued2016.	Main recommendation to undertake further CAZ study being undertaken
AQMA5 SS1	Port expansion mitigation measure No 4 HGV parking demand study	Transport Planning and Infrastructure	Other	N/A	completed	Sefton MBC	LA	NO	Funded	£50k - £100k	Completed	No Target pollution reduction set-hard to quantify	Robust assessment of HGV parking	Consultant appointed in 2015 to carryout .project Report issued March 2016.	Council to take forward recommendations.
AQMA5 SS2	ECO Stars fleet recognition scheme	Vehicle Fleet Efficiency	Fleet efficiency and recognition schemes	ongoing	completed/ongoing	Sefton MBC	DEFRA/LA	NO	Funded	£10k - 50k	Completed	no Target pollution reduction set-hard to quantify	Compliance with target to recruit 25 operators in the 2 years of scheme operation	ECO Stars commenced 2013, funded by Defra AQ grant, to run initially for two years. Formal launch in 2014. 50 operators recruited.	Mainly 4 & 5 star operators recruited. AQ benefits in context of port expansion low. Scheme now funded for a further 2 years with aim of recruiting a further 15 members.
AQMA4 - Junction Improvements	South Road/ Crosby road North junction improvements	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2018	completed	Sefton MBC	LA	NO	Funded	£1 million - £10 million	Completed	no Target pollution reduction set-hard to quantify	Compliance with NO2 objective in AQMA	Junction improvement works now completed – Compliance observed in 2018/2019/2020- consideration being given to revocation of AQMA	Junction improvement works now completed – Compliance observed in 2018/2019/2020- consideration being given to revocation of AQMA
AQMA3 - Junction improvements	Millers Bridge Junction improvements	Traffic Management	Strategic highway improvements, Re-prioritising road space away from cars, including Access management, Selective vehicle priority, bus priority, high vehicle occupancy lane	2020	ongoing	Sefton MBC	LA/CA	NO	Funded	£1 million - £10 million	Implementation	no Target pollution reduction set-hard to quantify	Compliance with NO2 objective in AQMA	Millers Bridge Junction improvement works currently underway	Works ongoing - once completed will review impact new junction has on reducing congestion and emissions

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	**Funding Source**	**Defra AQ Grant Funding**	Funding Status	**Estimated Cost of Measure**	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
GM1	SCOOT	Traffic Management	UTC, Congestion management, traffic reduction	2010	Completed	Sefton MBC	LA	NO	Funded	£100k - £500k	Completed	No target pollution reduction set - difficult to quantify	Liaison with Sefton Council Highways Maintenance Manager on optimisation of the SCOOT system	Implemented 2010	SCOOT system is optimised and operating successfully.
GM2	Variable Message Signs(VMS)	Public Information	Via other mechanisms	2013	Completed	Sefton MBC	LA	NO	Funded	£10k - 50k	Completed	No target pollution reduction set - difficult to quantify	Ensure system operating effectively	Implemented 2013	VMS system operational since July 2013 and linked to Sefton Council breathing space air quality website to display current levels.
GM3	Work Travel Plans	Promoting Travel Alternatives	Workplace Travel Planning	2010	completed	Sefton MBC	LA	NO	Funded	£10k - 50k	Completed	No target pollution reduction set - difficult to quantify	Number of work place travel plans implemented	implemented 2010	
GM5	Cycling & Walking	Promoting Travel Alternatives	Promotion of cycling	2010	Completed	Sefton MBC	LA	NO	Funded	< £10k	Completed	No target pollution reduction set - difficult to quantify	Increase in participation	Implemented 2010	
GM6	Land use planning	Policy Guidance and Development	Air Quality Planning and Policy Guidance	ongoing	Completed	Sefton MBC	LA	NO	Funded	< £10k	Completed	No target pollution reduction set - difficult to quantify	Percentage of planning permissions granted where the submitted air quality assessment shows no action was required or the air quality impact of a development was mitigated	ongoing	100% of planning permissions either required no action or the air quality impact of the development mitigated
GM7	Low emissions Strategies	Policy Guidance and Development	Low emissions Strategy	2010	Completed	Sefton MBC	LA	NO	Funded	< £10k	Completed	No target pollution reduction set - difficult to quantify	Number of LES measures implemented	Implemented 2010	Increasing number of EV charging points installed.
GM8	Tree planting	Other	Other	2010	Completed	Sefton MBC	LA	NO	Funded	< £10k	Completed	No target pollution reduction set - difficult to quantify	Number of trees planted within AQMA. Compliance with the PM10 air quality Objectives	Implemented 2010	
GM9	AQ awareness	Public Information	Via other mechanisms	2010	Completed	Sefton MBC	LA	NO	Not Funded	< £10k	Completed	No target pollution reduction set - difficult to quantify	Maintenance of Sefton Council air quality website. Number of AQ awareness events	Implemented 2010	
GM10	Freight Quality Partnership (FQP)	Freight and Delivery Management	Other	2010	Completed	Merseytravel	CA	NO	Not Funded	< £10k	Completed	No target pollution reduction set - difficult to quantify	Number of meetings held. Number of AQ initiatives undertaken	Implemented 2010	
GM11	Taxi Quality Partnership (TQP)	Promoting Low Emission Transport	Taxi emission incentives	2013	Completed	Merseytravel	CA	NO	Not Funded	< £10k	Completed	No target pollution reduction set -	Number of operators participating	Implemented 2013	

Measure No.	Measure	Category	Classification	Year Measure Introduced	Estimated / Actual Completion Year	Organisations Involved	**Funding Source**	**Defra AQ Grant Funding**	Funding Status	**Estimated Cost of Measure**	Measure Status	Reduction in Pollutant / Emission from Measure	Key Performance Indicator	Progress to Date	Comments / Barriers to Implementation
												difficult to quantify			
GM - Solid Fossil Fuel Project	Solid Fossil Fuel Project	Other	Other	ongoing	ongoing	Sefton MBC	DEFRA/LA	YES	Funded	£50k - £100k	Implementation	No target pollution reduction set - difficult to quantify	improvement in levels of PM2.5 following implementation of behaviour change solid fossil fuels project	Project Complete	Impact of Covid has had effect on outcomes – see section 2.2
GM- E Taxi project	Evolve -E - Taxi project	Promoting Low Emission Transport	Other	ongoing	ongoing	Sefton MBC	LA	NO	Funded	< £10k	Completed	No target pollution reduction set - difficult to quantify	Number of drivers/operators choosing RV taxi	Project complete	
GM-Schools Project	Schools Air Quality project	Other	Other	ongoing	ongoing	Sefton MBC	LA	NO	Funded	< £10k	Completed	No target pollution reduction set - difficult to quantify	Number of Schools participating in AQ sessions	Project Complete	
GM- Sefton Clean Air Plan	Clean Air Plan	Promoting Low Emission Transport	Low Emission Zone (LEZ)	ongoing	ongoing	Sefton MBC	LA	NO	Funded	£500k - £1 million	Implementation	No target pollution reduction set - difficult to quantify	reduction in Nox and PM levels	Consultants currently preparing outline business case	Impact of Covid has had effect on progress see section 2.2

$PM_{2.5}$ – Local Authority Approach to Reducing Emissions and/or Concentrations

As detailed in Policy Guidance LAQM.PG16 (Chapter 7), local authorities are expected to work towards reducing emissions and/or concentrations of $PM_{2.5}$ (particulate matter with an aerodynamic diameter of 2.5µm or less). There is clear evidence that $PM_{2.5}$ has a significant impact on human health, including premature mortality, allergic reactions, and cardiovascular diseases.

As reported in previous ASR's Sefton Council is already taking a number of measures to address $PM_{2.5}$, as many of the existing measures in the current Air Quality Action Plans to reduce PM_{10} also serve in reducing $PM_{2.5}$, see **Table 2.2**.

These measures continue in 2020/2021 and include:

- Traffic Management measures - SCOOT and Hurry Call systems.
- Promoting Alternative Travel through school and workplace travel plans and encouraging walking and cycling.
- Reducing dust emissions from industry through the LAPPC Environmental Permitting system.
- Reducing emissions from the freight transport sector through the continuation of the ECO Stars Fleet Recognitions Scheme.
- Strategic highway and junction improvements to reduce congestion and pollutant emissions specifically at Millers Bridge and Crosby Road North/South Road Junctions.
- Addressing particulate matter emissions through the land use planning and development control system.

Specific actions to address $PM_{2.5}$

Domestic Solid Fuel Behaviour Change Project

Evidence from ongoing research suggests that the use of domestic fossil fuels can increase local levels of particulates including $PM_{2.5}$.

As reported in last year's ASR Sefton was successful in obtaining a grant through the Local Authority Air Quality grant fund to the sum of £100,000 with the primary aim of minimising the Particulate Matter (PM) contribution from domestic solid fuel use in Sefton through behaviour change. The project is now complete as far as practicable and the details of the outcomes and conclusions that were able to be drawn are provided in detail within section 2.2.

Notwithstanding the impact of the pandemic a number of successful elements were completed and will remain as a legacy of the project with the ongoing objective of reducing PM emissions including PM2.5.

These are discussed in detail in section 2. but the headline actions are detailed below:

- Development of library of behaviour change publicity material - leaflets, posters, factsheets etc
- Continued engagement with stove suppliers/ installers /chimney sweeps and fuel suppliers in area using comms material produced as part of the project
- Real time ongoing measurement of PM10 and PM2.5 levels in the Crosby area (high stove use neighbourhood) using a FIDAS dual particulate monitor measuring PM_{10} and $PM_{2.5}$
- Development of and ongoing support for https://smokecontrolsefton.co.uk public website which contains behavior change information for householders, businesses and suppliers on ways to minimise particulate emissions from the use of solid fuels for heating.

Smoke Control Areas

Large parts of Sefton are already covered by Smoke Control Areas which formally restrict the type of fuel and/or appliance that can be used in these areas. Residents can easily determine if their property is within a Smoke Control Area by checking on Sefton's mapping system and website:

http://maps.sefton.gov.uk/webmaplayers/?datalayers=Smoke%20Control%20Areas&resolution

https://www.sefton.gov.uk/environmental-protection/pests,-pollution-and-food-hygiene/pollution/smoke-control-areas.aspx

Compliance in Sefton's smoke control areas is actively enforced and any complaints or allegations of properties breaching the smoke control area regulations are investigated and appropriate action taken. These measures although hard to quantify assist in reducing levels of particulates including PM $_{2.5}$ in Sefton.

Intensive Road Washing

Following recent visual inspections of road and pavement conditions within AQMA2, AQMA3 and AQMA5 it was apparent that large accumulations of debris and road grime have accumulated. Sefton undertook a successful intensive road/ footpath cleaning project previously which resulted in reductions of PM levels in the AQMA's.

A further road washing exercise was due to commence following the completion of the Millers Bridge junction improvement works. Unfortunately these works were completed just as the Covid pandemic took hold and was temporarily suspended. The project is now due to start in autumn year and will be reported in next year's ASR with the goal of reducing resuspended levels of PM including $PM_{2.5}$

Particulate Control at Construction/Demolition sites

As part of the development control process officers in the Pollution and Air Quality teams are consulted on developments which involve external construction/demolition works likely to give rise to particulate emissions. To proactively control PM emissions from construction works officers recommend the inclusion of formal conditions requiring the submission and approval of a detailed Construction Environmental Management Plan (CEMP) which includes dust control measures. This helps reduce and mitigate the release of particulates during the construction phase of a development including $PM_{2.5}$ emissions

$PM_{2.5}$ monitoring

Sefton currently monitors $PM_{2.5}$ at 2 locations in Sefton. A further FIDAS dual PM_{10}/$PM_{2.5}$ monitor has been purchased and is due to be installed at our Princess Way monitoring station in September 2021. The further expansion of our $PM_{2.5}$ monitoring capability will allow us to determine trends across the south of the Borough and develop site specific measures to work towards reducing emissions of this pollutant. The results of the monitoring are discussed in more detail in section 3.

The Air Quality (Domestic Solid Fuels Standards) (England) Regulations 2020.

The Government has recently introduced new regulations known as **The Air Quality (Domestic Solid Fuels Standards) (England) Regulations 2020** restricting the supply of certain solid fuels with the aim of reducing air pollution. In particular, they aim to reduce the amount of $PM_{2.5}$ emissions in smoke that can cause long term health problems for humans. Domestic burning of wood and coal has been identified by the Government as a major source of these emissions. Local Authorities are responsible for enforcing the regulations.

A summary of the changes /restrictions is provided below:

- the supply of **traditional house coal (bituminous coal)** is **phased out**;
- the supply of **wet wood** in units up to 2 cubic metres is **phased out**;
- **smoke emissions limits** are introduced for **manufactured solid fuels**.
- **Only dry wood (Moisture content less the 20%)** can be sold in quantities of 2 cubic meters or less and has to show the ready to burn logo :

This only applies to fuel supplied for combustion in domestic premises.

Unless otherwise stated in the duties section, these Regulations apply from **1st May 2021.**

Air quality officers in Sefton have started to engage with businesses likely to sell solid fuels for domestic purposes and an advisory letter and leaflet has been sent to over 200 businesses in the Borough. Officers are planning to undertake targeted inspections of the main suppliers to ensure compliance with the new regulations. It is hoped that with these new powers restricting the use of wet wood, emissions of $PM_{2.5}$ will further reduce.

3 Air Quality Monitoring Data and Comparison with Air Quality Objectives and National Compliance

This section sets out the monitoring undertaken within 2020 by Sefton Council and how it compares with the relevant air quality objectives. In addition, monitoring results are presented for a five-year period between 2016 and 2020 to allow monitoring trends to be identified and discussed.

Summary of Monitoring Undertaken

3.1.1 Automatic Monitoring Sites

Sefton Council undertook automatic (continuous) monitoring at 6 sites during 2020. 1 site however was only commissioned in September 2020. Table A.1 in Appendix A shows the details of the automatic monitoring sites. NB. Local Authorities do not have to report annually on the following pollutants: 1,3 butadiene, benzene, carbon monoxide and lead, unless local circumstances indicate there is a problem.

The http://breathingspace.sefton.gov.uk/ page presents automatic monitoring results for Sefton Council, with automatic monitoring results also available through the UK-Air website.

Maps showing the location of the automatic monitoring sites are provided in Appendix D. Further details on how the monitors are calibrated and how the data has been adjusted are included in Appendix C.

3.1.2 Non-Automatic Monitoring Sites

Sefton Council undertook non- automatic (i.e. passive) monitoring of NO_2 at 80 sites during 2020. Table A.2 in Appendix A presents the details of the non-automatic sites.

Maps showing the location of the non-automatic monitoring sites are provided in Appendix D. Further details on Quality Assurance/Quality Control (QA/QC) for the diffusion tubes, including bias adjustments and any other adjustments applied (e.g. annualisation and/or distance correction), are included in Appendix C.

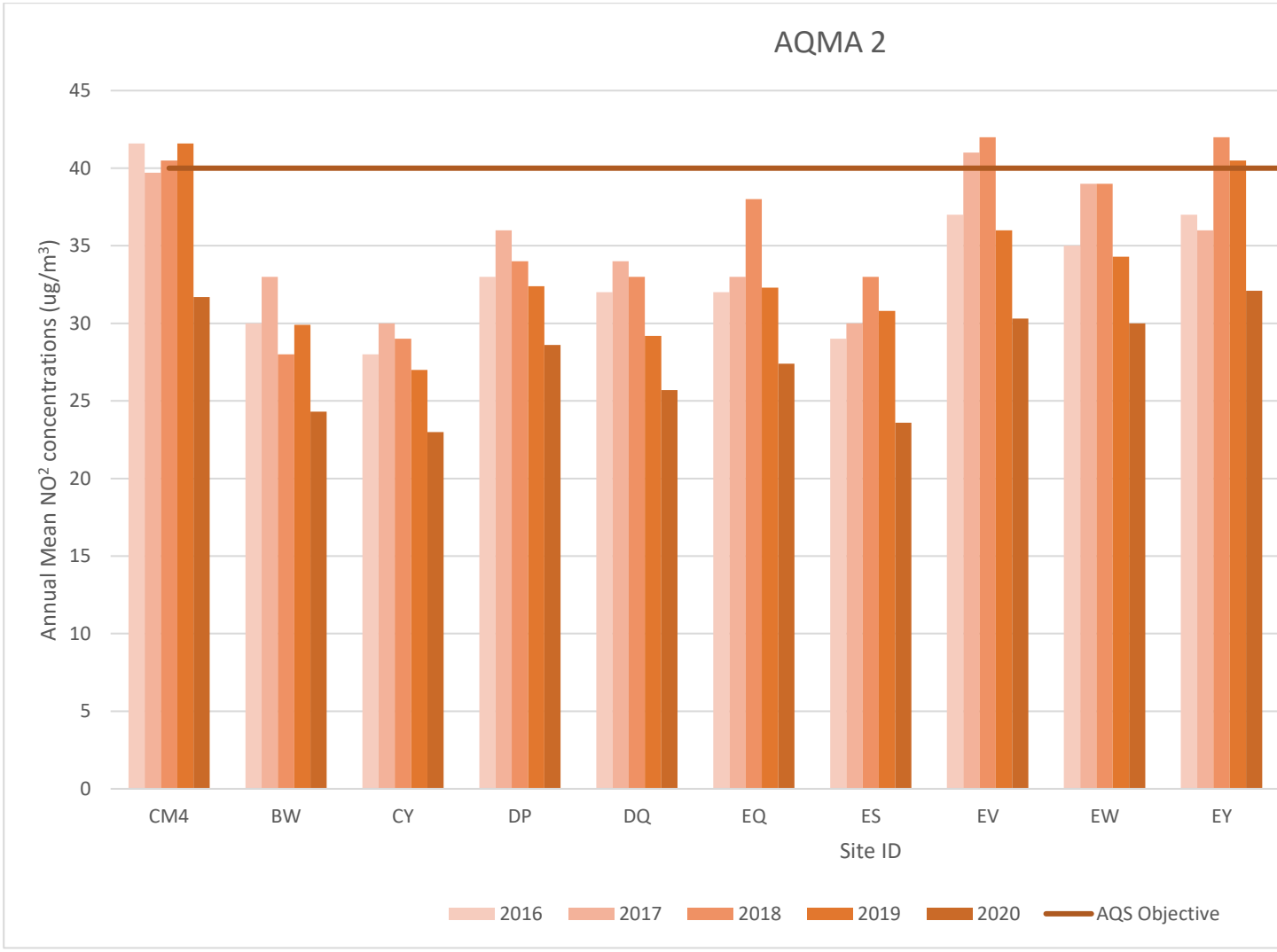
Individual Pollutants

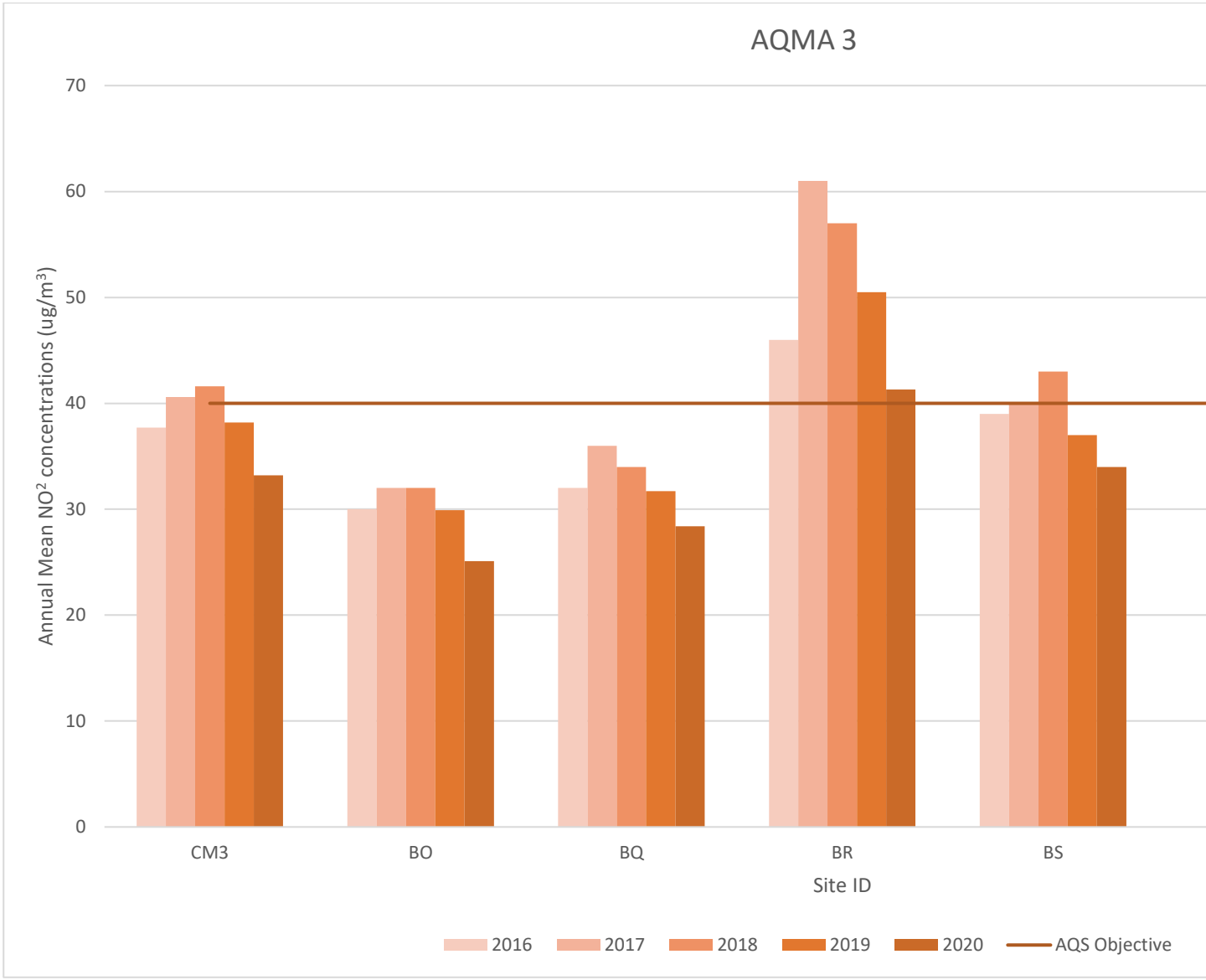
The air quality monitoring results presented in this section are, where relevant, adjusted for bias, annualisation (where the annual mean data capture is below 75% and greater than 33%), and distance correction. Further details on adjustments are provided in Appendix C.

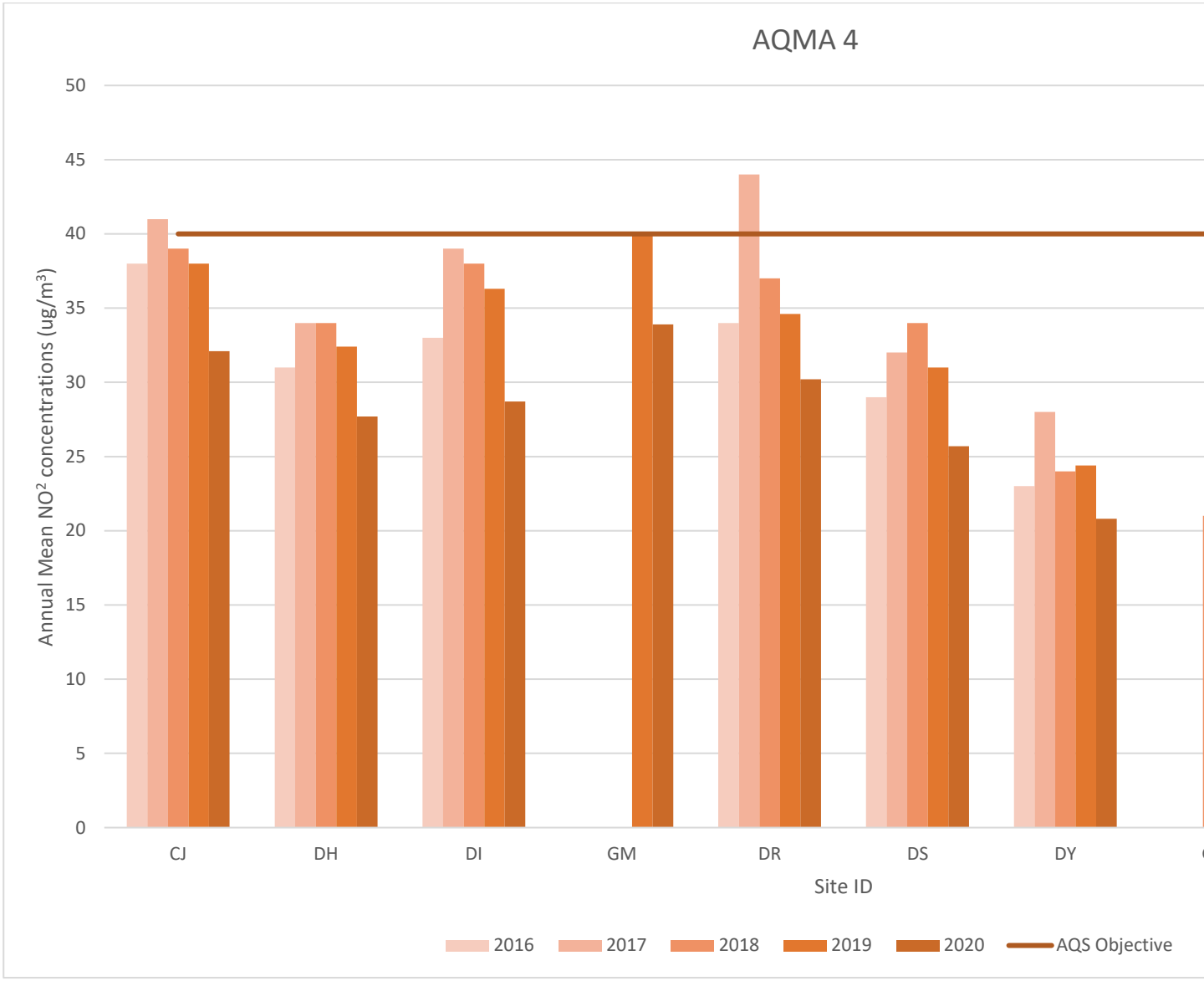
3.1.3 Nitrogen Dioxide (NO_2)

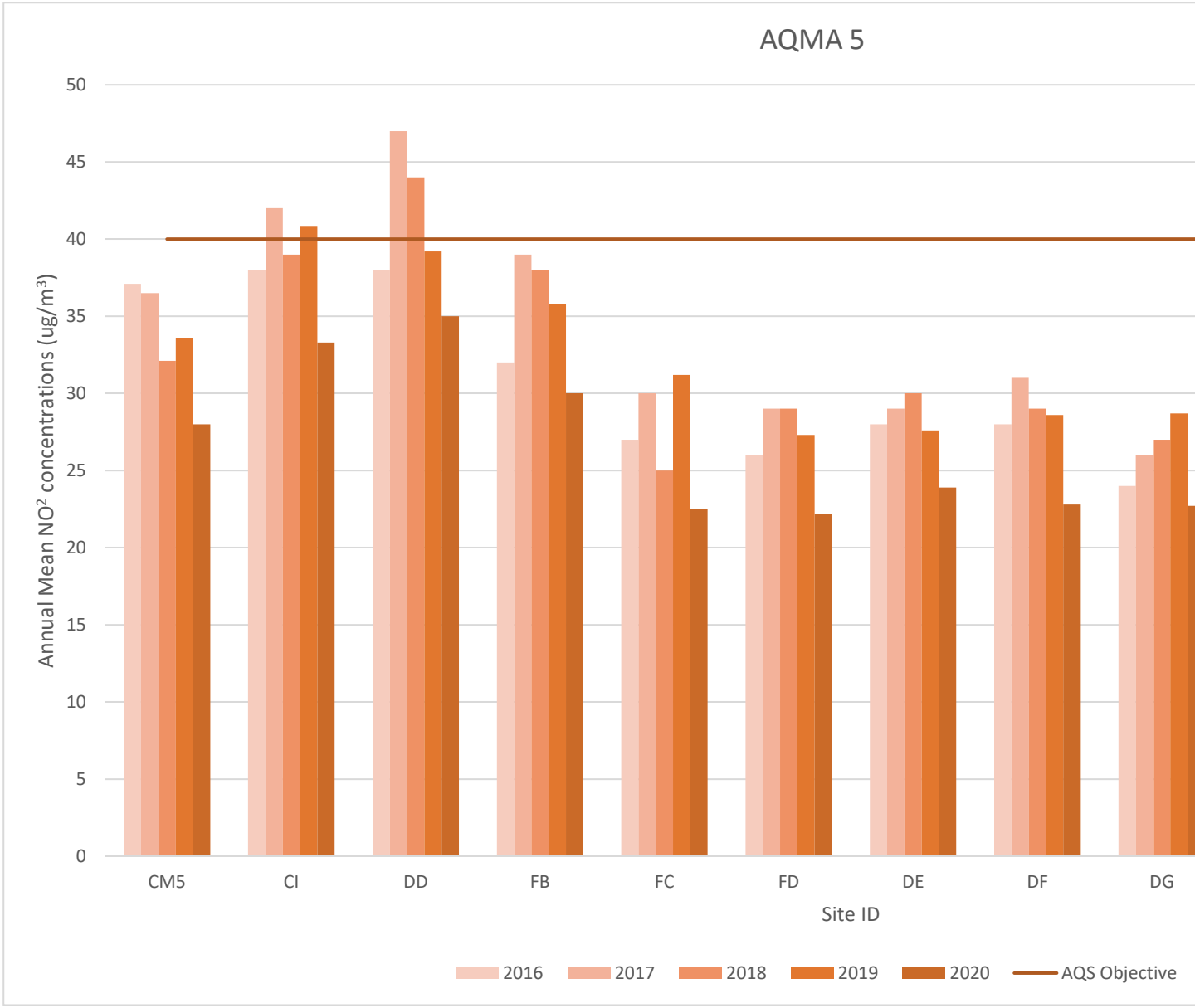
Table A.3 and Table A.4 in Appendix A compare the ratified and adjusted monitored NO_2 annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Note that the concentration data presented represents the concentration at the location of the monitoring site, following the application of bias adjustment and annualisation, as required (i.e. the values are exclusive of any consideration to fall-off with distance adjustment).

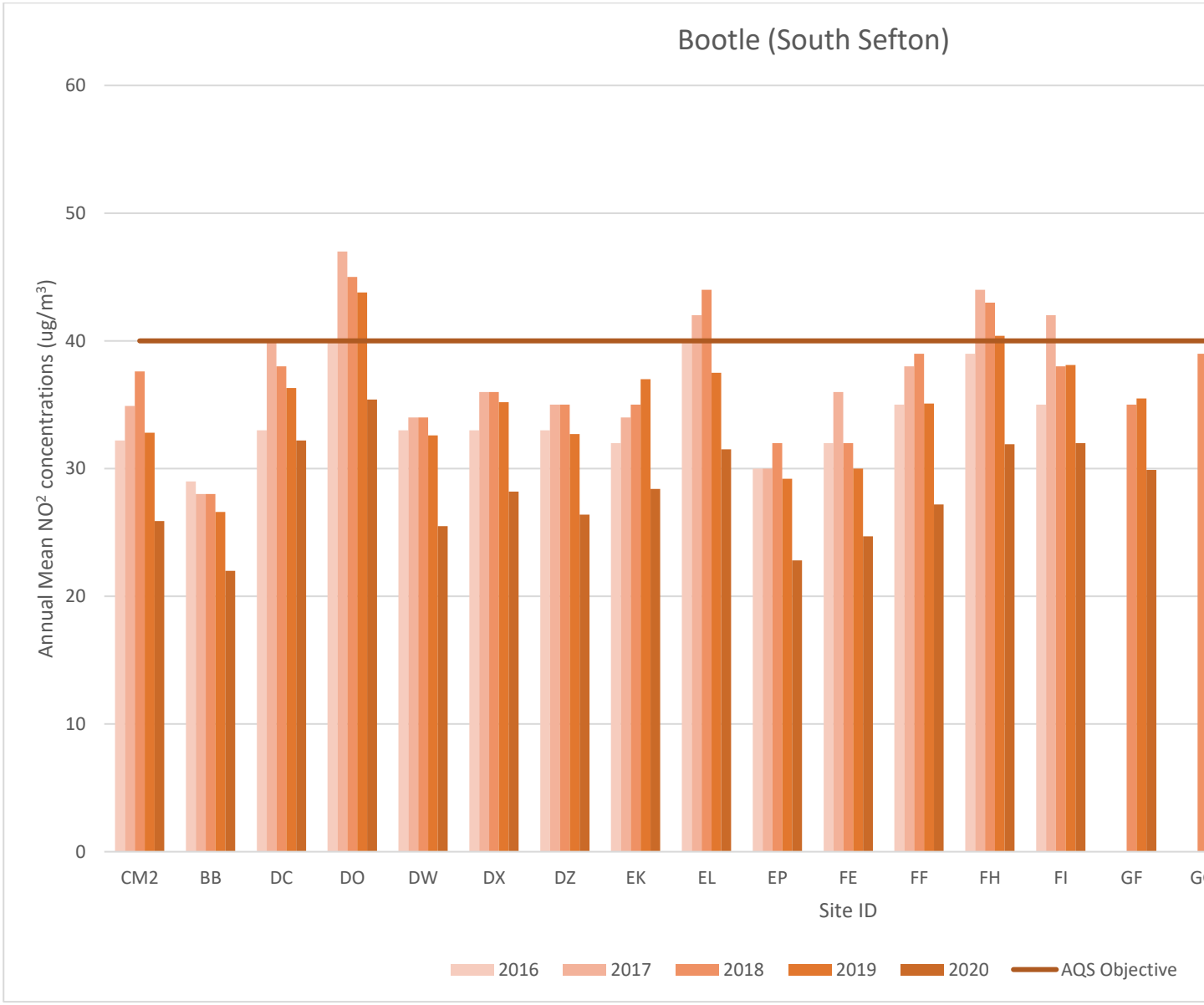
For diffusion tubes, the full dataset of monthly mean values for 2020 is provided in Appendix B. Note that the concentration data presented in Table B.1 includes distance corrected values, only where relevant.

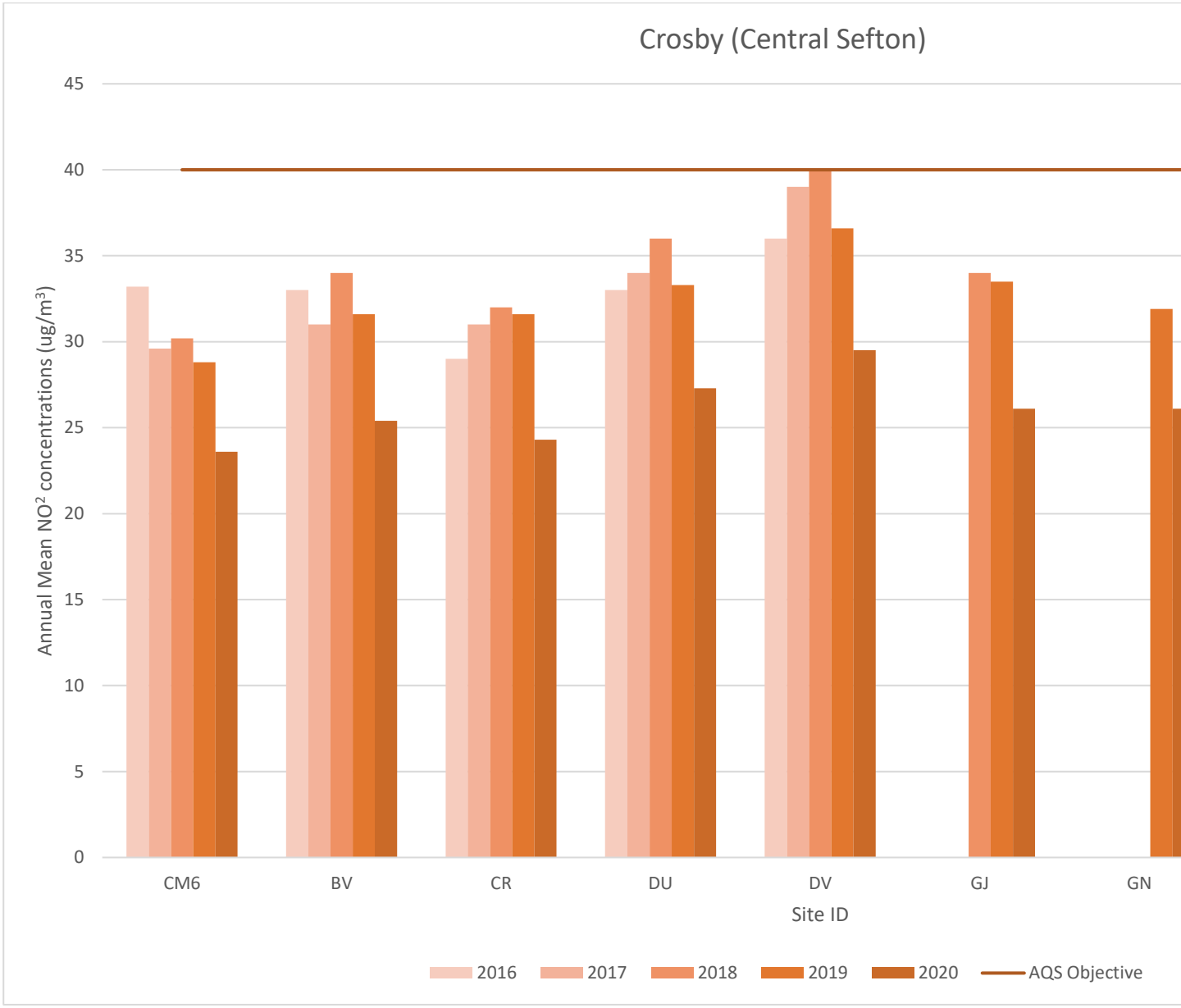

AQMA 2
Annual Mean NO2 concentrations (ug/m3)
45
40
35
30
25
20
15
10
5
0
CM4
BW
CY
DP
DQ
EQ
ES
EV
EW
EY
Site ID
2016
2017
2018
2019
2020
AQS Objective

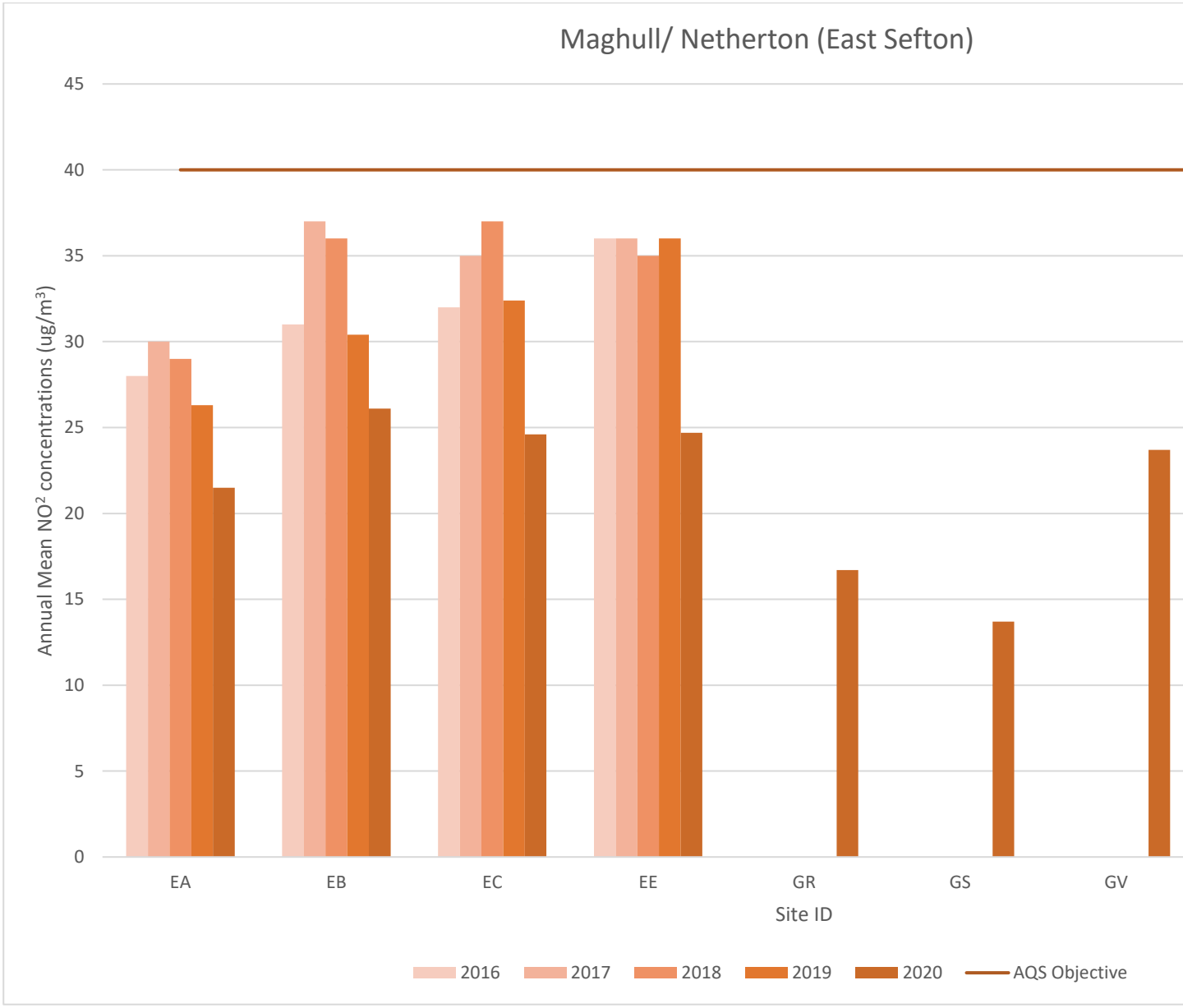

AQMA 3
70
60
50
40
30
20
10
0
Annual Mean NO2 concentrations (ug/m3)
CM3
BO
BQ
BR
BS
Site ID
2016
2017
2018
2019
2020
AQS Objective


AQMA 4
50
45
40
35
30
25
20
15
10
5
0
Annual Mean NO2 concentrations (ug/m3)
CJ
DH
DI
GM
DR
DS
DY
Site ID
2016
2017
2018
2019
2020
AQS Objective


AQMA 5
Annual Mean NO2 concentrations (ug/m3)
50
45
40
35
30
25
20
15
10
5
0
CM5
CI
DD
FB
FC
FD
DE
DF
DG
Site ID
2016
2017
2018
2019
2020
AQS Objective


Bootle (South Sefton)
60
50
40
30
20
10
0
Annual Mean NO2 concentrations (ug/m3)
CM2
BB
DC
DO
DW
DX
DZ
EK
EL
EP
FE
FF
FH
FI
GF
Site ID
2016
2017
2018
2019
2020
AQS Objective


Crosby (Central Sefton)
45
40
35
30
25
20
15
10
5
0
Annual Mean NO2 concentrations (ug/m3)
CM6
BV
CR
DU
DV
GJ
GN
Site ID
2016
2017
2018
2019
2020
AQS Objective


Maghull/ Netherton (East Sefton)
45
40
35
30
25
20
15
10
5
0
Annual Mean NO2 concentrations (ug/m3)
EA
EB
EC
EE
GR
GS
GV
Site ID
2016
2017
2018
2019
2020
AQS Objective

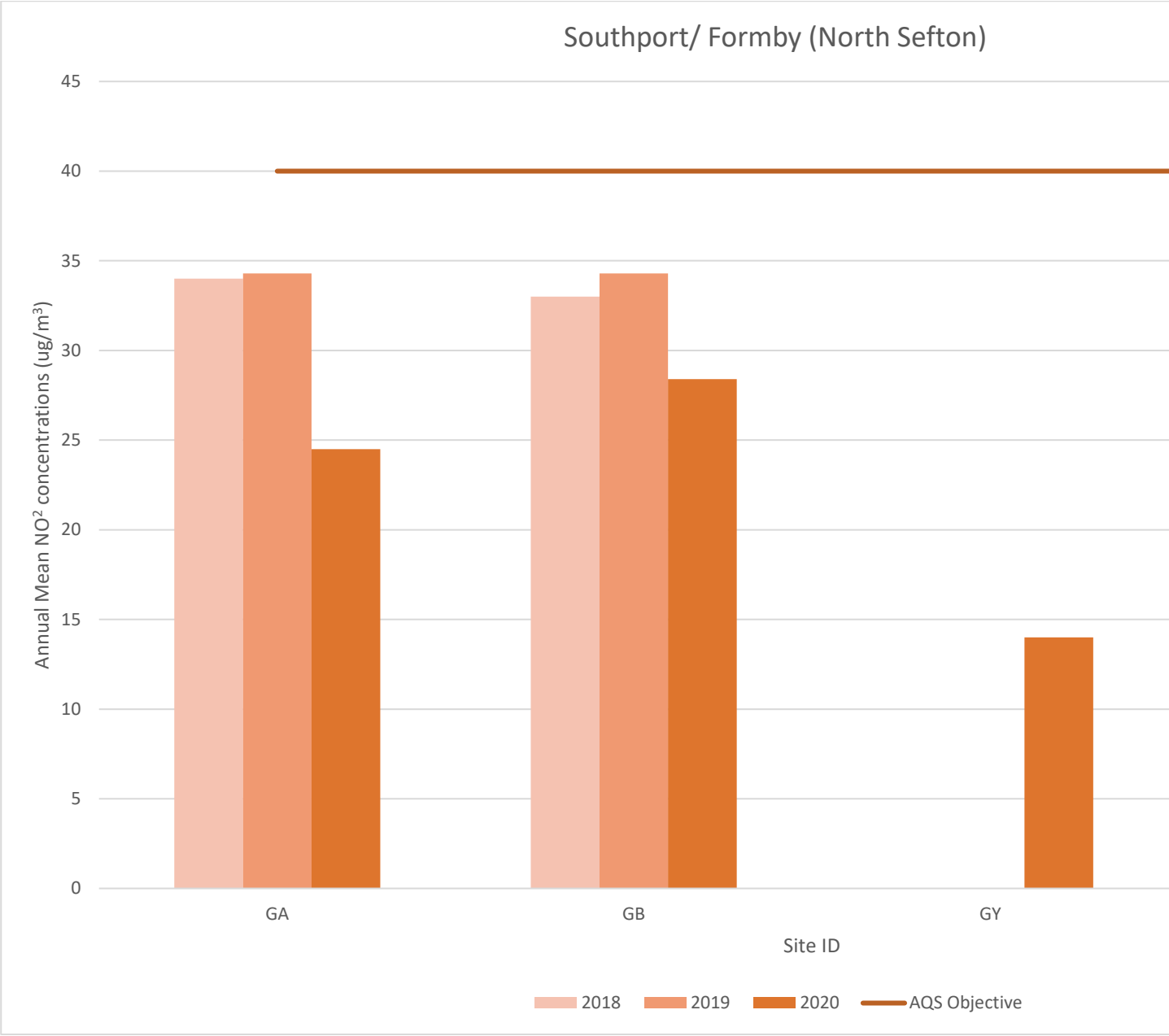


Table A.5 in Appendix A compares the ratified continuous monitored NO_2 hourly mean concentrations for the past five years with the air quality objective of 200µg/m^3, not to be exceeded more than 18 times per year.

