Bath & North East Somerset Council

Improving People's Lives

Climate Emergency and Sustainability Policy Development and Scrutiny Panel

Date: **Monday, 27th June, 2022**
Time: **4.00 pm**
Venue: **Council Chamber - Guildhall, Bath**

Councillors: Karen Walker, Joel Hirst, Duncan Hounsell (for Shelley Bromley), Lucy Hodge (for Paul Crossley), Grant Johnson, Ruth Malloy, Paul May (for Lisa O'Brien), Ryan Wills and Dr Kumar

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NOTES:
1. **Inspection of Papers:** Papers are available for inspection as follows:

Council's website: https://democracy.bathnes.gov.uk/ieDocHome.aspx?bcr=1

2. **Details of decisions taken at this meeting** can be found in the minutes which will be circulated with the agenda for the next meeting. In the meantime, details can be obtained by contacting as above.

3. **Recording at Meetings**:-

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Further details of the scheme can be found at:

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Climate Emergency and Sustainability Policy Development and Scrutiny Panel - Monday, 27th June, 2022

at 4.00 pm in the Council Chamber - Guildhall, Bath

A G E N D A

1. WELCOME AND INTRODUCTIONS

2. EMERGENCY EVACUATION PROCEDURE

   The Chair will draw attention to the emergency evacuation procedure as set out under Note 6.

3. APOLOGIES FOR ABSENCE AND SUBSTITUTIONS

4. DECLARATIONS OF INTEREST

   At this point in the meeting declarations of interest are received from Members in any of the agenda items under consideration at the meeting. Members are asked to indicate:

   (a) The agenda item number in which they have an interest to declare.

   (b) The nature of their interest.

   (c) Whether their interest is **a disclosable pecuniary interest** *or* an **other interest**, (as defined in Part 2, A and B of the Code of Conduct and Rules for Registration of Interests)

   Any Member who needs to clarify any matters relating to the declaration of interests is recommended to seek advice from the Council's Monitoring Officer or a member of his staff before the meeting to expedite dealing with the item during the meeting.

5. TO ANNOUNCE ANY URGENT BUSINESS AGREED BY THE CHAIRMAN

6. ITEMS FROM THE PUBLIC OR COUNCILLORS - TO RECEIVE DEPUTATIONS, STATEMENTS, PETITIONS OR QUESTIONS RELATING TO THE BUSINESS OF THIS MEETING

   The Panel will be updated at the meeting on statements submitted.

7. MINUTES (Pages 7 - 14)

8. CABINET MEMBER UPDATE

   The Cabinet Member will update the Panel on any relevant issues. Panel members may ask questions on the update provided.

9. CITY CENTRE SECURITY PROGRAMME IMPLEMENTATION UPDATE (Pages 15 - 22)

10. RECYCLING HUB PLANS - UPDATE (Pages 23 - 32)

11. CLEAN AIR ZONE UPDATE (Pages 33 - 172)

12. PANEL WORKPLAN (Pages 173 - 178)

    This report presents the latest workplan for the Panel. Any suggestions for further items or amendments to the current programme will be logged and scheduled in consultation with the Panel's Chair and supporting senior officers.

The Committee Administrator for this meeting is Michaela Gay who can be contacted on 01225 394411.

BATH AND NORTH EAST SOMERSET

MINUTES OF CLIMATE EMERGENCY AND SUSTAINABILITY POLICY DEVELOPMENT AND SCRUTINY PANEL MEETING

Monday, 14th March, 2022

Present:- **Councillors** Karen Walker, Joel Hirst, Shelley Bromley, Paul Crossley, Ruth Malloy, Ryan Wills, Dr Kumar and Karen Warrington (in place of Lisa O'Brien)

Apologies for absence: Councillors: Grant Johnson and Lisa O Brien

51 WELCOME AND INTRODUCTIONS

The Chair welcomed everyone to the meeting.

52 EMERGENCY EVACUATION PROCEDURE

The Chair drew attention to the emergency evacuation procedure.

53 APOLOGIES FOR ABSENCE AND SUBSTITUTIONS

Councillor Lisa O Brien sent her apologies and was substituted by Councillor Karen Warrington.

Councillor Grant Johnson sent his apologies.

54 DECLARATIONS OF INTEREST

There were none.

55 TO ANNOUNCE ANY URGENT BUSINESS AGREED BY THE CHAIRMAN

There was none.

56 ITEMS FROM THE PUBLIC OR COUNCILLORS - TO RECEIVE DEPUTATIONS, STATEMENTS, PETITIONS OR QUESTIONS RELATING TO THE BUSINESS OF THIS MEETING

Panel members noted that David Redgewell had registered to make a statement but was unable to attend. The statement has been circulated to Panel members.

57 MINUTES

The Panel confirmed the minutes of the previous meeting as a true record..

58 NEIGHBOURHOOD CLEANSING

Councillor Dave Wood, Cabinet Member for Neighbourhood Services, and Carol Maclellan, Assistant Director Environmental Services, introduced the report.

Councillor Wood explained that all Council's had seen a squeeze on front line services and his aim had been to get investment in these areas and had been working with officers to target the areas that need most intervention. Carol Maclellan outlined the 11 priority areas of investment.

Panel members asked the following questions and made the following points:

Councillor Joel Hirst welcomed the report and investment. He asked the following questions – *officer/Cabinet Member response shown in italics.*

- What are the logistics around the 'clean and green days'? *Councillor Wood explained that a post had been created to organise these days to get the community (Residents Associations, Parish and Town Councillors and Ward Councillors) and Council teams together and focus on an area.*

- How will we raise awareness of the opportunities for support? *The officer explained that there was definitely a communications aspect and once everything is in place, there would be a public launch.*

Councillor Shelley Bromley welcomed the investment in the mechanical weed remover as she has had comments from her residents about the weeds looking untidy. She asked how best to tackle graffiti on utility boxes. *Councillor Wood explained that if you let the company know, they will usually remove the graffiti. The officer added that Council vans will remove small bits of graffiti from these boxes.* Councillor Karen Walker asked for a list of contact details for utility companies be provided for ward Councillors.

Councillor Ruth Malloy stated that if graffiti on telecoms cabinets is reported to 'Fix my Street' it will be forwarded to the correct place.

Councillor Ruth Malloy asked about road and pavement repairs and what the process is if utility companies do not clear up properly after works.
Councillor Wood explained that companies do have a legal obligation to return the area to a certain standard. He stated that he was not sure the legal level is high enough, but the Council can check up.

Councillor Karen Warrington asked how gully emptying and dog fouling enforcement was prioritised. *Councillor Wood stated that there is usually a small amount of dog owners that are responsible, it is about the community coming together with intelligence that will inform the enforcement officer. In terms of gully emptying there are different issues such as verges not being cleared. This investment should see a 50% increase in gulley's cleared.*

Councillor Ryan Wills asked the following questions, *officer/Cabinet Member responses are in italics:*

- How will road repairs be prioritized? *Councillor Wood stated that the highways budget has shrunk and this investment is needed to bring the road network back to a 'steady state' which is where the network is maintained gradually and no area is left to deteriorate which is what happens when there is under*

investment. The ranking of the priorities is done by the Highways Department – they do take into account the future cost and level of community interest.

- Are these investments one offs? *Councillor Wood explained that this is a one-off trial but the knowledge gained will be used to best direct resources to meet public need during the next budget setting.*

Councillor Walker asked the following questions, *officer/Cabinet Member responses are in italics:*

- Regarding the additional resources on dog fouling, fly tipping & litter offences - would it not be more beneficial for town and Parish councils to take on more responsibility, so this would reduce the cost and continue to deliver this service once the funding has finished. *Councillor Wood explained that the Council has statutory powers of enforcement.*

- Regarding the increased routine street cleaning in wards, and our highways network - would it be more beneficial for wards that are parishes to have more input from the parish council for street cleaning, especially those streets the road sweepers do not clean? *Councillor Wood explained that Parish and Town Councils could be consulted on priorities.* Councillor Warrington agreed that Parish and ward Councillors should be consulted as some have a formal set up with organised volunteers and to have BANES crews would be a great benefit.

The Panel **RESOLVED** that their comments on the 11 priority activities and communication and engagement with communities be forwarded to the Cabinet Member for Neighbourhood Services and relevant officers.

59 CITY REGION SUSTAINABLE TRANSPORT SETTLEMENT

Councillor Sarah Warren, Cabinet Member for Climate and Sustainable Travel and Sophie Broadfield, Director of Sustainable Communities, introduced the report and gave a presentation which covered the following:

- CRSTS Programme (1) – Transport Corridors
- CRSTS Programme (2) – Walking and Cycling
- Liveable Neighbourhoods
- Residents Parking Zones

<u>Panel members asked the following questions and made the following points:</u>

Councillor Warrington asked about the money for rural areas which includes the Somer Valley and Midsomer Norton but not Chew Valley. Councillor Warren stated that there is money for specific initiatives in rural communities and confirmed that a pilot study is being considered for Chew Valley.