Automatic Monitoring Results

The substantial traffic reductions due to the various lockdowns and social restrictions associated with the Covid pandemic in 2020 have had a striking imact on the NO_2 annual mean monitoring results. For the first time since monitoring began all of the 5 automatic monitoring sites showed complinace with the NO_2 annual mean objective in 2020 (at the monitoring location).

See table A3 for results and Figure A.1 onwards for graphs representing trends.

There were no exceedances of 1-hour mean objective at any of the automatic monitoring sites.

Trends in Annual Mean NO_2 automatic monitoring Data across all sites

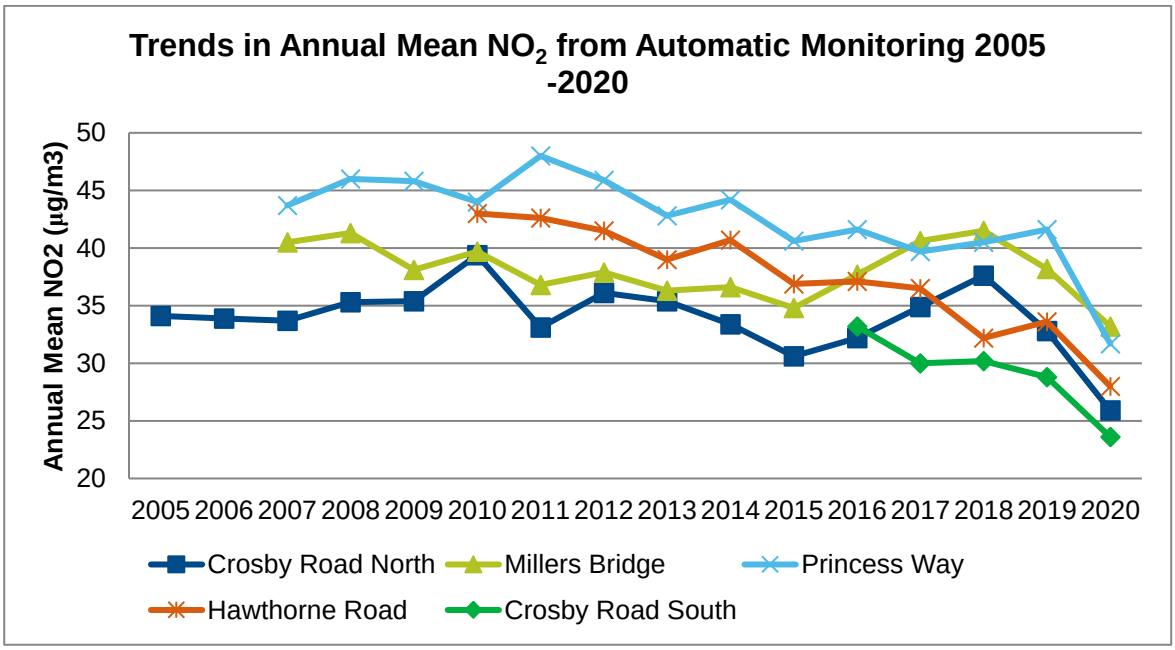


Figure F1 above shows the trends in Annual mean NO_2 levels between 2005 and 2020 at each of the continuous monitoring sites.

As can be observed all monitoring sites showed a reduction in NO_2 annual mean levels in 2020 compared to 2019, with all sites substantially below the NAQS objective. As 2020 is considered an extraordinary year in terms of air quality no real conclusions can be drawn in terms of future trends and monitoring will continue at all sites.

Diffusion Tube Monitoring Results

In line with the automatic monitoring results, **all** 80 non-automatic diffusion tube monitoring sites showed significantly reduced NO_2 annual mean levels compared to 2019 (where previous monitoring is availble) again no doubt due to the unprecedented circumstances

resulting from the covid pandemic. As can be seen from the trend charts in figure A1 some of the reductions oberved were substantial with the majority of sites showing levels well below the NAQS objective

Notably **Only 1** Site ID: BR Derby Road, Bootle showed an exceedance of the NAQS objective in 2020 with an NO_2 annual mean of 41.3 µg/m^3 . As this site recorded a 2020 NO_2 annual mean concentration in exceedance of the air quality objective at a monitoring site which is not representative of public exposure, the concentration at the nearest receptor for this location was estimated using the distance correction via the Defra diffusion tube processing tool. This showed the estimated concentration of 39.0µg/m^3 indicating borderline complinace with the NO_2 annual mean objective at a relevant public exposure location in this area. This is within AQMA 3 - Millers Bridge.

In line with TG/16, two other sites showed annual mean levels above 36 µg/m^3 and have been adjusted for distance accordingly. Site ID: GT Millers Bridge recorded a level of 36.9 µg/m^3 at the monitoing site with the levels estimated to be 32 µg/m^3 at the location of public exposure. This site is within AQMA 3 - Millers Bridge.

Site ID: GH A565 Derby Road recorded a level of 38.6 µg/m^3 at the monitoing site with the levels estimaetd to be 31.1 µg/m^3 at the location of public exposure.

All other sites showed annual mean levels below 36 µg/m^3 and as such in line with TG/16 have not been adjusted for distance.

Further discussion of the monitoring results focused around the AQMA's can be found below.

Compliance with NAQS in current AQMA's

A summary of each AQMA with regards to NO_2 objective exceedance/compliance is discussed below. **Maps showing details of the monitoring sites and last 5 years results in and around each AQMA are also provided following this discussion** .

- **AQMA 2 Princess Way, Seaforth**. Unlike previous years no exceedance of the NO_2 annual mean objective was observed either at the automatic monitor or diffusion tube site. All results in 2020 were well within NAQS by some margin with the highest level of 32.1 µg/m^3 observed at diffusion tube site ID: EY -Lathom Close. Complaince with the 1-hour mean objective was also achieved at this location. With the exception of 2020, monitoring data has shown regular

exceedances of the NO_2 annual mean in this AQMA. We do not know if the improvements in air quality that have been observed due to Covid will continue into 2021 and beyond and there is still concern that increases in port related traffic will impact on pollution levels in this area and as such this AQMA is not being considered for revocation in the immediate future. All existing monitoring will continue in this AQMA also.

- **AQMA 3 Millers Bridge, Bootle**. An exceedance of the NO_2 annual mean objective occurred in 2020 at 1 diffusion tube Site ID: BR Derby Road, Bootle with an annual mean of 41.3 µg/m^3 . As this site recorded a 2020 NO_2 annual mean concentration in exceedance of the air quality objective at a monitoring site which is not representative of public exposure, the concentration at the nearest receptor for this location was estimated using the distance correction via the Defra diffusion tube processing tool. This showed the estimated concentration of 39.0 µg/m^3 just below the NAQS. The next highest diffusion tube level was Site ID: GT Millers Bridge which recorded a level of 36.9 µg/m^3 at the monitoing site with the levels estimated to be 32 µg/m^3 at the location of public exposure. Notwithstanding the exceedance at site BR levels across the AQMA are much reduced compared to previous years. For example last 2019's result for site BR was 50.5 µg/m^3 around 9 µg/m^3 higher than 2020. Compliance with the 1 hour mean objective was again achieved at this location. These reductions in NO_2 levels are again in the main due to the covid pandemic. As in AQMA2 in view of the previous levels monitored and uncertanties around the future impact of covid this AQMA is not being considered for revocation.

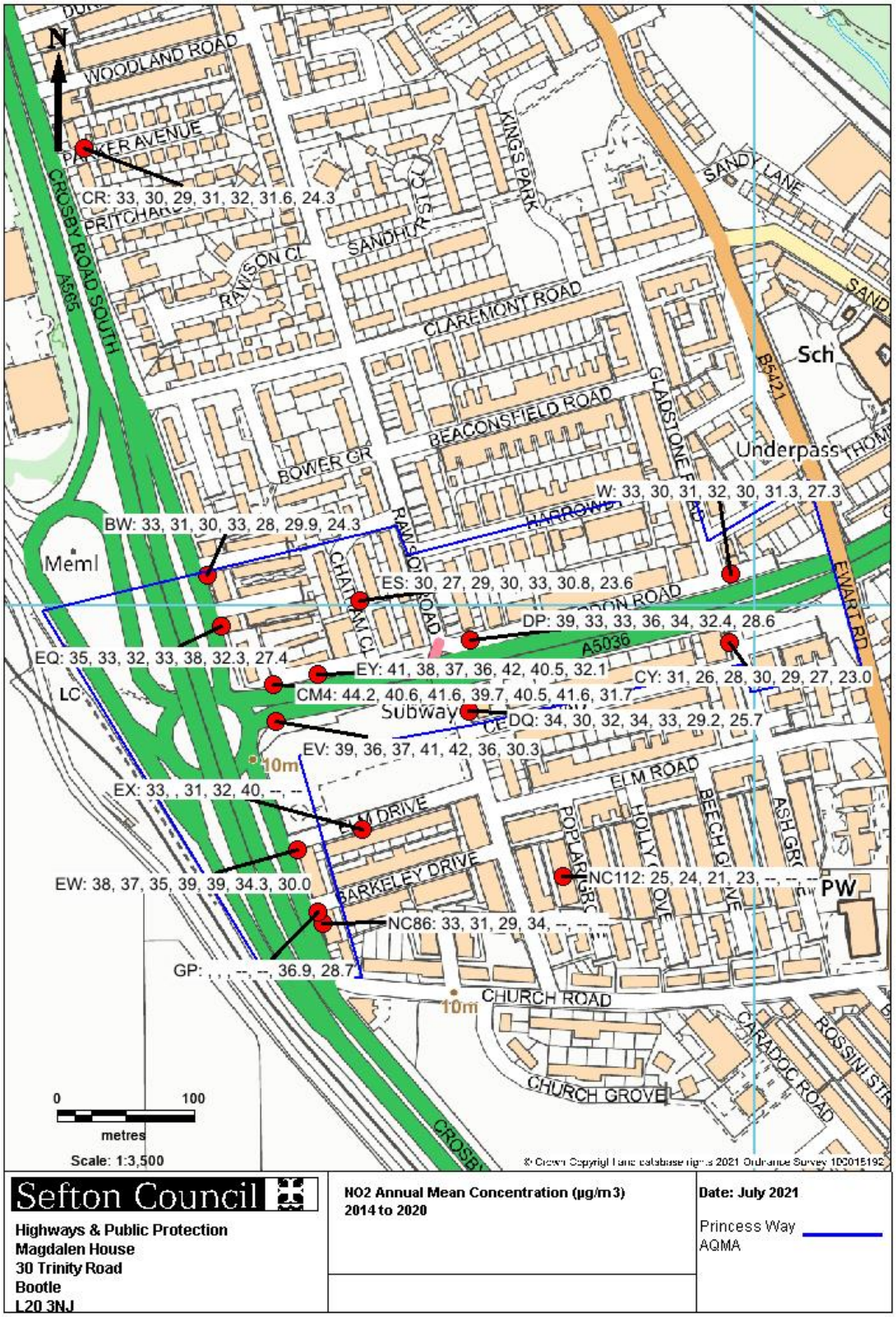
- **AQMA4 Waterloo**. No automatic NO_2 monitoring is carried out within AQMA 4. Diffusion tube monitoring in 2020 has shown compliance with the NAQS objective at all monitoring locations with significant reductions compared to 2019 levels. The maximum monitored level in 2020 was Site ID: GH - South Road with an annual mean level of 33.9 µg/m^3 . Since the junction improvement works have been completed, overall levels of NO_2 have reduced and shown consistent compliance with NAQS objectives. Obviously 2020 would be considered an exceptional year in terms of air quality. Sefton was looking into the possibility of revoking AQMA4 following 2020 results however in view of the particular circumstances due to covid

we are progressing with caution and will review revocation status following completion of 2021 monitoring.

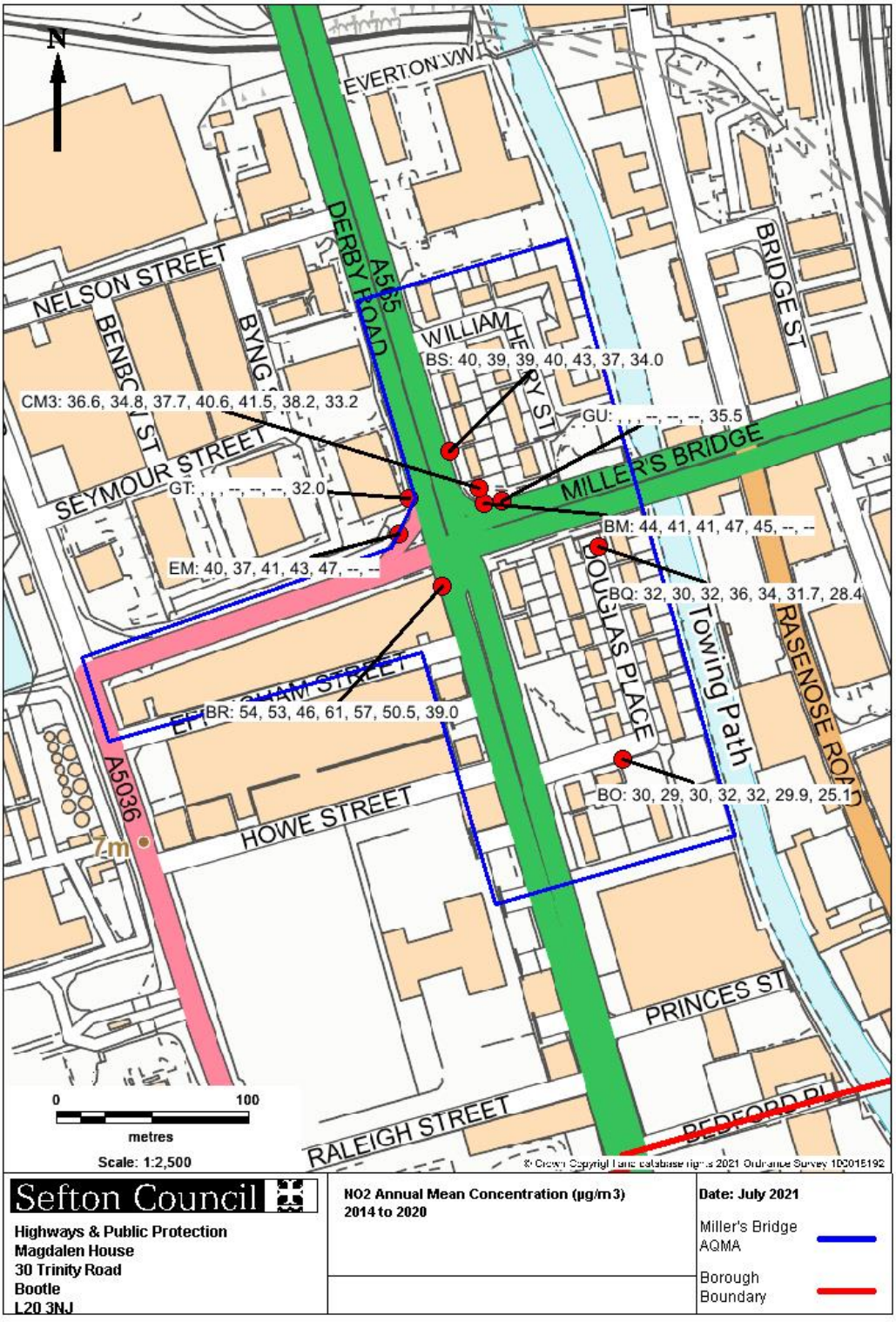
- **AQMA 5 Hawthorne Road, Litherland**. Compliance with the NO_2 annual mean objective and 1-hour mean objective at the automatic monitoring location was achieved in 2020 at the automatic monitoring site. For the first time for a number of years all diffusion tube monitoring locations in this AQMA also showed levels in compliance with the NAQS objective. Again this is due in the main to the Covid pandemic. All monitoring sites showed significant reductions in 2020 compared to 2019 results. The highest level recorded in 2020 in this AQMA was site ID: DD - Hawthorne Road with a level of 35.0 µg/m^3. In 2019 a level of 43.2 µg/m^3 was recorded at this site. Due to the uncertanties around covid and unknown impact the port expansion will have on pollution levels in this area, this AQMA is not being considered for revocation in the immediate future.

Maps 1-4 showing NO_2 Monitoring results in and around Sefton's AQMA's

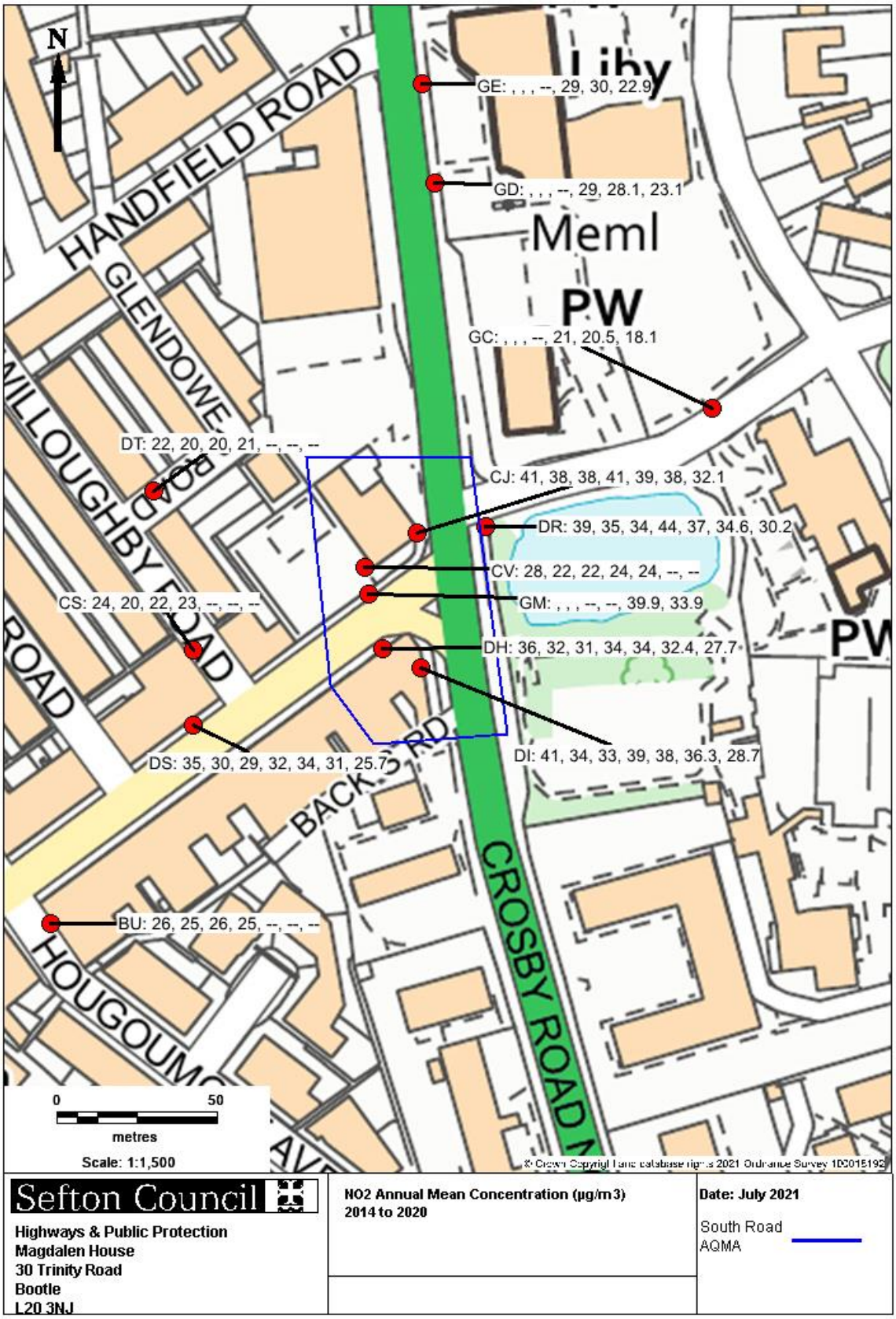
Map 1 - AQMA 2


N
WOODLAND ROAD
PARKER AVENUE
CR: 33, 30, 29, 31, 32, 31.6, 24.3
CROSBY ROAD SOUTH
A565
KINGS PARK
SANDY LANE
CLAREMONT ROAD
BEACONSFIELD ROAD
BOWER GR
B5421
Sch
Underpass
W: 33, 30, 31, 32, 30, 31.3, 27.3
BW: 33, 31, 30, 33, 28, 29.9, 24.3
Meml
ES: 30, 27, 29, 30, 33, 30.8, 23.6
DP: 39, 33, 33, 36, 34, 32.4, 28.6
A5036
EQ: 35, 33, 32, 33, 38, 32.3, 27.4
EY: 41, 38, 37, 36, 42, 40.5, 32.1
CY: 31, 26, 28, 30, 29, 27, 23.0
CM4: 44.2, 40.6, 41.6, 39.7, 40.5, 41.6, 31.7
LC
Subway
DQ: 34, 30, 32, 34, 33, 29.2, 25.7
EV: 39, 36, 37, 41, 42, 36, 30.3
10m
EX: 33, , 31, 32, 40, --, --
ELM ROAD
EW: 38, 37, 35, 39, 39, 34.3, 30.0
BARKELEY DRIVE
NC112: 25, 24, 21, 23, --, --, --
PW
NC86: 33, 31, 29, 34, --, --, --
GP: , , , --, --, 36.9, 28.7
10m
CHURCH ROAD
CHURCH GROVE
CARADOC ROAD
0
100
metres
Scale: 1:3,500
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
NO2 Annual Mean Concentration (µg/m3)
2014 to 2020
Date: July 2021
Princess Way AQMA

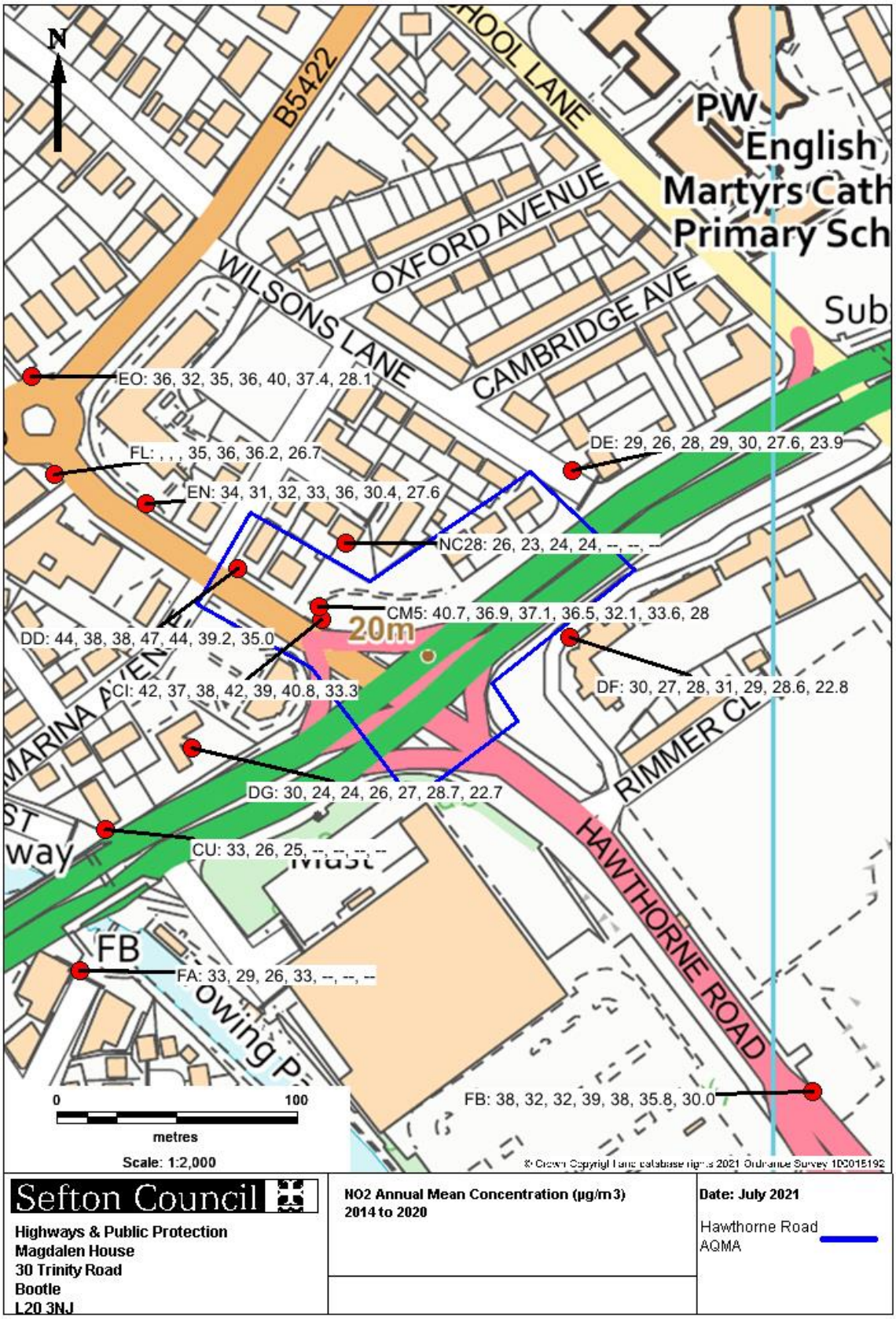
Map 2 - AQMA3


N
EVERTON LWL
DERBY ROAD
A565
NELSON STREET
BENBOW ST
BYNG ST
WILLIAM HENRY ST
BRIDGE ST
BS: 40, 39, 39, 40, 43, 37, 34.0
CM3: 36.6, 34.8, 37.7, 40.6, 41.5, 38.2, 33.2
GU: , , , --, --, --, 35.5
SEYMOUR STREET
GT: , , , --, --, --, 32.0
MILLER'S BRIDGE
BM: 44, 41, 41, 47, 45, --, --
EM: 40, 37, 41, 43, 47, --, --
BQ: 32, 30, 32, 36, 34, 31.7, 28.4
DOUGLAS PLACE
Towing Path
RASENOSE ROAD
BR: 54, 53, 46, 61, 57, 50.5, 39.0
A5036
BO: 30, 29, 30, 32, 32, 29.9, 25.1
HOWE STREET
7m
PRINCES ST
RALEIGH STREET
BEDFORD PL
0
100
metres
Scale: 1:2,500
© Crown Copyright and database rights 2021 Ordnance Survey 100015192
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
NO2 Annual Mean Concentration (µg/m3)
2014 to 2020
Date: July 2021
Miller's Bridge AQMA
Borough Boundary

Map 3 - AQMA4


N
HANDFIELD ROAD
GLENDOWE ROAD
WILLOUGHBY ROAD
ROAD
BACK S RD
CROSBY ROAD
HOUGOUM
GE: , , , --, 29, 30, 22.9
GD: , , , --, 29, 28.1, 23.1
GC: , , , --, 21, 20.5, 18.1
DT: 22, 20, 20, 21, --, --, --
CJ: 41, 38, 38, 41, 39, 38, 32.1
DR: 39, 35, 34, 44, 37, 34.6, 30.2
CV: 28, 22, 22, 24, 24, --, --
GM: , , , --, --, 39.9, 33.9
CS: 24, 20, 22, 23, --, --, --
DH: 36, 32, 31, 34, 34, 32.4, 27.7
DI: 41, 34, 33, 39, 38, 36.3, 28.7
DS: 35, 30, 29, 32, 34, 31, 25.7
BU: 26, 25, 26, 25, --, --, --
0
50
metres
Scale: 1:1,500
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
NO2 Annual Mean Concentration (µg/m3)
2014 to 2020
Date: July 2021
South Road
AQMA

Map 4 - AQMA5



Changes to NO_2 Diffusion tube monitoring network

Some additional diffusion tube monitoring sites were added in 2020 to the network along with some relocations.

The changes and reasons are summarised in the table below

Site ID	Address	Reason for Monitoring
GR	School Lane	Monitoring effects of new commercial/residential development Maghull
GS	Poverty Lane	Monitoring effects of new commercial/residential development Maghull
GT	Miller's Bridge	Relocated due to junction works (AQMA3)
GU	Miller's Bridge	Relocated due to junction works (AQMA3)
GV	Hall Lane	Monitoring effects of new commercial/residential development in Maghull
GW	A59 Northway	Monitoring Effect of revised Traffic light Junction
GX	Prescot Road	Monitoring effects of new commercial/residential development Maghull
GY	Raven Meols Lane	Monitoring levels of NO_2 around railway crossing
GZ	Weld Parade	Monitoring levels of NO_2 around railway crossing

3.1.4 Particulate Matter (PM_{10})

Table A.6 in Appendix A: Monitoring Results compares the ratified and adjusted monitored PM_{10} annual mean concentrations for the past five years with the air quality objective of 40µg/m^3. Please note PM_{10} monitoring at CM2 Crosby Road North and CM6 Crosby Road South was not undertaken in 2020 due to issues with the monitoring equipment. The Eberline BAM at CM2 and TEOM at CM6 both failed audit checks in 2020 and due to their age and non-availability of spares could not be repaired. Both these units have been decommissioned. Monitoring of PM_{10} at CM2 is due to recommence in 2021 with the relocation of the BAM from Princess Way CM4.

Table A.7 in Appendix A compares the ratified continuous monitored PM_{10} daily mean concentrations for the past five years with the air quality objective of 50µg/m^3, not to be exceeded more than 35 times per year.

No exceedances of either the PM_{10} annual mean objective or the 24-hour mean objective at any of the five sites where PM_{10} is monitored were recorded in 2020 with levels of PM well within NAQS objectives. This follows the trend in previous years.

Unexpectedly levels of PM_{10} at CM4 has risen slightly in 2020 compared to the previous year. Levels of PM_{10} tend not to be linked to traffic in the same way as NO_2 and it may be that because of the higher overall speeds at this location on the A5036 during 2020 more PM_{10} emissions have resulted (i.e. from tyre and brake wear), however further consideration of this is needed.

AQMA 3 Millers Bridge is the only current AQMA that has been declared for PM_{10}. This was was due to historical exceedance of the 24-hour mean objective. Compliance with the objective at Millers Bridge has now been met since 2008 (with 2008 showing borderline compliance) and although a Detailed Assessment in 2014 concluded that the PM_{10} declaration could be revoked, the 2015 Air Quality Action Plan Progress Report advised that the declaration for PM_{10} should remain in place due to the potential future impacts of port expansion on PM_{10} levels at Millers Bridge. Following consistent compliance arragements to revoke this AQMA will begin in due course

3.1.5 Particulate Matter ($PM_{2.5}$)

Table A.8 in Appendix A presents the ratified and adjusted monitored $PM_{2.5}$ annual mean concentrations since monitoring began.

Automatic Monitoring of $PM_{2.5}$ commenced in July 2017 at the Millers Bridge monitoring site. The results indicate that levels of $PM_{2.5}$ are relatively stable and well below the current $PM_{2.5}$ annual mean limit value of 25$\mu g/m^3$. Monitoring will continue in this location to monitor future trends.

As part of Sefton's successful AQ grant bid an additional $PM_{2.5}/PM_{10}$ monitor was installed in August 2020 at Regent Road to monitor background levels of PM. Only part year results are available and as such have been annualised. Levels in this location for the 2020 monitoring period show compliance with the current limit value. Monitoring will continue to determine future trends. A new Dual $PM_{2.5}/PM_{10}$ monitor has recently been purchased and is due to be installed at the Princess Way monitor location imminently.

3.1.6 Sulphur Dioxide (SO_2)

Table A.9 in Appendix A compares the ratified continuous monitored SO_2 concentrations for 2020 with the air quality objectives for SO_2.

Sefton Council recommenced automatic monitoring for SO_2 at one location near to the Port of Liverpool at Crosby Road South, Seaforth (Site ID:CM6) in April 2015, due to concerns that SO_2 concentrations from shipping may increase as a result of port expansion. The aim was to establish baseline SO_2 concentrations prior to the new deep water berth becoming operational towards the end of 2016 and to then monitor any increase in SO_2 concentrations that may occur and determine any potential non-compliance with SO_2 air quality objectives.

No exceedances of the 15-minute, 1-hour or 24-hour SO_2 objectives were recorded in 2020 and follows a similar trend to previous years.

Appendix A: Monitoring Results

Table A.1 – Details of Automatic Monitoring Sites

Site ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Monitoring Technique	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Inlet Height (m)
CM2	Crosby Road North,	Roadside	332,174.59	398,483.27	NO2	NO	Chemiluminescene;	4.49	4.11	1.8
CM3	Millers Bridge, Bootle.	Roadside	333,772.36	394,602.27	NO2;PM10;PM2.5	YES AQMA3	Chemiluminescence;FIDAS	6.23	8.68	1.8
CM4	Lathom Close, Princess Way, Seaforth.	Roadside	332,648.51	396,941.57	NO2;PM10	YES AQMA2	Chemiluminescence;Beta attenuation monitor (BAM)	10.63	3.81	1.8
CM5	Hawthorne Road, Litherland.	Roadside	333,811.59	397,518.59	NO2,PM10	YES AQMA5	Chemiluminescence,Beta attenuation	13.84	7.04	1.8
CM6	Crosby Road South,	Urban Background	332,873.66	396,549.21	NO2,SO2	NO	Chemiluminescence;	N/A	23.5	2.8
CM7	Regent Road Crosby	Urban Background	331,643.192	399,587.690	PM10,PM2.5	NO	FIDAS	N/A	3.00	1.8

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable

Table A.2 – Details of Non-Automatic Monitoring Sites

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
BB	Eaton Avenue, Seaforth	Roadside	333509.906	397186.176	NO2	No	3.0	1.9	No	2.7
BO	Douglas Place, Bootle	Roadside	333846.94	394461.346	NO2	Yes AQMA 3	5.2	1.9	No	2.7
BQ	Douglas Place/Millers Bridge, Bootle	Roadside	333834.762	394572.335	NO2	Yes AQMA 3	6.5	1.8	No	2.8
BR	Derby Road, Bootle	Roadside	333753.201	394551.8	NO2	Yes AQMA 3	1.6	1.1	No	2.6
BS	Derby Road, Bootle	Roadside	333757	394622	NO2	Yes AQMA 3	7.2	2.8	No	2.5
BV	Quarry Road, Thornton	Roadside	333395.37	400862.903	NO2	No	7.5	1.7	No	2.5
BW	Crosby Road South/Riversdale Road, Seaforth	Roadside	332600.204	397021.204	NO2	Yes AQMA 2	2.1	1.3	No	2.6
CI	Hawthorne Road, Bootle	Roadside	333812.64	397513.553	NO2	Yes AQMA 5	17.9	3.2	No	2.5
CJ	South Road, Waterloo	Roadside	332204.248	398228.819	NO2	Yes AQMA 4	0.7	2.5	No	2.6
CR	Parker Avenue, Seaforth	Roadside	332510.918	397332.214	NO2	No	2.5	2.1	No	2.7
CY	Lytton Grove, Seaforth	Roadside	332980.557	396972.038	NO2	Yes AQMA 2	3.7	2.2	No	2.6
DC	Marsh Lane, Bootle	Kerbside	334339.384	395800.213	NO2	No	4.1	0.6	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DD	Hawthorne Road, Litherland	Roadside	333777.928	397534.487	NO2	Yes AQMA 5	5.6	2.3	No	2.6
DE	Wilson's Lane, Litherland	Roadside	333917.158	397574.971	NO2	No	9.4	2.2	No	2.6
DF	Church Road flats. Litherland	Roadside	333915.796	397505.738	NO2	No	3.9	12.3	No	2.6
DG	Marina Avenue, Litherland	Roadside	333759	397460	NO2	No	0.0	16.7	No	2.1
DH	South Road, Waterloo	Roadside	332193.401	398192.808	NO2	Yes AQMA 4	0.0	3.6	No	2.8
DI	Crosby Road North, Waterloo	Roadside	332205.678	398186.77	NO2	Yes AQMA 4	0.0	3.6	No	2.5
DO	Hawthorne Road/ Linacre Lane, Bootle	Kerbside	334639.624	396399.039	NO2	No	4.7	0.6	No	2.6
DP	Gordon Road/ Rawson Road, Bootle	Kerbside	332792.503	396973.797	NO2	Yes AQMA 2	9.2	0.6	No	2.7
DQ	Rawson Road, Bootle	Roadside	332791.498	396922.302	NO2	Yes AQMA 2	5.6	1.7	No	2.6
DR	Crosby Road North, Waterloo	Roadside	332225.716	398230.708	NO2	Yes AQMA 2	21.1	2.5	No	2.5
DS	South Road, Waterloo	Roadside	332134.399	398168.805	NO2	No	2.1	1.4	No	2.6
DU	Liverpool Road/ Kingsway, Waterloo	Roadside	332196.353	398785.848	NO2	No	6.9	3.5	No	2.6

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
DV	Moor Lane, Crosby	Roadside	332341.4	400167.903	NO2	No	4.7	1.4	No	2.6
DW	Church Road/ Kirkstone Road North	Roadside	334571.851	397918.273	NO2	No	7.4	7.3	No	2.6
DX	Merton Road, Bootle	Roadside	334737.802	395137.533	NO2	No	13.6	5.8	No	2.6
DY	Hougoumont Avenue/Crosby Road North	Kerbside	332249.794	398008.38	NO2	No	6.2	0.4	No	2.4
DZ	Bailey Drive, Bootle	Roadside	335393.977	397281.889	NO2	No	8.3	2.3	No	2.6
EA	Copy Lane, Netherton	Roadside	336638.651	399495.675	NO2	No	10.5	35.1	No	2.5
EB	Copy Lane, Netherton	Roadside	336591.597	399452.837	NO2	No	22.7	1.0	No	2.6
EC	Copy Lane/ Dunningsbridge Road	Roadside	336539	399477	NO2	No	25.7	2.7	No	2.6
EE	Copy Lane Police Station, Netherton	Roadside	336572.016	399523.734	NO2	No	N/A	3.4	No	2.6
EK	Hawthorne Road, Bootle	Roadside	334781.591	395188.948	NO2	No	13.1	1.1	No	2.3
EL	Breeze Hill, Bootle	Kerbside	335265.082	394968.091	NO2	No	8.2	0.9	No	2.6
EN	Hawthorne Road, Litherland	Roadside	333739.853	397561.249	NO2	No	9.6	3.9	No	2.5

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
EO	Hatton Hill Road, Litherland	Roadside	333692.411	397614.604	NO2	No	8.4	2.0	No	2.6
EP	Ash Road, Seaforth	Roadside	333343.422	397209.994	NO2	No	11.5	1.3	No	2.6
EQ	Crosby Road South, Seaforth	Roadside	332610.502	396984.604	NO2	Yes AQMA 2	3.8	2.3	No	2.6
ES	Chatham Close, Seaforth	Roadside	332711.603	397002.599	NO2	Yes AQMA 2	7.1	1.3	No	2.6
EV	Princess Way, Seaforth	Kerbside	332650.169	396914.61	NO2	Yes AQMA 2	N/A	0.2	No	2.6
EW	Crosby Road South, Seaforth	Roadside	332665.744	396821.821	NO2	Yes AQMA 2	1.1	1.2	No	2.7
EY	Lathom Avenue, Seaforth	Roadside	332681.302	396949.104	NO2	Yes AQMA 2	6.2	1.2	No	2.7
FB	Hawthorne Road, Litherland	Roadside	334017	397317	NO2	No	N/A	2.4	No	2.6
FC	St Phillips Avenue, Litherand	Roadside	334216.953	397662.84	NO2	No	9.9	2.3	No	2.6
FD	Church Road, Litherland	Roadside	334242.328	397712.677	NO2	No	7.9	2.6	No	2.6
FE	Church Road, Litherland	Roadside	334642.41	397923.332	NO2	No	6.4	7.0	No	2.6
FF	Boundary Road, Litherland	Roadside	334978.217	398170.5	NO2	No	14.4	1.2	No	2.6
FH	Church Road, Netherton	Kerbside	334962.072	398134.04	NO2	No	12.2	0.6	No	2.6

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
FI	Hemans Street, Bootle	Roadside	333279.77	395957.948	NO2	No	13.5	8.7	No	2.6
FL	Hawthorne Road opp 20A Litherland	Kerbside	333701.439	397573.795	NO2	No	6.8	0.7	No	2.5
GA	Lord Street	Roadside	333431.41	417165.922	NO2	No	9.6	1.5	No	2.6
GB	Lord Street	Roadside	333704.011	417414.806	NO2	No	9.7	1.8	No	2.6
GC	Haigh Road - Illuminated Sign	Roadside	332296.398	398267.697	NO2	No	15.0	1.0	No	2.6
GD	Crosby Road North - Lighting Column 46D	Roadside	332209.8	398337.697	NO2	No	N/A	2.0	No	2.6
GE	Crosby Road North - Lighting Column 48D	Roadside	332205.76	398368.998	NO2	No	N/A	1.6	No	2.6
GF	Bridle Road - Lighting Column 0010	Roadside	335347.053	397500.241	NO2	No	12.5	1.3	No	2.6
GG	A565/Hemans Street - Lighting Column 0038	Roadside	333270.041	395967.365	NO2	No	5.3	3.1	No	2.6
GH	A565 opp car wash - Lighting Column 0044	Roadside	333230.91	396068.856	NO2	No	12.4	3.5	No	2.6
GI	St Joans Close opp No.40	Roadside	333281.122	396027.099	NO2	No	2.2	1.0	No	2.6

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
GJ	A565 Liverpool Road - Lighting column 120D	Kerbside	332087.963	399829.23	NO2	No	4.0	0.6	No	2.6
GK	Derby Road, Bootle	Roadside	333669.3	394912.097	NO2	No	8.0	2.1	No	2.6
GL	Green Lane, Seaforth	Roadside	333109.979	397071.549	NO2	No	1.4	2.2	No	2.6
GM	South Road, Waterloo	Roadside	332189.204	398209.503	NO2	Yes AQMA 4	9.5	1.5	No	2.6
GN	Moor Lane, Thornton	Roadside	333326.297	400771.8	NO2	No	10.8	1.4	No	2.6
GO	Marsh Lane, Bootle	Roadside	334203.588	395748.628	NO2	No	3.8	2.4	No	2.6
GP	Barkeley Drive, Seaforth	Roadside	332680.519	396776.004	NO2	Yes AQMA 2	0.8	1.0	No	2.6
GQ	Mariners Road, Blundellsands	Roadside	330706.409	398904.207	NO2	No	11.5	0.6	No	2.6
GR	School Lane	Roadside	339,200.95	402,502.57	NO2	No	32.9	2.4	No	2.6
GS	Poverty Lane	Kerbside	338,710.43	401,570.88	NO2	No	13.6	0.7	No	2.6
GT	Miller's Bridge	Roadside	333,735.79	394,597.47	NO2	Yes AQMA 3	34.3	3.4	No	2.6
GU	Miller's Bridge	Roadside	333,784.30	394,595.69	NO2	Yes AQMA 3	16.9	5.0	No	2.6
GV	Hall Lane	Roadside	337,536.74	401,542.17	NO2	No	16.1	1.6	No	2.6

Diffusion Tube ID	Site Name	Site Type	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Pollutants Monitored	In AQMA? Which AQMA?	Distance to Relevant Exposure (m) (1)	Distance to kerb of nearest road (m) (2)	Tube Co-located with a Continuous Analyser?	Tube Height (m)
GW	A59 Northway	Roadside	337,499.20	401,552.00	NO2	No	11.6	2.0	No	2.6
GX	Prescot Road	Kerbside	340,334.22	401,214.14	NO2	No	5.2	0.7	No	2.6
GY	Raven Meols Lane	Roadside	329,187.93	406,599.57	NO2	No	1.6	2.0	No	2.6
GZ	Weld Parade	Roadside	332,987.98	415,800.06	NO2	No	9.0	2.6	No	2.6
UK 2	Church Road, Litherland	Roadside	334798.812	398065.228	NO2	No	7.1	1.7	No	2.5
UK 4	Crosby Road North, Waterloo	Kerbside	332171.362	398546.757	NO2	No	3.5	0.9	No	2.6
W	Gladstone Road/Gordon Road, Seaforth	Roadside	332981.851	397022.013	NO2	Yes AQMA 2	1.4	2.4	No	2.6

Notes:

(1) 0m if the monitoring site is at a location of exposure (e.g. installed on the façade of a residential property).

(2) N/A if not applicable.

Table A.3 – Annual Mean NO_2 Monitoring Results: Automatic Monitoring (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	**2016**	**2017**	**2018**	**2019**	**2020**
CM2	332,174.59	398,483.27	Roadside	94.8	94.8	32.2	34.9	37.6	32.8	25.9
CM3	333,772.36	394,602.27	Roadside	99.7	99.7	37.7	**40.6**	**41.6**	38.2	33.2
CM4	332,648.51	396,941.57	Roadside	99.6	99.6	**41.6**	39.7	**40.5**	**41.6**	31.7
CM5	333,811.59	397,518.59	Roadside	96.2	96.2	37.1	36.5	32.1	33.6	28
CM6	332,873.66	396,549.21	Urban Background	89.2	89.2	33.2	29.6	30.2	28.8	23.6

☒ **Annualisation has been conducted where data capture is <75% and >33% in line with LAQM.TG16**

☒ **Reported concentrations are those at the location of the monitoring site (annualised, as required), i.e. prior to any fall-off with distance correction.**

Notes:

The annual mean concentrations are presented as µg/m^3.

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

All means have been "annualised" as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.4 – Annual Mean NO_2 Monitoring Results: Non-Automatic Monitoring (µg/m^3)

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
BB	333509.906	397186.176	Roadside	84.6	84.6	29.0	28.0	28.0	26.6	22.0
BO	333846.94	394461.346	Roadside	84.6	84.6	30.0	32.0	32.0	29.9	25.1
BQ	333834.762	394572.335	Roadside	75.0	75.0	32.0	36.0	34.0	31.7	28.4
BR	333753.201	394551.8	Roadside	75.0	75.0	**46.0**	**61.0**	**57.0**	**50.5**	**41.3**
BS	333757	394622	Roadside	84.6	84.6	39.0	**40.0**	**43.0**	37.0	34.0
BV	333395.37	400862.903	Roadside	84.6	84.6	33.0	31.0	34.0	31.6	25.4
BW	332600.204	397021.204	Roadside	50.0	50.0	30.0	33.0	28.0	29.9	24.3
CI	333812.64	397513.553	Roadside	84.6	84.6	38.0	**42.0**	39.0	**40.8**	33.3
CJ	332204.248	398228.819	Roadside	84.6	84.6	38.0	**41.0**	39.0	38.0	32.1
CR	332510.918	397332.214	Roadside	84.6	84.6	29.0	31.0	32.0	31.6	24.3
CY	332980.557	396972.038	Roadside	84.6	84.6	28.0	30.0	29.0	27.0	23.0
DC	334339.384	395800.213	Kerbside	84.6	84.6	33.0	**40.0**	38.0	36.3	32.2
DD	333777.928	397534.487	Roadside	84.6	84.6	38.0	**47.0**	**44.0**	39.2	35.0

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2020 (%) [2]	**2016**	**2017**	**2018**	**2019**	**2020**
DE	333917.158	397574.971	Roadside	69.2	69.2	28.0	29.0	30.0	27.6	23.9
DF	333915.796	397505.738	Roadside	84.6	84.6	28.0	31.0	29.0	28.6	22.8
DG	333759	397460	Roadside	84.6	84.6	24.0	26.0	27.0	28.7	22.7
DH	332193.401	398192.808	Roadside	84.6	84.6	31.0	34.0	34.0	32.4	27.7
DI	332205.678	398186.77	Roadside	76.9	76.9	33.0	39.0	38.0	36.3	28.7
DO	334639.624	396399.039	Kerbside	76.9	76.9	**40.0**	**47.0**	**45.0**	**43.8**	35.4
DP	332792.503	396973.797	Kerbside	84.6	84.6	33.0	36.0	34.0	32.4	28.6
DQ	332791.498	396922.302	Roadside	76.9	76.9	32.0	34.0	33.0	29.2	25.7
DR	332225.716	398230.708	Roadside	84.6	84.6	34.0	**44.0**	37.0	34.6	30.2
DS	332134.399	398168.805	Roadside	84.6	84.6	29.0	32.0	34.0	31.0	25.7
DU	332196.353	398785.848	Roadside	84.6	84.6	33.0	34.0	36.0	33.3	27.3
DV	332341.4	400167.903	Roadside	84.6	84.6	36.0	39.0	**40.0**	36.6	29.5
DW	334571.851	397918.273	Roadside	84.6	84.6	33.0	34.0	34.0	32.6	25.5
DX	334737.802	395137.533	Roadside	76.9	76.9	33.0	36.0	36.0	35.2	28.2

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2020 (%) [2]	**2016**	**2017**	**2018**	**2019**	**2020**
DY	332249.794	398008.38	Kerbside	76.9	76.9	23.0	28.0	24.0	24.4	20.8
DZ	335393.977	397281.889	Roadside	84.6	84.6	33.0	35.0	35.0	32.7	26.4
EA	336638.651	399495.675	Roadside	84.6	84.6	28.0	30.0	29.0	26.3	21.5
EB	336591.597	399452.837	Roadside	84.6	84.6	31.0	37.0	36.0	30.4	26.1
EC	336539	399477	Roadside	84.6	84.6	32.0	35.0	37.0	32.4	24.6
EE	336572.016	399523.734	Roadside	50.0	50.0	36.0	36.0	35.0	36.0	24.7
EK	334781.591	395188.948	Roadside	76.9	76.9	32.0	34.0	35.0	37.0	28.4
EL	335265.082	394968.091	Kerbside	84.6	84.6	**40.0**	**42.0**	**44.0**	37.5	31.5
EN	333739.853	397561.249	Roadside	84.6	84.6	32.0	33.0	36.0	30.4	27.6
EO	333692.411	397614.604	Roadside	84.6	84.6	35.0	36.0	**40.0**	37.4	28.1
EP	333343.422	397209.994	Roadside	76.9	76.9	30.0	30.0	32.0	29.2	22.8
EQ	332610.502	396984.604	Roadside	84.6	84.6	32.0	33.0	38.0	32.3	27.4
ES	332711.603	397002.599	Roadside	84.6	84.6	29.0	30.0	33.0	30.8	23.6
EV	332650.169	396914.61	Kerbside	84.6	84.6	37.0	**41.0**	**42.0**	36.0	30.3

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2020 (%) [2]	**2016**	**2017**	**2018**	**2019**	**2020**
EW	332665.744	396821.821	Roadside	69.2	69.2	35.0	39.0	39.0	34.3	30.0
EY	332681.302	396949.104	Roadside	84.6	84.6	37.0	36.0	**42.0**	**40.5**	32.1
FB	334017	397317	Roadside	76.9	76.9	32.0	39.0	38.0	35.8	30.0
FC	334216.953	397662.84	Roadside	67.3	67.3	27.0	30.0	25.0	31.2	22.5
FD	334242.328	397712.677	Roadside	84.6	84.6	26.0	29.0	29.0	27.3	22.2
FE	334642.41	397923.332	Roadside	75.0	75.0	32.0	36.0	32.0	30.0	24.7
FF	334978.217	398170.5	Roadside	84.6	84.6	35.0	38.0	39.0	35.1	27.2
FH	334962.072	398134.04	Kerbside	84.6	84.6	39.0	**44.0**	**43.0**	**40.4**	31.9
FI	333279.77	395957.948	Roadside	84.6	84.6	35.0	**42.0**	38.0	38.1	32.0
FL	333701.439	397573.795	Kerbside	84.6	84.6		35.0	36.0	36.2	26.7
GA	333431.41	417165.922	Roadside	84.6	84.6			34.0	34.3	24.5
GB	333704.011	417414.806	Roadside	67.3	67.3			33.0	34.3	28.4
GC	332296.398	398267.697	Roadside	84.6	84.6			21.0	20.5	18.1
GD	332209.8	398337.697	Roadside	84.6	84.6			29.0	28.1	23.1

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2020 (%) [2]	2016	2017	2018	2019	2020
GE	332205.76	398368.998	Roadside	84.6	84.6			29.0	30.0	22.9
GF	335347.053	397500.241	Roadside	84.6	84.6			35.0	35.5	29.9
GG	333270.041	395967.365	Roadside	84.6	65.4			39.0	**40.9**	32.7
GH	333230.91	396068.856	Roadside	84.6	84.6			**48.0**	**47.0**	38.6
GI	333281.122	396027.099	Roadside	84.6	84.6			33.0	30.7	25.5
GJ	332087.963	399829.23	Kerbside	84.6	84.6			34.0	33.5	26.1
GK	333669.3	394912.097	Roadside	76.9	76.9				37.1	31.6
GL	333109.979	397071.549	Roadside	84.6	84.6				29.2	24.8
GM	332189.204	398209.503	Roadside	76.9	76.9				39.9	33.9
GN	333326.297	400771.8	Roadside	84.6	84.6				31.9	26.1
GO	334203.588	395748.628	Roadside	84.6	84.6				34.6	26.7
GP	332680.519	396776.004	Roadside	76.9	76.9				36.9	28.7
GQ	330706.409	398904.207	Roadside	84.6	84.6				21.7	16.1
GR	339,200.95	402,502.57	Roadside	84.6	84.6					16.7

Diffusion Tube ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) [1]	Valid Data Capture 2020 (%) [2]	2016	2017	2018	2019	2020
GS	338,710.43	401,570.88	Kerbside	84.6	84.6					13.7
GT	333,735.79	394,597.47	Roadside	84.6	84.6					36.9
GU	333,784.30	394,595.69	Roadside	69.2	69.2					35.5
GV	337,536.74	401,542.17	Roadside	84.6	84.6					23.7
GW	337,499.20	401,552.00	Roadside	69.2	69.2					22.8
GX	340,334.22	401,214.14	Kerbside	84.6	84.6					19.6
GY	329,187.93	406,599.57	Roadside	84.6	84.6					14.0
GZ	332,987.98	415,800.06	Roadside	76.9	76.9					14.6
UK 2	334798.812	398065.228	Roadside	76.9	76.9	28.0	29.0	28.0	27.5	22.2
UK 4	332171.362	398546.757	Kerbside	76.9	84.6	31.0	36.0	36.0	34.4	24.8
W	332981.851	397022.013	Roadside	84.6	84.6	31.0	32.0	30.0	31.3	27.3

☒ **Annualisation has been conducted where data capture is <75% and >33% in line with LAQM.TG16**

☒ **Diffusion tube data has been bias adjusted**

☒ **Reported concentrations are those at the location of the monitoring site (bias adjusted and annualised, as required), i.e. prior to any fall-off with distance correction**

Notes:

The annual mean concentrations are presented as µg/m^3.

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined**.

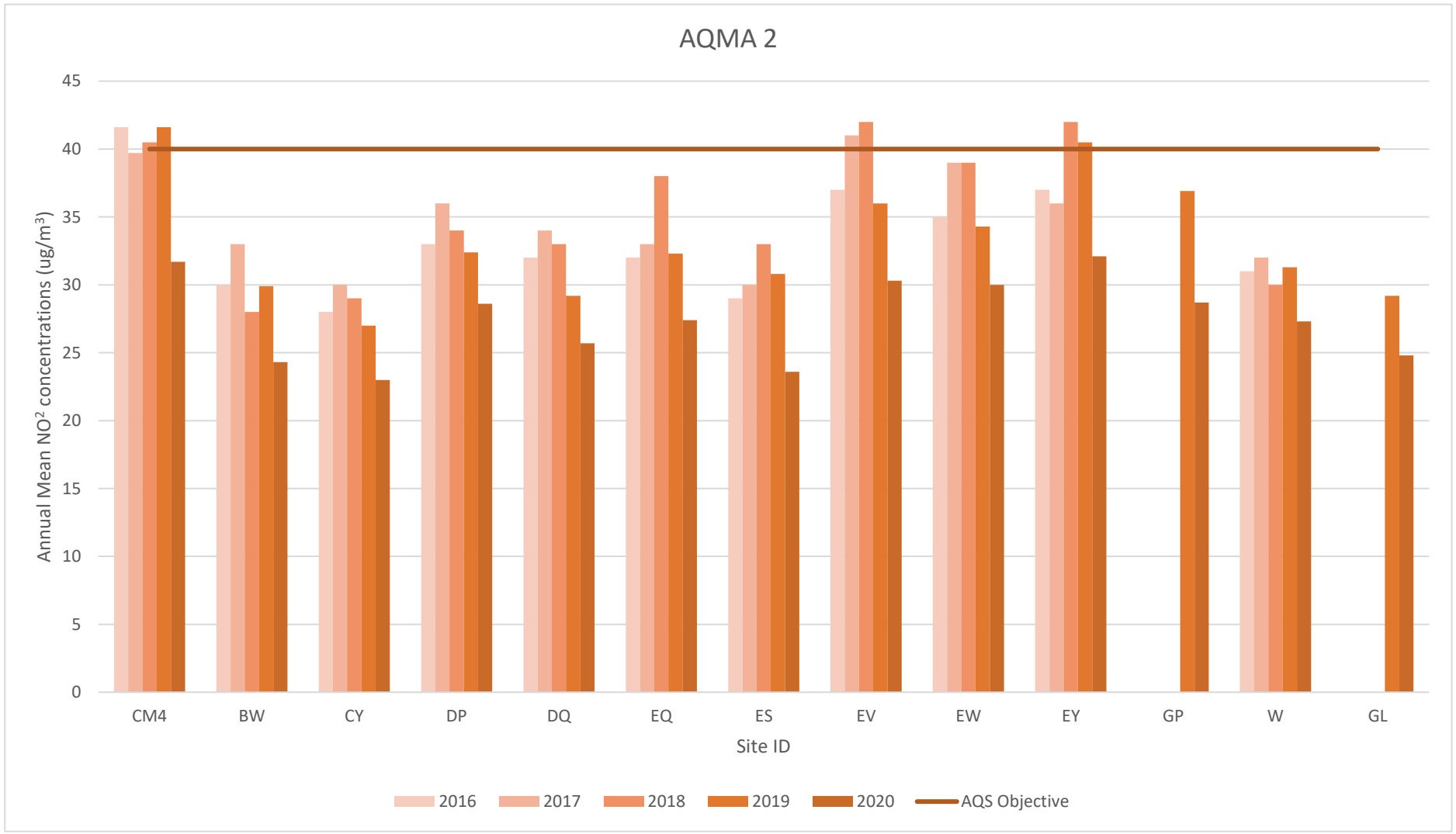
Means for diffusion tubes have been corrected for bias. All means have been "annualised" as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

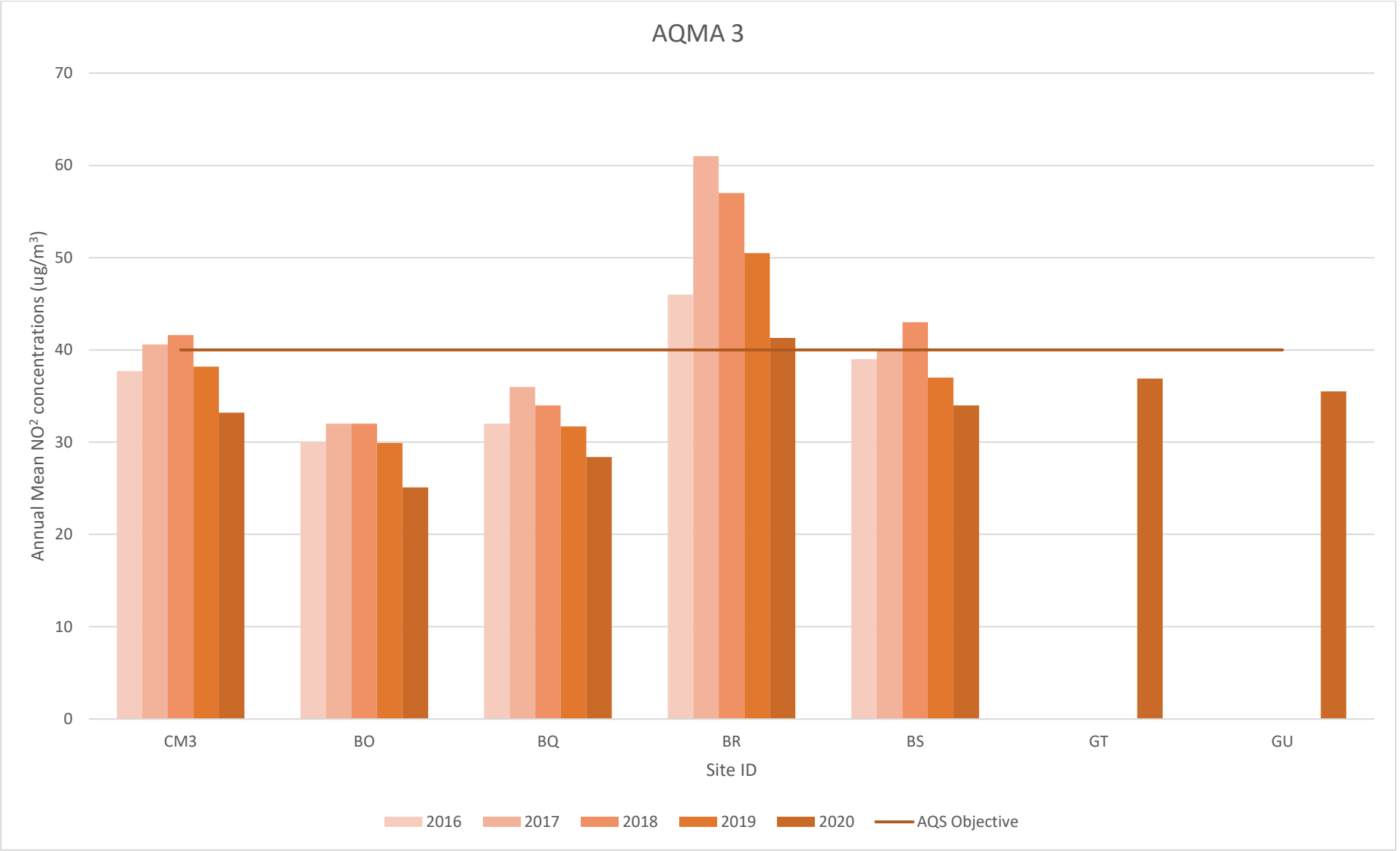
Concentrations are those at the location of monitoring and not those following any fall-off with distance adjustment.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Figure A.1 – Trends in Annual Mean NO_2 Concentrations




AQMA 3
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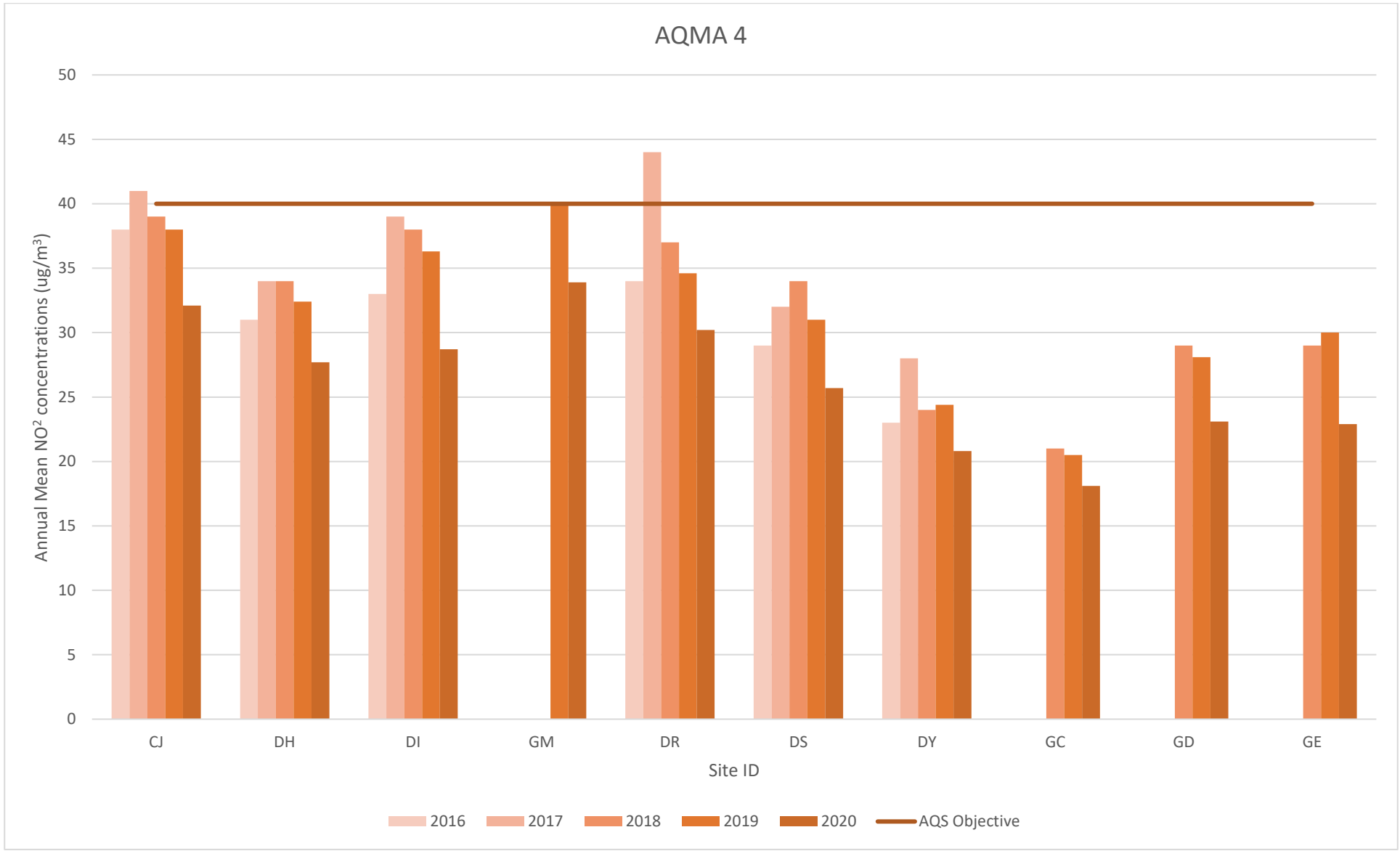
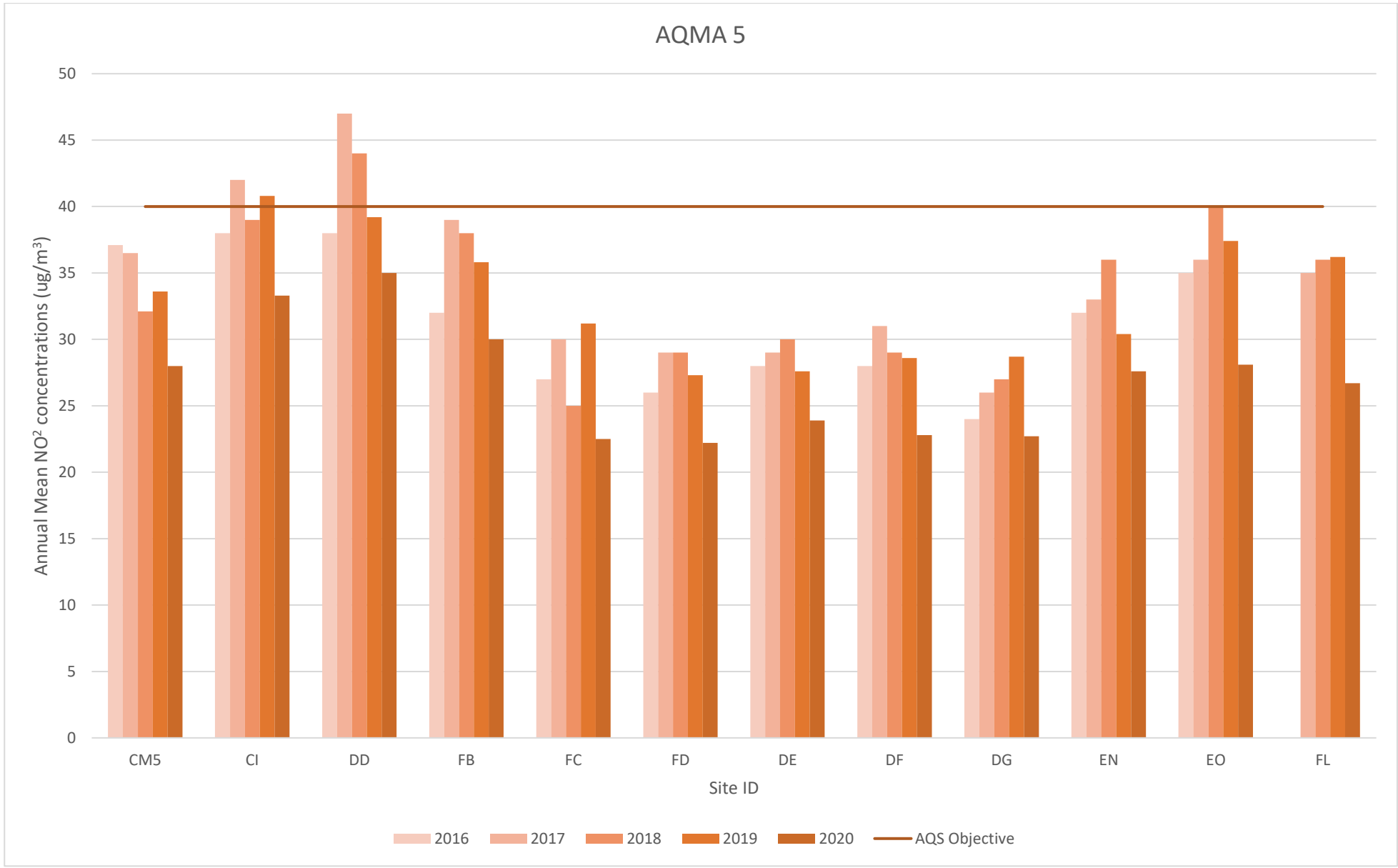
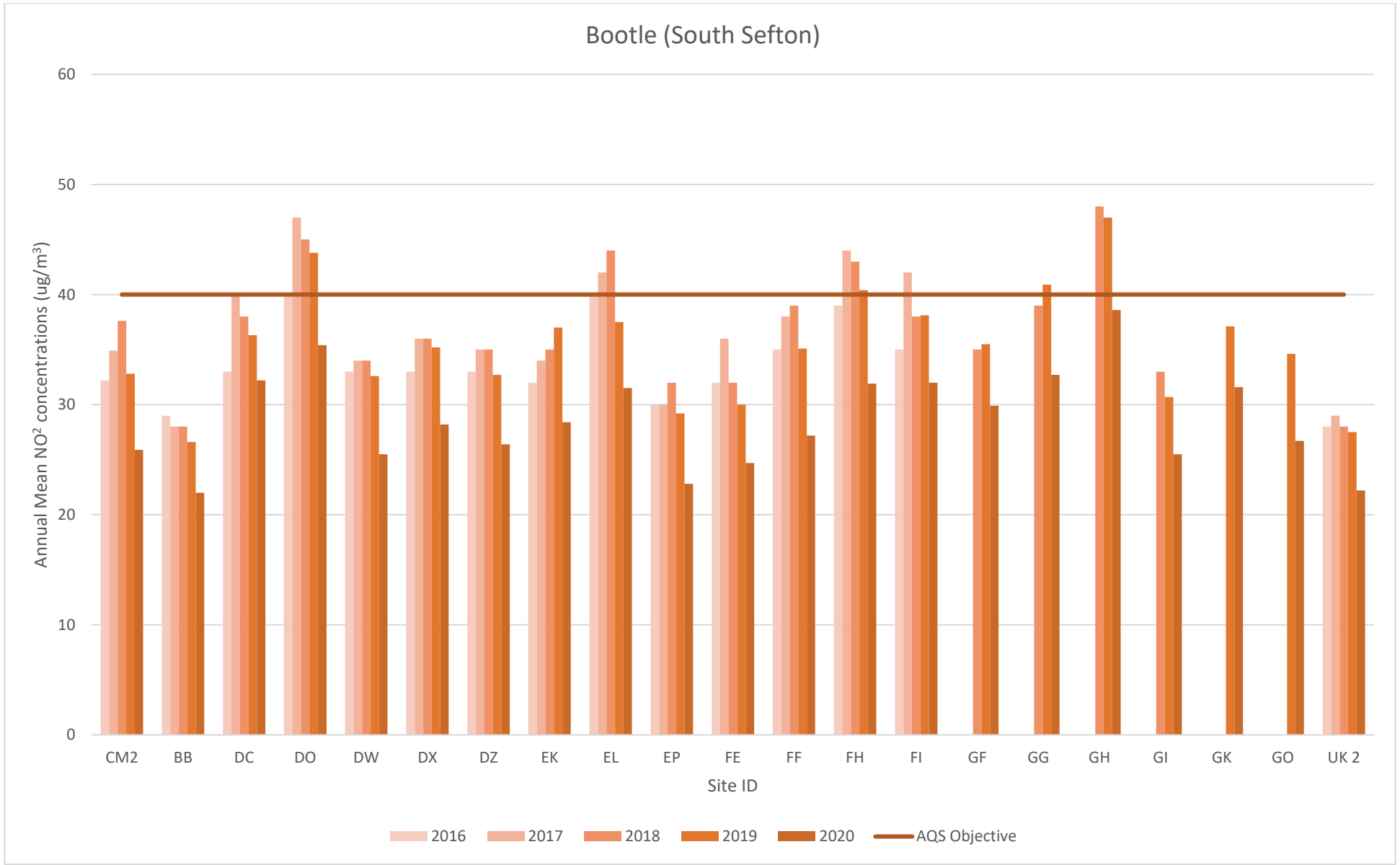
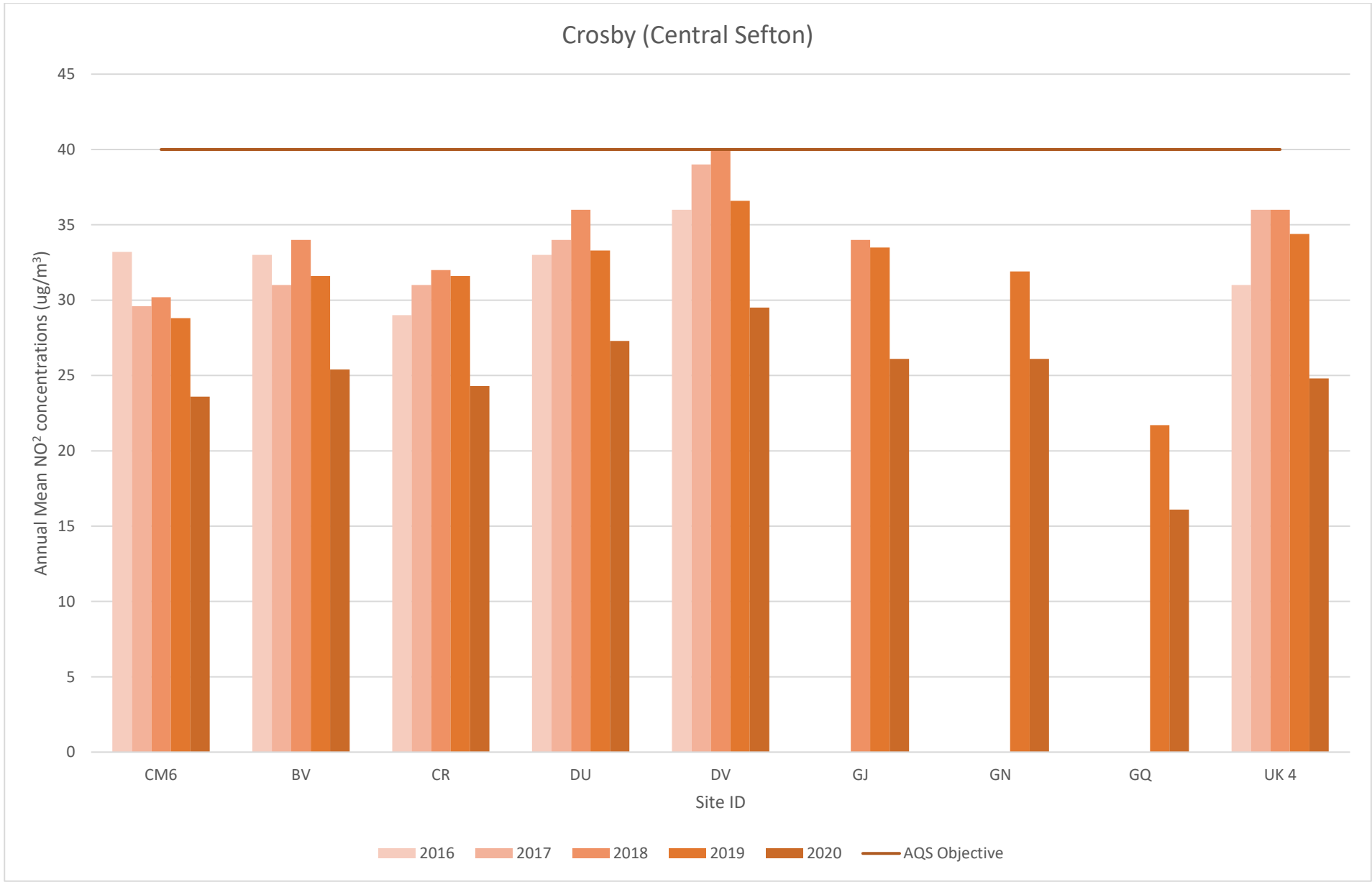
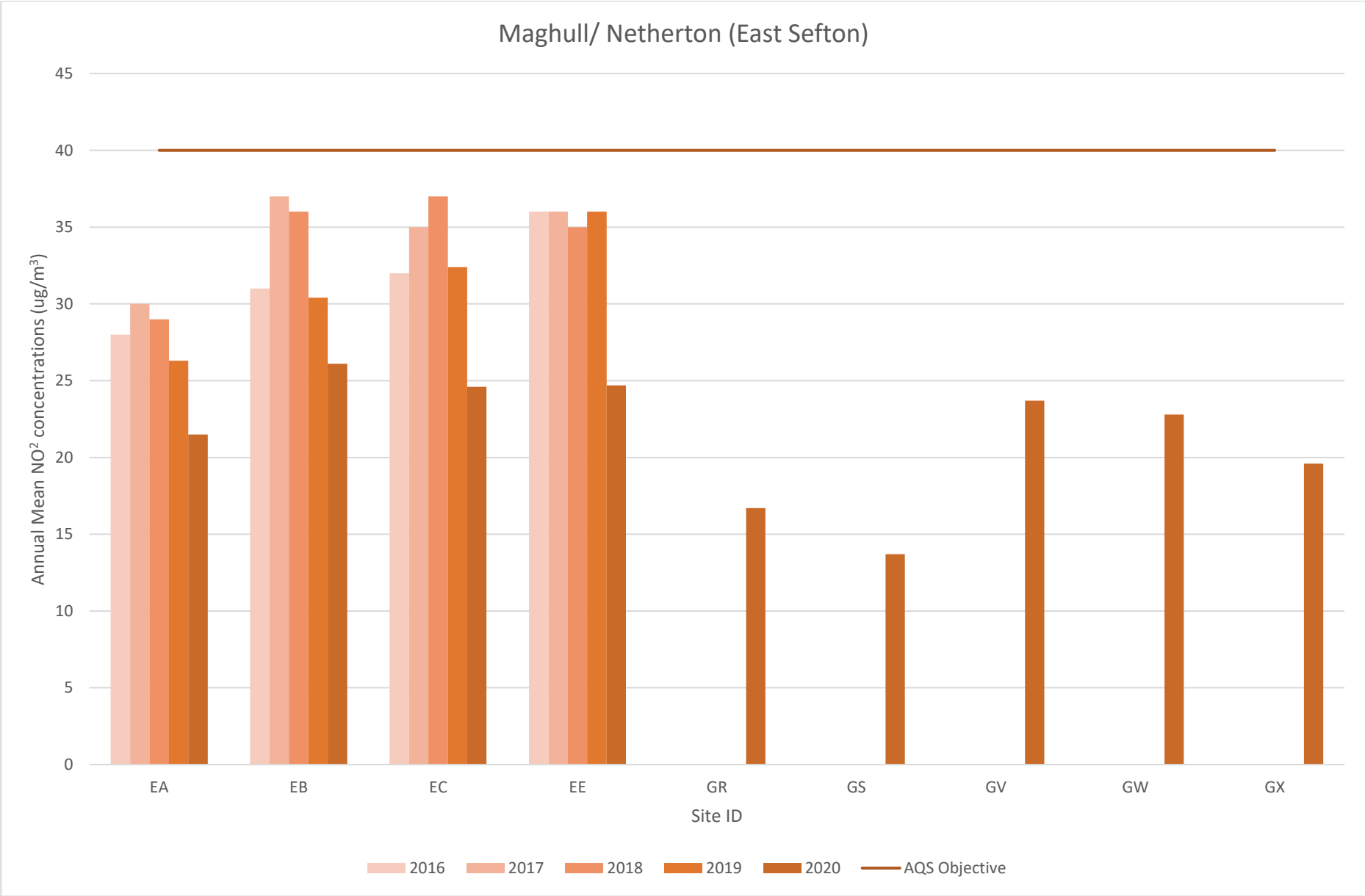
60
50
40
30
20
10
0
Annual Mean NO2 concentrations (ug/m3)
CM3
BO
BQ
BR
BS
GT
GU
Site ID
2016
2017
2018
2019
2020
AQS Objective


AQMA 4
50
45
40
35
30
25
20
15
10
5
0
Annual Mean NO2 concentrations (ug/m3)
CJ
DH
DI
GM
DR
DS
DY
GC
GD
GE
Site ID
2016
2017
2018
2019
2020
AQS Objective


AQMA 5
Annual Mean NO2 concentrations (ug/m3)
50
45
40
35
30
25
20
15
10
5
0
CM5
CI
DD
FB
FC
FD
DE
DF
DG
EN
EO
FL
Site ID
2016
2017
2018
2019
2020
AQS Objective


Bootle (South Sefton)
60
50
40
30
20
10
0
Annual Mean NO2 concentrations (ug/m3)
CM2
BB
DC
DO
DW
DX
DZ
EK
EL
EP
FE
FF
FH
FI
GF
GG
GH
GI
GK
GO
UK 2
Site ID
2016
2017
2018
2019
2020
AQS Objective


Crosby (Central Sefton)
45
40
35
30
25
20
15
10
5
0
Annual Mean NO2 concentrations (ug/m3)
CM6
BV
CR
DU
DV
GJ
GN
GQ
UK 4
Site ID
2016
2017
2018
2019
2020
AQS Objective


Maghull/ Netherton (East Sefton)
45
40
35
30
25
20
15
10
5
0
Annual Mean NO2 concentrations (ug/m3)
EA
EB
EC
EE
GR
GS
GV
GW
GX
Site ID
2016
2017
2018
2019
2020
AQS Objective

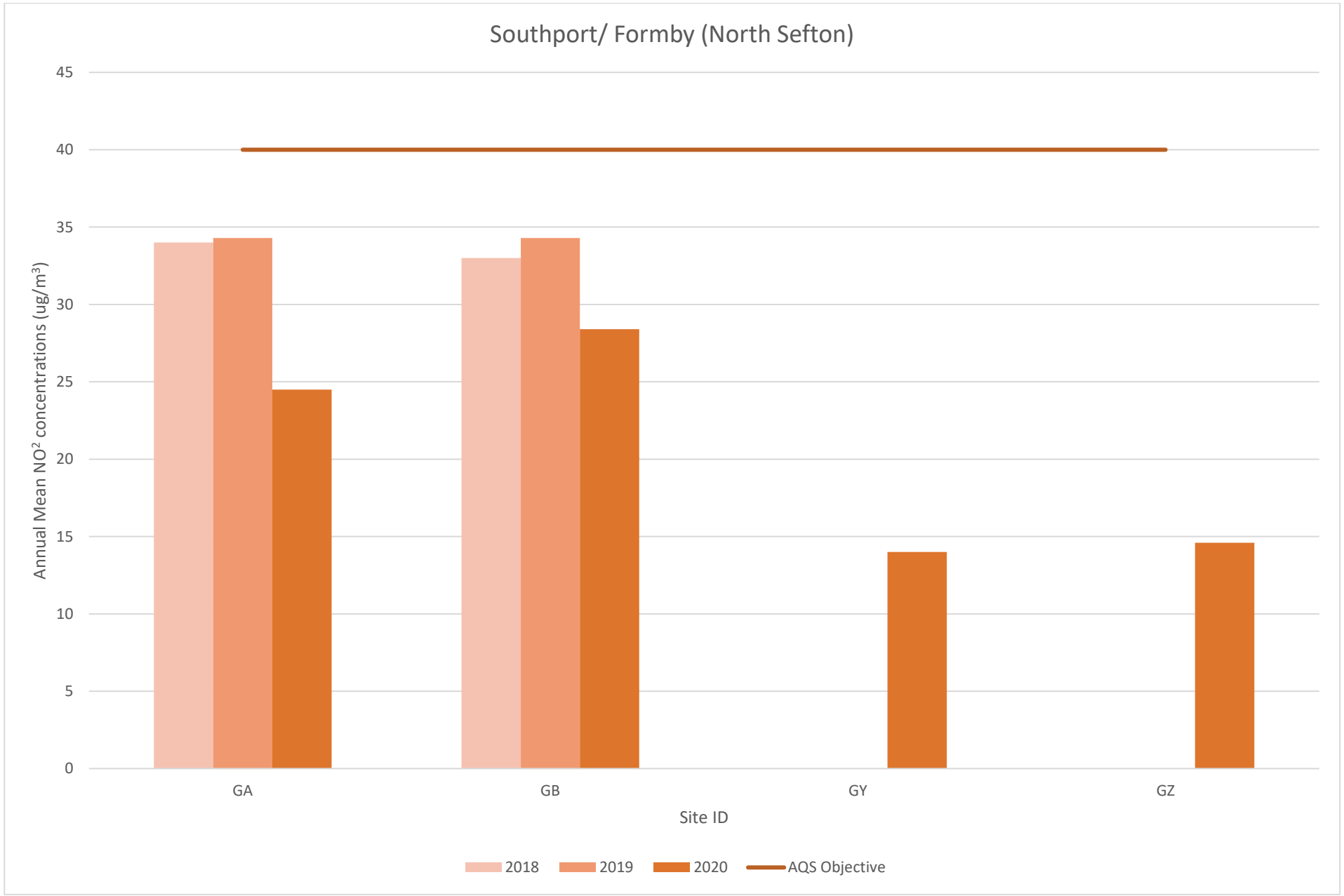

Southport/ Formby (North Sefton)
45
40
35
30
25
20
15
10
5
0
Annual Mean NO2 concentrations (ug/m3)
GA
GB
GY
GZ
Site ID
2018
2019
2020
AQS Objective

Table A.5 – 1-Hour Mean NO_2 Monitoring Results, Number of 1-Hour Means > 200µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	2016	2017	2018	2019	2020
CM2	332,174.59	398,483.27	Roadside	94.8	94.8	0	0	**0(113)**	**0(127)**	0
CM3	333,772.36	394,602.27	Roadside	99.7	99.7	0	0	**0**	**0**	0
CM4	332,648.51	396,941.57	Roadside	99.6	99.6	0	0	0	0	0
CM5	333,811.59	397,518.59	Roadside	96.2	96.2	0	**0(120)**	**0(105)**	0	0
CM6	332,873.66	396,549.21	Urban Background	89.2	89.2	**0(82)**	**0(91)**	0	0	0

Notes:

Results are presented as the number of 1-hour periods where concentrations greater than 200µg/m^3 have been recorded.

Exceedances of the NO_2 1-hour mean objective (200µg/m^3 not to be exceeded more than 18 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 99.8th percentile of 1-hour means is provided in brackets.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Table A.6 – Annual Mean PM_{10} Monitoring Results (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	**2016**	**2017**	**2018**	**2019**	**2020**
CM2	332,174.59	398,483.27	Roadside	0	0	17	21.1	19.9	26.2	N/A
CM3	333,772.36	394,602.27	Roadside	99	99	25.4	23.9	20.1	17.6	16.1
CM4	332,648.51	396,941.57	Roadside	90	90	23.8	23.1	22.6	16.9	20
CM5	333,811.59	397,518.59	Roadside	99.2	99.2		23.9	23.7	23.7	20.3
CM6	332,873.66	396,549.21	Urban Background	0	0	22.4	19.5	21.2	N/A	N/A
CM7	331,643.192	399,587.690	Urban Background	86	29	N/A	N/A	N/A	N/A	13.2

☒ **Annualisation has been conducted where data capture is <75% and >33% in line with LAQM.TG16.**

Notes:

The annual mean concentrations are presented as µg/m^3.

Exceedances of the PM_{10} annual mean objective of 40µg/m^3 are shown in **bold**.

All means have been "annualised" as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Figure A.2 – Trends in Annual Mean PM_{10} Concentrations

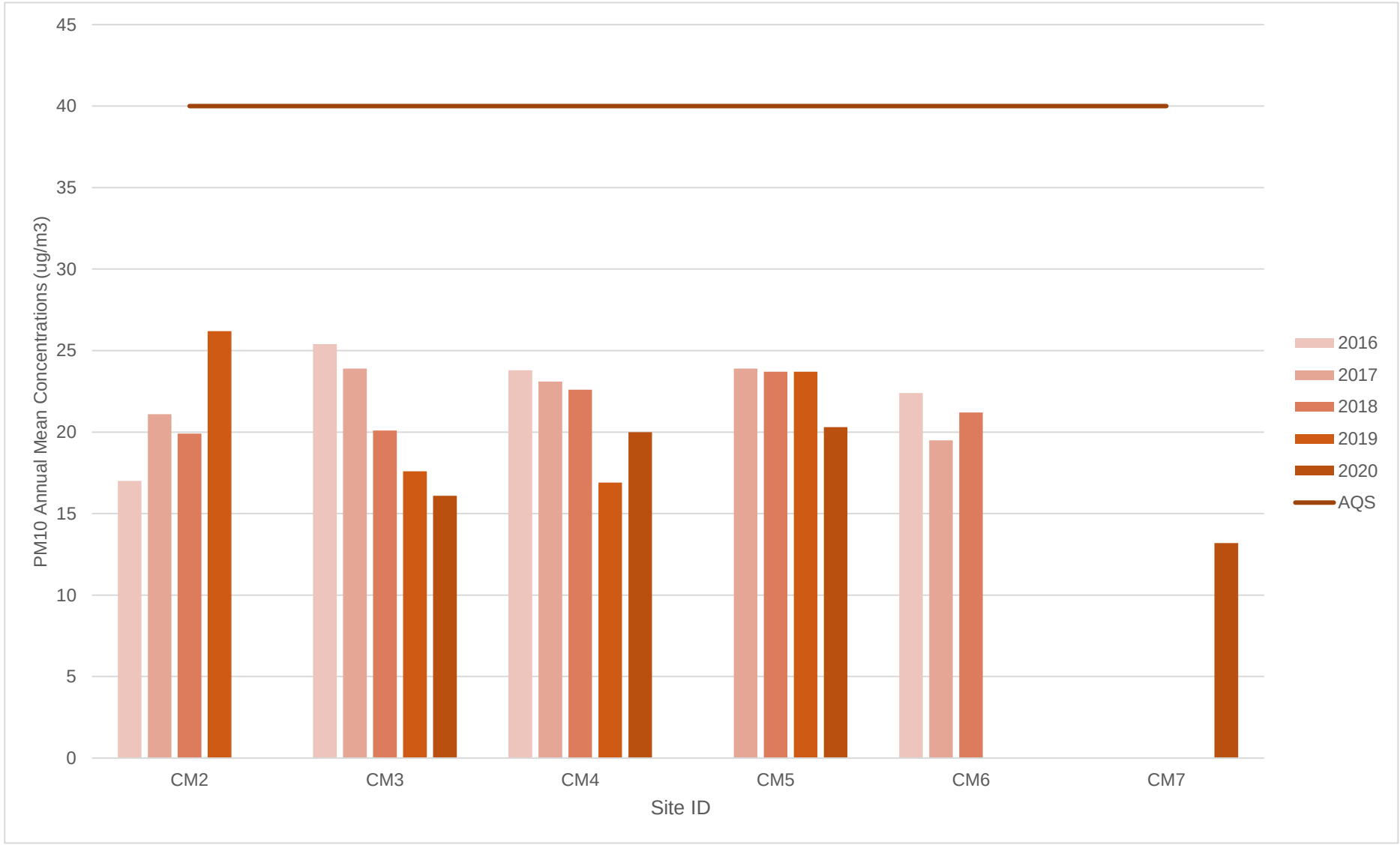


Table A.7 – 24-Hour Mean PM_{10} Monitoring Results, Number of PM_{10} 24-Hour Means > 50µg/m^3

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	**2016**	**2017**	**2018**	**2019**	**2020**
CM2	332,174.59	398,483.27	Roadside	0	0	2	6	**1(32)**	**1(35)**	**N/A**
CM3	333,772.36	394,602.27	Roadside	99	99	5	17	**1(25)**	**1(27)**	2
CM4	332,648.51	396,941.57	Roadside	90	90	6	7	3	**1(28)**	1
CM5	333,811.59	397,518.59	Roadside	99.2	99.2		**2(29)**	**3(33)**	10	1
CM6	332,873.66	396,549.21	Urban Background	0	0	2	**1(28)**	**6(33)**	**N/A**	N/A
CM7	331,643.192	399,587.690	Urban Background	86	29	N/A	N/A	N/A	N/A	0(18)

Notes:

Results are presented as the number of 24-hour periods where daily mean concentrations greater than 50µg/m^3 have been recorded.