Councillor Crossley asked if the timescale was realistic regarding Liveable Neighbourhoods. The Director explained that almost all ward Councillors had now been approached.

Councillor Hirst stated that it was great – regarding Liveable Neighbourhoods – that responses were fairly positive. He asked when the time was to go beyond the 15 areas. Councillor Warren explained that co-design with the 15 communities begins imminently, it will become clear where public consensus emerges. Our hands are fairly full with the 15 areas at present. The Director added that it is hoped that a 5 year programme can be developed.

Councillor Walker asked how trade and service vehicles will access these areas. Councillor Warren stated that the areas will not necessarily be car free, it is about having only the vehicles that need to be there such as residents and tradespeople rather than through traffic. The Director confirmed that a road can be accessed and then the vehicle can drive back the way they came rather than drive through which will stop rat running.

Councillor Dr Kumar asked what would happen if an LTN did not succeed. Councillor Warren stressed that co-design was the approach and that if agreement cannot be reached, then that LTN may not be able to go forward. There will need to be a reasonable level of consensus. There will also be monitoring of unintended consequences.

Councillor Dr Kumar asked about the timescales. The Director explained that the next stage was co-design ward by ward. The aim was to have designs around September.

The Panel **RESOLVED:**

- To note the elements of the West of England CRSTS that relate to activity in Bath and North East Somerset for inclusion in the submission to DfT and
- Note the progress with the Liveable Neighbourhoods/RPZ proposals

60 JOURNEY TO NET ZERO: REDUCING THE ENVIRONMENTAL IMPACT OF TRANSPORT IN BATH

Councillor Sarah Warren, Cabinet Member for Climate and Sustainable Travel and Sophie Broadfield, Director of Sustainable Communities, introduced the report and gave a presentation which covered the following:

- Introduction
- Vision
- Objectives
- How we have consulted so far
- Consultation findings
- Better public transport options
- Providing for Travel by bike or on foot
- Creating improved places to live and work

- Cleaner, greener school travel
- Supporting future mobility
- Connecting Bath to rural communities and market towns
- Next steps
- Have your say
- The Plan identifies: current projects/Developming projects/Future projects

Panel members asked the following questions and made the following points:

Councillor Karen Warrington stated that the programme is centred around Bath. Rural communities have had public transport cuts recently – residents welcome transport improvements into the City. Also, will you be working with Bristol City Council regarding transport into Bristol. Councillor Warren explained that the document evolved from previous documents about Bath. Bath and access to it is central to the document. CRST rural fund and innovation fund will help. Chew Valley has been suggested for a pilot regarding decarbonisation. Regarding Bristol routes, there will be focus on the A37.

Councillor Hirst stated that it was an exciting document, but the challenge is how we deliver. He asked the following questions, *officer/Cabinet Member responses are shown in italics.*

- The table shows that twice the amount of people use public transport in Oxford – how can we learn from them? *Councillor Warren stated that she had spoken to her counterpart in Oxford Council. The Director stated that visiting other cities will help with improvements. Councillor Walker stated that while the population is similar in the two cities, Bath has a lot more hills.*
- Can we take the issues such as air pollution and transport out of the political sphere? There could be a cross party advisory board which would mean there would be no stall due to a change in administration. *Councillor Warren stated that she would think about this suggestion.*

Councillor Dr Kumar stated that this was a grandiose wish list. He asked how cleaner, greener schools would be achieved and what the plan is to encourage independent and healthy travel. He asked if schools would be funded to help them improve their environment. Councillor Warren gave the example of Amsterdam in the 1970's which was choked with cars. She explained that this situation was addressed by someone first having a vision. She explained that step one is the vision from which the business case can be put together which is how local government funding works. She further explained that the basis of the plan is putting in safe and segregated cycle routes so that parents would feel safe allowing children to cycle to school. We want to show more residents the potential of e-bikes. She explained that the document contains a bold vision but has been broken down in current/futures plans.

Councillor Dr Kumar stated that cycle lanes are 1.5metres and roads in Bath are too narrow and a lot of the secondary school are on hills. Councillor Warren agreed that this outlines one of the problems faced but not only flat cities are cycling cities. Access to e-bikes will help.