Exceedances of the PM_{10} 24-hour mean objective (50µg/m^3 not to be exceeded more than 35 times/year) are shown in **bold**.

If the period of valid data is less than 85%, the 90.4th percentile of 24-hour means is provided in brackets.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Figure A.3 – Trends in Number of 24-Hour Mean PM_{10} Results > 50µg/m^3

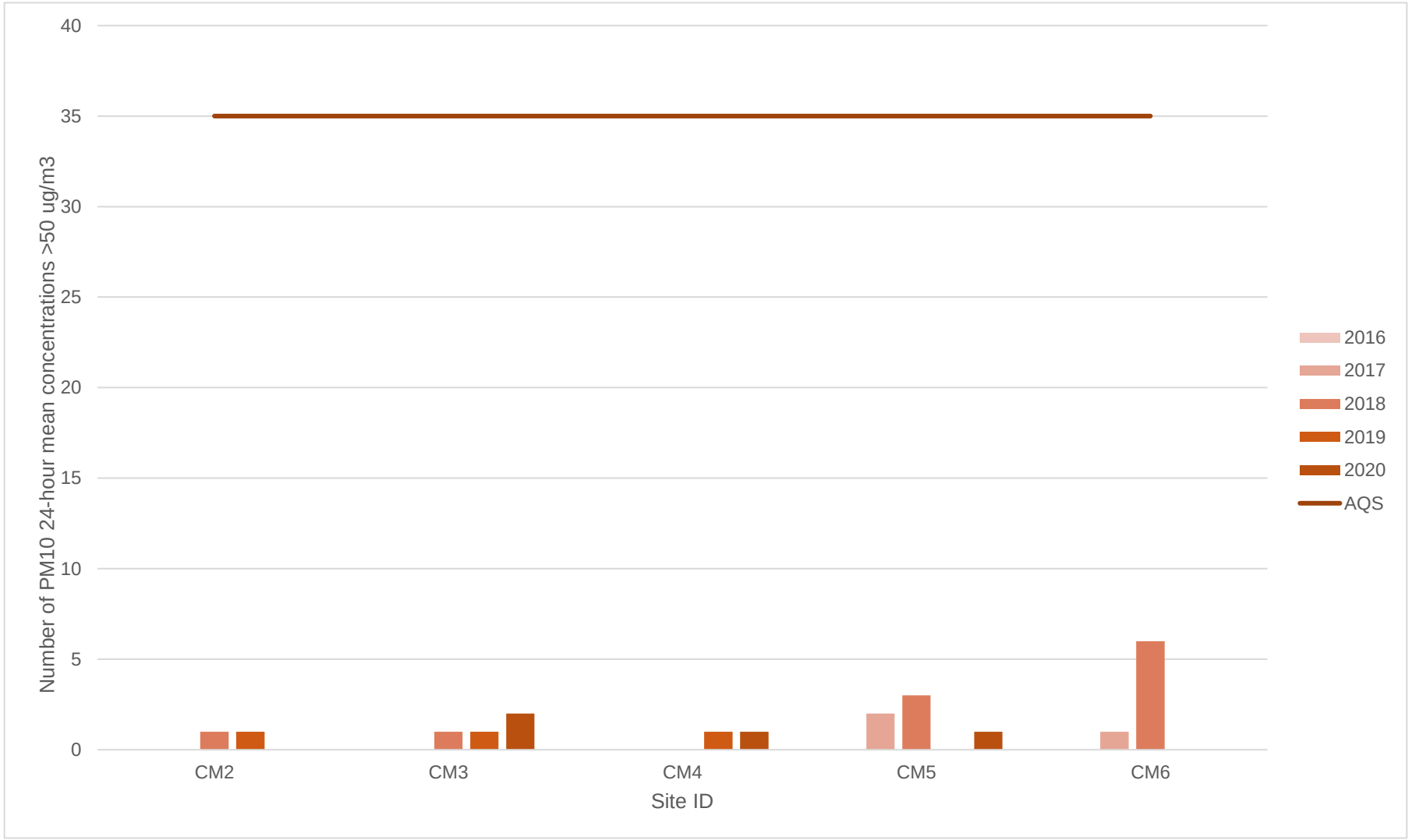


Table A.8 – Annual Mean $PM_{2.5}$ Monitoring Results (µg/m^3)

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	**2016**	**2017**	**2018**	**2019**	**2020**
CM3	333,772.36	394,602.27	Roadside	99	99	N/A	7.1	8.9	10.2	7.8
CM7	331,643.192	399,587.690	Urban Background	86	29	N/A	N/A	N/A	N/A	7.3

☒ **Annualisation has been conducted where data capture is <75% and >33% in line with LAQM.TG16**

Notes:

The annual mean concentrations are presented as µg/m^3.

All means have been "annualised" as per LAQM.TG16 if valid data capture for the full calendar year is less than 75%. See Appendix C for details.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Figure A.4 – Trends in Annual Mean $PM_{2.5}$ Concentrations

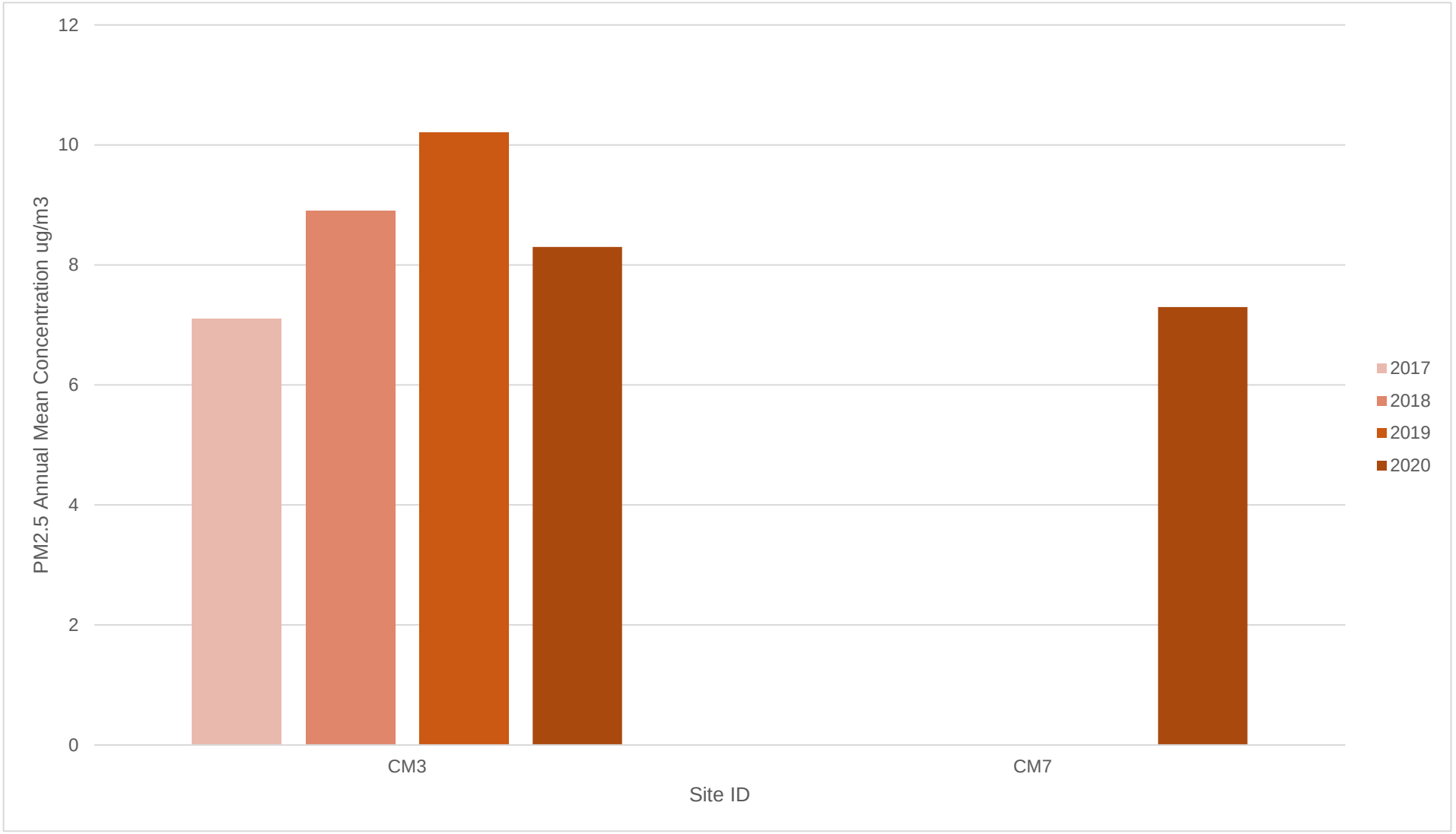


Table A.9 – SO_2 2020 Monitoring Results, Number of Relevant Instances

Site ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Northing)	Site Type	Valid Data Capture for Monitoring Period (%) (1)	Valid Data Capture 2020 (%) (2)	**Number of 15-minute Means > 266µg/m³**	**Number of 1-hour Means > 350µg/m³**	**Number of 24-hour Means > 125µg/m³**
CM6	332,873.66	396,549.21	Urban Background	92.6	92.6	0	0	0

Notes:

Results are presented as the number of instances where monitored concentrations are greater than the objective concentration.

Exceedances of the SO_2 objectives are shown in **bold** (15-min mean = 35 allowed a year, 1-hour mean = 24 allowed a year, 24-hour mean = 3 allowed a year).

If the period of valid data is less than 85%, the relevant percentiles are provided in brackets.

(1) Data capture for the monitoring period, in cases where monitoring was only carried out for part of the year.

(2) Data capture for the full calendar year (e.g. if monitoring was carried out for 6 months, the maximum data capture for the full calendar year is 50%).

Appendix B: Full Monthly Diffusion Tube Results for 2020

Table B.1 – NO_2 2020 Diffusion Tube Results (µg/m^3)

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted	Annual Mean: Distance Corrected to Nearest Exposure	Comments:
BB	333509.906	397186.176	36.9	29.3			19.0	20.7	20.7	22.5	28.1	28.8	28.7	37.4	27.2	22.0	-	Tubes not collected in March April due to Covid lockdown
BO	333846.94	394461.346	35.4	34.4			25.0	24.3	28.6	25.6	31.4	29.7	37.7	37.5	30.9	25.1	-	Tubes not collected in March April due to Covid lockdown
BQ	333834.762	394572.335	40.0	35.2				26.2	34.6	30.8	35.6	38.5	35.6	38.6	35.0	28.4	-	Tubes not collected in March April due to Covid lockdown
BR	333753.201	394551.8	59.6	60.5			35.3	41.3	50.9	45.7	56.1		49.4	60.5	51.0	**41.3**	39.0	Tubes not collected in March April due to Covid lockdown. Octobers tube missing
BS	333757	394622	49.6	44.9			33.1	33.0	37.6	37.3	45.3	42.6	47.4	48.9	42.0	34.0	-	Tubes not collected in March April due to Covid lockdown
BV	333395.37	400862.903	38.9	31.1			21.1	27.8	22.7	28.5	35.3	30.9	42.8	34.6	31.4	25.4	-	Tubes not collected in March April due to Covid lockdown
BW	332600.204	397021.204	43.9	32.9			20.0		22.1				40.5	45.8	34.2	24.3	-	Tubes not collected in March April due to Covid lockdown. Jun/Aug/Sep/Oct tubes missing
CI	333812.64	397513.553	48.5	43.7			28.3	33.8	31.8	34.3	42.9	43.9	51.7	52.7	41.2	33.3	-	Tubes not collected in March April due to Covid lockdown
CJ	332204.248	398228.819	45.1	38.9			28.6	33.9	29.7	37.7	41.5	44.8	48.8	47.6	39.7	32.1	-	Tubes not collected in March April due to Covid lockdown
CR	332510.918	397332.214	35.2	32.5			18.8	22.5	23.0	25.9	28.6	30.9	44.3	37.8	30.0	24.3	-	Tubes not collected in March April due to Covid lockdown
CY	332980.557	396972.038	28.4	32.0			17.7	22.3	21.9	22.2	28.7	32.8	38.9	39.3	28.4	23.0	-	Tubes not collected in March April due to Covid lockdown
DC	334339.384	395800.213	48.5	40.0			27.4	31.0	32.9	35.4	42.8	43.5	51.1	44.5	39.7	32.2	-	Tubes not collected in March April due to Covid lockdown
DD	333777.928	397534.487	53.9	45.5			29.3	30.7	32.6	42.4	40.4	47.2	56.3	53.7	43.2	35.0	-	Tubes not collected in March April due to Covid lockdown
DE	333917.158	397574.971					17.8	22.2	20.7	22.8	29.1	30.5	44.9	36.8	28.1	23.9	-	Tubes not collected in March April due to Covid lockdown. Jan/Feb tubes missing
DF	333915.796	397505.738	36.4	33.1			19.1	21.9	22.2	22.1	29.4	30.9	37.9	28.3	28.1	22.8	-	Tubes not collected in March April due to Covid lockdown
DG	333759	397460	31.5	28.9			19.3	24.3	22.1	15.5	28.6	28.5	43.4	38.6	28.1	22.7	-	Tubes not collected in March April due to Covid lockdown
DH	332193.401	398192.808	43.7	37.8			20.6	27.7	23.8	31.4	35.2	33.7	45.1	43.0	34.2	27.7	-	Tubes not collected in March April due to Covid lockdown

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted	Annual Mean: Distance Corrected to Nearest Exposure	Comments:
DI	332205.678	398186.77		38.0			23.5	27.3	29.2	32.1	36.2	40.4	48.0	43.9	35.4	28.7	-	Tubes not collected in March April due to Covid lockdown. Jan tube missing
DO	334639.624	396399.039	55.0	47.8			32.3	37.4	36.8	41.5	46.8	49.7		46.5	43.7	35.4	-	Tubes not collected in March April due to Covid lockdown. Nov tube missing
DP	332792.503	396973.797	50.4	43.8			23.4	26.3	24.5	28.0	34.1	36.4	47.8	38.3	35.3	28.6	-	Tubes not collected in March April due to Covid lockdown
DQ	332791.498	396922.302	38.8				21.8	25.4	24.3	26.9	31.6	35.1	39.7	41.6	31.7	25.7	-	Tubes not collected in March April due to Covid lockdown. Feb tube missing
DR	332225.716	398230.708	49.5	38.4			25.7	29.2	30.0	33.5	34.2	37.8	48.8	45.2	37.2	30.2	-	Tubes not collected in March April due to Covid lockdown
DS	332134.399	398168.805	39.7	31.2			20.5	26.6	23.4	29.7	34.3	31.1	41.7	38.9	31.7	25.7	-	Tubes not collected in March April due to Covid lockdown
DU	332196.353	398785.848	45.3	37.1			21.1	24.5	26.2	29.9	30.9	36.1	47.1	39.0	33.7	27.3	-	Tubes not collected in March April due to Covid lockdown
DV	332341.4	400167.903	46.0	36.7			24.9	31.5	27.9	34.0	39.7	36.3	47.3	40.4	36.4	29.5	-	Tubes not collected in March April due to Covid lockdown
DW	334571.851	397918.273	42.3	35.0			21.4	26.8	22.2	28.1	32.1	31.8	46.1	28.5	31.4	25.5	-	Tubes not collected in March April due to Covid lockdown
DX	334737.802	395137.533		39.8			22.5	30.3	27.9	30.6	34.9	37.0	45.9	44.4	34.8	28.2	-	Tubes not collected in March April due to Covid lockdown. Jan tube missing
DY	332249.794	398008.38	31.6	22.4			15.3	21.2		22.7	24.9	22.9	32.9	37.1	25.7	20.8	-	Tubes not collected in March April due to Covid lockdown. Jul tube missing
DZ	335393.977	397281.889	44.9	38.3			18.2	24.9	22.7	27.2	32.6	32.3	48.0	36.9	32.6	26.4	-	Tubes not collected in March April due to Covid lockdown
EA	336638.651	399495.675	38.2	33.3			15.9	18.3	19.5	20.9	25.7	24.2	38.2	30.9	26.5	21.5	-	Tubes not collected in March April due to Covid lockdown
EB	336591.597	399452.837	40.8	34.5			21.9	25.4	24.9	27.5	33.7	32.3	41.6	40.1	32.3	26.1	-	Tubes not collected in March April due to Covid lockdown
EC	336539	399477	35.0	29.6			22.8	29.1	17.4	28.7	29.5	25.7	44.4	42.1	30.4	24.6	-	Tubes not collected in March April due to Covid lockdown
EE	336572.016	399523.734	42.6	35.6							34.3	32.2	47.7	44.5	39.5	24.7	-	Tubes not collected in March April due to Covid lockdown
EK	334781.591	395188.948		40.1			23.7	28.0	26.5	31.1	37.1	37.6	43.6	47.7	35.0	28.4	-	Tubes not collected in March April due to Covid lockdown. Jan tube missing
EL	335265.082	394968.091	48.4	35.0			27.3	32.3	38.7	36.3	40.7	39.1	45.7	45.4	38.9	31.5	-	Tubes not collected in March April due to Covid lockdown
EN	333739.853	397561.249	41.9	36.4			23.2	29.0	24.3	30.3	32.1	32.9	45.5	45.3	34.1	27.6	-	Tubes not collected in March April due to Covid lockdown
EO	333692.411	397614.604	12.7	40.2			25.8	33.0	27.1	33.7	38.9	38.5	48.5	48.6	34.7	28.1	-	Tubes not collected in March April due to Covid lockdown

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted	Annual Mean: Distance Corrected to Nearest Exposure	Comments:
EP	333343.422	397209.994		32.8			20.8	26.4	21.2	24.8	30.2	24.5	37.1	35.7	28.2	22.8	-	Tubes not collected in March April due to Covid lockdown. Jan tube missing
EQ	332610.502	396984.604	45.1	36.9			22.0	27.4	23.0	28.3	31.9	33.0	45.6	45.5	33.9	27.4	-	Tubes not collected in March April due to Covid lockdown
ES	332711.603	397002.599	37.3	33.8			18.6	22.8	19.9	22.2	27.2	29.1	44.1	35.9	29.1	23.6	-	Tubes not collected in March April due to Covid lockdown
EV	332650.169	396914.61	49.5	40.4			26.4	30.4	30.8	30.9	37.1	39.5	42.8	45.8	37.4	30.3	-	Tubes not collected in March April due to Covid lockdown
EW	332665.744	396821.821					24.1	29.4	29.9	33.1	35.4	36.5	51.1	42.4	35.2	30.0	-	Tubes not collected in March April due to Covid lockdown. Jan/Feb tubes missing
EY	332681.302	396949.104	42.3	46.0			32.0	34.9	31.0	34.1	41.5	38.7	54.1	41.5	39.6	32.1	-	Tubes not collected in March April due to Covid lockdown
FB	334017	397317	43.3	43.7			25.8		32.2	30.6	35.0	34.1	47.5	41.0	37.0	30.0	-	Tubes not collected in March April due to Covid lockdown. June tube missing
FC	334216.953	397662.84	32.7	32.5			33.3	19.0	22.1	22.3			33.8	32.6	28.5	22.5	-	Tubes not collected in March April due to Covid lockdown. Sep/Oct tubes missing
FD	334242.328	397712.677	35.1	33.9			17.9	21.0	18.6	20.1	26.7	27.8	37.8	34.6	27.4	22.2	-	Tubes not collected in March April due to Covid lockdown
FE	334642.41	397923.332	37.4	34.1			21.0	26.0	24.7		29.6	28.2	40.8	32.3	30.4	24.7	-	Tubes not collected in March April due to Covid lockdown. Aug tube missing
FF	334978.217	398170.5	42.2	40.6			23.6	28.1	21.1	29.4	32.0	27.3	51.9	39.5	33.6	27.2	-	Tubes not collected in March April due to Covid lockdown
FH	334962.072	398134.04	54.3	42.3			27.5	33.7	33.4	34.8	40.4	38.1	48.3	41.0	39.4	31.9	-	Tubes not collected in March April due to Covid lockdown
FI	333279.77	395957.948	57.4	47.9			27.7	31.2	37.3	33.9	35.5	38.9	48.1	37.4	39.5	32.0	-	Tubes not collected in March April due to Covid lockdown
FL	333701.439	397573.795	38.7	33.7			23.7	30.5	16.5	31.4	34.3	33.5	40.8	47.0	33.0	26.7	-	Tubes not collected in March April due to Covid lockdown
GA	333431.41	417165.922	40.2	31.7			19.0	26.0	22.5	29.2	30.8	31.3	31.8	39.5	30.2	24.5	-	Tubes not collected in March April due to Covid lockdown
GB	333704.011	417414.806	41.8	38.7			19.8	25.4	26.4	30.8	31.9	32.8			31.0	28.4	-	Tubes not collected in March April due to Covid lockdown. Nov/Dec tube missing
GC	332296.398	398267.697	32.2	24.3			11.9	14.9	11.6	17.4	19.5	27.3	34.3	30.0	22.3	18.1	-	Tubes not collected in March April due to Covid lockdown
GD	332209.8	398337.697	40.4	29.5			15.6	22.3	18.8	24.1	27.3	30.5	39.0	37.7	28.5	23.1	-	Tubes not collected in March April due to Covid lockdown
GE	332205.76	398368.998	41.8	27.6			15.6	21.3	15.6	25.9	26.1	30.2	38.9	39.4	28.2	22.9	-	Tubes not collected in March April due to Covid lockdown

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted	Annual Mean: Distance Corrected to Nearest Exposure	Comments:
GF	335347.053	397500.241	51.8	43.7			23.2	28.4	31.2	31.9	34.6	36.6	47.5	39.7	36.9	29.9	-	Tubes not collected in March April due to Covid lockdown
GG	333270.041	395967.365	57.9	51.5			27.8	34.0	32.3		35.5		56.9	47.4	42.9	32.7	-	Tubes not collected in March April due to Covid lockdown. Aug/Oct tube missing
GH	333230.91	396068.856	62.3	54.3			36.7	37.8	45.2	43.4	43.7	42.9	60.1	49.7	47.6	38.6	31.1	Tubes not collected in March April due to Covid lockdown
GI	333281.122	396027.099	45.6	37.2			20.3	22.2	27.9	27.7	27.3	28.1	43.9	35.2	31.5	25.5	-	Tubes not collected in March April due to Covid lockdown
GJ	332087.963	399829.23	49.7	40.2			20.0	27.7	28.3	9.3	33.0	33.4	44.0	36.5	32.2	26.1	-	Tubes not collected in March April due to Covid lockdown
GK	333669.3	394912.097		40.6			31.4	36.5	33.8	36.4	39.1	40.0	45.6	47.9	39.0	31.6	-	Tubes not collected in March April due to Covid lockdown. Jan tube missing
GL	333109.979	397071.549	36.8	35.9			22.4	27.0	26.7	22.1	30.5	30.0	39.0	35.9	30.6	24.8	-	Tubes not collected in March April due to Covid lockdown
GM	332189.204	398209.503	56.9	45.2			24.1	33.7		39.0	38.1	42.4	51.9	45.0	41.8	33.9	-	Tubes not collected in March April due to Covid lockdown. Jul tube missing
GN	333326.297	400771.8	43.1	34.6			23.0	27.9	24.1	30.9	31.9	29.7	39.9	37.6	32.3	26.1	-	Tubes not collected in March April due to Covid lockdown
GO	334203.588	395748.628	48.0	35.5			22.1	27.8	25.5	31.0	34.4	32.1	34.4	39.0	33.0	26.7	-	Tubes not collected in March April due to Covid lockdown
GP	332680.519	396776.004	47.6				25.8	29.2	30.9	32.3	33.8	31.7	43.9	44.1	35.5	28.7	-	Tubes not collected in March April due to Covid lockdown. Feb tube missing
GQ	330706.409	398904.207	22.0	20.1			13.9	15.3	10.0	18.0	20.9	17.4	32.2	29.0	19.9	16.1	-	Tubes not collected in March April due to Covid lockdown
GR	339,200.95	402,502.57	27.7	23.4			12.7	16.8	16.9	16.4	19.5	18.6	30.0	23.9	20.6	16.7	-	Tubes not collected in March April due to Covid lockdown
GS	338,710.43	401,570.88	23.1	19.3			10.5	12.6	8.5	11.8	16.2	15.8	29.1	22.5	16.9	13.7	-	Tubes not collected in March April due to Covid lockdown
GT	333,735.79	394,597.47	50.4	48.1			34.7	40.1	35.5	47.4	46.3	44.1	53.1	56.3	45.6	36.9	32.0	Tubes not collected in March April due to Covid lockdown
GU	333,784.30	394,595.69					38.1	36.7	39.8	45.1	42.7	39.1	48.0	45.0	41.8	35.5	-	Tubes not collected in March April due to Covid lockdown. Jan/Feb tubes missing
GV	337,536.74	401,542.17	39.3	31.3			18.7	21.5	25.1	26.5	30.1	24.8	40.9	33.8	29.2	23.7	-	Tubes not collected in March April due to Covid lockdown
GW	337,499.20	401,552.00					16.6	22.0	22.3	24.7	27.1	28.8	38.1	34.9	26.8	22.8	-	Tubes not collected in March April due to Covid lockdown. Jan/Feb tube missing
GX	340,334.22	401,214.14	29.9	25.7			15.9	21.4	16.8	21.9	25.5	25.5	30.3	29.4	24.2	19.6	-	Tubes not collected in March April due to Covid lockdown

DT ID	X OS Grid Ref (Easting)	Y OS Grid Ref (Easting)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Mean: Raw Data	Annual Mean: Annualised and Bias Adjusted	Annual Mean: Distance Corrected to Nearest Exposure	Comments:
GY	329,187.93	406,599.57	21.5	17.5			11.9	14.0	10.6	14.9	17.4	15.8	24.1	25.3	17.3	14.0	-	Tubes not collected in March April due to Covid lockdown
GZ	332,987.98	415,800.06	20.5	18.1			9.7		10.9	17.1	18.6	18.4	24.9	24.3	18.0	14.6	-	Tubes not collected in March April due to Covid lockdown.Jun tube missing
UK 2	334798.812	398065.228	32.4	30.8			19.4		18.1	22.7	27.6	25.3	39.9	30.3	27.4	22.2	-	Tubes not collected in March April due to Covid lockdown.Jun tube missing
UK 4	332171.362	398546.757	41.8	29.1			22.6	26.7	22.3	26.7	31.8	34.8	40.6	30.4	30.7	24.8	-	Tubes not collected in March April due to Covid lockdown
W	332981.851	397022.013	47.6	39.1			20.4	24.4	24.6	25.8	31.5	33.0	47.7	43.3	33.7	27.3	-	Tubes not collected in March April due to Covid lockdown

☒ **All erroneous data has been removed from the NO_2 diffusion tube dataset presented in Table B.1**

☒ **Annualisation has been conducted where data capture is <75% and >33% in line with LAQM.TG16**

☐ **Local bias adjustment factor used**

☒ **National bias adjustment factor used**

☒ **Where applicable, data has been distance corrected for relevant exposure in the final column**

☒ **Sefton confirm that all 2020 diffusion tube data has been uploaded to the Diffusion Tube Data Entry System**

Notes:

Exceedances of the NO_2 annual mean objective of 40µg/m^3 are shown in **bold**.

NO_2 annual means exceeding 60µg/m^3, indicating a potential exceedance of the NO_2 1-hour mean objective are shown in **bold and underlined**.

See Appendix C for details on bias adjustment and annualisation.

Appendix C: Supporting Technical Information / Air Quality Monitoring Data QA/QC

New or Changed Sources Identified Within Sefton During 2020

No new sources of pollution have been identified in 2020, however, a number of minor changes to the diffusion tube monitoring network have taken place in 2020 to assess levels of NO_2 at locations of interest. Maps detailing the location of all diffusion tubes are provided in appendix D.

Additional Air Quality Works Undertaken by Sefton During 2020

Sefton has not completed any additional works within the reporting year of 2020 that has not already been reported in the ASR.

QA/QC of Diffusion Tube Monitoring

Sefton Council use a large number of passive nitrogen dioxide diffusion tubes to monitor NO_2 throughout the Borough, the majority of which form part of its in-house monitoring programme and the remainder are used for the Community Air Watch programme.

The tubes are currently prepared and analysed by Gradko International Limited, St Martins House, 77 Wales Street, Winchester, Hampshire, SO23 0RH. Gradko are amongst the market leaders in the preparation, supply and analysis of NO_2 diffusion tubes. Gradko representatives participated and provided input into the working group on the harmonisation of diffusion tubes set up to manage the process of harmonisation of NO_2 tube preparation and analysis methods. The diffusion tubes used are prepared by making up a solution of 20% Triethanolamine (TEA) solution and 80% deionised water. The grey caps are loaded with two stainless steel mesh grids onto which is pipetted 50μL of 20%TEA/water. The tube is then fully assembled and stored under refrigerated conditions ready for use. On receipt the unexposed tubes are stored in a refrigerator prior to and following exposure and then returned to Gradko for analysis. A travel blank is also used to identify possible contamination of diffusion tubes while in transport or storage. Analysis is carried out in accordance with

Gradko's documented UKAS accredited in-house laboratory method GLM7 and follows the harmonisation practical guidance for diffusion tube.

Gradko participate in AIR, an independent analytical proficiency-testing (PT) scheme, operated by LGC Standards and supported by the Health and Safety Laboratory (HSL). AIR PT is a new scheme, started in April 2014, which combines two long running PT schemes: LGC Standards STACKS PT scheme and HSL Workplace Analysis Scheme for Proficiency (WASP) PT scheme. AIR offers a number of test samples designed to test the proficiency of laboratories undertaking analysis of chemical pollutants in ambient, indoor, stack and workplace air. One such sample is the AIR NO_2 test sample type that is distributed to participants in a quarterly basis.

AIR NO_2 PT forms an integral part of the UK NO_2 Network's QA/QC and is a useful tool in assessing the analytical performance of those laboratories supplying diffusion tubes to Local Authorities for use in the context of Local Air Quality Management (LAQM). With consent from the participating laboratories, LGC Standards provides summary proficiency testing data to the LAQM Helpdesk for hosting on the webpages at: http://laqm.DEFRA.gov.uk/diffusion-tubes/qa-qc-framework.html. This information is updated on a quarterly basis following completion of each AIR PT round.

Defra advise that diffusion tubes used for LAQM should be obtained from laboratories that have demonstrated satisfactory performance in the AIR PT scheme. Laboratory performance in AIR PT is also assessed, by the National Physical Laboratory (NPL), alongside laboratory data from the monthly NPL Field Intercomparison Exercise carried out at Marylebone Road, central London.

The information is used to help the laboratories to identify if they have problems and may assist devising measures to improve their performance and forms part of work for DEFRA and the Devolved Administrations under the LAQM Services Contract.

Laboratory Performance

The AIR PT scheme uses laboratory spiked Palmes type diffusion tubes to test each participating laboratory's analytical performance on a quarterly basis and continues the format used in the preceding Workplace Analysis Scheme for Proficiency WASP PT scheme. Such tubes are not designed to test other parts of the measurement system e.g. sampling. Every quarter, roughly January, April, July and October each year, each

laboratory receives four diffusion tubes doped with an amount of nitrite, known to LGC Standards, but not the participants. At least two of the tubes are usually duplicates, which enables precision, as well as accuracy, to be assessed. The masses of nitrite on the spiked tubes are different each quarter, and reflect the typical analytical range encountered in actual NO_2 ambient monitoring in the UK.

Preparation of test samples

Diffusion tubes are spiked using a working nitrite solution prepared from a stock solution. The concentration of this stock solution is initially assayed using a titrimetric procedure. All steps in the subsequent test sample production process, involving gravimetric and volumetric considerations, are undertaken using calibrated instruments employing traceable standards. As an additional cross check, 12 spiked Palmes tubes are picked at random from each spike loading level and submitted to a third party laboratory which is accredited to ISO 17025 to undertake this analysis using an ion chromatographic procedure.

In summary, the tube spiking precision is calculated to be better than 0.5 %, expressed as a standard deviation, and this is derived from repeat gravimetric checking of the pipette device used to spike the test samples. The calculated spike values, derived from titrimetric, gravimetric and volumetric considerations, are found to be typically within ± 3 % of results obtained by the third party laboratory using an ion chromatographic analytical procedure.

Scheme operation

The participants analyse the test samples and report the results to LGC Standards via their on-line PORTAL data management system. LGC Standards assign a performance score to each laboratory's result, based on how far their results deviate from the assigned values for each test samples. The assigned values are best estimates of the levels of nitrite doped onto the test sample tubes and are calculated from the median of participant results, after the removal of test results that are inappropriate for statistical evaluation, e.g. miscalculations, transpositions and other gross errors. At the completion of the round, laboratories receive a report detailing how they have performed and how their results relate to those of their peers.

Performance scoring

The z-score system is used by LGC to assess the performance of laboratories participating in the AIR PT NO_2 scheme.

The Z_{score}, may be defined as:

$$Z_{score} = \frac{(x_{lab} - \bar{x}_{assigned})}{\sigma_{SDPA}}$$

Where:
x_{lab} = participant result from a laboratory

$\bar{x}_{assigned}$ = assigned value

σ_{SDPA} = standard deviation for performance assessment (currently set at 7.5% of $\bar{x}_{assigned}$)

Performance score interpretation

A Z_{score} is interpreted as described below:

$|Z_{score}| \leq 2$, indicates satisfactory laboratory performance.

$2.0 < |Z_{score}| < 3$, indicates questionable (warning) laboratory performance.

$|Z_{score}| \geq 3$, indicates unsatisfactory (action) laboratory performance.

As a general rule of thumb, provided that a laboratory does not have systematic sources of bias in their laboratory measurement system, then on average, 19 out of every 20 z-scores should be ≤± 2. In this scheme each laboratory receives 4 test samples per round and therefore submits 4 z-scores per round. Hence over 5 rounds laboratories would receive 20 test samples and report 20 z-scores.

Assessing the performance of a laboratory

End users that avail of analytical services from laboratories should satisfy themselves that such laboratories meet their requirements. A number of factors ideally need to be considered including:

· Expertise and skills of staff within the laboratory?

· Does the laboratory follow accepted measurement standards, guidance?
· Does the laboratory operate a robust internal quality control system?
· Is the laboratory third party accredited to relevant standards such as ISO 17025?
· Does the laboratory successfully participate in relevant external proficiency testing schemes?
· How good is their customer care (communication, turnaround times, pricing etc)?

Participation therefore, in an external proficiency-testing scheme such as AIR PT, represents but one factor in such considerations. Participation in a single round of an external proficiency-testing scheme represents a “snap-shot” in time of a laboratory’s analytical quality. It is more informative therefore to consider performance over a number of rounds.

Following on from above, therefore over a rolling five round AIR PT window, one would expect that 95 % of laboratory results should be ≤± 2. If this percentage is substantially lower than 95 % for a particular laboratory, within this five round window, then one can conclude that the laboratory in question may have significant systematic sources of bias in their assay.

A summary of the performance, for Gradko participating in the AIR PT scheme, is provided in the table below. This table shows the percentage of results where the absolute z-score, for the laboratory, was less than or equal to 2, i.e. those results which have been assessed as satisfactory.

AIR PT Round	AIR PT AR036	AIR PT AR037	AIR PT AR039	AIR PT AR040
Round conducted in the period	January – February 2020	May – June 2020	July – August 2020	September – October 2020
Gradko International	75 %	NR [3]	NR [3]	75 %

Diffusion Tube Annualisation

Nine diffusion tube monitoring locations within Sefton recorded data capture of less than 75% and in line with TG 16 required annualisation of the monitoring data. The remaining diffusion tube monitoring locations had a data capture higher than 75% and so did not require annualisation.

Where monitoring has taken place with data capture falling below the required 75% capture rate annualisation of these results has been carried in accordance with TG 16 to estimate the likely annual result. The new DEFRA Diffusion Tube Data Processing tool has been utilised to process all diffusion tube data for 2020.

Table C2 below shows the annualisation factor for the nine required sites. Automatic monitoring data from the Urban network has been used to work out the annualisation factor.

Diffusion Tube Bias Adjustment Factors

The diffusion tube data presented within the 2020 ASR have been corrected for bias using an adjustment factor. Bias represents the overall tendency of the diffusion tubes to under or over-read relative to the reference chemiluminescence analyser (Diffusion tubes may exhibit substantial under or over estimation compared with the reference chemiluminescence method, due to factors in the field affecting performance, such as wind induced shortening of the effective diffusive path length, that are not related to the laboratory's preparation or analysis of the tubes.)

LAQM.TG16 provides guidance with regard to the application of a bias adjustment factor to correct diffusion tube monitoring. Triplicate co-location studies can be used to determine a local bias factor based on the comparison of diffusion tube results with data taken from NO_x/NO_2 continuous analysers. Alternatively, the national database of diffusion tube co-location surveys provides bias factors for the relevant laboratory and preparation method.

Sefton utilised the national bias adjustment figures for 2020 – The Gradko adjustment using the latest spreadsheet (06/2021) was 0.81. This bias adjustment has been applied to all diffusion tubes via the Diffusion Tube Data Processing Tool. A summary of bias adjustment factors used by Sefton over the past five years is presented in Table C.1.

Table C.1 – Bias Adjustment Factor

Year	Local or National	If National, Version of National Spreadsheet	Adjustment Factor
2020	National	06/21	0.81
2019	National	09/20	0.91
2018	National	06/19	0.93
2017	National	06/18	0.89
2016	Local		0.85

NO_2 Fall-off with Distance from the Road

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure should be estimated using the Diffusion Tube Data Processing Tool/NO_2 fall-off with distance calculator available on the LAQM Support website.

Three diffusion tube NO_2 monitoring locations within Sefton required distance correction during 2020. Sites BR, GH and GT all required distance correction, BR exceeded an annual mean concentration of 40µg/m^3 (41.3µg/m^3 after bias adjustment and annualisation). GH and GT exceeded an annual mean concentration 36µg/m^3 (at 38.6µg/m^3 and 36.9µg/m^3 respectively) and so were also considered for distance correction.

This distance correction was completed using the Diffusion Tube Data Processing Tool and a summary of the results presented in table C4

QA/QC of Automatic Monitoring

Sefton Council's monitoring network is operated and run by officers who have been trained in all aspects of air quality monitoring, including routine site maintenance, calibration of analysers and data ratification. The QA/QC procedures used are detailed below.

Horiba 360 and 370 series analysers are used for gaseous pollutants and BAM analysers used for particulates PM_{10}. FIDAS dual Particulate monitor is used for $PM_{2.5}$ PM_{10}.

Sefton Council have in place a rigorous QA/QC programme which incorporates the daily screening, by visual examination of all monitoring and calibration data to ascertain if any immediate action is necessary, fortnightly site visits to carry out routine maintenance and calibration checks, equipment maintenance support including breakdown repair and 6 monthly servicing following the manufacturers recommendations carried out by trained service engineers, 6 monthly QA/QC audits carried out by an external UKAS accredited field auditor (RICARDO) and data validation and ratification of all datasets.

The QA/QC audit independent organisation used must hold UKAS accreditation to ISO 17025 for the on-site calibration of the NO_x gas analysers and for flow rate checks on particulate (PM_{10}) analysers and for the determination of the spring constant, k0, for conventional and TEOM-FDMS instruments. ISO17025 accreditation provides confidence that the analyser calibration factors produced are traceable to national metrology standards, that the calibration methodology is suitable, and that the uncertainties are appropriate for data reporting purposes and ISO17025 accreditation for laboratory certification of NO, NO2, CO and SO2 gas cylinders is also held.

Horiba gas analysers carry out automatic checks every three days for zero and span calibration and Horiba software scales the data of the three-day calibration checks. Monitoring and calibration data from automatic monitors for the previous day(s) are examined on the morning of each working day by an air quality officer to check for spurious or unusual readings, allowing for the identification of anomalies or instrument faults, so they can be investigated and dealt with promptly.

An air quality officer carries out routine site visits every 30 days in accordance with a documented procedure, during which routine maintenance is carried out including the changing of all sample inlet filters. Zero and span calibration checks and gas cylinder pressures checks are also made. Any faults identified are either rectified at the time of the visit or are reported immediately to the instrument supplier service department to arrange an engineer call out.

Sefton Council has a maintenance contract currently with Horiba UK, which includes six monthly servicing intervals and breakdown cover to ensure optimum performance of the analysers throughout the year. External QA/QC audits are carried out at 6 monthly intervals. This work is presently carried out by Ricardo Energy & Environment, who provide a report with recommendations and comments relating to data management as a result of the audit and any necessary action to correct data for long term drift or any other matters which need to be addressed.

Primary data validation (application of calibration factors, screening of data for spurious and unusual measurements) is followed up with a more detailed process known as data ratification, a more rigorous data management procedure involving a critical review of all information relating to a particular dataset, the purpose being to verify, amend or reject as necessary. These methods are given in more detail in DEFRA technical guidance LAQM.TG (16).

PM_{10} and $PM_{2.5}$ Monitoring Adjustment

Defra and the Devolved Administrations have approved a number of different monitoring technologies to be equivalent to the reference method. In some cases, the data have to be corrected before they can be used.

In 2020 Sefton Council used 2 different instrument types to measure PM_{10}

- Met-One 1020 Beta Attenuation Monitor (BAM) with unheated inlet
- FIDAS dual monitor with unheated inlet

In accordance with LAQM.TG16 Chapter 7: the following correction factors have been applied:

- Met-One 1020 Beta Attenuation Monitor (BAM) with unheated inlet - divide by 1.2
- FIDAS dual monitor with unheated inlet -$PM_{2.5}$ - divide by 1.06

Automatic Monitoring Annualisation

Where monitoring has taken place with data capture falling below the required 75% capture rate annualisation of these results has been carried in accordance with TG 16 to estimate the likely annual result.

The tables below show a summary of the annualisation that was applied to each data set below the required threshold.

CM7- Regent Road Annualisation adjustment-PM_{10}

Measurements from 3 of the nearest background AURN monitoring sites with the necessary data has been used in this annualisation process.

Monitor Location	PM_{10} Annual Mean 2020 (A_m)	PM_{10} Period Mean (P_m)	Ratio (A_m/P_m)
Blackpool	14.79456763	13.77683747	1.073872553
Preston	13.21540202	12.33963499	1.070971875
Salford Eccles	14.20398165	13.50807692	1.051517676
Average (R_a)			**1.065454035**

The measured unadjusted (M) PM_{10} concentration at Regent Road CM7 for the period is 12.4 µg/m^3

Annualisation of the annual mean concentration at Regent Road CM7 for 2020 is M x Ra = 12.4 x 1.0654 = 13.2 µg/m^3.

CM7 – Regent Road Annualisation adjustment $PM_{2.5}$

Measurements from 3 of the nearest background AURN monitoring sites with the necessary data has been used in this annualisation process.

Monitor Location	$PM_{2.5}$ Annual Mean 2020 (A_m)	$PM_{2.5}$Period Mean (P_m)	Ratio (A_m/P_m)
Blackpool	8.19607717	7.789976536	1.052131176
Preston	7.360046959	7.341018939	1.002592013
Salford Eccles	8.329362238	8.46202906	0.984322103
Average (R_a)			**1.013015097**

The measured unadjusted (M) $PM_{2.5}$ concentration at Regent Road CM7 for the period is 7.2 µg/m^3

Annualisation of the annual mean concentration at Regent Road is M x Ra = 7.2 x 1.013 = 7.3 µg/m^3.

This summary is also presented in Table C.2.

Calculation of 90.4th Percentile for 24 hour PM_{10}

For PM_{10} it is required to report the number of days where there was greater than 50µg/m^3 over a calendar year. With the exception of Scotland, there are allowed to be no more than 35 exceedances per calendar year. The number of exceedances should only be reported where data capture is more than 85% of a full year. If data capture is less than 85% or monitoring is for less than a full year, then local authorities should instead **report the 90.4th percentile for 24 hour PM_{10}.** For monitoring station CM7 Regent Road the data capture for 2020 was less than 75% and as such the 90.4th percentile for the **24 hour PM_{10}** mean is reported. A spreadsheet was used to calculate this using the following Excel formula =PERCENTILE(A:A,0.904).

NO_2 Fall-off with Distance from the Road

Wherever possible, local authorities should ensure that monitoring locations are representative of exposure. However, where this is not possible, the NO_2 concentration at the nearest location relevant for exposure should be estimated using the NO_2 fall-off with distance calculator available on the LAQM Support website.

No automatic NO_2 monitoring locations within Sefton required distance correction during 2020 as no annual mean concentrations recorded were greater than 36µg/m^3.

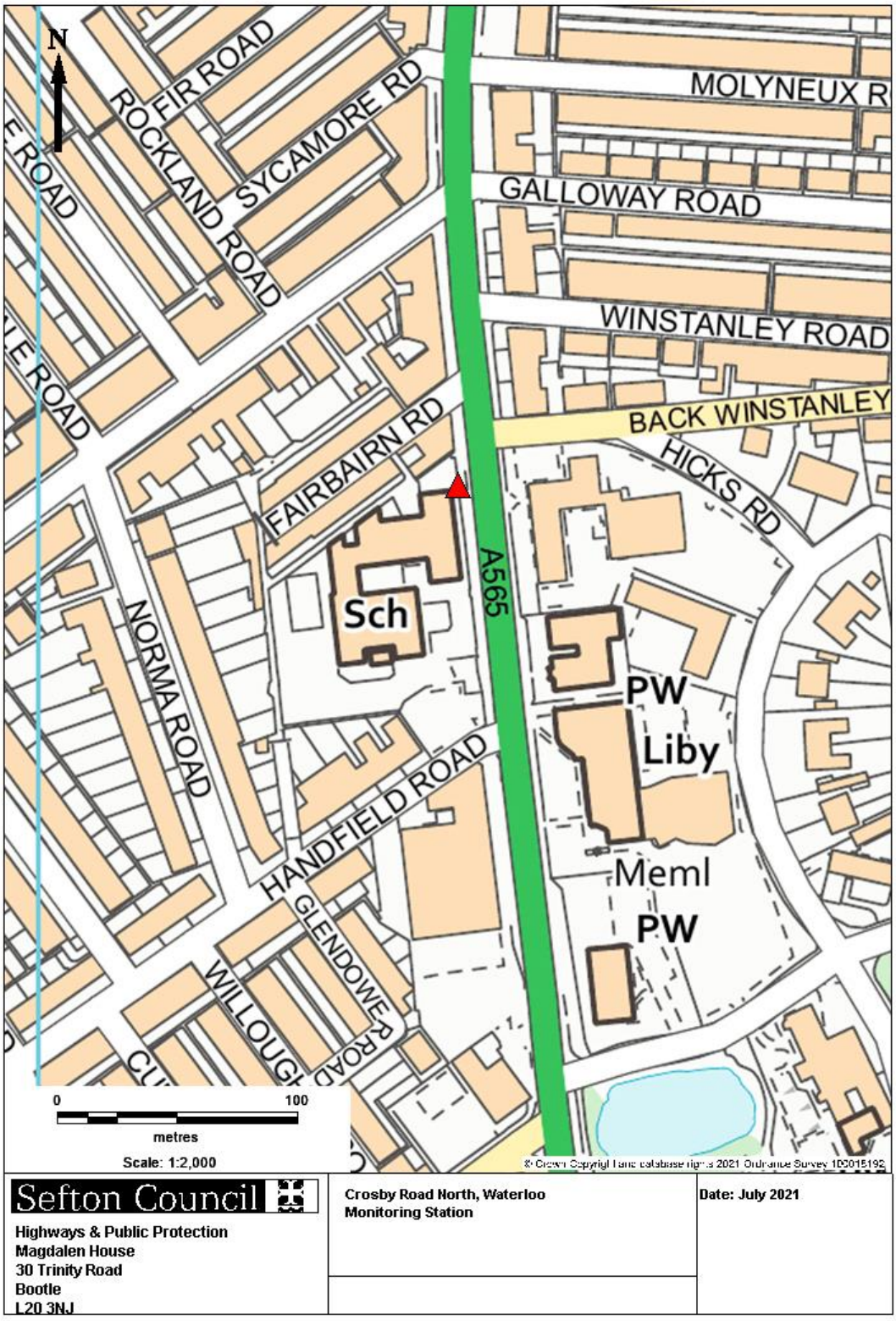
Table C.2 – Annualisation Summary (concentrations presented in µg/m^3)

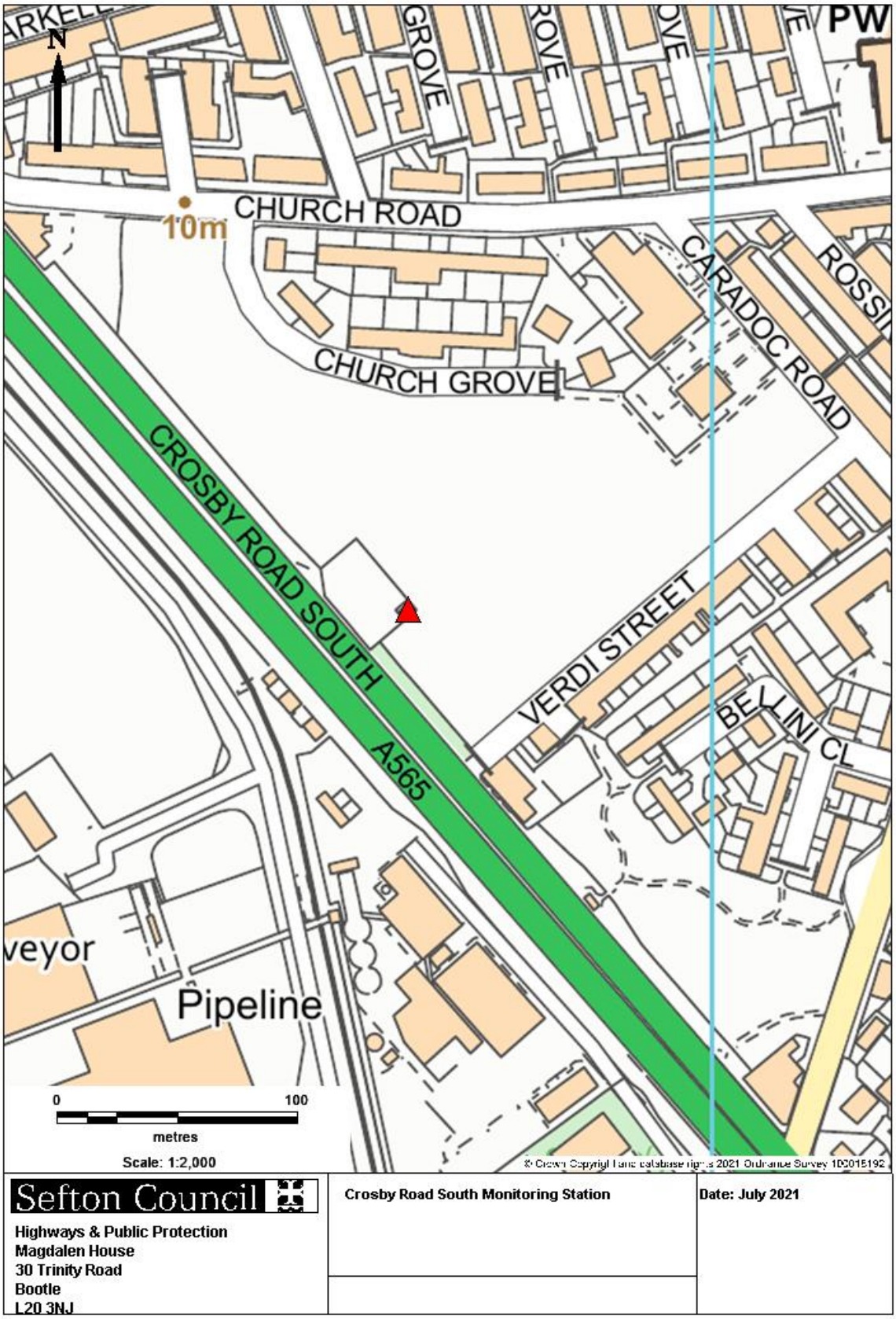
Site ID	Annualisation Factor Blackpool Marton	Annualisation Factor Preston	Annualisation Factor Salford Eccles	Average Annualisation Factor	Raw Data Annual Mean	Annualised Annual Mean	Comments
BW	0.8777	0.8382	0.9115	0.8758	34.2	30.0	
DE	1.0557	1.0551	1.0385	1.0497	28.1	29.5	
EE	0.7662	0.7339	0.8156	0.7719	39.5	30.5	
EW	1.0557	1.0551	1.0385	1.0497	35.2	37.0	
FC	0.9801	0.9461	0.9896	0.9720	28.5	27.7	
GB	1.1532	1.1457	1.0963	1.1317	31.0	35.0	
GG	0.9466	0.9080	0.9635	0.9394	42.9	40.3	
GU	1.0557	1.0551	1.0385	1.0497	41.8	43.9	
GW	1.0557	1.0551	1.0385	1.0497	26.8	28.1	
CM7 (PM_{10})	1.0738	1.0709	1.0515	1.0654	12.4	13.2	
CM7 ($PM_{2.5}$)	1.0521	1.0029	0.9843	1.0131	7.2	7.3	

Table C.3 – NO_2 Fall off With Distance Calculations (concentrations presented in µg/m^3)

Site ID	Distance (m): Monitoring Site to Kerb	Distance (m): Receptor to Kerb	Monitored Concentration (Annualised and Bias Adjusted	Background Concentration	Concentration Predicted at Receptor	Comments
BR	1.1	2.7	41.3	29.2	*39.0*	
GH	3.5	15.9	38.6	20.2	31.1	
GT	3.4	37.7	36.9	29.2	32.0	

Appendix D: Map(s) of Monitoring Locations and AQMAs




N
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CHURCH GROVE
CARADOC ROAD
ROSSI
CROSBY ROAD SOUTH
A565
VERDI STREET
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metres
Scale: 1:2,000
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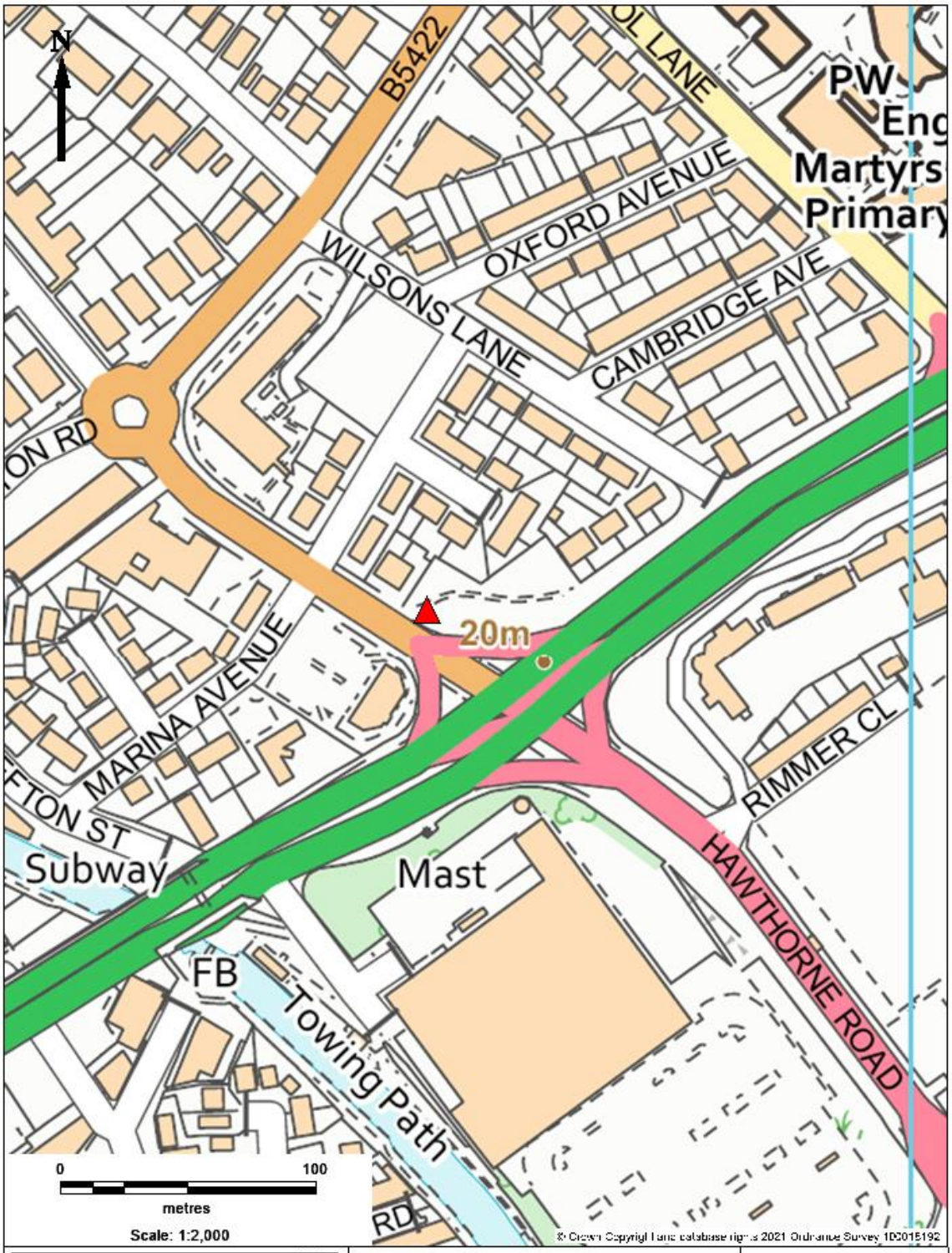
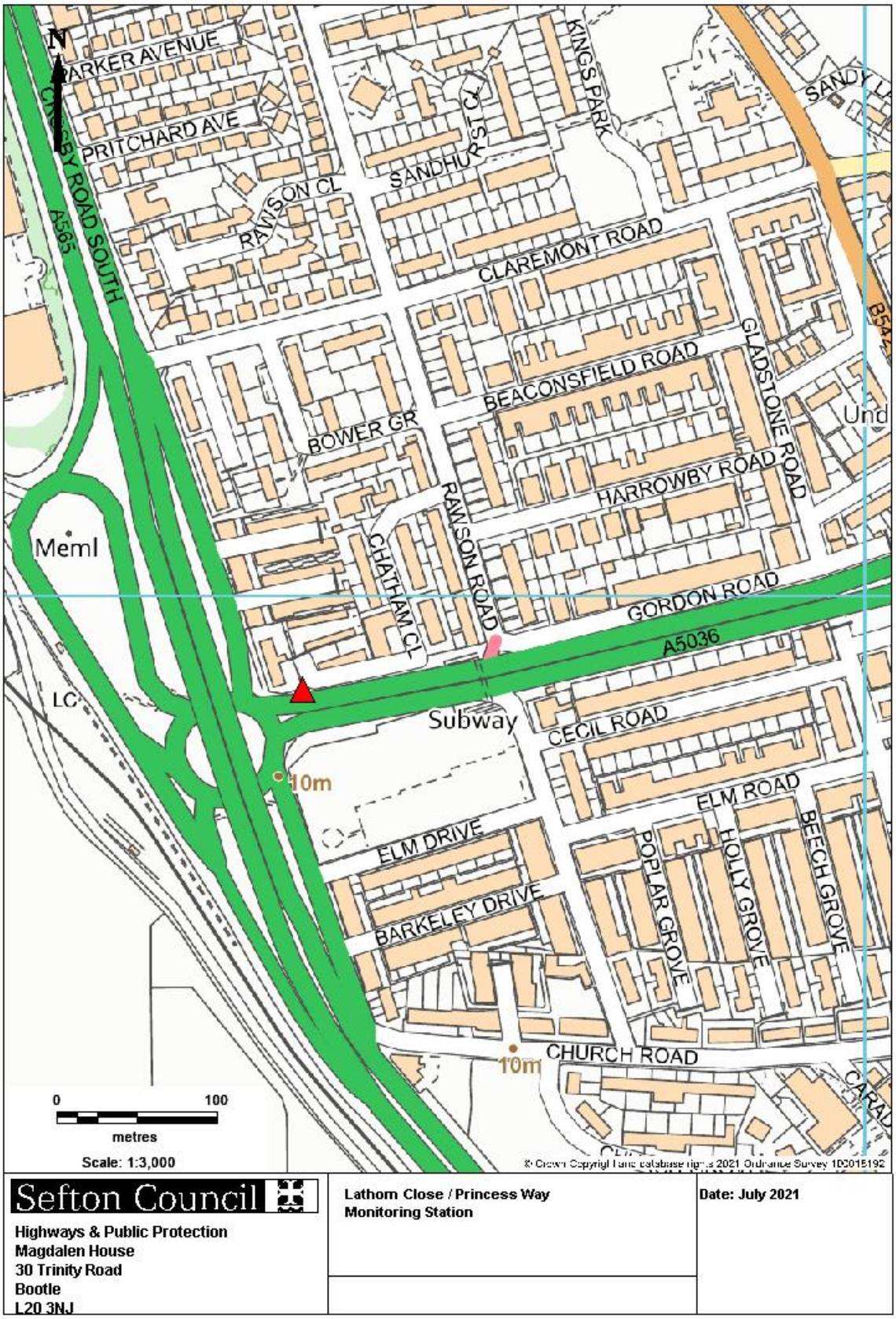
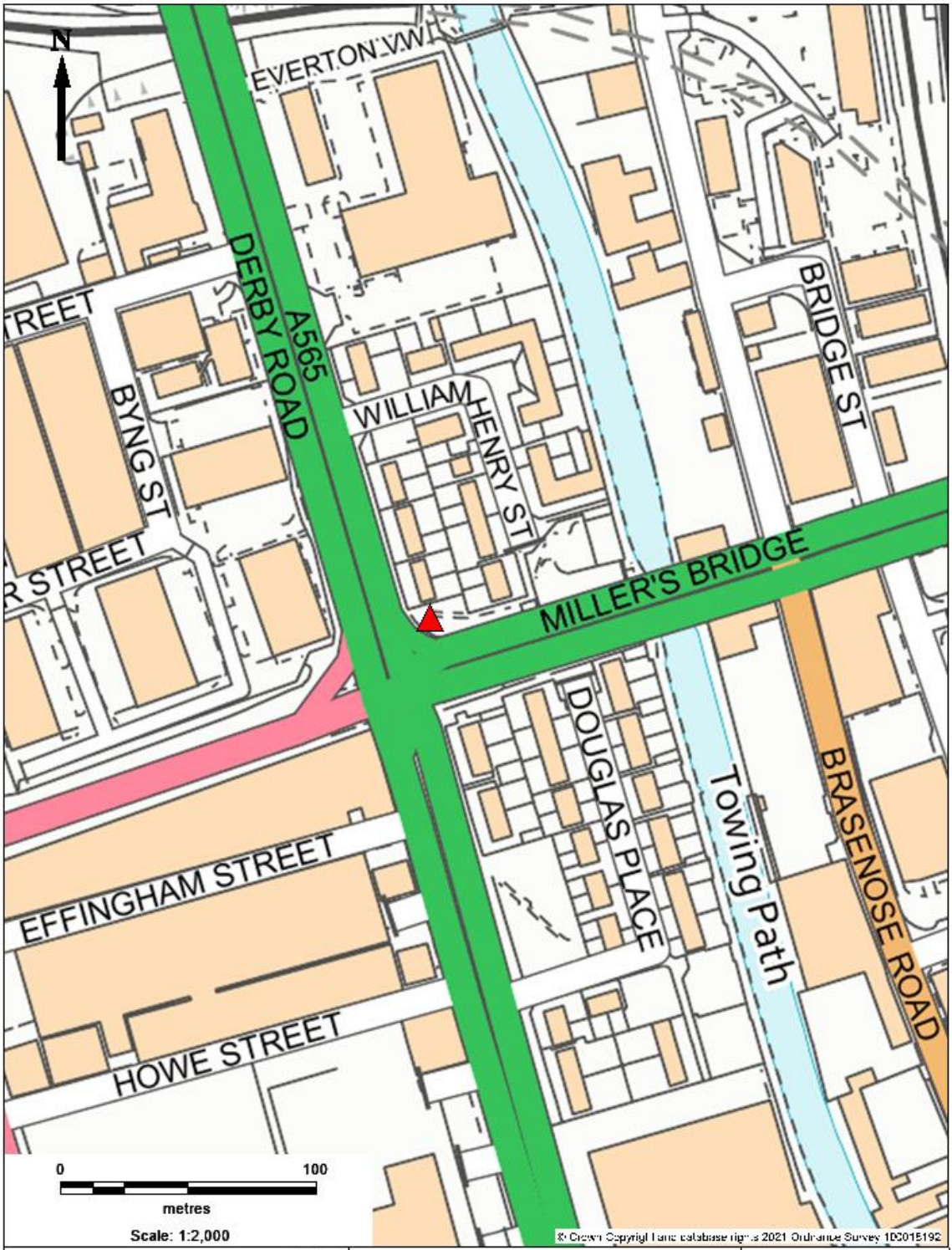
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Crosby Road South Monitoring Station
Date: July 2021


N
B5422
OL LANE
PW
Martyrs
Primary
OXFORD AVENUE
WILSONS LANE
CAMBRIDGE AVE
ON RD
20m
MARINA AVENUE
FTON ST
Subway
Mast
RIMMER CL
HAWTHORNE ROAD
FB
Towing Path
RD
0
100
metres
Scale: 1:2,000
© Crown Copyright Land database rights 2021 Ordnance Survey 100015192
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Hawthorne Road Monitoring Station
Date: July 2021


N
PARKER AVENUE
PRITCHARD AVE
CROSBY ROAD SOUTH
A565
RAWSON CL
SANDHURST CL
KINGS PARK
CLAREMONT ROAD
BEACONSFIELD ROAD
GLADSTONE ROAD
BOWER GR
HARROWBY ROAD
RAWSON ROAD
CHATHAM CL
GORDON ROAD
A5036
Meml
LC
Subway
CECIL ROAD
10m
ELM ROAD
ELM DRIVE
BARKELEY DRIVE
POPLAR GROVE
HOLLY GROVE
BEECH GROVE
CHURCH ROAD
10m
0
100
metres
Scale: 1:3,000
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Lathom Close / Princess Way
Monitoring Station
Date: July 2021


N
EVERTON VW
DERBY ROAD
A565
TREET
BYNG ST
R STREET
WILLIAM HENRY ST
BRIDGE ST
MILLER'S BRIDGE
DOUGLAS PLACE
Towing Path
BRASENOSE ROAD
EFFINGHAM STREET
HOWE STREET
0
100
metres
Scale: 1:2,000
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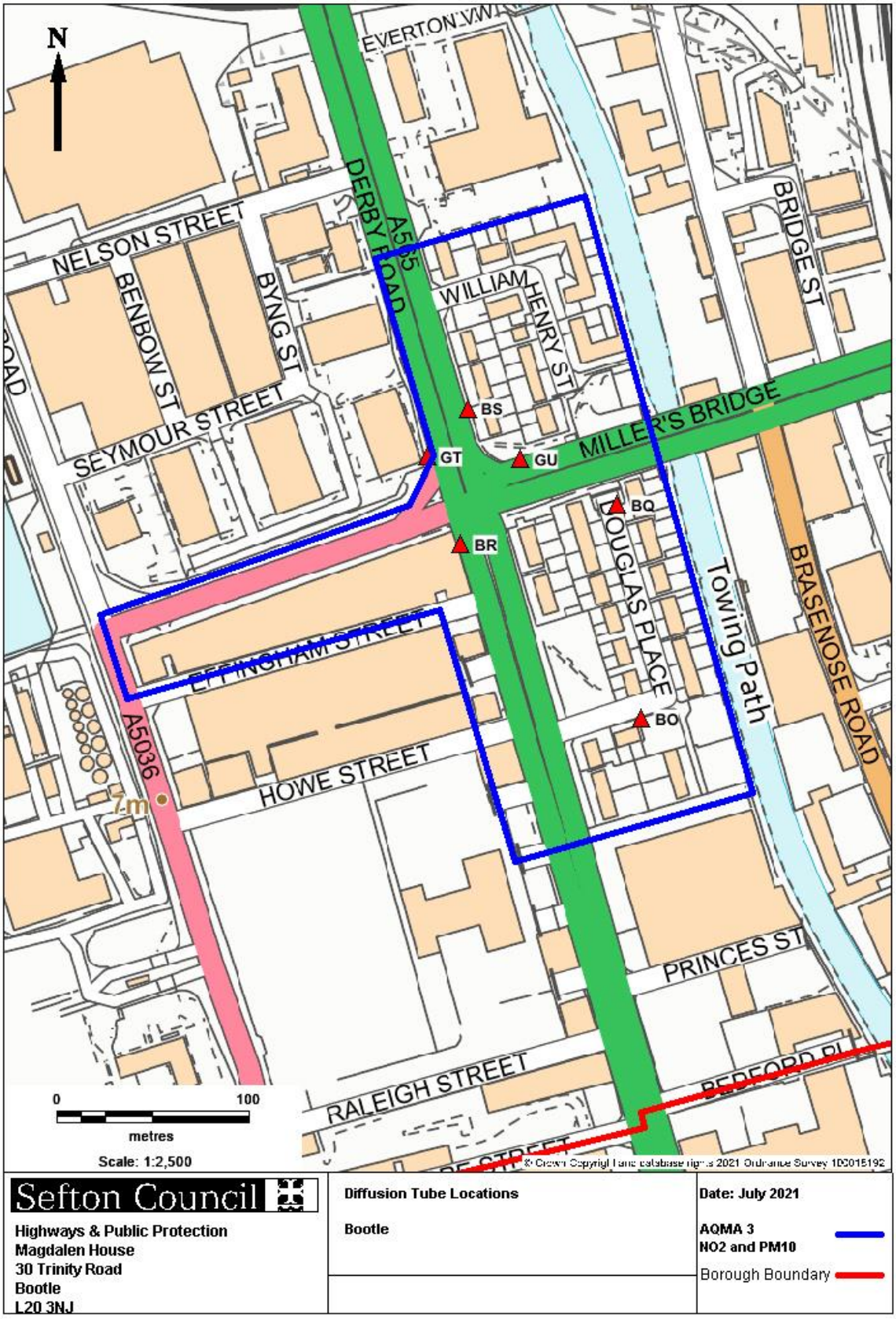
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Miller's Bridge Monitoring Station
Date: July 2021


N
EVERTON VW
DERBY ROAD
A5036
NELSON STREET
BENBOW ST
BYNG ST
SEYMOUR STREET
WILLIAM HENRY ST
BRIDGE ST
MILLER'S BRIDGE
BS
GT
GU
BQ
BR
DOUGLAS PLACE
Towing Path
BRASENOSE ROAD
ETTINGHAM STREET
A5036
HOWE STREET
7m
BO
PRINCES ST
RALEIGH STREET
0
100
metres
Scale: 1:2,500
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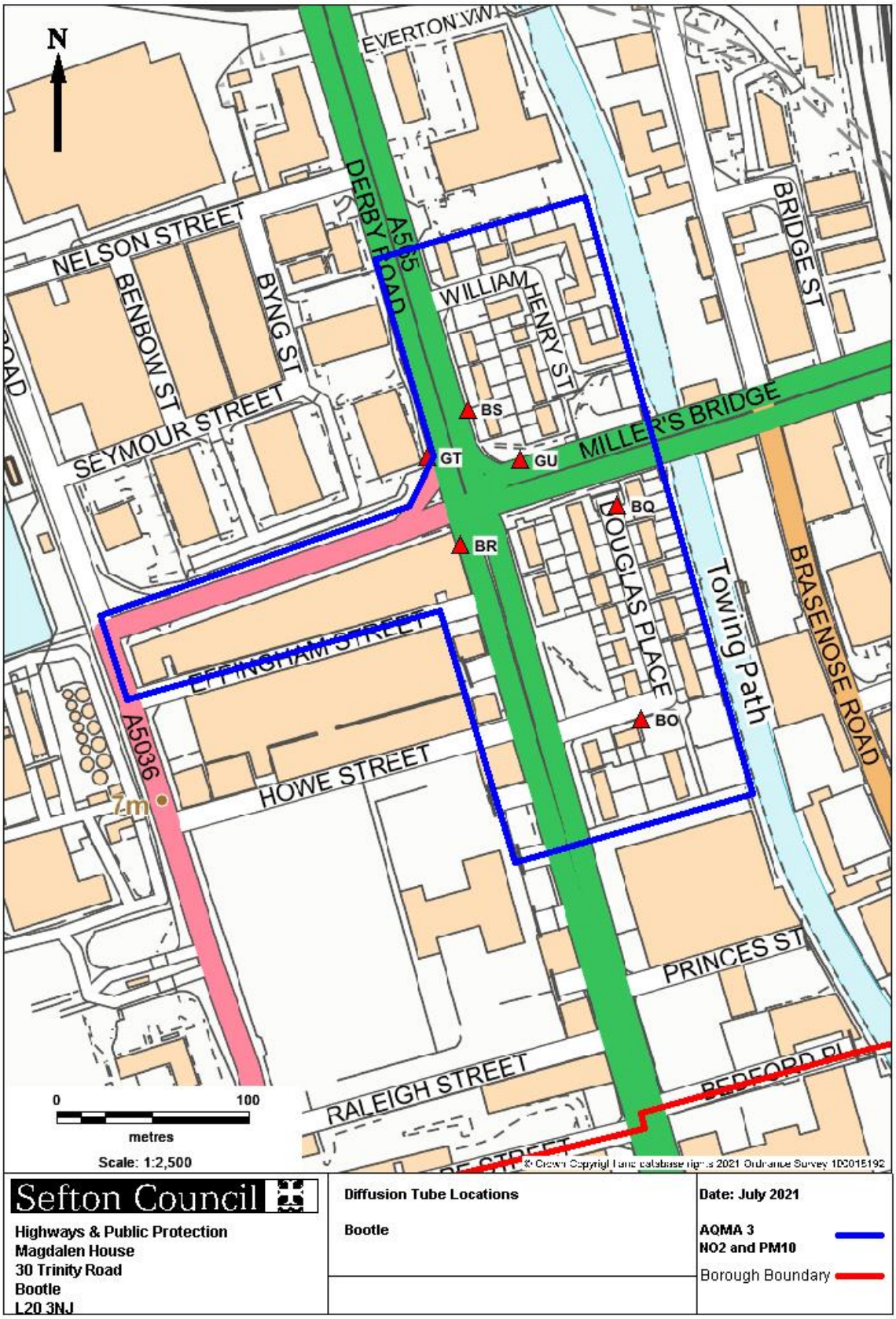
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Diffusion Tube Locations
Bootle
Date: July 2021
AQMA 3
NO2 and PM10
Borough Boundary


N
EVERTON VW
DERBY ROAD
A5
NELSON STREET
BENBOW ST
BYNG ST
WILLIAM HENRY ST
BRIDGE ST
SEYMOUR STREET
MILLER'S BRIDGE
BS
GT
GU
BQ
BR
DOUGLAS PLACE
Towing Path
BRASENOSE ROAD
ETTINGHAM STREET
A5036
HOWE STREET
7m
BO
PRINCES ST
RALEIGH STREET
0
100
metres
Scale: 1:2,500
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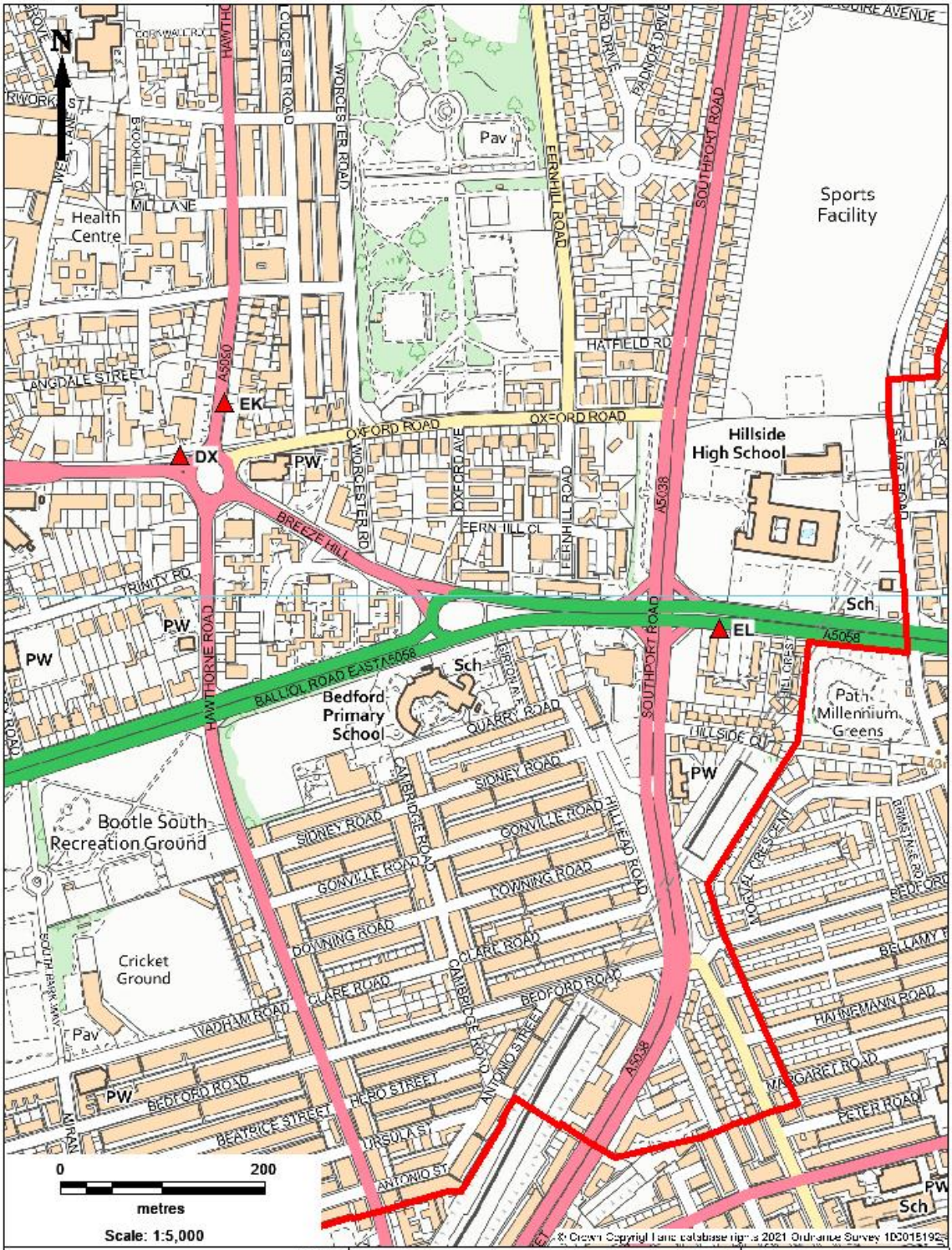
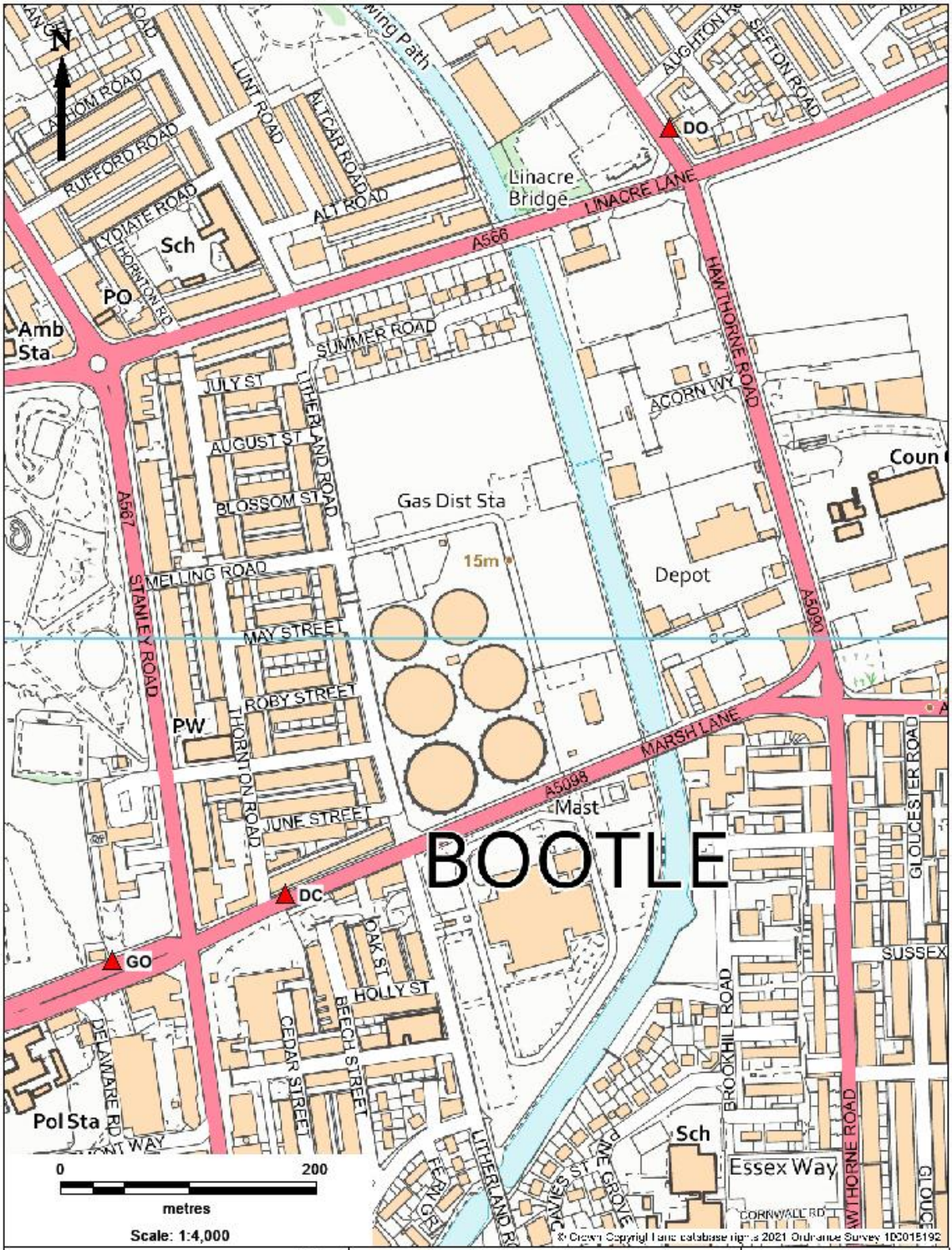
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Diffusion Tube Locations
Bootle
Date: July 2021
AQMA 3
NO2 and PM10
Borough Boundary



Sefton Council **Highways & Public Protection** **Magdalen House** **30 Trinity Road** **Bootle** **L20 3NJ**	**Diffusion Tube Locations** **Bootle**	**Date: July 2021** **Borough Boundary**


N
Linacre Bridge
LINACRE LANE
A566
DO
HAWTHORNE ROAD
Sch
PO
Amb Sta
SUMMER ROAD
JULY ST
AUGUST ST
LITHERLAND ROAD
BLOSSOM ST
ACORN WY
Gas Dist Sta
15m
Depot
Coun
A567
STANLEY ROAD
MELLING ROAD
MAY STREET
ROBY STREET
PW
THORNTON ROAD
JUNE STREET
A5098
MARSH LANE
Mast
BOOTLE
DC
GO
A5090
GLOUCESTER ROAD
SUSSEX
OAK ST
HOLLY ST
BEECH STREET
CEDAR STREET
DELAWARE RD
Pol Sta
BROOKHILL ROAD
Sch
Essex Way
PINE GROVE
CORNWALL RD
WITHORNE ROAD
0
200
metres
Scale: 1:4,000
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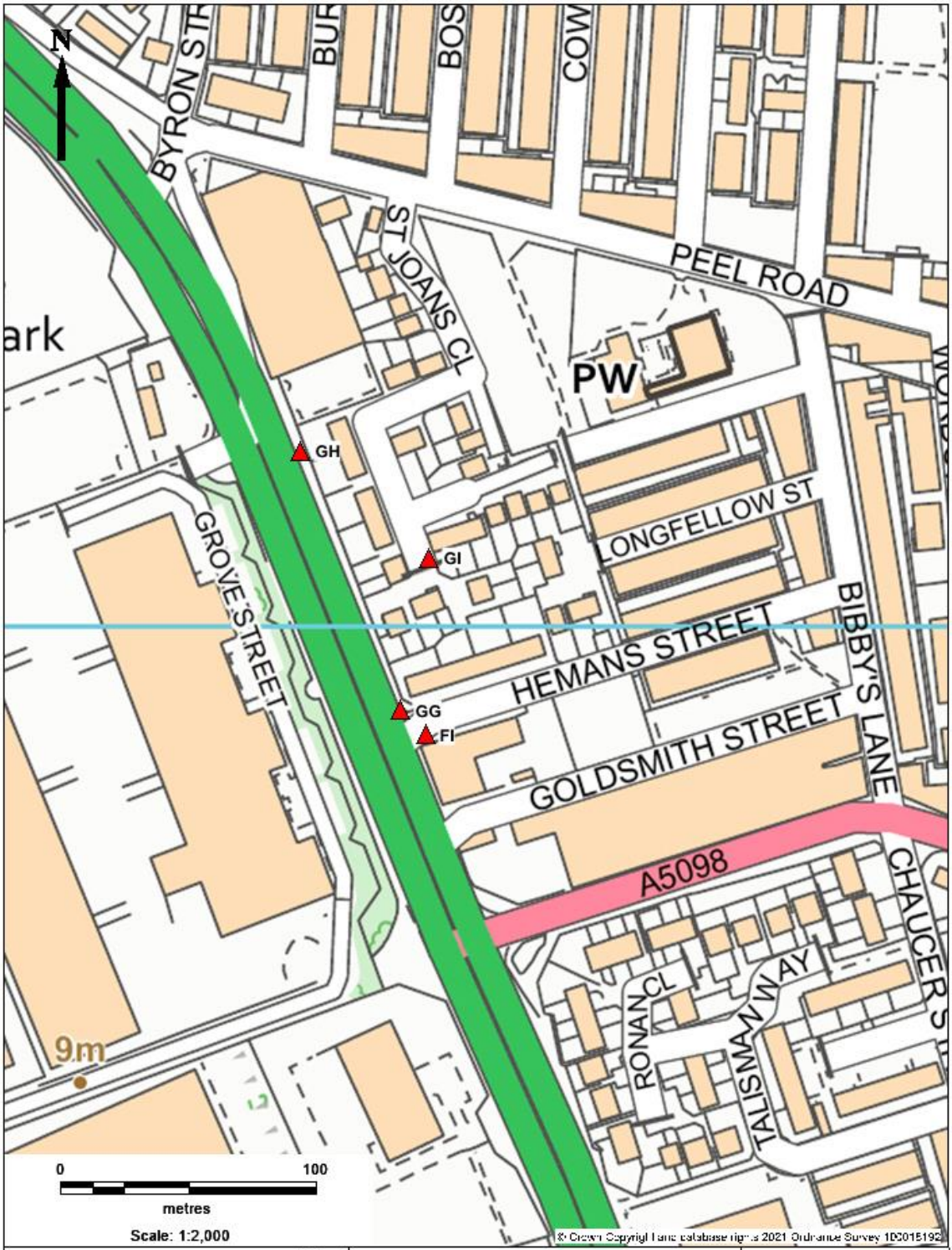
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Diffusion Tube Locations
Bootle
Date: July 2021