Councillor Ruth Malloy asked the following questions, *officer/Cabinet Member responses are shown in italics:*

- The Council has 4 e-bikes for hire to businesses – is there a similar system for individuals? *The Director stated that this was a good suggestion that she would take away.*
- Bath is a World Heritage City, we could look at the 10 other Spa towns of Europe. *The Director stated that the City of Bath was built to walk around. She stated that investments are being made such as in Bathampton.*

Councillor Shelley Bromley stated that a car club could be an attractive idea, especially for younger people. She stated that bus fares are very expensive and we need to try to drive them down. Councillor Warren explained that this Council does not control the bus companies, but WECA has a direct relationship and we do talk to them. First Bus are the largest provider in the area and they are mindful of the impact of cancelled services and are keen to work with WECA. Bath is a difficult place to run buses as it is bus lanes that make bus journeys more attractive to drivers.

Regarding the Council's control over Park and Ride sites, Councillor Walker stated that these sites need to be made safter for people to use with confidence.

Councillor Ryan Wills asked the following questions, *officer/Cabinet Member responses are shown in italics:*

- Do we work with WECA on recruiting bus drivers? *Councillor Warren explained that First Bus have been taking innovative approaches on this.*
- What are the plans for the Electric Vehicle (EV) charging infrastructure? *Councillor Warren stated that there are many challenges on this and WECA are putting in a bid for additional funding. We would like to progress faster. It was also pointed out the technology is moving fast in this area.*

Councillor Karen Walker stated that blue badge holders and non blue badge holders are being put off coming into the City – how will this be addressed? Councillor Warren explained that a group was being set up including blue badge holders, please tell us about other groups (such as people who may be registered as disabled but do not have a blue badge) so that we can make sure they are represented. We are thinking of a Transport Forum with independent chairing.

Councillor Warrington added that groups such as NHS care workers and district nurses should be represented and also the temporarily disabled. The Director stated that the Council is not anti-car but the problems caused by congestion impact on all groups. Councillor Bromley stated that she had spoken to some Blue Badge holders who found that Westgate Street was easier to access now.

The Panel **RESOLVED** that their comments on the plan be forwarded to the Cabinet Member for Climate and Sustainable Travel and relevant officers prior to the plan being taken to Cabinet for full approval in May 2022.

61 PANEL WORKPLAN

Panel members noted the future workplan.

The meeting ended at 5.45 pm

Chair(person) .....

Date Confirmed and Signed .....

Prepared by Democratic Services

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Bath & North East Somerset Council		
MEETING/ DECISION MAKER:	**Climate Emergency & Sustainable Policy Development & Scrutiny Panel**	
MEETING/ DECISION DATE:	**27 June 2022**	EXECUTIVE FORWARD PLAN REFERENCE:
TITLE:	**City Centre Security Programme Implementation and Security Surveillance Review**	
WARD:	All	
AN OPEN PUBLIC ITEM		
List of attachments to this report: Please list all the appendices here, clearly indicating any which are exempt and the reasons for exemption		

1 THE ISSUE

1.1 The panel has requested an update on the City Centre Security Programme implementation and delivery programme.

1.2 In addition, this Report highlights to the Panel the wider strategic approach to security and public safety across Bath and North East Somerset, to aid a greater understanding of the steps being taken ahead of the forthcoming Protect Duty which will increase the responsibility for all local authorities.

1.3 This report does not seek to make any recommendations but to present an overview of security and public safety for discussion, before a full report and business case is taken to Cabinet for decision.

2 RECOMMENDATION

The Panel is asked to:

2.1 Note the city centre security programme implementation timelines

2.2 Note the anticipated legislation and powers with regards to the forthcoming Protect Duty and creation of a Protect & Prepare Board

2.3 Give feedback and highlight any concerns or opportunities they wish Officers to take into consideration as we move forward with the Strategic Review of the Council's Security Surveillance project

3 THE REPORT

City Centre Security:

3.1 Following a Report to Cabinet in July 2021, approval was given to advertise three Traffic Regulation Orders for Anti-Terrorism purposes to operate:

(1) between 1000 hours and 1800 hours on the following streets:

a) Lower Borough Walls, Stall Street, including Abbeygate Street, Abbey Green, Swallow Street (South), Bath Street and Hot Bath Street

b) York Street; and

c) Cheap Street, Westgate Street, Saw Close, Parsonage Lane and Upper Borough Walls

- with access to the restricted streets also being provided to Blue Badge Holders, carers transporting Blue Badge Holders, and taxi's transporting Blue Badge Holders.