N
BYRON STR
BUR
BOS
COW
ST JOANS CL
PEEL ROAD
ark
PW
GH
GI
GG
FI
GROVE STREET
LONGFELLOW ST
HEMANS STREET
BIBBY'S LANE
GOLDSMITH STREET
A5098
CHAUCER S
RONAN CL
TALISMAN WAY
9m
0
100
metres
Scale: 1:2,000
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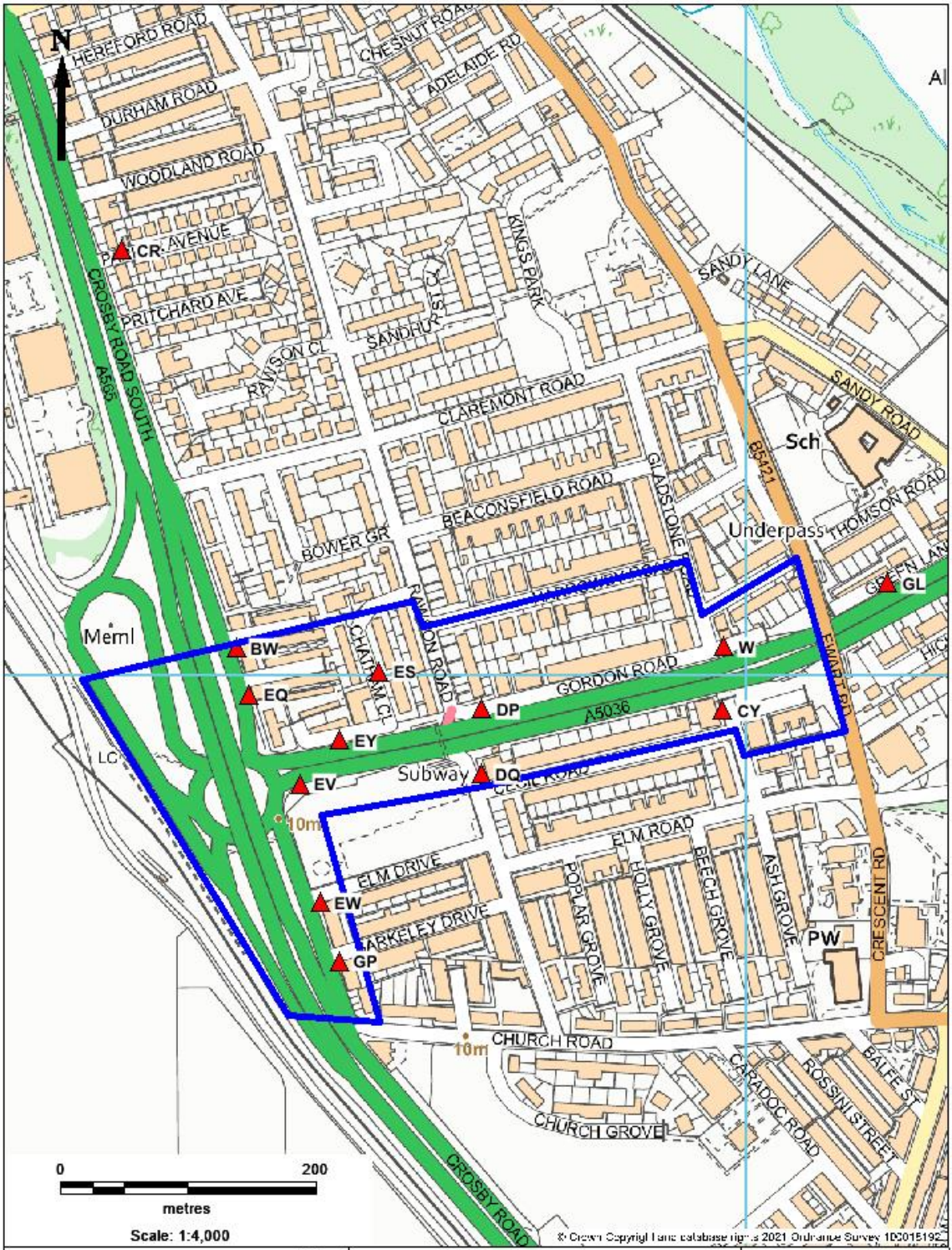
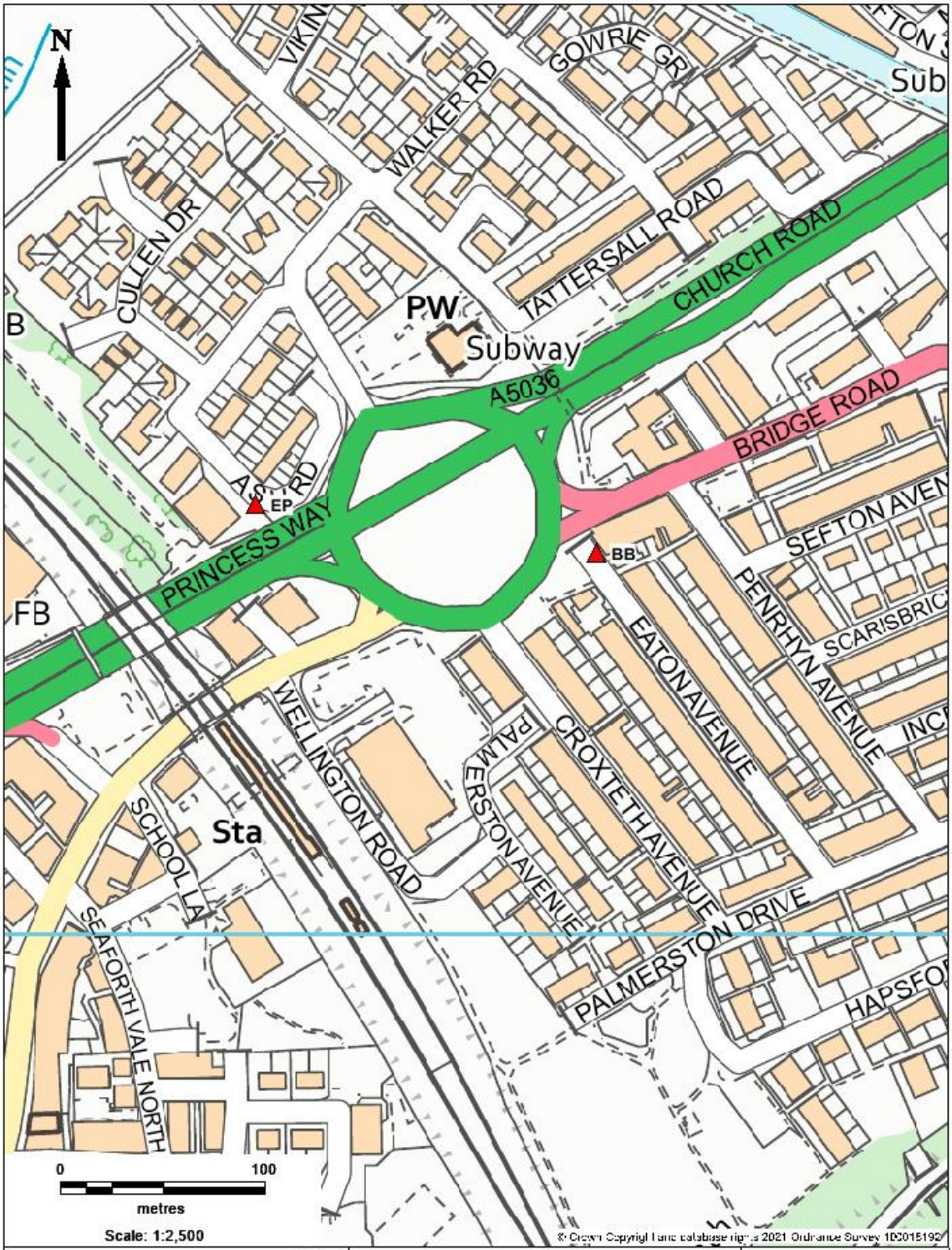
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Diffusion Tube Locations
Bootle
Date: July 2021



Sefton Council Highways & Public Protection Magdalen House 30 Trinity Road Bootle L20 3NJ	Diffusion Tube Locations Seaforth	Date: July 2021 AQMA 2 NO2


N
WALKER RD
GOWRIE GR
CULLEN DR
TATTERSALL ROAD
CHURCH ROAD
PW
Subway
B
A5036
BRIDGE ROAD
A59 RD
EP
PRINCESS WAY
BB
SEFTON AVEN
FB
PENRHYN AVENUE
EATON AVENUE
WELLINGTON ROAD
PALM
ERSTON AVENUE
CROXTETH AVENUE
SCHOOL LA
Sta
SEAFORTH VALE NORTH
PALMERSTON DRIVE
0
100
metres
Scale: 1:2,500
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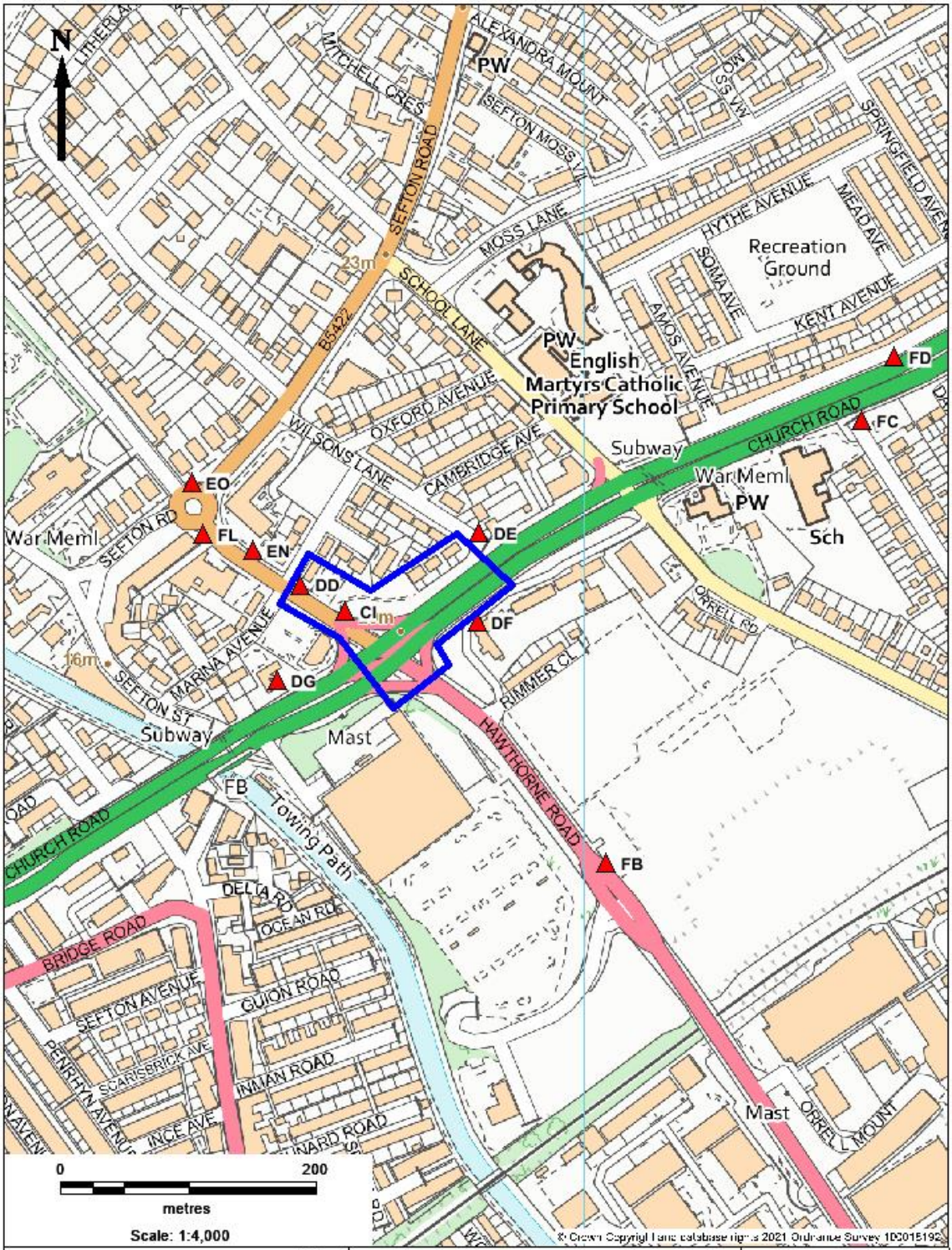
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Diffusion Tube Locations
Litherland and Seaforth
Date: July 2021


N
ALEXANDRA MOUNT
PW
MITCHELL CRES
SEFTON ROAD
SEFTON MOSS VIA
MOSS LANE
HYTHE AVENUE
MEAD AVE
SPRINGFIELD AVEN
Recreation Ground
SOMA AVE
KENT AVENUE
AMOS AVENUE
23m
SCHOOL LANE
B5427
PW
English Martyrs Catholic Primary School
FD
FC
OXFORD AVENUE
WILSONS LANE
CAMBRIDGE AVE
Subway
CHURCH ROAD
War Meml
PW
Sch
EO
SEFTON RD
War Meml
FL
EN
DE
DD
Cl m
DF
ORRELL RD
RIMMER CL
16m
MARINA AVENUE
SEFTON ST
DG
Subway
Mast
HAWTHORNE ROAD
FB
Towing Path
FB
CHURCH ROAD
DELTA RD
OCEAN RD
BRIDGE ROAD
SEFTON AVENUE
GUION ROAD
PENRHYN AVENUE
SCARISBRICK AVE
INMAN ROAD
INCE AVE
INARD ROAD
Mast
ORRELL MOUNT
0
200
metres
Scale: 1:4,000
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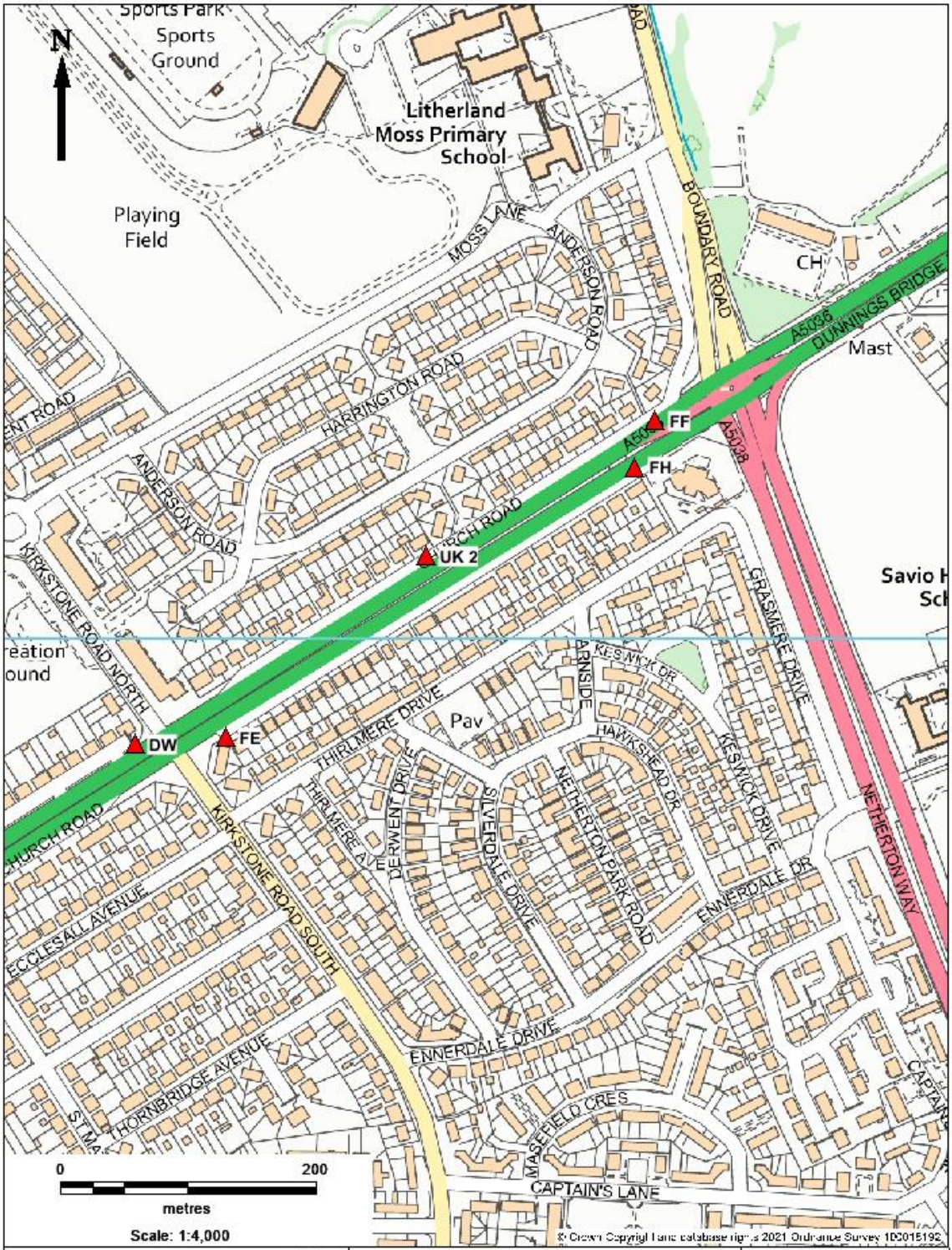
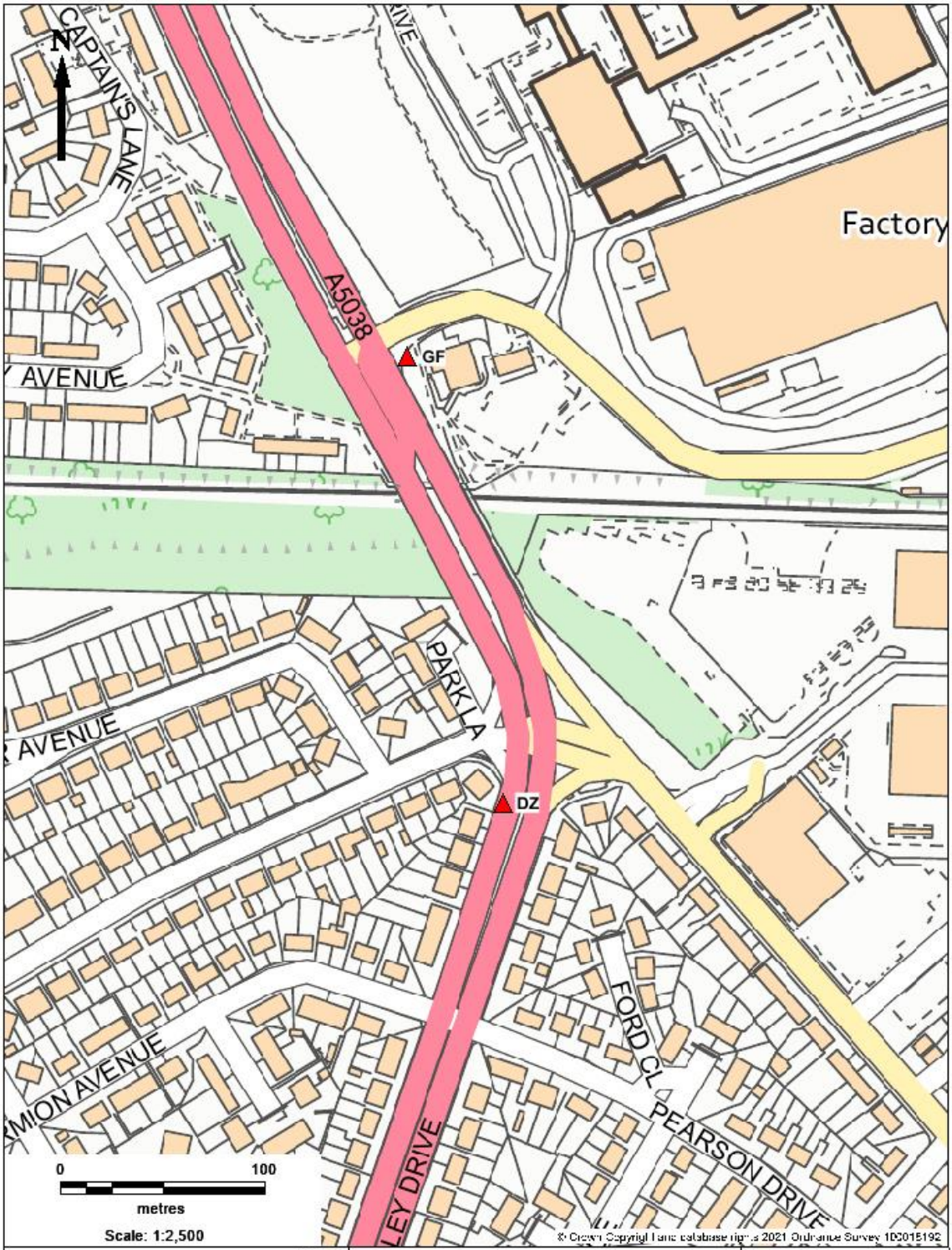
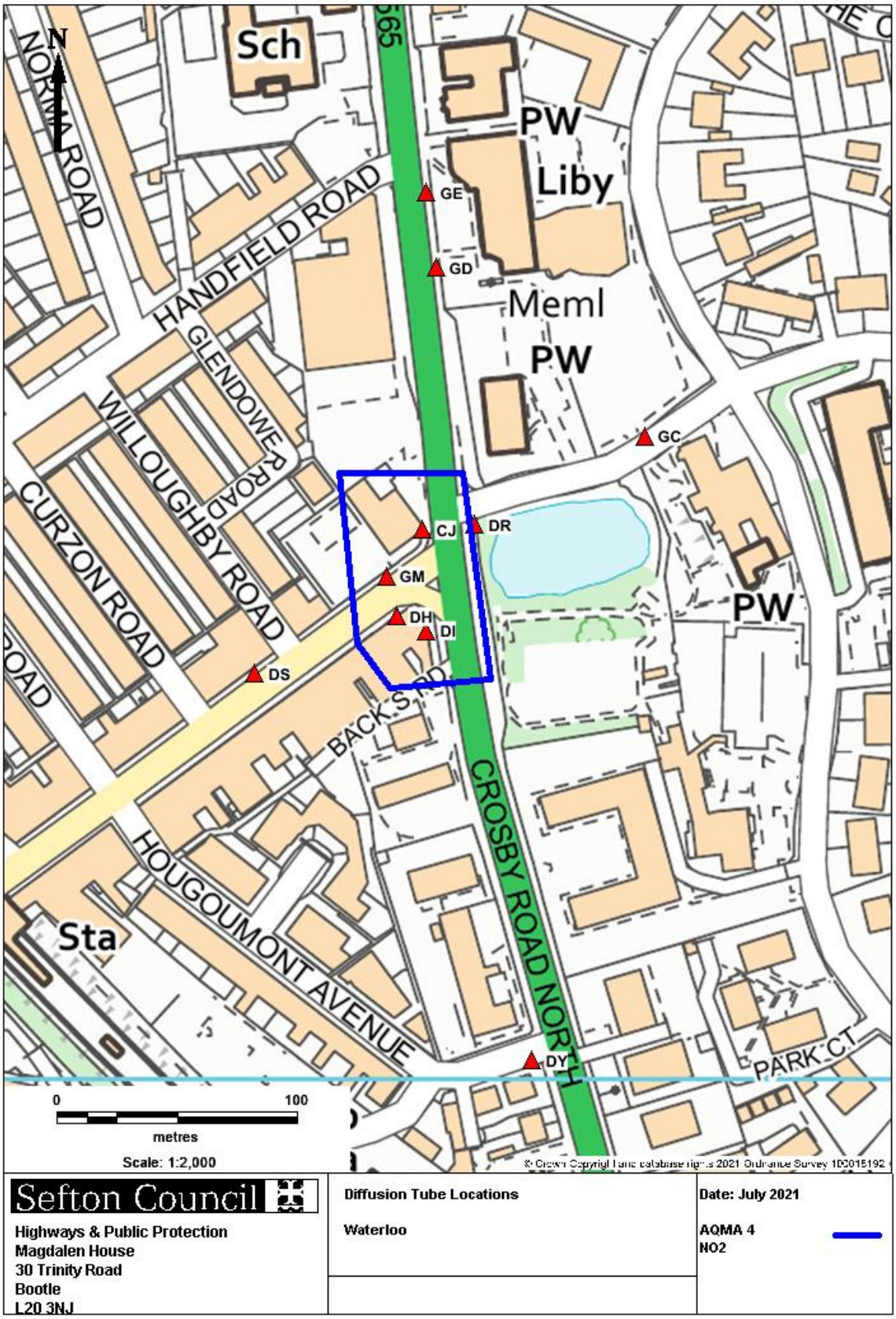
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Diffusion Tube Locations
Litherland
Date: July 2021
AQMA 5
NO2


N
Sports Park
Sports Ground
Litherland Moss Primary School
Playing Field
MOSS LANE
ANDERSON ROAD
BOUNDARY ROAD
CH
A5036
DUNNINGS BRIDGE
Mast
HARRINGTON ROAD
A565
FF
FH
UK 2
KIRKSTONE ROAD NORTH
DW
FE
THIRLMERE DRIVE
Pav
KESWICK DR
ARNSIDE
GRASMERE DRIVE
HAWKSHEAD DR
KESWICK DRIVE
NETHERTON WAY
DERWENT DRIVE
SILVERDALE DRIVE
NETHERTON PARK ROAD
ENNERDALE DR
ECCLESALL AVENUE
KIRKSTONE ROAD SOUTH
ENNERDALE DRIVE
THORNBRIDGE AVENUE
MASEFIELD CRES
CAPTAIN'S LANE
0
200
metres
Scale: 1:4,000
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Diffusion Tube Locations
Litherland
Date: July 2021


N
CAPTAIN'S LANE
A5038
Factory
GF
AVENUE
PARK LA
DZ
FORD CL
PEARSON DRIVE
0
100
metres
Scale: 1:2,500
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Diffusion Tube Locations
Bootle and Netherton
Date: July 2021


N
Sch
PW
Liby
Meml
PW
PW
NORMA ROAD
HANDFIELD ROAD
GLENDOWER ROAD
WILLOUGHBY ROAD
CURZON ROAD
BACK S RD
CROSBY ROAD NORTH
HOUGOUMONT AVENUE
PARK CT
Sta
GE
GD
GC
CJ
DR
GM
DH
DI
DS
DY
0
100
metres
Scale: 1:2,000
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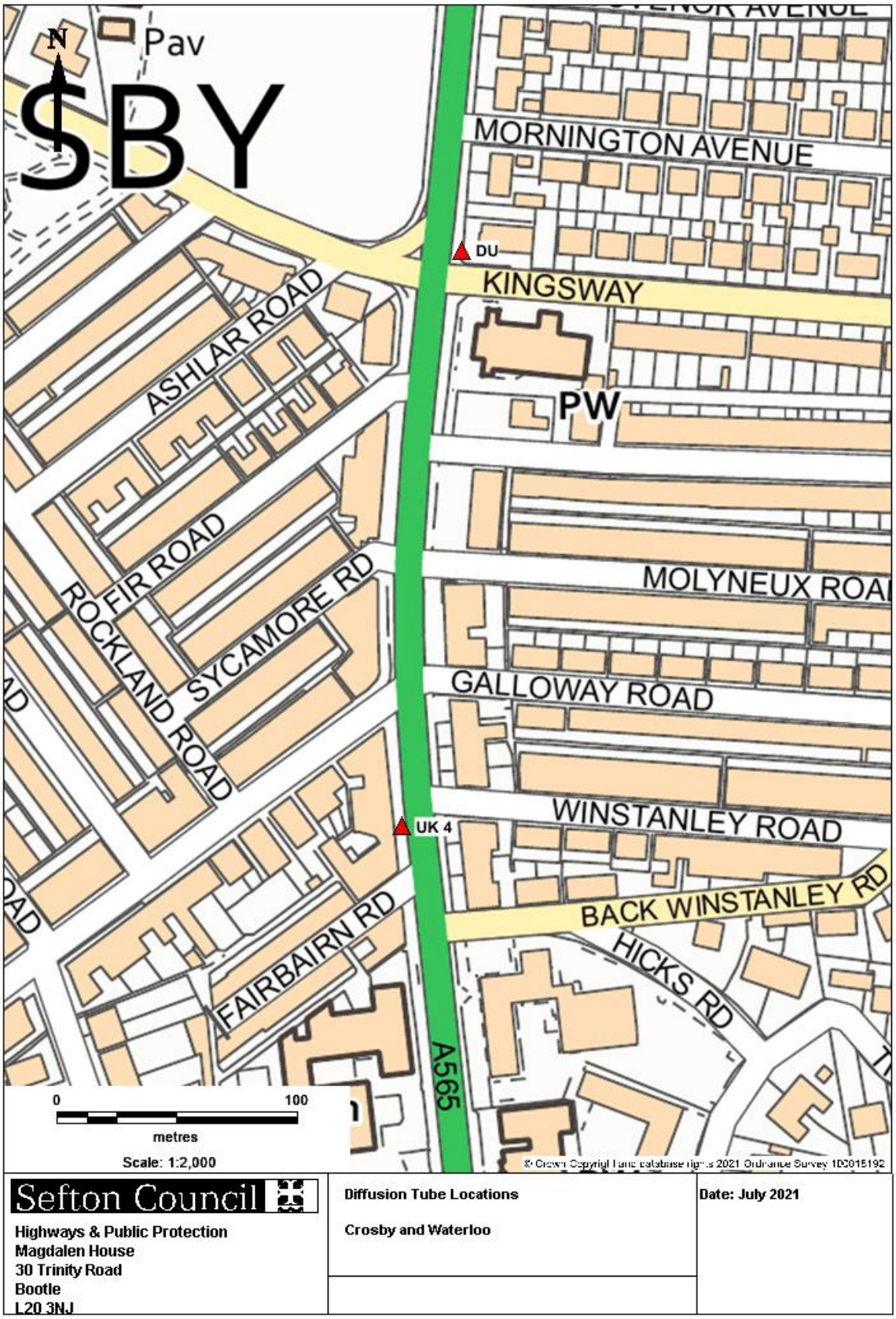
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Diffusion Tube Locations
Waterloo
Date: July 2021
AQMA 4
NO2


N
Pav
SBY
MORNINGTON AVENUE
DU
KINGSWAY
ASHLAR ROAD
PW
FIR ROAD
ROCKLAND ROAD
SYCAMORE RD
MOLYNEUX ROAD
GALLOWAY ROAD
UK 4
WINSTANLEY ROAD
BACK WINSTANLEY RD
HICKS RD
FAIRBAIRN RD
A565
0
100
metres
Scale: 1:2,000
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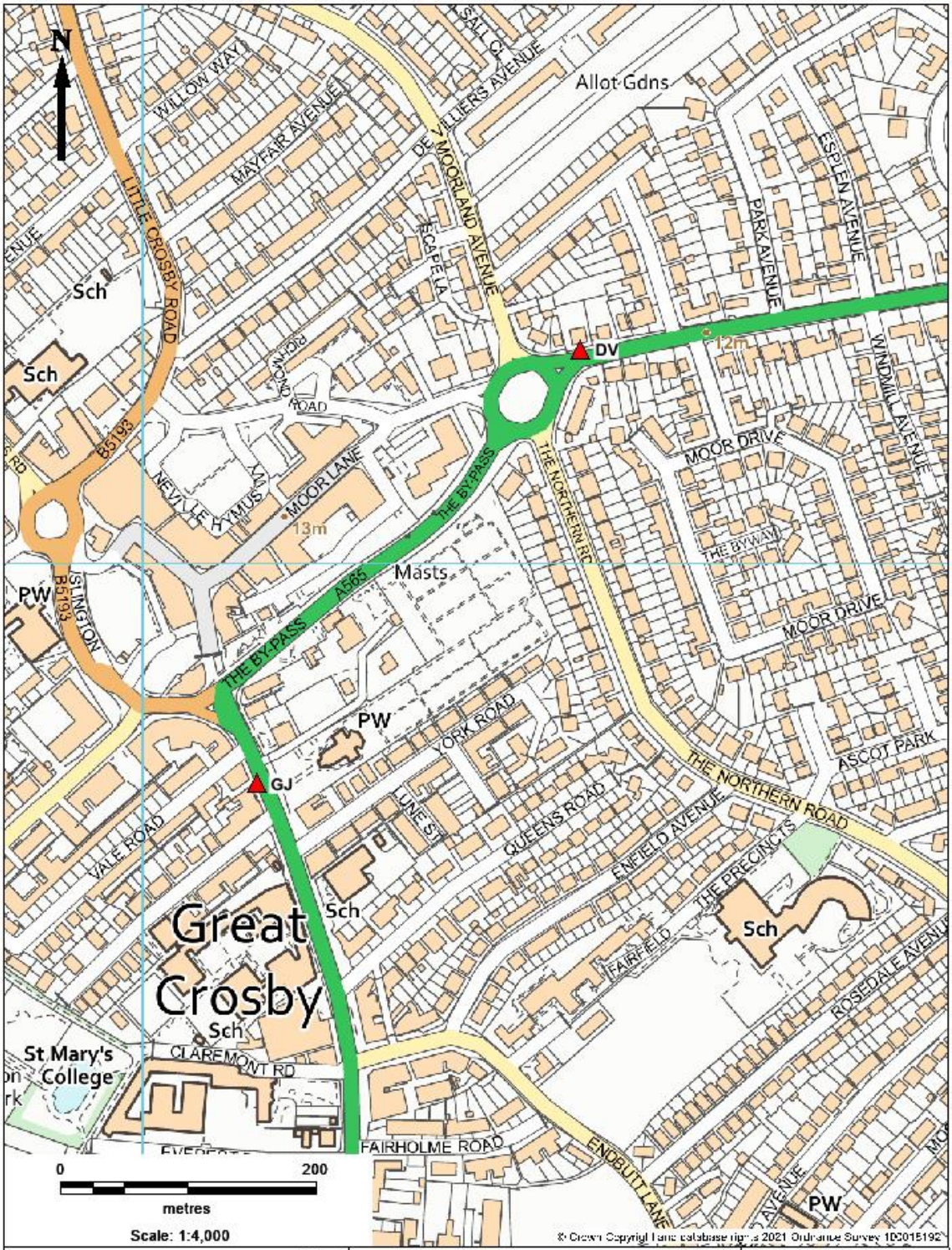
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Diffusion Tube Locations
Crosby and Waterloo
Date: July 2021


N
Allot Gdns
DE VILLIERS AVENUE
MOORLAND AVENUE
WILLOW WAY
MAYFAIR AVENUE
LITTLE CROSBY ROAD
ESCAPELA
ROAD
PARK AVENUE
ESPLEN AVENUE
WINDMILL AVENUE
MOOR DRIVE
THE BY-PASS
THE NORTHERN RD
MOOR LANE
NEVILLE HYMUS WAY
B5193
A565
Masts
13m
12m
DV
GJ
PW
Sch
ISLINGTON
YORK ROAD
QUEENS ROAD
ENFIELD AVENUE
THE NORTHERN ROAD
ASCOT PARK
THE PRECINCTS
FAIRFIELD
ROSEDALE AVENUE
VALE ROAD
Great Crosby
St Mary's College
CLAREMONT RD
FAIRHOLME ROAD
ENDBUTT LANE
0
200
metres
Scale: 1:4,000
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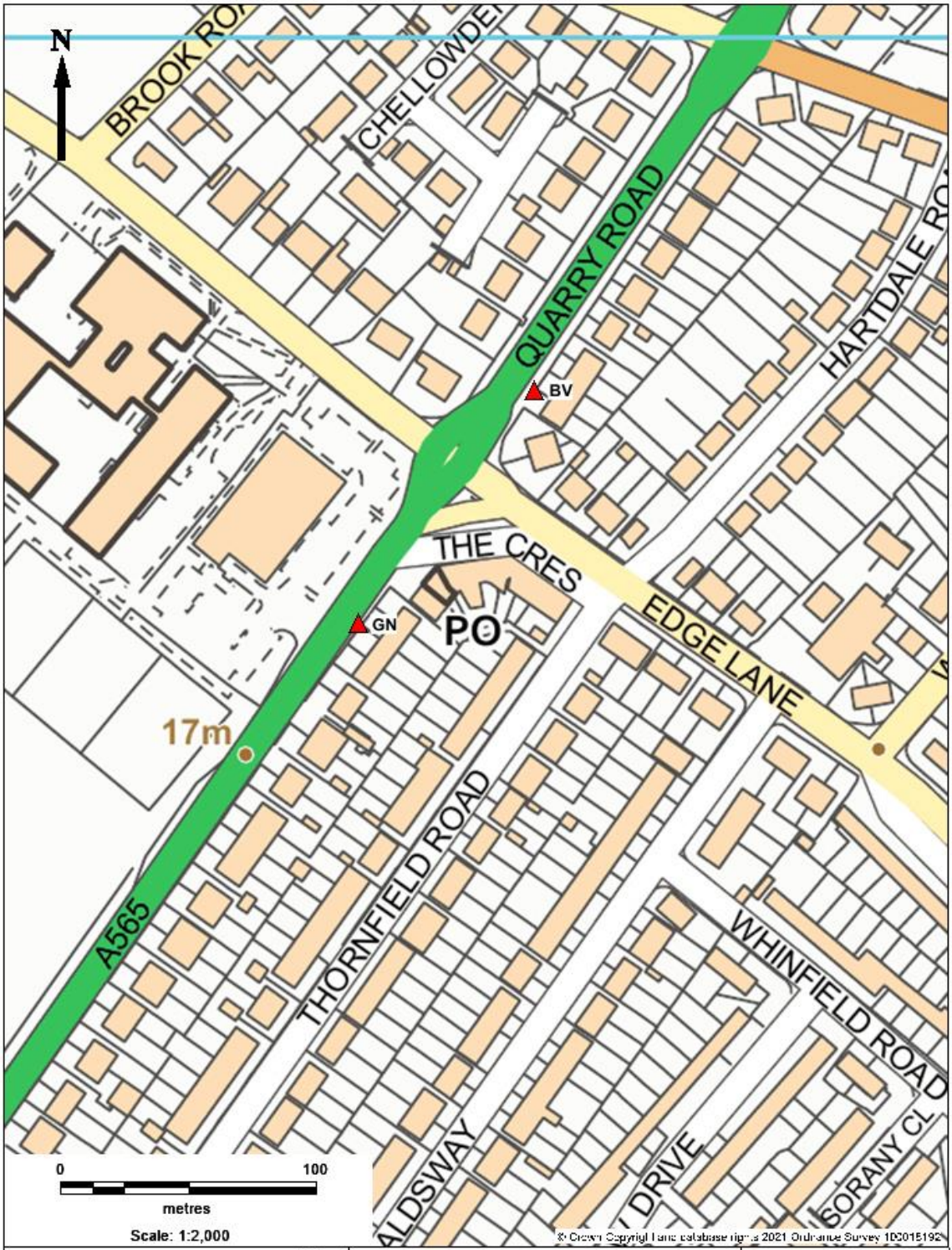
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Diffusion Tube Locations
Crosby
Date: July 2021


N
BROOK RO
CHELLOWDE
QUARRY ROAD
HARTDALE RO
BV
THE CRES
EDGE LANE
GN
PO
17m
A565
THORNFIELD ROAD
WHINFIELD ROAD
ALDSWAY
DRIVE
GORANY CL
0
100
metres
Scale: 1:2,000
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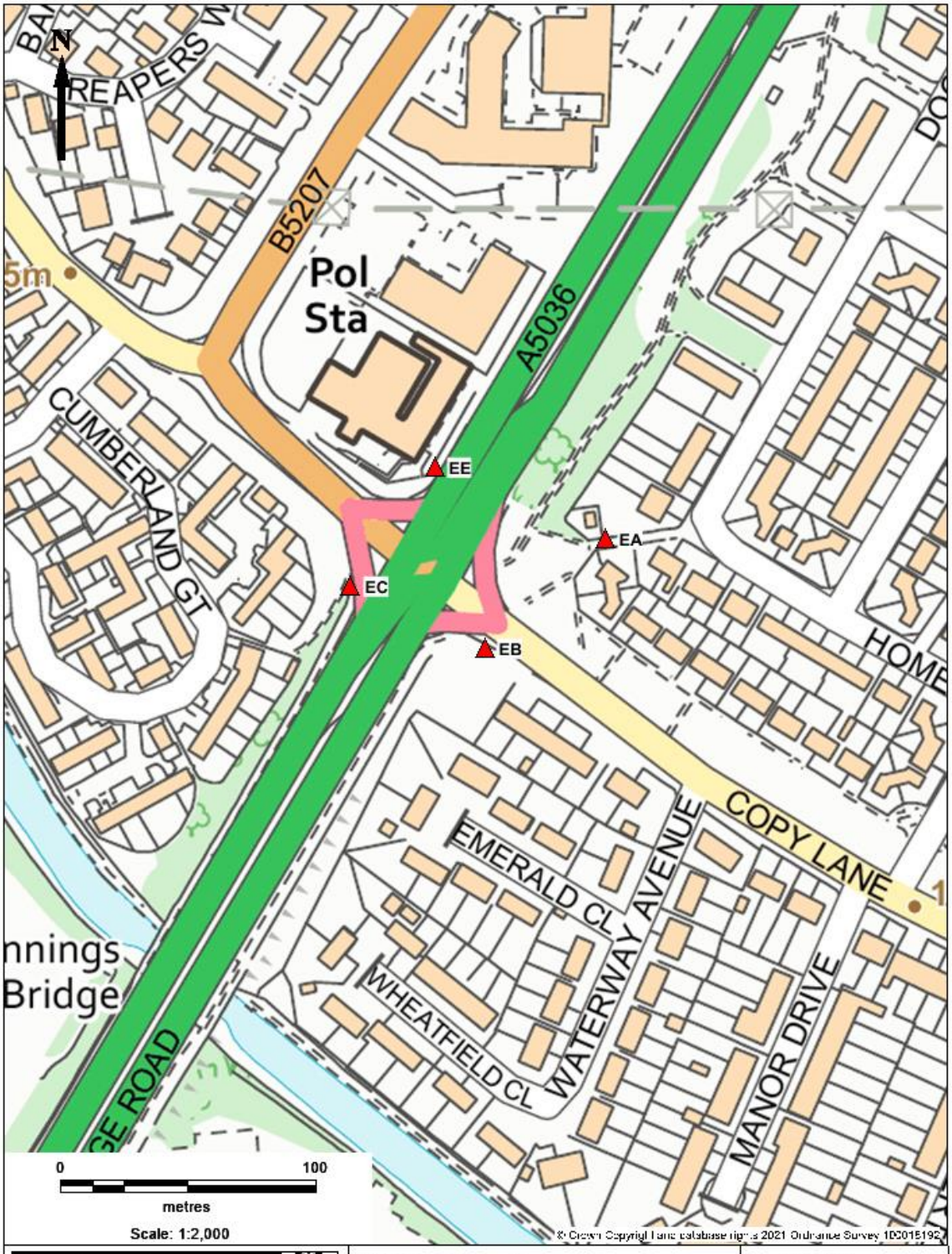
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Diffusion Tube Locations
Thornton
Date: July 2021


N
REAPERS W
B5207
Pol
Sta
A5036
CUMBERLAND GT
EE
EA
EC
EB
COPY LANE
EMERALD CL
WATERWAY AVENUE
WHEATFIELD CL
MANOR DRIVE
nnings
Bridge
0
100
metres
Scale: 1:2,000
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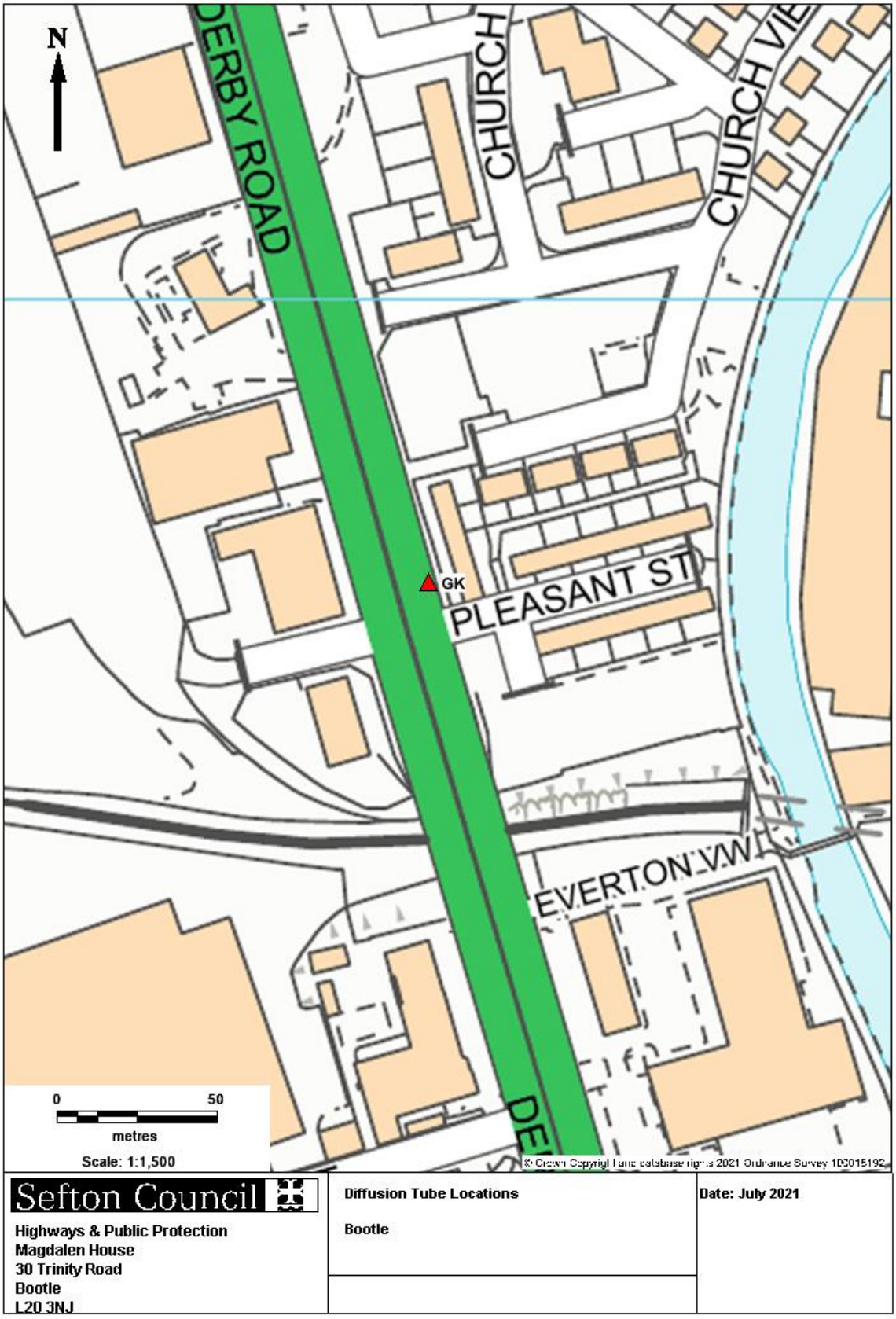
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Diffusion Tube Locations
Netherton
Date: July 2021


N
Marine
Gardens
War Meml
B5245
NEVILL STREET
WEST STREET
CABLE ST
GB
ST GEORGE'S PL
ANCHOR
LORD ST
PW
WAVERLEY ST
SHARROCK STREET
CHAPEL STREET
HULME STREET
565
GA
Liby
Sta
TULKETH ST
MARKET STREET
Campsite
(private)
WESLEY ST
TULKETH STREET
Car Par
PW
PORTLAND STREET
KING STREET
EASTBANK STREET
0
100
metres
Scale: 1:3,000
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Diffusion Tube Locations
Southport
Date: July 2021


N
DERBY ROAD
CHURCH
CHURCH VIE
GK
PLEASANT ST
EVERTON VW
0
50
metres
Scale: 1:1,500
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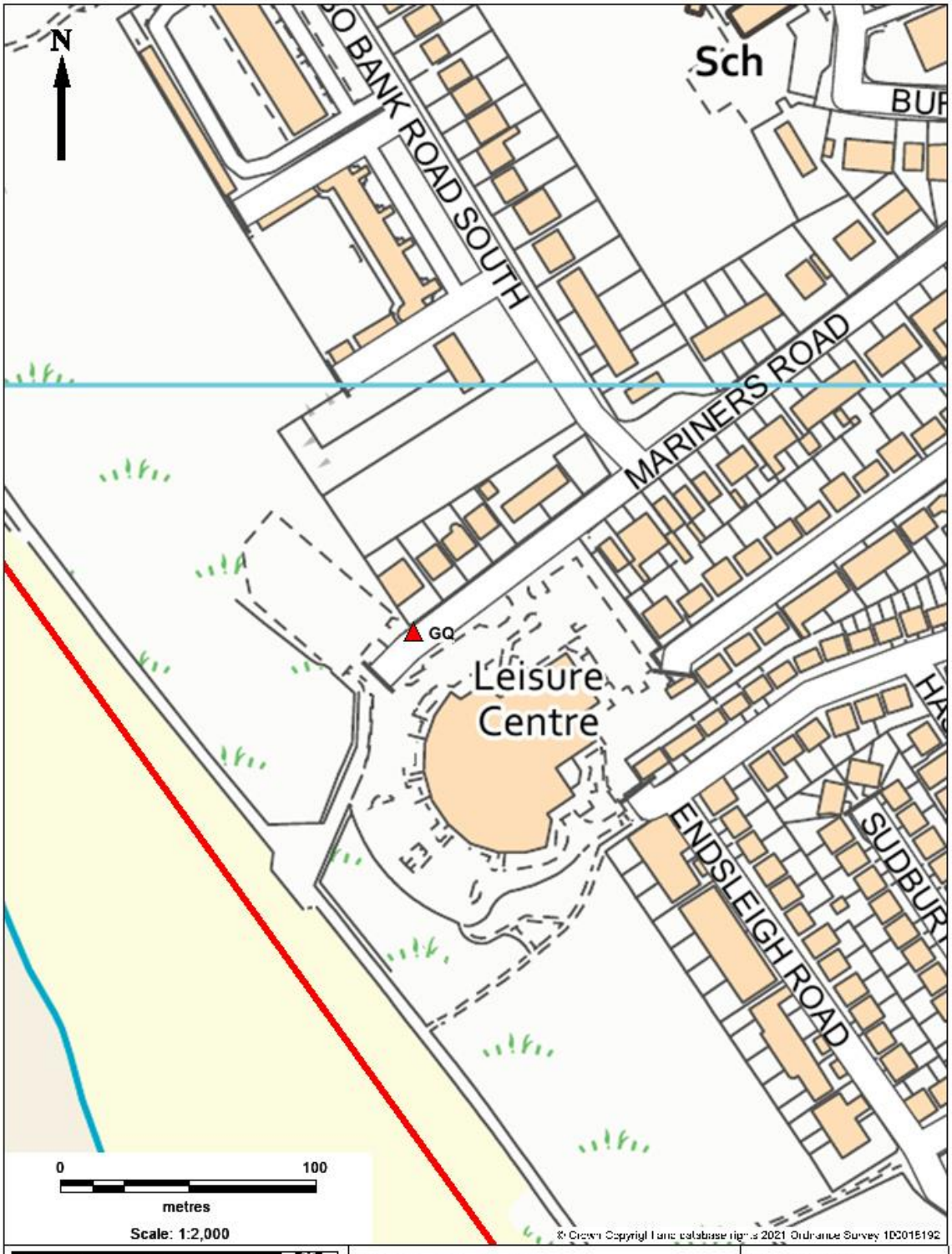
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Diffusion Tube Locations
Bootle
Date: July 2021


N
Sch
BANK ROAD SOUTH
MARINERS ROAD
GQ
Leisure Centre
ENDSLEIGH ROAD
0
100
metres
Scale: 1:2,000
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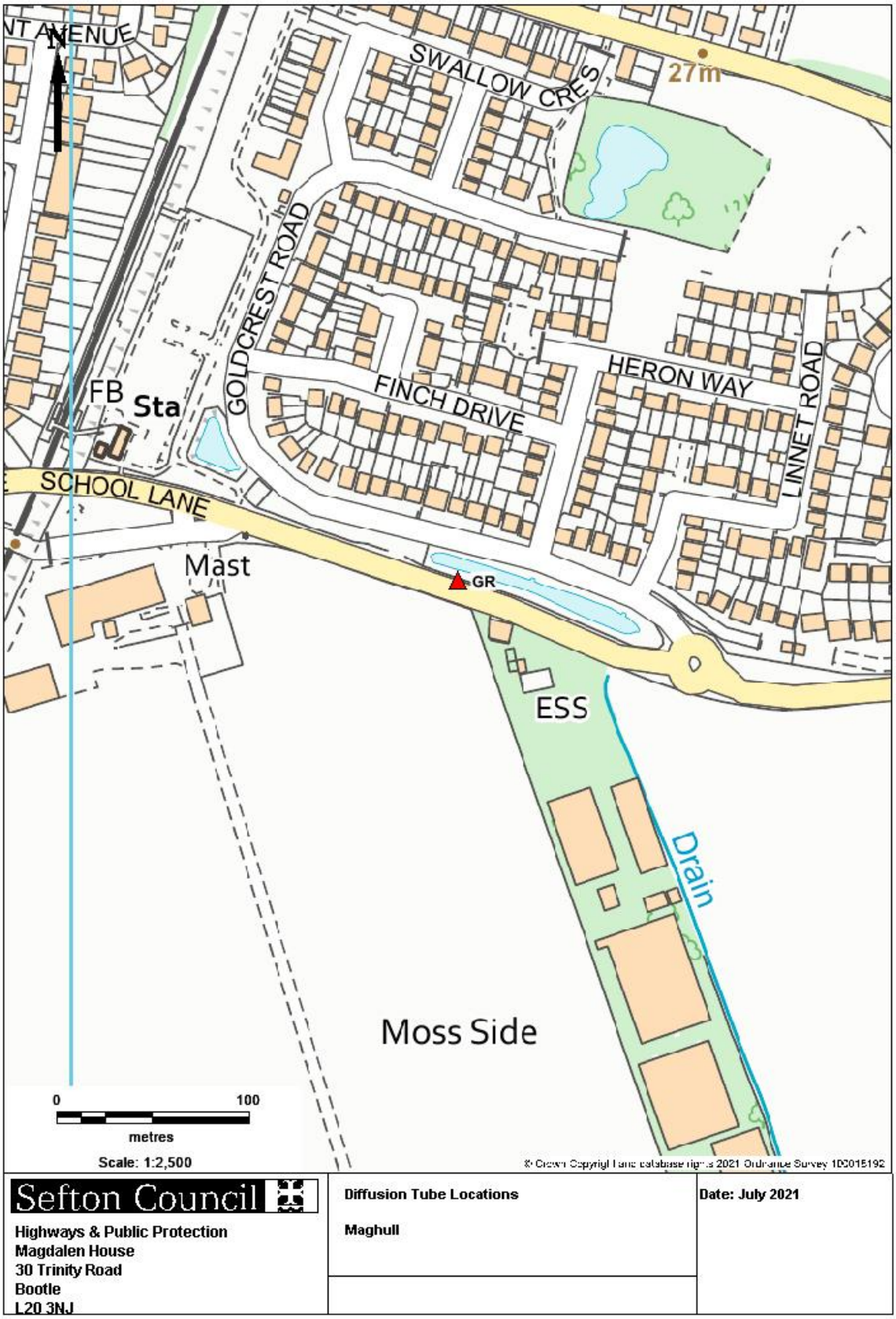
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Diffusion Tube Locations
Blundellsands
Date: July 2021


NT AVENUE
N
SWALLOW CRES
27m
GOLDCREST ROAD
FB
Sta
FINCH DRIVE
HERON WAY
LINNET ROAD
SCHOOL LANE
Mast
GR
ESS
Drain
Moss Side
0
100
metres
Scale: 1:2,500
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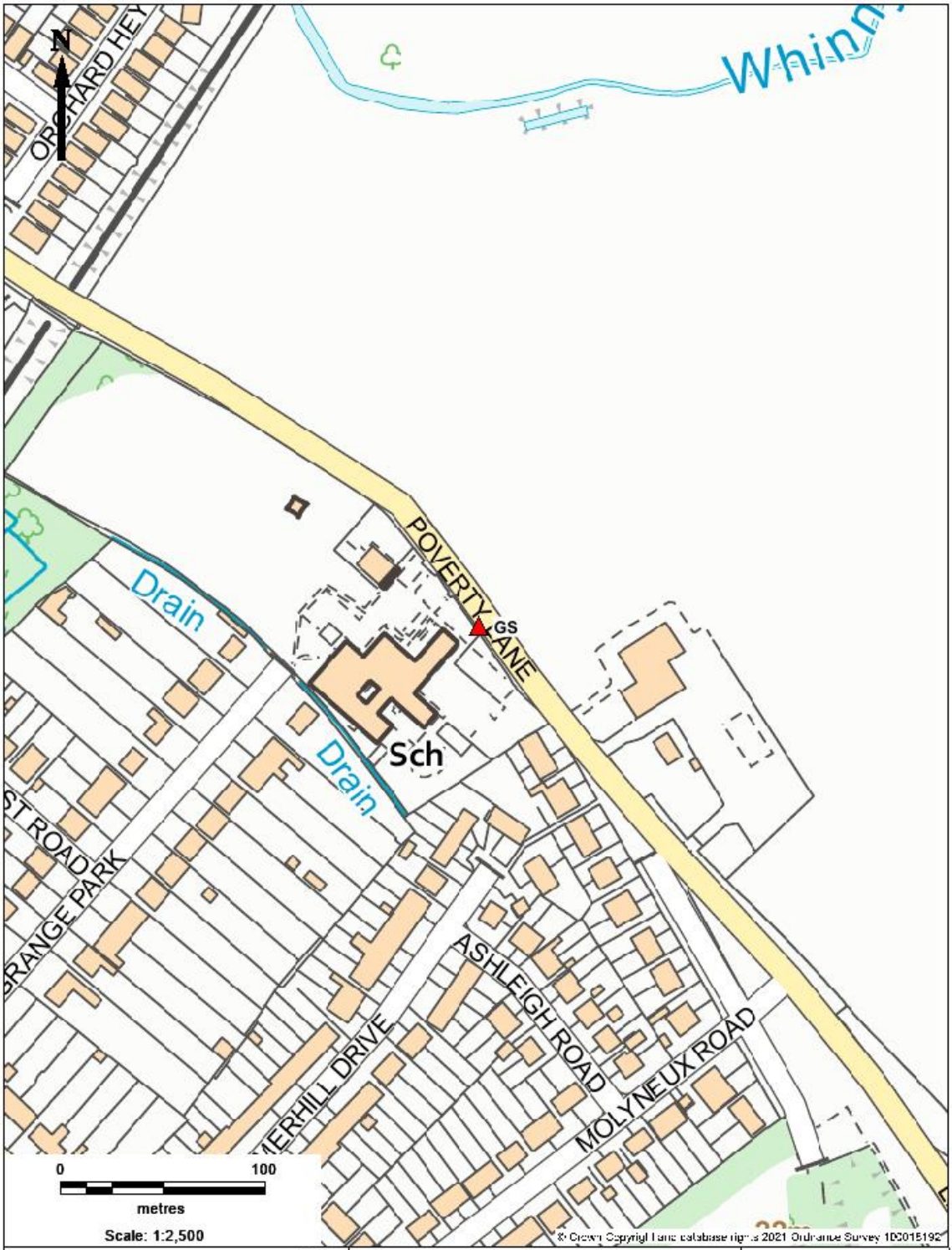
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Diffusion Tube Locations
Maghull
Date: July 2021


N
ORCHARD HEY
Whinn
POVERTY LANE
GS
Drain
Drain
Sch
ST ROAD
RANGE PARK
ERHILL DRIVE
ASHLEIGH ROAD
MOLYNEUX ROAD
0
100
metres
Scale: 1:2,500
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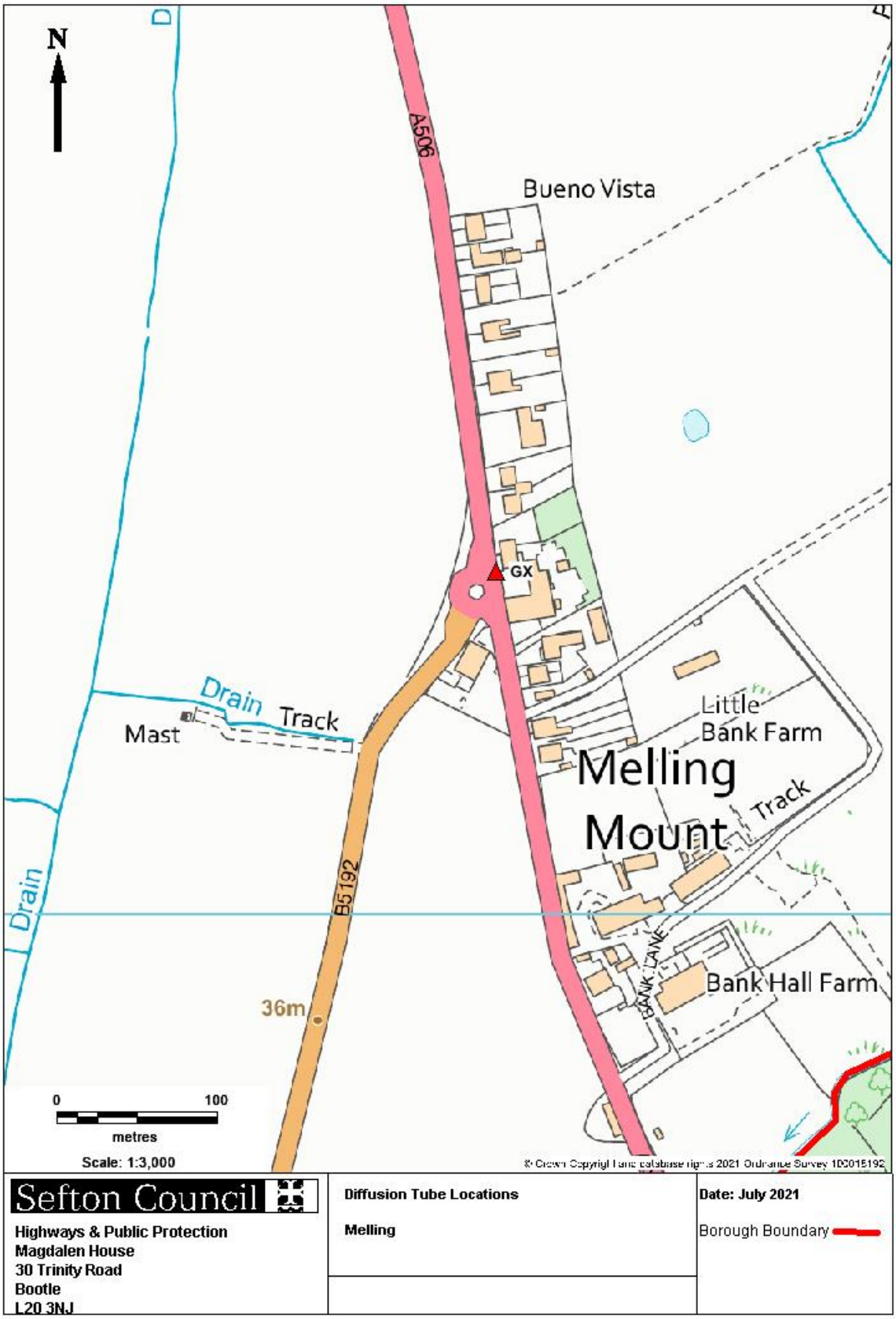
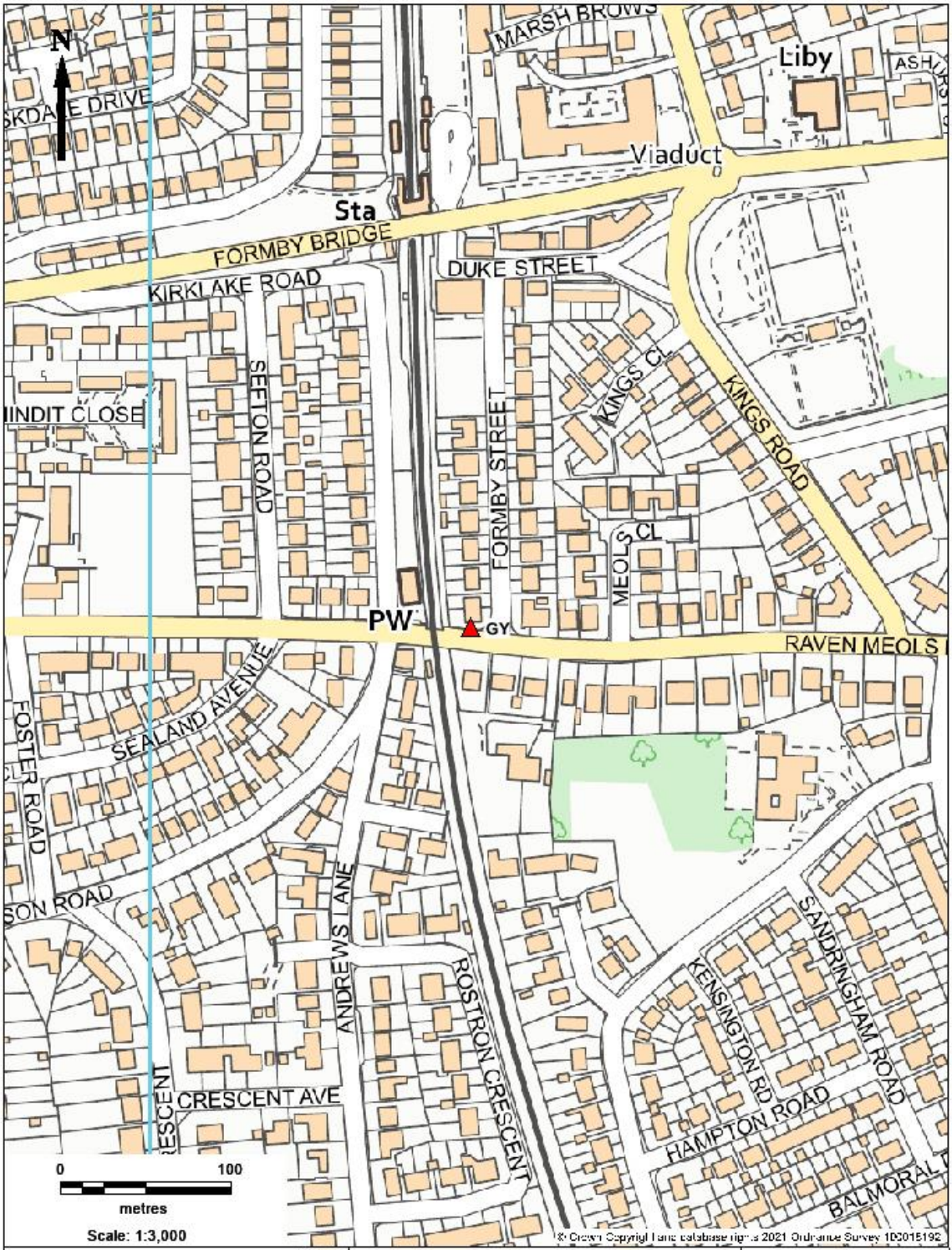
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Diffusion Tube Locations
Maghull
Date: July 2021


N
Towing Path
RENDALE AVENUE
Pav
Cricket Ground
Pav
ALSCOT CL
Liby
Maghull Leisure Centre
GW
GV
ALL LANE
OLD HALL ROAD
PW
FB
A59
NORTHWAY
Sch
KINGSFIELD RD
DENNETT CLOSE
0
100
metres
Scale: 1:2,500
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Diffusion Tube Locations
Maghull
Date: July 2021


N
A506
Bueno Vista
GX
Drain
Track
Mast
Little
Bank Farm
Melling
Mount
Track
B5192
Drain
36m
BANK LANE
Bank Hall Farm
0
100
metres
Scale: 1:3,000
© Crown Copyright Land database rights 2021 Ordnance Survey 100015192
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Diffusion Tube Locations
Melling
Date: July 2021
Borough Boundary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MARSH BROWS
Liby
Viaduct
Sta
FORMBY BRIDGE
DUKE STREET
KIRKLAKE ROAD
SEFTON ROAD
FORMBY STREET
KINGS CL
KINGS ROAD
MEOLS CL
PW
GY
RAVEN MEOLS
SEALAND AVENUE
FOSTER ROAD
ANDREWS LANE
ROSTRON CRESCENT
CRESCENT AVE
KENSINGTON RD
SANDRINGHAM ROAD
HAMPTON ROAD
0
100
metres
Scale: 1:3,000
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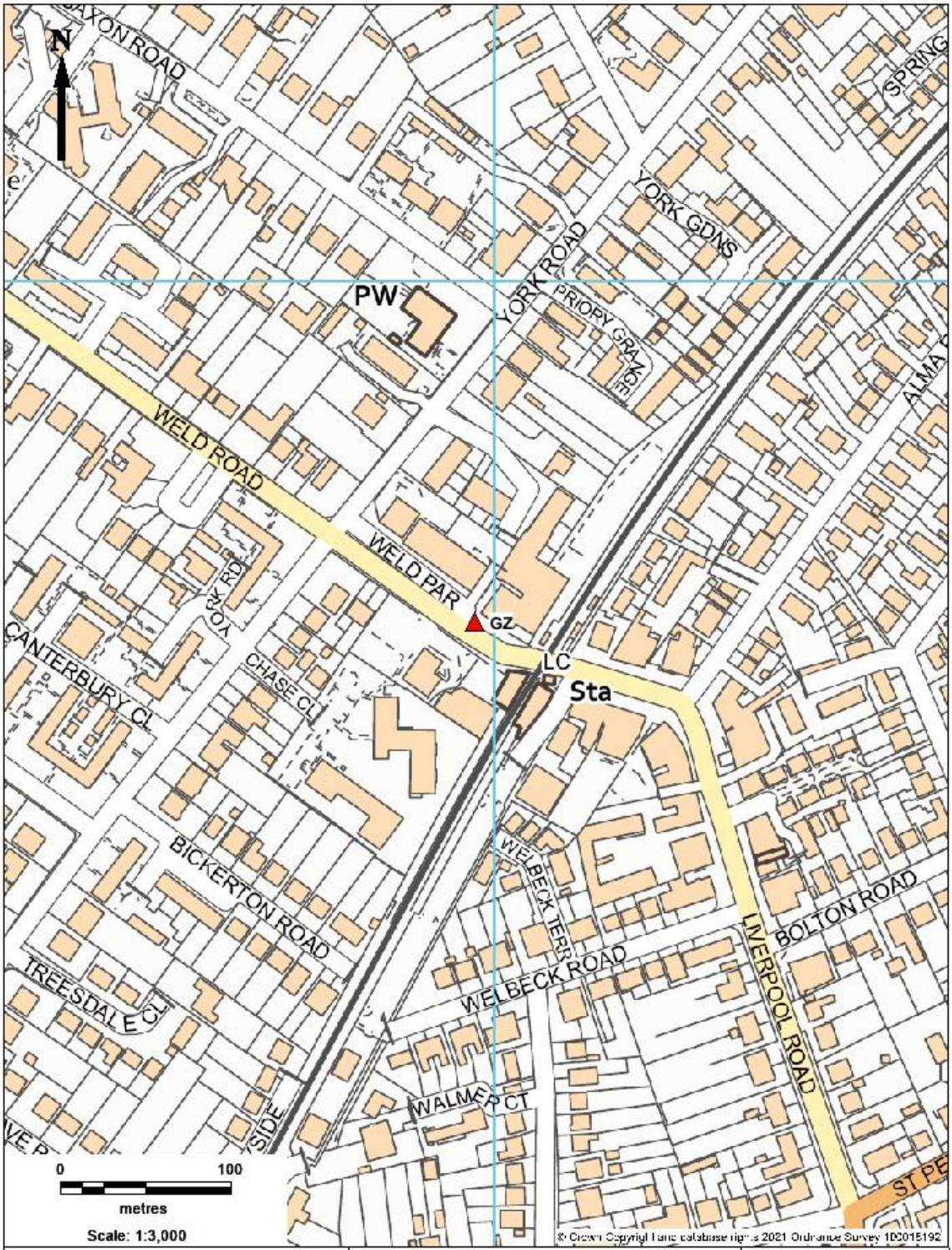
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Diffusion Tube Locations
Formby
Date: July 2021


N
PW
YORK ROAD
YORK GDNS
PRIORY GRANGE
WELD ROAD
WELD PAR
GZ
LC
Sta
CANTERBURY CL
CHASE CL
BICKERTON ROAD
TREESDALE CL
WELBECK TERR
WELBECK ROAD
WALMER CT
LIVERPOOL ROAD
BOLTON ROAD
0
100
metres
Scale: 1:3,000
© Crown Copyright and database rights 2021 Ordnance Survey 100015192
Sefton Council
Highways & Public Protection
Magdalen House
30 Trinity Road
Bootle
L20 3NJ
Diffusion Tube Locations
Birkdale
Date: July 2021

Appendix E: Summary of Air Quality Objectives in England

Table E.1 – Air Quality Objectives in England[7]

Pollutant	Air Quality Objective: Concentration	Air Quality Objective: Measured as
Nitrogen Dioxide (NO_2)	200µg/m^3 not to be exceeded more than 18 times a year	1-hour mean
Nitrogen Dioxide (NO_2)	40µg/m^3	Annual mean
Particulate Matter (PM_{10})	50µg/m^3, not to be exceeded more than 35 times a year	24-hour mean
Particulate Matter (PM_{10})	40µg/m^3	Annual mean
Sulphur Dioxide (SO_2)	350µg/m^3, not to be exceeded more than 24 times a year	1-hour mean
Sulphur Dioxide (SO_2)	125µg/m^3, not to be exceeded more than 3 times a year	24-hour mean
Sulphur Dioxide (SO_2)	266µg/m^3, not to be exceeded more than 35 times a year	15-minute mean

[7] The units are in microgrammes of pollutant per cubic metre of air (µg/m^3).

Appendix F: Impact of COVID-19 upon LAQM

COVID-19 has had a significant impact on society. Inevitably, COVID-19 has also had an impact on the environment, with implications to air quality at local, regional and national scales.

COVID-19 has presented various challenges for Local Authorities with respect to undertaking their statutory LAQM duties in the 2021 reporting year. Recognising this, Defra provided various advice updates throughout 2020 to English authorities, particularly concerning the potential disruption to air quality monitoring programmes, implementation of Air Quality Action Plans (AQAPs) and LAQM statutory reporting requirements. Defra has also issued supplementary guidance for LAQM reporting in 2021 to assist local authorities in preparing their 2021 ASR. Where applicable, this advice has been followed.

Despite the challenges that the pandemic has given rise to, the events of 2020 have also provided Local Authorities with an opportunity to quantify the air quality impacts associated with wide-scale and extreme intervention, most notably in relation to emissions of air pollutants arising from road traffic. The vast majority (>95%) of AQMAs declared within the UK are related to road traffic emissions, where attainment of the annual mean objective for nitrogen dioxide (NO_2) is considered unlikely. On 23rd March 2020, the UK Government released official guidance advising all members of public to stay at home, with work-related travel only permitted when absolutely necessary. During this initial national lockdown (and to a lesser extent other national and regional lockdowns that followed), marked reductions in vehicle traffic were observed; Department for Transport (DfT) data[8] suggests reductions in vehicle traffic of up to 70% were experienced across the UK by mid-April, relative to pre COVID-19 levels.

This reduction in travel in turn gave rise to a change of air pollutant emissions associated with road traffic, i.e. nitrous oxides (NO_x), and exhaust and non-exhaust particulates (PM). The Air Quality Expert Group (AQEG)[9] has estimated that during the initial lockdown period in 2020, within urbanised areas of the UK reductions in NO_2 annual mean concentrations were between 20 and 30% relative to pre-pandemic levels, which

[8] Prime Minister's Office, COVID-19 briefing on the 31st of May 2020

[9] Air Quality Expert Group, Estimation of changes in air pollution emissions, concentrations and exposure during the COVID-19 outbreak in the UK, June 2020

represents an absolute reduction of between 10 to 20µg/m^3 if expressed relative to annual mean averages. During this period, changes in $PM_{2.5}$ concentrations were less marked than those of NO_2. $PM_{2.5}$ concentrations are affected by both local sources and the transport of pollution from wider regions, often from well beyond the UK. Through analysis of AURN monitoring data for 2018-2020, AQEG have detailed that $PM_{2.5}$ concentrations during the initial lockdown period are of the order 2 to 5µg/m^3 lower relative to those that would be expected under business-as-usual conditions.

As restrictions are gradually lifted, the challenge is to understand how these air quality improvements can benefit the long-term health of the population.

Impacts of COVID-19 on Air Quality within Sefton

The impact of Covid on air quality levels for 2020 has already been discussed in some detail within the body of the ASR. Some more detailed work has been completed comparing pre-Covid traffic and air quality levels with levels during the first lockdown and was presented to Sefton's elected members. The information from the briefing paper has been provided below:

Background and introduction

The impacts of the Government imposed restrictions on movement and activity to manage and reduce the impacts of the Covid 19 pandemic are believed to have had a significant effect on traffic levels and associated levels of air pollution. Data from some key roads and the automatic monitoring stations in south Sefton have been compiled to demonstrate the impact in the Borough.

Traffic and Air quality data

Traffic flow data for four key roads in south Sefton; Crosby Road, Stanley Road, Southport Road and Dunnings Bridge Road have been extracted from the data collected by traffic signal loops. This is not exactly the same as a full traffic count, but it does provide a value for the number of vehicles that cross the loop on any given day. The traffic flow figures for Monday 13th January to Friday 17th January, prior to the introduction of the restrictions, have been collated and are presented below. The traffic flow figures from the same locations for the dates 30th March to 3rd April and 27th April to 1st May (also Mondays to Fridays) are also presented below. All four sites show a significant reduction in the daily volume of traffic since the restrictions were imposed.

Initial reductions in traffic flow of more than 50% were seen at all the sites in the week of the 30/03 to 03/04. The traffic flows recorded at the end of April had increased slightly, but still remained significantly below the numbers that were recorded prior to the restrictions. It will be important to continue monitoring the traffic flows to see whether that trend continues.

Nitrogen dioxide (NO_2) data were collated from the four automatic monitoring stations located in the south of the Borough for the same dates (13/01-17/01, 30/03-03/04 and 27/04-01/05). The NO_2 daily average concentrations from the monitoring stations are presented below. They all show significant reductions in levels of NO_2, which equates to a substantial improvement in air quality. The only site where levels did not drop as much initially was at Miller's Bridge. This monitoring station is located at the Derby Road/Miller's Bridge junction where a major highway improvement scheme has been going on for an extended period. It is not possible to determine whether the levels have not reduced as much because of the road works or because the numbers of HGVs from the nearby Port entrance has remained largely unchanged since the restrictions were introduced.

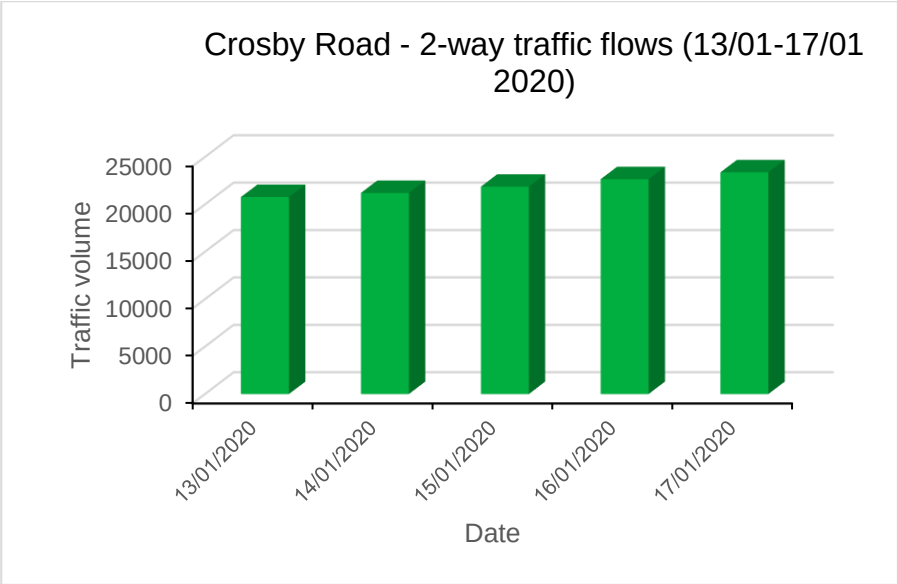
Later results from the end of April show that levels of NO_2 at Miller's Bridge are now notably lower than levels before the lockdown restrictions. However, NO_2 levels for the site at Princess Way appear to have started increasing slightly, although still markedly lower than the January levels.

Particulate matter (PM_{10}) data were collated from three automatic monitoring stations in the south of the Borough for the same dates (13/01-17/01, 30/03-03/04 and 27/04-01/05). The PM_{10} daily average concentrations from the monitoring stations are presented below. The PM_{10} levels did not show the same sort of reductions that were seen with the NO_2 concentrations. The levels at Millers Bridge in the week 30/03-03/04 were actually higher than levels in January, although that is consistent with the pattern of the NO_2 results, where Miller's Bridge did not show the same reduction in that first week of the restrictions.

PM_{10} is derived from a variety of sources and concentrations of PM_{10} are not as dependent on traffic volumes as NO_2. Nevertheless, later results from the end of April show that levels of PM_{10} are generally lower than levels before the lockdown restrictions and the levels at Miller's Bridge have reduced significantly, following a similar pattern to the NO_2 results.

The data available so far for traffic flows and for air quality in the south of the Borough clearly demonstrate a major improvement as a result of the restrictions introduced by the Government to control the spread of Covid 19.

The following graphs show firstly traffic and then air quality levels before the lockdown and during the first lockdown in 2020.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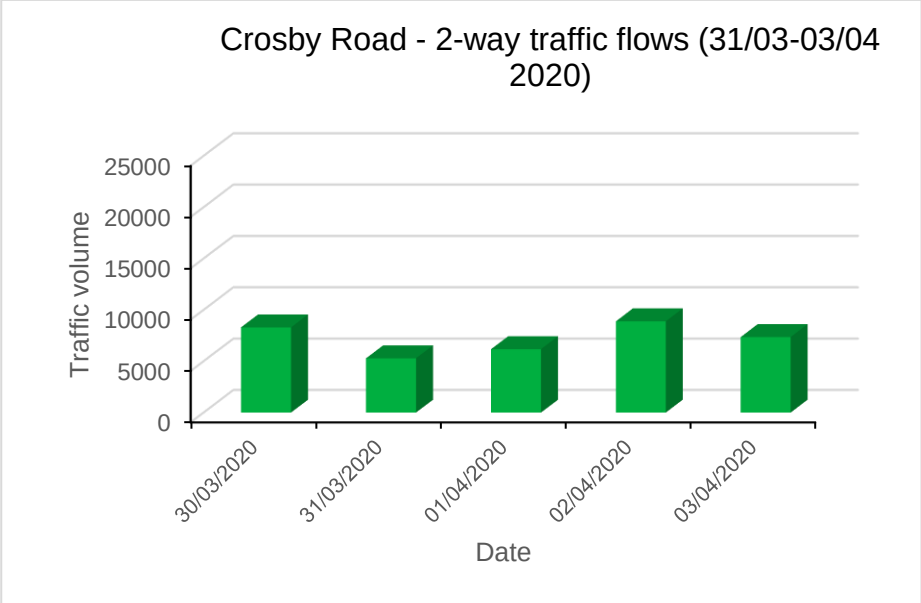
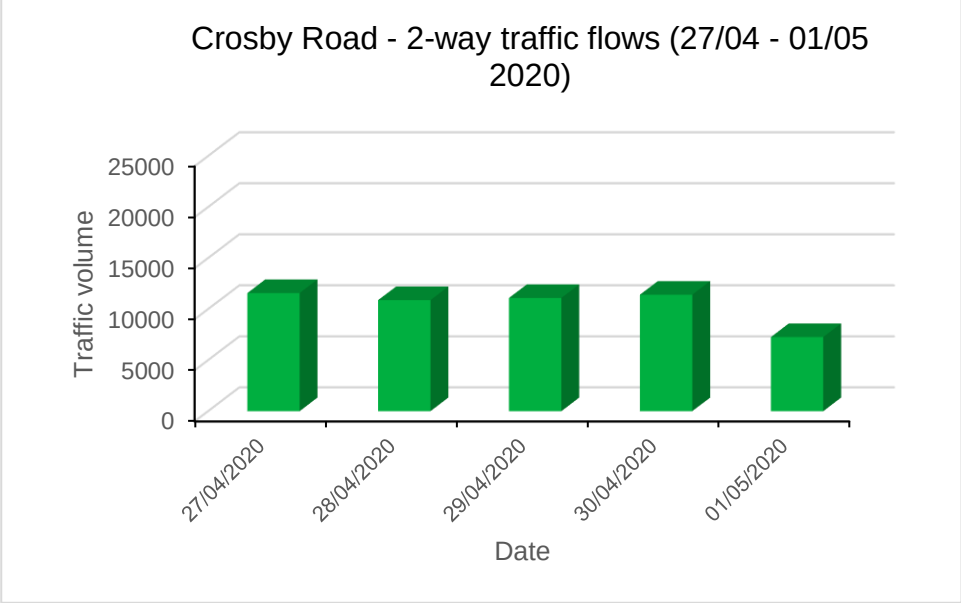
Traffic volume
25000
20000
15000
10000
5000
0
13/01/2020
14/01/2020
15/01/2020
16/01/2020
17/01/2020
Date


Crosby Road - 2-way traffic flows (31/03-03/04 2020)
Traffic volume
25000
20000
15000
10000
5000
0
30/03/2020
31/03/2020
01/04/2020
02/04/2020
03/04/2020
Date


Crosby Road - 2-way traffic flows (27/04 - 01/05 2020)
Traffic volume
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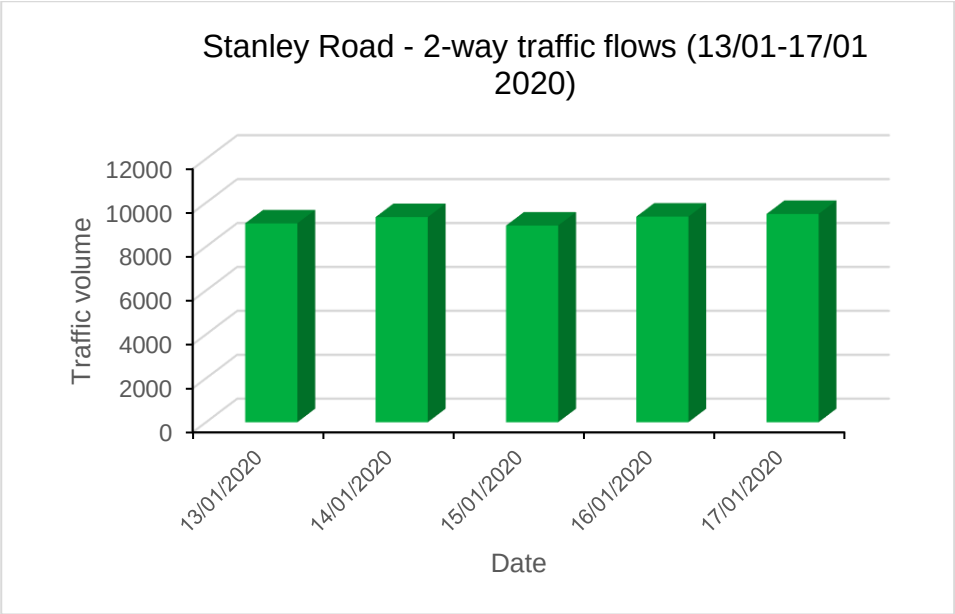
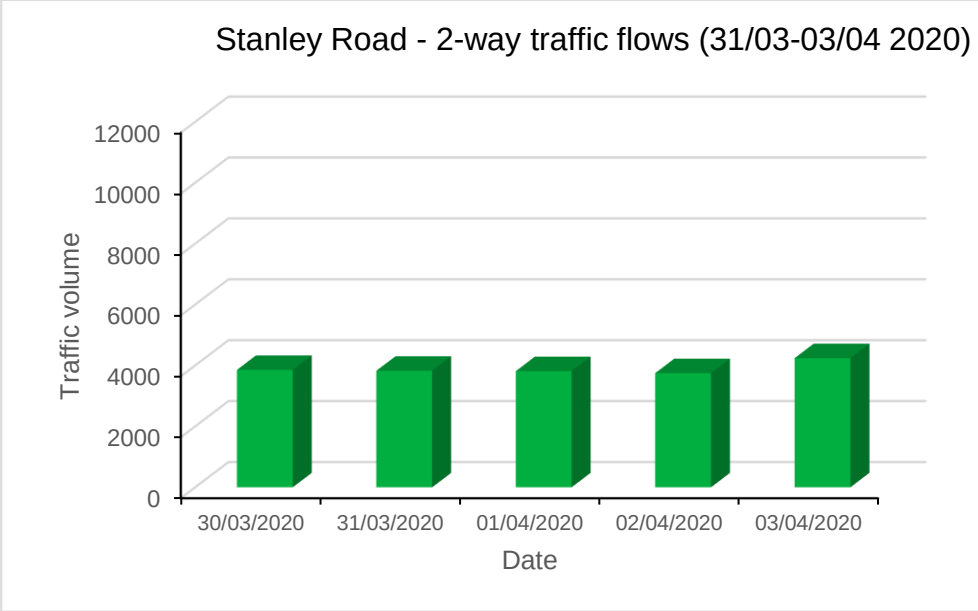
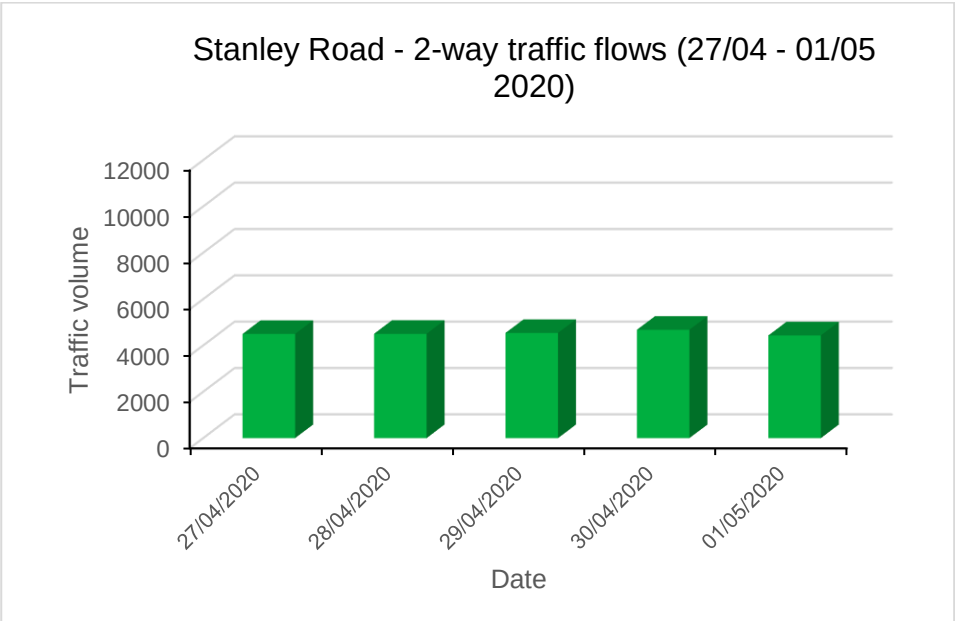
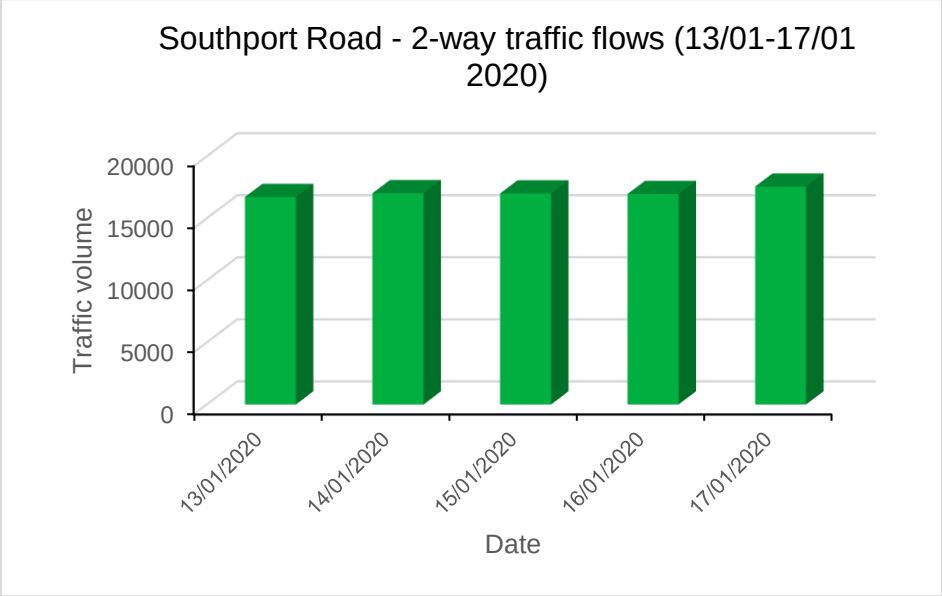
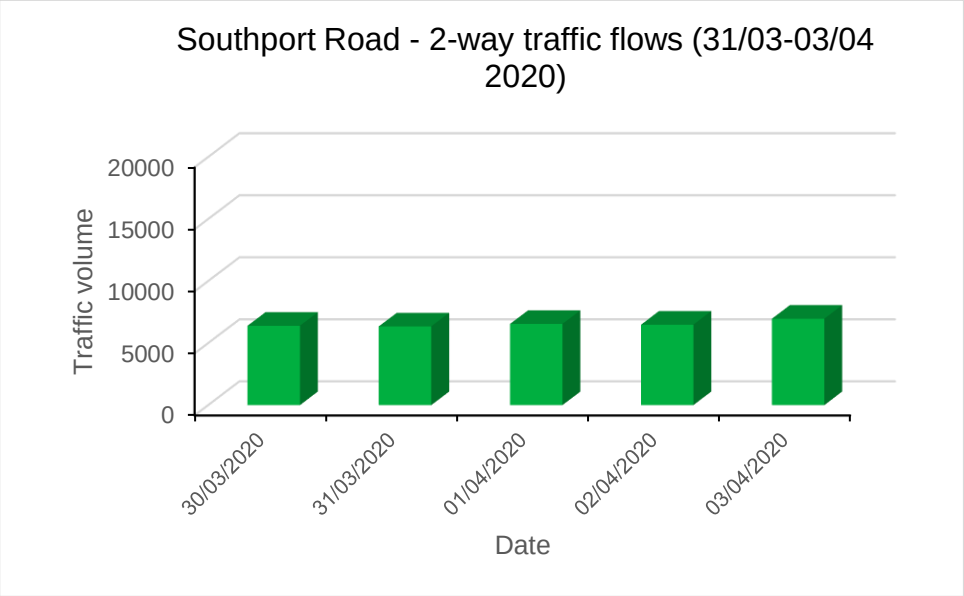
20000
15000
10000
5000
0
27/04/2020
28/04/2020
29/04/2020
30/04/2020
01/05/2020
Date


Stanley Road - 2-way traffic flows (13/01-17/01 2020)
Traffic volume
12000
10000
8000
6000
4000
2000
0
13/01/2020
14/01/2020
15/01/2020
16/01/2020
17/01/2020
Date


Stanley Road - 2-way traffic flows (31/03-03/04 2020)
Traffic volume
12000
10000
8000
6000
4000
2000
0
30/03/2020
31/03/2020
01/04/2020
02/04/2020
03/04/2020
Date