(2) To advertise the TRO between 1800 hours and 2200 hours on York Street, to reflect its proximity to the Roman Baths and to support the increased footfall from Terrace Walk through York Street to the new Clore Learning Centre and World Heritage Centre. The Roman Baths, Clore Learning Centre and World Heritage Centre will, at times, will be open late into the evening

3.2 On 1 January 2022, the TRO's in relation to 3.1(1)a and (1)c came into effect. The two TRO's in relation to York Street, were the subject of a Public Inquiry on 26 April 2022, when an objection to the Orders could not be resolved. The public inquiry heard evidence from a number of stakeholders and objectors to the scheme including from Avon and Somerset Police who initiated the proposals.

3.3 York Street was subject to a Public Inquiry, with the Inspector's decision received on 8 June, which recommended the TRO's be made. As the Order seeks to restrict access to all vehicles for 12 hours per day, in accordance with the statutory requirements, Secretary of State approval is now being sought. Until such time York Street will remain open.

3.4 The streets that are closed are currently managed by temporary barriers and security marshals.

3.5 The Council is now moving forward with replacing with a permanent scheme.

3.6 This will see a series of sliding PAS 68* rated bollards at the entry points, supported by PAS 68* rated static bollards alongside. Entry will be managed via a video management system, controlled by the Council's CCTV team. Additional static bollards will be installed at other points of entry, eg Southgate Street and New Orchard Street.

*PAS 68 is a publicly available specification (PAS) for impact testing and rating hostile vehicle mitigation products such as bollards, blockers and barriers used for security and counter-terrorism purposes, in line with CPNI guidance

3.7 Pre-trial investigative works were undertaken in 2021 at these locations, to help establish existing cellar locations and the presence of statutory undertakers apparatus.

3.8 A programme of works will now commence in June 2022 and is dependent on the prior diversion of statutory undertakers' equipment at the sliding bollard locations. Works Orders have been issued to the various statutory undertakers and their programmes of work are awaited. Once this initial work has been carried out works will commence on the provision of sliding and static bollards. It is envisaged that this will commence in August 2022 and with all works to be completed by of 31 March 2023.

3.9 Works on the sliding and static bollards will be phased to ensure we maintain access to the city streets for pedestrians, cyclists and vehicles which are exempt from the access restrictions. However, it should be noted that diversion routes will be in place in some locations during construction:

Works to be Undertaken	**Timescales**
Statutory Undertakers diversion of equipment (cables/pipes)	Commence late June/July 2022 Up to 6 Weeks at each location (phased) – Statutory Undertaker work programmes awaited
Advanced Ducting for video management system	Commence late June/ July 2022
Installation of sliding/static bollards	Commence August 2022 8 weeks at each location (phased)
Completion	**31 March 2023**

3.10 Due to the unique nature of the city and highway construction, there are a number of challenges within the programme. These include working above existing vaults and cellars, working in close proximity to statutory undertakers apparatus and maintaining access to the restricted streets for exempt vehicles. A full risk assessment of all elements of the construction has been completed and the overall RAG rating remains Red due to the complexity of the project.

3.11 To inform and engage with all parties during the construction phase of the work, a comprehensive communications plan has been drawn up, which includes:

(1) Business and Residents Pre-Engagement Meetings and Webinars

(2) On site points of contact with both contractors and council officers

(3) Website updates, including regular e:newsletters

(4) Direct communication to Blue Badge holders, for those whose details we hold

3.12 Governance for the Project is managed through the City Centre Security Project Board, chaired by the Director of Place Management, alongside the Cabinet Members for Transport and Resources.

3.13 The Police have asked the Council to consider a wider ATTRO, and we will discuss any next steps on this proposal once we have delivered the current ATTRO

Protect Duty:

3.14 The government's counter-terrorism strategy is called CONTEST. The Council is a member of the Avon & Somerset CONTEST Board. CONTEST has 4 strategic frameworks:

(1) **Pursue**: to stop terrorist attacks;

(2) **Prevent**: to stop people becoming terrorists or supporting terrorism;

(3) **Protect**: to strengthen our protection against a terrorist attack; and

(4) **Prepare**: to mitigate the impact of a terrorist attack.