Stanley Road - 2-way traffic flows (27/04 - 01/05 2020)
Traffic volume
12000
10000
8000
6000
4000
2000
0
27/04/2020
28/04/2020
29/04/2020
30/04/2020
01/05/2020
Date


Southport Road - 2-way traffic flows (13/01-17/01 2020)
Traffic volume
20000
15000
10000
5000
0
13/01/2020
14/01/2020
15/01/2020
16/01/2020
17/01/2020
Date


Southport Road - 2-way traffic flows (31/03-03/04 2020)
Traffic volume
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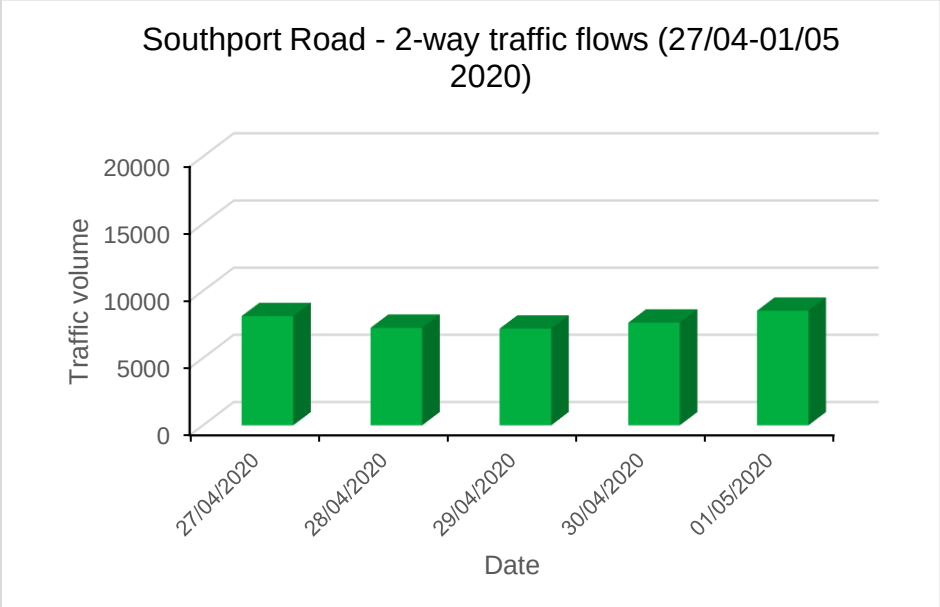
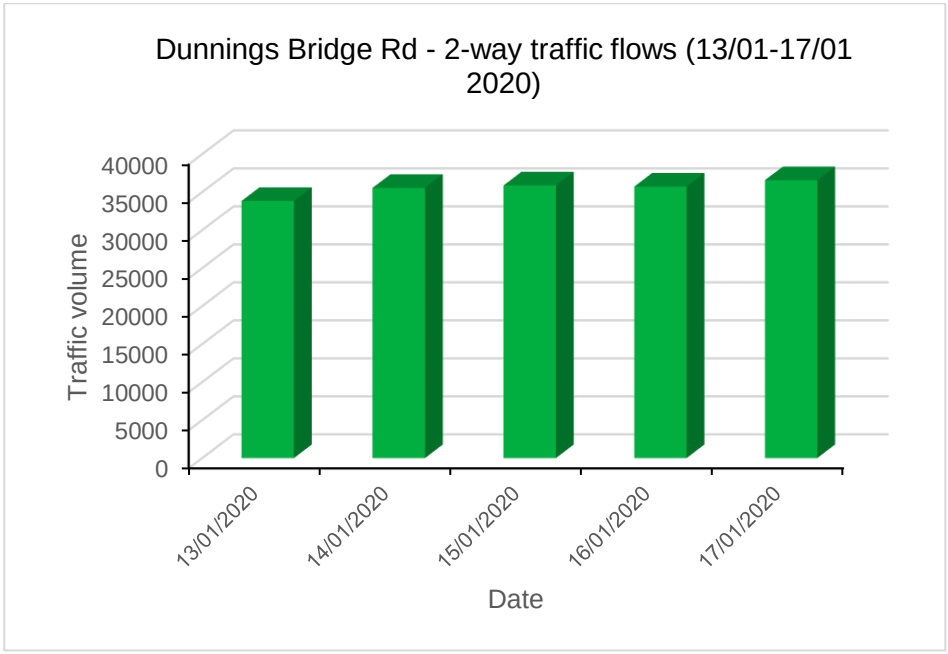
15000
10000
5000
0
30/03/2020
31/03/2020
01/04/2020
02/04/2020
03/04/2020
Date


Southport Road - 2-way traffic flows (27/04-01/05 2020)
Traffic volume
20000
15000
10000
5000
0
27/04/2020
28/04/2020
29/04/2020
30/04/2020
01/05/2020
Date


Dunnings Bridge Rd - 2-way traffic flows (13/01-17/01 2020)
Traffic volume
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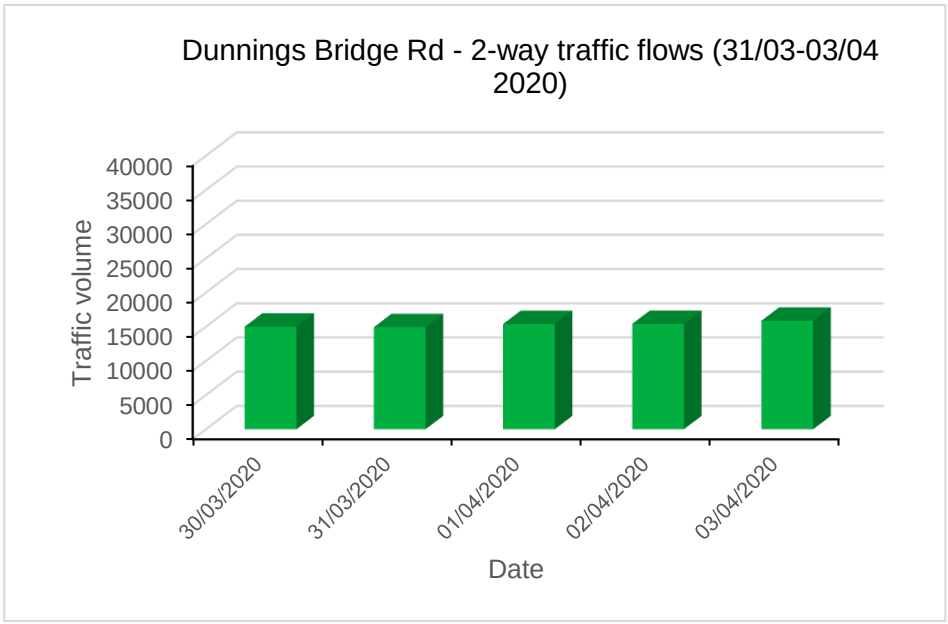
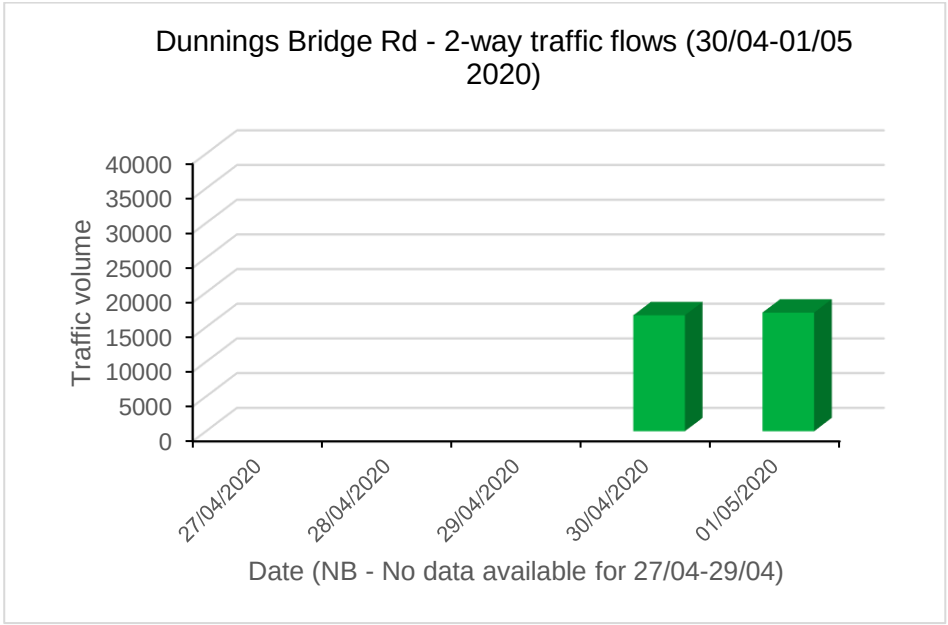
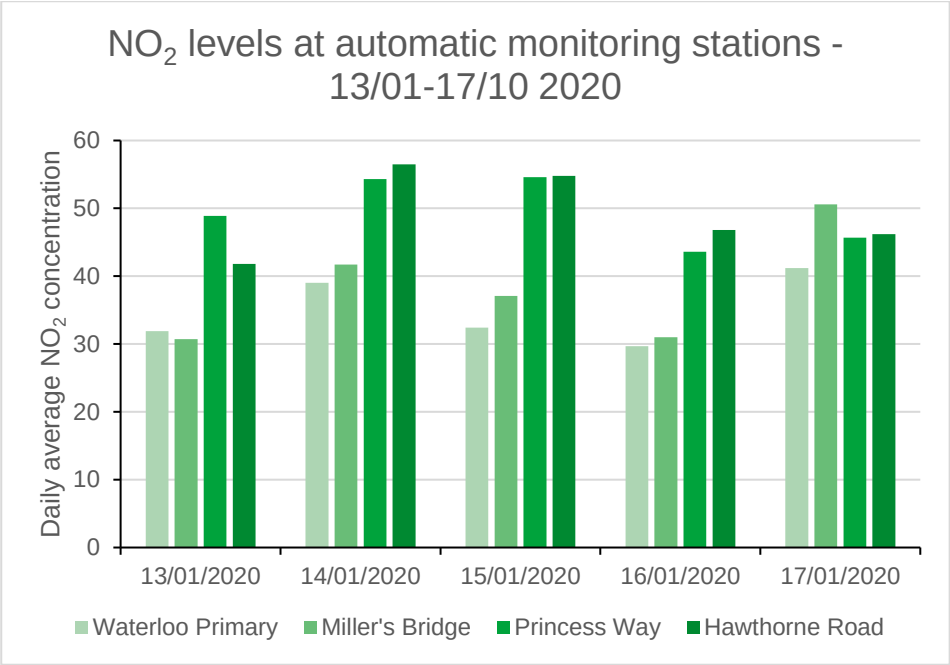
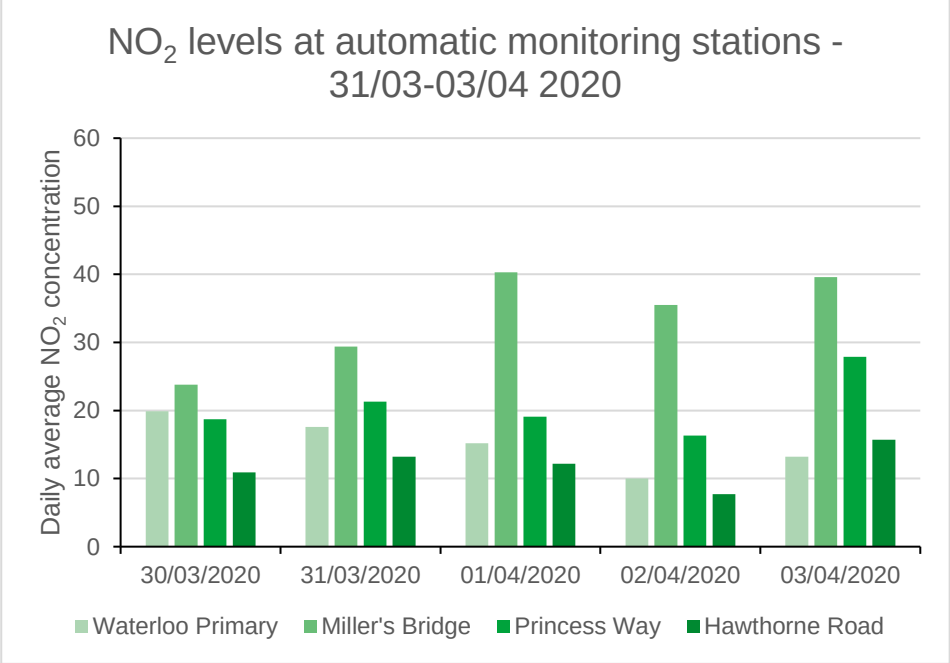
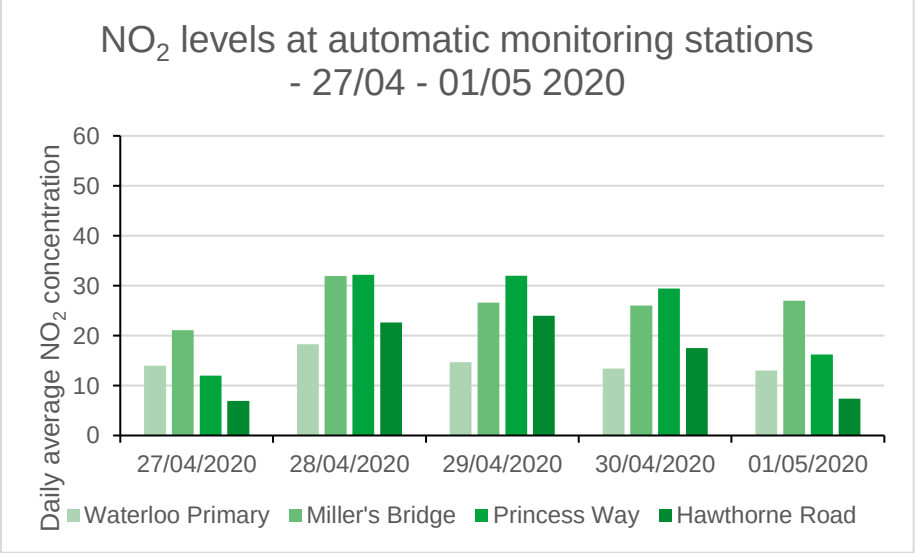
35000
30000
25000
20000
15000
10000
5000
0
13/01/2020
14/01/2020
15/01/2020
16/01/2020
17/01/2020
Date

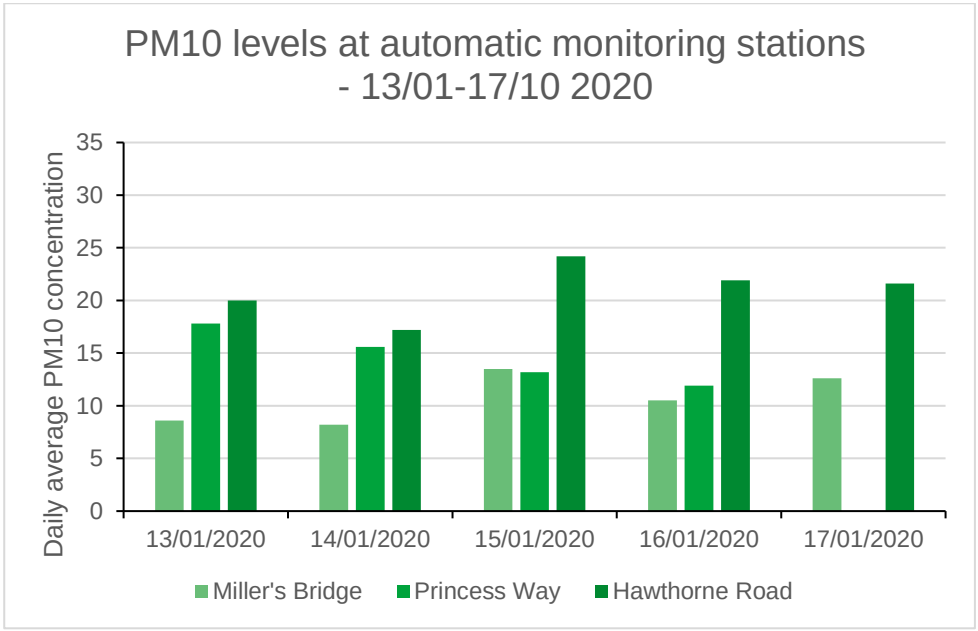

Dunnings Bridge Rd - 2-way traffic flows (31/03-03/04 2020)
Traffic volume
40000
35000
30000
25000
20000
15000
10000
5000
0
30/03/2020
31/03/2020
01/04/2020
02/04/2020
03/04/2020
Date

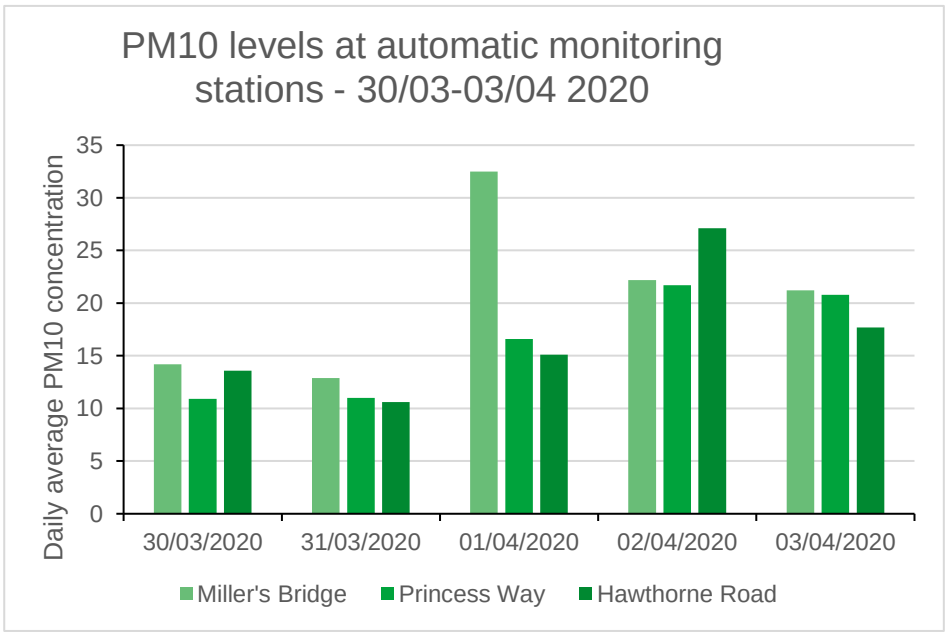

Dunnings Bridge Rd - 2-way traffic flows (30/04-01/05 2020)
Traffic volume
40000
35000
30000
25000
20000
15000
10000
5000
0
27/04/2020
28/04/2020
29/04/2020
30/04/2020
01/05/2020
Date (NB - No data available for 27/04-29/04)

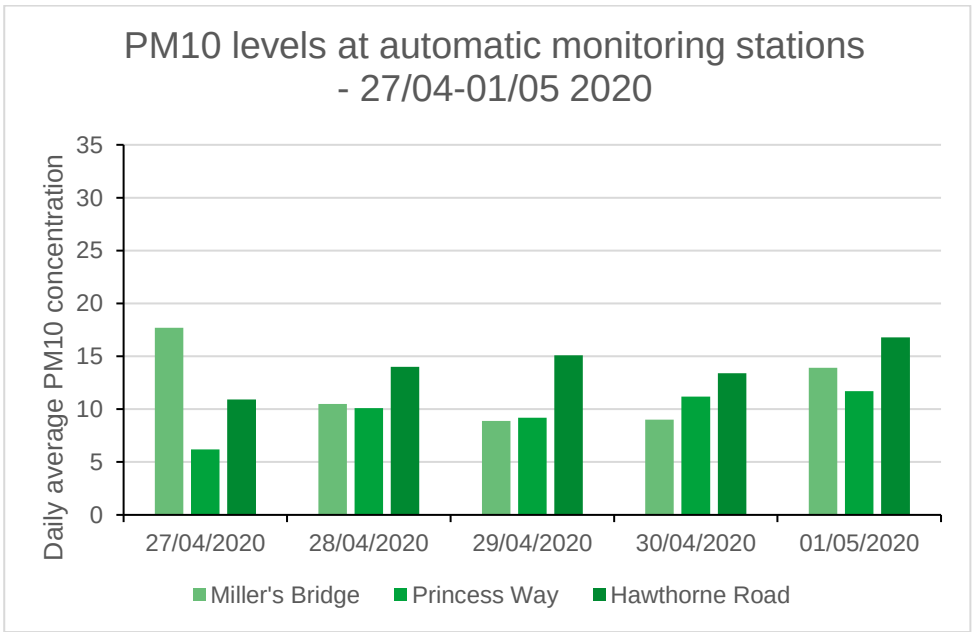

NO2 levels at automatic monitoring stations - 13/01-17/10 2020
Daily average NO2 concentration
60
50
40
30
20
10
0
13/01/2020
14/01/2020
15/01/2020
16/01/2020
17/01/2020
Waterloo Primary
Miller's Bridge
Princess Way
Hawthorne Road


NO2 levels at automatic monitoring stations - 31/03-03/04 2020
Daily average NO2 concentration
60
50
40
30
20
10
0
30/03/2020
31/03/2020
01/04/2020
02/04/2020
03/04/2020
Waterloo Primary
Miller's Bridge
Princess Way
Hawthorne Road


NO2 levels at automatic monitoring stations - 27/04 - 01/05 2020
Daily average NO2 concentration
60
50
40
30
20
10
0
27/04/2020
28/04/2020
29/04/2020
30/04/2020
01/05/2020
Waterloo Primary
Miller's Bridge
Princess Way
Hawthorne Road

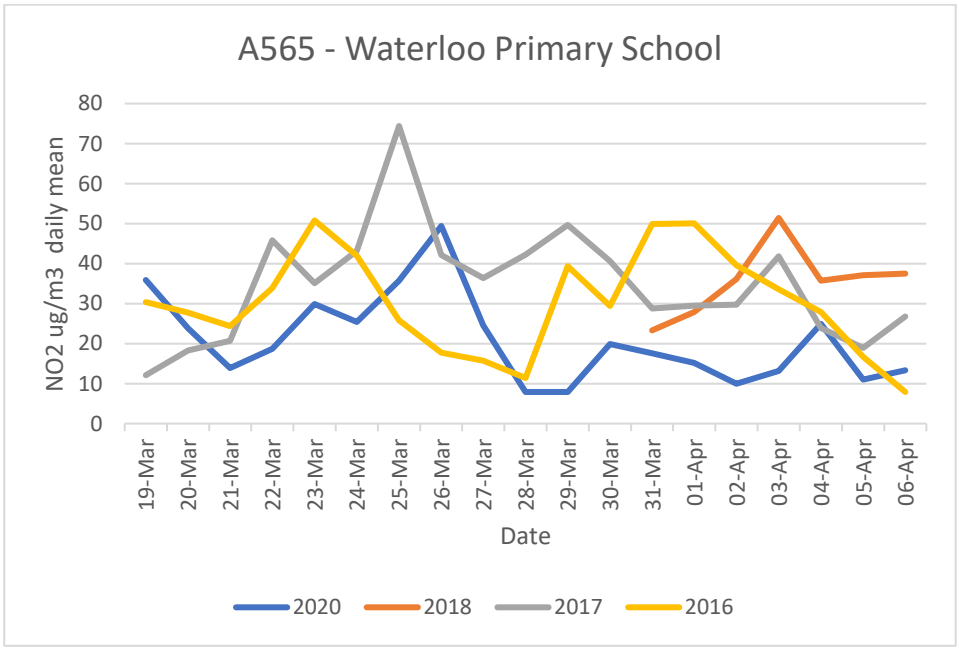

PM10 levels at automatic monitoring stations - 13/01-17/10 2020
Daily average PM10 concentration
35
30
25
20
15
10
5
0
13/01/2020
14/01/2020
15/01/2020
16/01/2020
17/01/2020
Miller's Bridge
Princess Way
Hawthorne Road

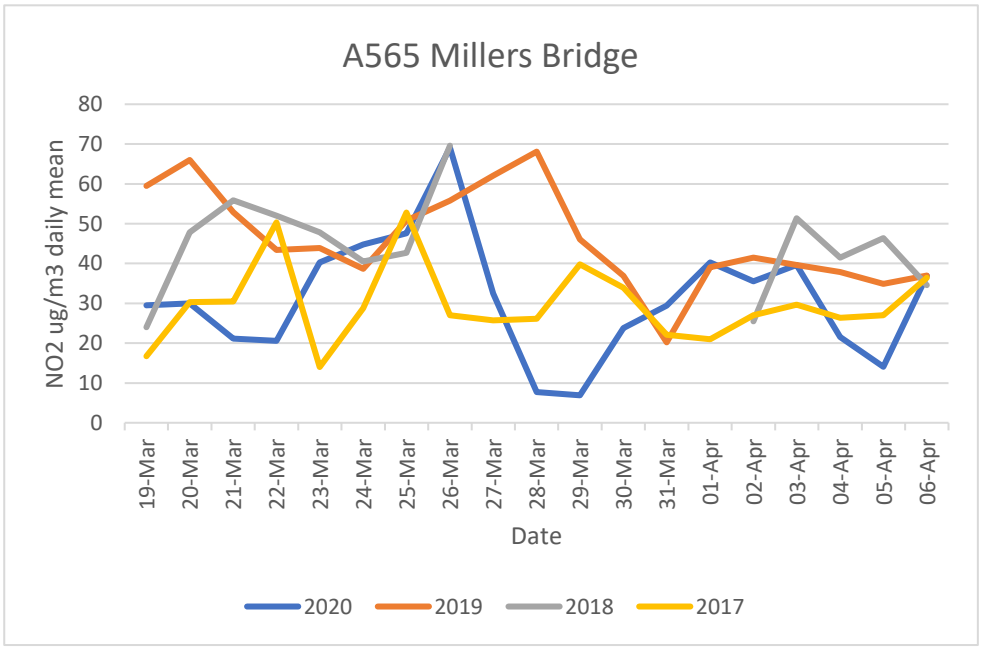

PM10 levels at automatic monitoring stations - 30/03-03/04 2020
Daily average PM10 concentration
35
30
25
20
15
10
5
0
30/03/2020
31/03/2020
01/04/2020
02/04/2020
03/04/2020
Miller's Bridge
Princess Way
Hawthorne Road

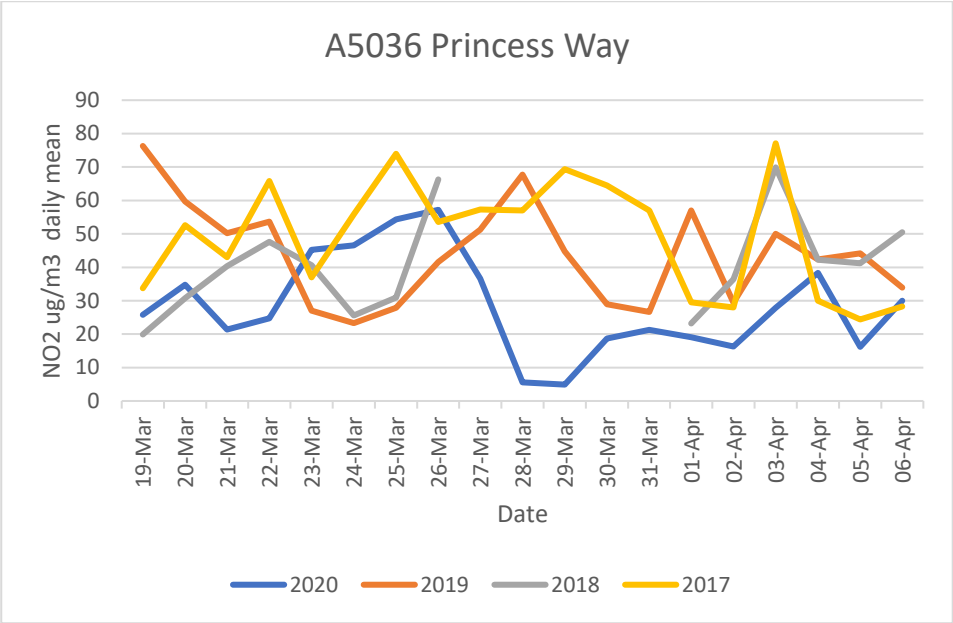

PM10 levels at automatic monitoring stations - 27/04-01/05 2020
Daily average PM10 concentration
35
30
25
20
15
10
5
0
27/04/2020
28/04/2020
29/04/2020
30/04/2020
01/05/2020
Miller's Bridge
Princess Way
Hawthorne Road

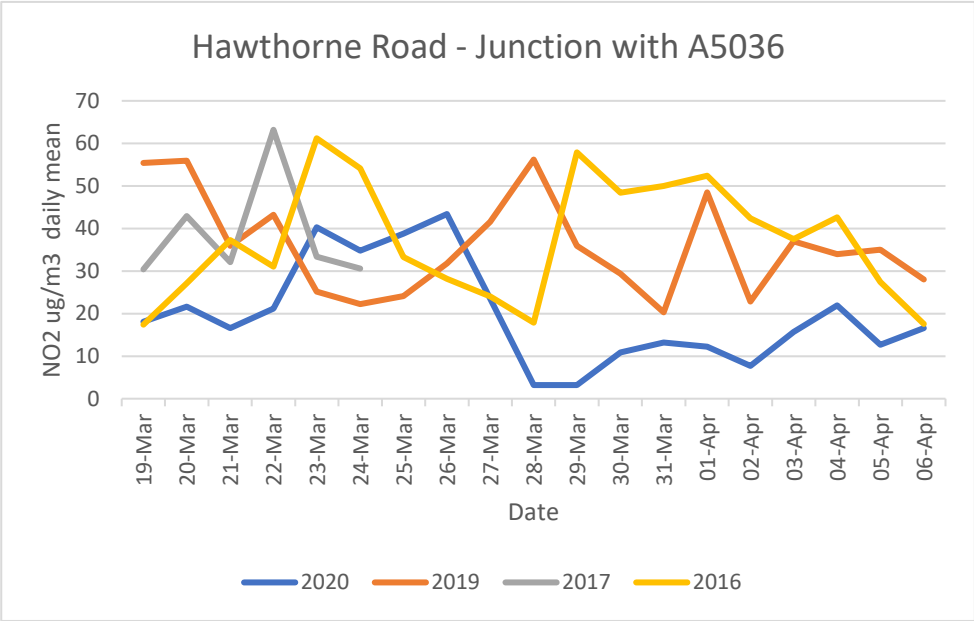
Air quality monitoring

Nitrogen dioxide (NO_2) data for previous years from the four automatic monitoring stations for the dates 19/03 to 06/04 has been collated and is presented below. The data set is not complete for some of the monitoring stations due to the equipment being repaired (at Waterloo Primary and Hawthorne Road). The NO_2 daily average concentrations are presented and illustrate the variability in concentrations from day to day caused primarily by variations in weather conditions, as well as volumes of emissions. They all show a significant reduction in levels of NO_2 over the weekend at the end of March 2020 following the introduction of the restrictions and the concentrations for 2020 (the blue line) then remain generally below the concentrations for previous years, with Miller's Bridge the only exception as discussed previously above.



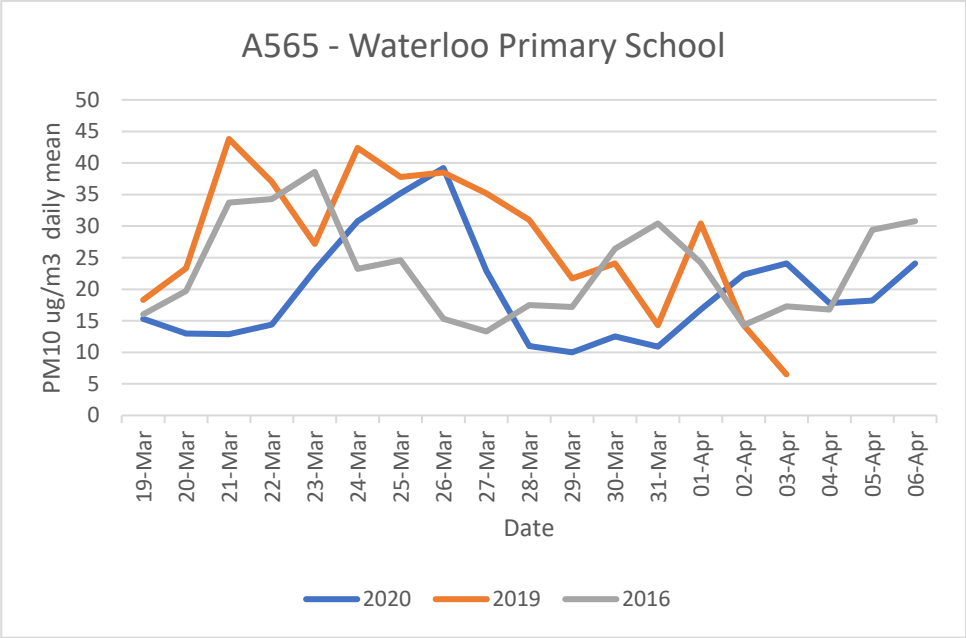


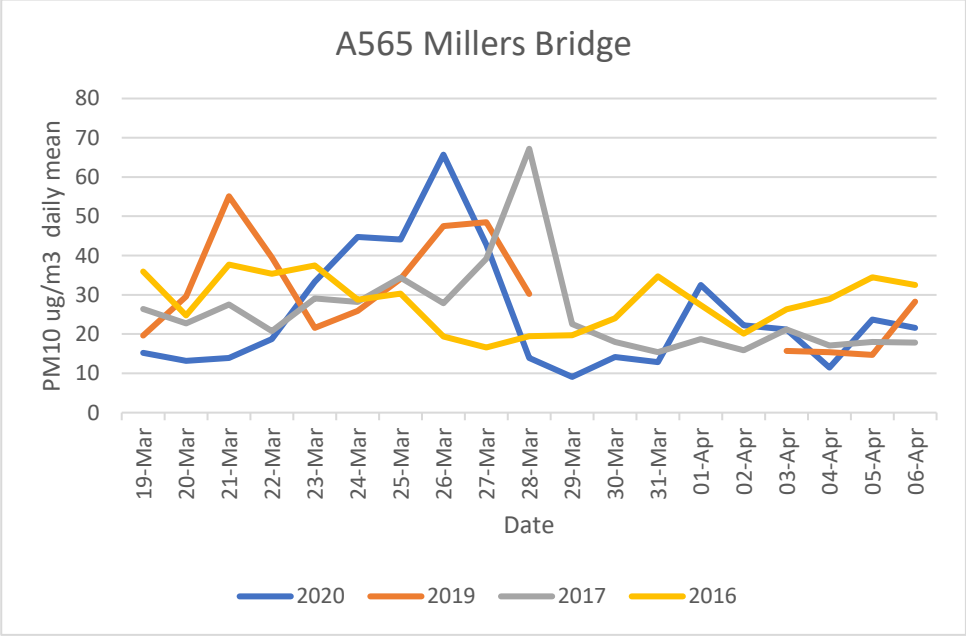


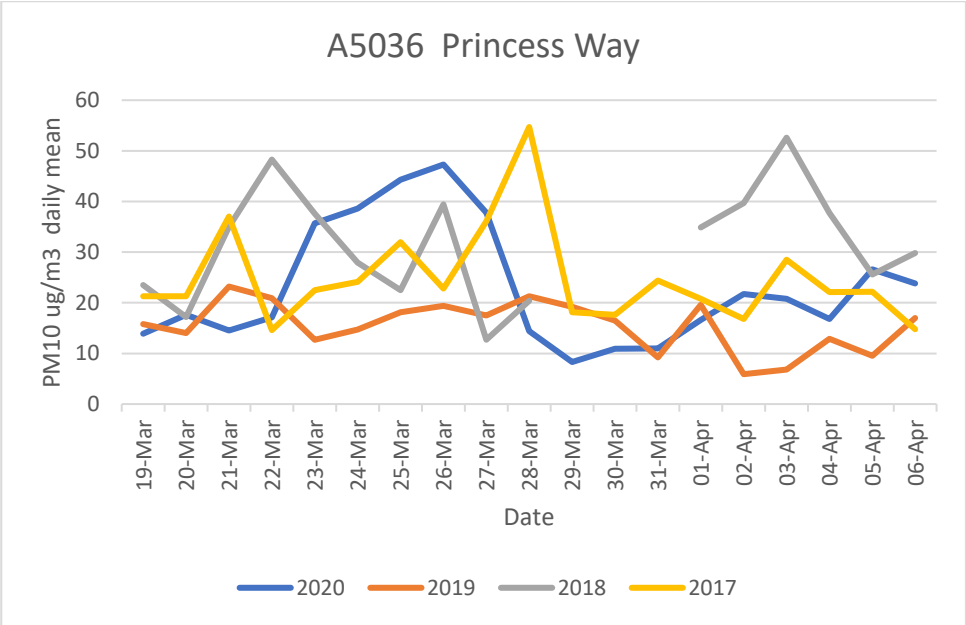


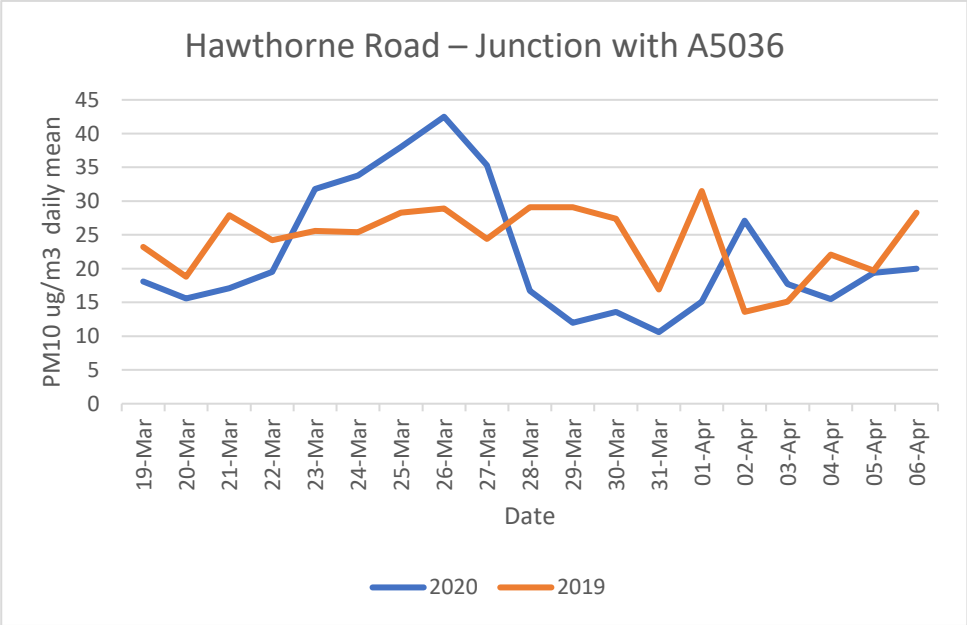
Particulate matter (PM_{10}) data for previous years from the four automatic monitoring stations for the dates 19/03 to 06/04 has been collated and is presented below. The data set is not complete for some of the monitoring stations due to the equipment being repaired or only being installed more recently. The PM_{10} daily average concentrations are presented and illustrate the variability in concentrations from day to day. They all show a significant reduction in levels of PM_{10} over the weekend at the end of March 2020 following the introduction of the restrictions. However, PM_{10} is derived from a variety of sources and as described above, concentrations of PM_{10} are not as dependent on traffic volumes as NO_2. As a result, the 2020 daily average concentrations of PM_{10} do not show the generally lower levels than previous years that are seen in the NO_2 monitoring data. This illustrates

that a range of different strategies and measures are needed to reduce the levels of different pollutants.









Conclusions

The information presented above provides a valuable comparison in terms of traffic and air quality between the situation early in the year before Covid 19 related restrictions and the situation since the restrictions were introduced. It is only a snapshot of two weeks so it will be important to continue to collect the data and to review it on an ongoing basis. The long term air quality monitoring data for the end of March and early April over the last few years illustrates the inherent variability in pollution levels in response to weather conditions and other factors. Nevertheless, the data presented above does clearly demonstrate an improvement in both NO_2 and PM10 levels, particularly for NO_2, as a result of the restrictions introduced by the Government to control the spread of Covid 19.

Opportunities Presented by COVID-19 upon LAQM within Sefton

In May 2020 the Government announced a significant funding opportunity and released guidance to Local Authorities to help us make changes to our streets, so they allow for social distancing and make it easier for people to walk and cycle once the restrictions are eased and the roads get busier with more people driving. The Emergency Active Travel Fund invited bids from Combined Authorities and Local Authorities and our ideas were included in the bid submitted to the Government by the Liverpool City Region Combined Authority (LCRCA). The statutory guidance issued to local authorities said Local Authorities should make **significant changes to streets and spaces by reallocating road space to people walking and cycling**.

The LCRCA were successfully awarded their full allocation of £1.947m. The £1.947 million has been allocated to the local authorities within the LCR and Sefton Council were allocated a proportion of funding to deliver 2 routes, one in Southport and one in Bootle which will encourage cycling and walking and make significant improvements to the streets to enable people to use cars less and move around in a different way.

The routes are still in use and their success/effectiveness is currently being analysed.

Engagement with the community on and around Clean air day took place via social media focusing on the improvements in air quality due to lockdowns etc and encouraging people to continue to cycle and reduce car use.

Challenges and Constraints Imposed by COVID-19 upon LAQM within Sefton

- As with previous years, a national bias adjustment factor has been utilised to adjust the diffusion tube results for 2020. Within 2019 there were 27 co-location studies that were utilised to calculate the bias factor for the laboratory and preparation method used. For 2020, this number has reduced to 18 studies. There is therefore the potential for there to be a greater degree of uncertainty associated with the

resultant annual mean NO_2 concentrations in 2020 than in previous years. **Small Impact**

- During 2020, access to a number of diffusion tube monitoring sites was restricted due to their locations on residential buildings. Therefore, it was not possible to maintain diffusion tube exposure periods for April to May in line with the national monitoring calendar for a number of sites. This has affected data capture within 2020, resulting in some monitoring sites having to be annualised. **Small Impact**
- Sefton's AQAP's require updating for AQMA 2,3,4,5. However, owing to the reallocation of Council resources during 2020, the development and implementation of the updated AQAP's has been delayed. Current estimates are that the revised AQAP will be prepared in and sent out for draft consultation by the end of 2021. **High Impact**
- Sefton's preparation of their CAZ Outline Business Case has been heavily impacted by the Covid pandemic. Staff resource reallocation and impacts on the consultancies staff have led to delays in the programme. The OBC is now around 9 months behind schedule. **Medium Impact**
- Sefton's progress with regard to the DEFRA AQ grant funded Domestic solid fuel behaviour change project was significantly impacted by the Covid pandemic in 2020. The behaviour change elements of the project were most affected as engagement with businesses and lesser degree public were difficult. There were also delays to the installation of the particulate monitor due to Covid and supplying companies HR restrictions. **High Impact.**
- The joint DVSA and Sefton emissions monitoring/enforcement project had to be postponed due to Covid restrictions. It is hoped that this project will be undertaken in autumn /winter 2021. **Medium impact**
- The proposed intensive road washing project had to be postponed due to Covid restrictions. It is planned that this will now commence in autumn /winter 2021. **Medium impact**

The impacts as presented above are aligned with the criteria as defined in Table F 1, with professional judgement considered as part of their application.

Table F 1 – Impact Matrix

Category	Impact Rating: None	Impact Rating: Small	Impact Rating: Medium	Impact Rating: High
Automatic Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Automatic Monitoring – QA/QC Regime	Adherence to requirements as defined in LAQM.TG16	Routine calibrations taken place frequently but not to normal regime. Audits undertaken alongside service and maintenance programmes	Routine calibrations taken place infrequently and service and maintenance regimes adhered to. No audit achieved	Routine calibrations not undertaken within extended period (e.g. 3 to 4 months). Interruption to service and maintenance regime and no audit achieved
Passive Monitoring – Data Capture (%)	More than 75% data capture	50 to 75% data capture	25 to 50% data capture	Less than 25% data capture
Passive Monitoring – Bias Adjustment Factor	Bias adjustment undertaken as normal	<25% impact on normal number of available bias adjustment colocation studies (2020 vs 2019)	25-50% impact on normal number of available bias adjustment studies (2020 vs 2019)	>50% impact on normal number of available bias adjustment studies (2020 vs 2019) and/or applied bias adjustment factor studies not considered representative of local regime
Passive Monitoring – Adherence to Changeover Dates	Defra diffusion tube exposure calendar adhered to	Tubes left out for two exposure periods	Tubes left out for three exposure periods	Tubes left out for more than three exposure periods
Passive Monitoring – Storage of Tubes	Tubes stored in accordance with laboratory guidance and analysed promptly.	Tubes stored for longer than normal but adhering to laboratory guidance	Tubes unable to be stored according to be laboratory guidance but analysed prior to expiry date	Tubes stored for so long that they were unable to be analysed prior to expiry date. Data unable to be used
AQAP – Measure Implementation	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP
AQAP – New AQAP Development	Unaffected	Short delay (<6 months) in development of a new AQAP, but is on-going	Long delay (>6 months) in development of a new AQAP, but is on-going	No progression in development of a new AQAP

Glossary of Terms

Abbreviation	Description
AQAP	Air Quality Action Plan - A detailed description of measures, outcomes, achievement dates and implementation methods, showing how the local authority intends to achieve air quality limit values'
AQMA	Air Quality Management Area – An area where air pollutant concentrations exceed / are likely to exceed the relevant air quality objectives. AQMAs are declared for specific pollutants and objectives
ASR	Annual Status Report
Defra	Department for Environment, Food and Rural Affairs
DMRB	Design Manual for Roads and Bridges – Air quality screening tool produced by Highways England
EU	European Union
FDMS	Filter Dynamics Measurement System
LAQM	Local Air Quality Management
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxides
PM_{10}	Airborne particulate matter with an aerodynamic diameter of 10µm or less
$PM_{2.5}$	Airborne particulate matter with an aerodynamic diameter of 2.5µm or less
QA/QC	Quality Assurance and Quality Control
SO_2	Sulphur Dioxide

References

- Local Air Quality Management Technical Guidance LAQM.TG16. April 2021. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.
- Local Air Quality Management Policy Guidance LAQM.PG16. May 2016. Published by Defra in partnership with the Scottish Government, Welsh Assembly Government and Department of the Environment Northern Ireland.