3.15 As set out by Ministers as part of the consultation on the Protect Duty:

> *"The United Kingdom has suffered a number of recent low-sophistication terror attacks at public spaces, in addition to the devastation of larger-scale atrocities such as that at the Manchester Arena. The targeting of such locations is usually an individual choice which cannot always be anticipated. Attacks could potentially occur at any location, and preventing them can prove challenging, highlighting the Government's decision to consider what more could be done to improve public protection.*
>
> *There is currently no legislative requirement for organisations to consider or employ security measures at the vast majority of public places. Many organisations choose to implement their own security measures, ranging from the consideration of risk assessments leading to a range of emergency plans and procedures being in place, undertaking staff training and awareness raising, and employing security systems, processes and measures to mitigate threats. Whilst all such efforts are welcome and encouraged, the proposed Protect Duty would aim to create a culture of security, with a consistency of application and a greater certainty of effect."*

3.16 The proposals target venues, organisations, businesses, local authorities, public authorities and individuals who own or operate at publicly accessible locations.

3.17 In anticipation of Protect Duty receiving Royal Assent and become Law over the next 12 to 18 months, a Bath & North East Somerset Protect & Prepare Board is being created to ensure that this authority is best placed to fulfil the requirements of the new legislation. The objectives of the Board will be:

(1) Management of Publicly Accessible Locations (PALs) in partnership with private and public sector bodies

(2) Ensuring the responsibilities under the new Protect Duty can be discharged

(3) Identifying and managing emerging threats and important areas of public safety & security

(4) To provide a joined-up approach to security consistent with current national guidance and standards to keep our communities safe and feeling safe

(5) To enhance and support protective security and preparedness at publicly accessible locations within Bath & North East Somerset, improving capability and ability to respond to current and emerging threats

3.18 Members of the Board will be drawn from Avon & Somerset Police, Counter-Terrorism Policing South West, the Council and strategic partners across Bath and North East Somerset.

Strategic Security Surveillance Review:

3.19 The Council manages c400 CCTV Surveillance Cameras across both the corporate property estate, transport and public space cameras; with 40 of these located within Bath's Heritage sites.

3.20 The cameras enable the Council to improve the safety and protection of our communities, whilst ensuring we do this within our statutory framework and legal compliance, in addition to our own organisational priorities and policies.

3.21 All public space cameras; streets, parks, car parks, park & ride, traffic, plus our key corporate sites are monitored centrally within the CCTV hub

3.22 In July 2021, a Cross-Party motion was passed on the Safety for Women and Girls in Public Places:

1) Believes everyone should have the right to be safe from violence and harassment on our streets
2) Recognises that the killing of Sarah Everard has, again, brought the issue of behaviour towards women and girls and their safety to the forefront
3) Acknowledges it's not just women who are at risk but that any individual may be vulnerable to attack for various reasons.
4) **The Motion called for:**
   Council departments and other bodies responsible for public spaces e.g. housing associations, parish councils, transport providers, to improve the security of public spaces by encouraging them to review lighting (in streets, car parks and parks) CCTV provision and other pertinent means to improve safety.

3.23 There is additional growing demand from Police, Members, partner agencies and the public for increased surveillance for public safety, as well as emerging significant new multi-million-pound projects and sites requiring CCTV, across Council Services and public spaces.

3.24 The Council has undertaken a comprehensive security surveillance review, and will include:

(1) Security Surveillance Strategy, to scope the future vision of a safer community

(2) Undertake a feasibility and options appraisal:

a) of the Council's CCTV VMS System, ahead of procurement for new supplier

b) for a fully costed business case for an aspirational centralised 24/7 security surveillance hub, which has the ability to flex with future demand, with incident room capacity

3.25 A governance structure has been set up, feeding into the Preparing for the Future and Delivering for Residents Programme Board.

3.26 Early stakeholder engagement has started with internal services, as well as key strategic partners, including:

(1) Avon & Somerset Police

(2) Avon Fire & Rescue

(3) Bath Business Improvement District

(4) SouthGate Shopping Centre

(5) Transport Hubs

(6) Keynsham, Radstock and Midsomer Norton Town Councils

3.27 The Strategy and Business Case will be presented to Cabinet in the Autumn for consideration.

3.28 Investment in upgrading of our security surveillance systems will commence, prior to The Protect Duty becoming Law as our commitment to improving security and safety for residents and visitors.

4 STATUTORY CONSIDERATIONS

4.1 The statutory framework for the Security Surveillance Review will include:

(1) Surveillance Camera Commissioner's Code of Practice (currently under review)

(2) Protection of Freedoms Act 2012

(3) Regulation of Investigatory Powers Act 2022

(4) Data Protection Act 2018

(5) Crime & Disorder Act 1998/Criminal Procedures & Investigation Act 1996

(6) Article 8 of the Human Rights Act

(7) Equality Act 2010

5 RESOURCE IMPLICATIONS (FINANCE, PROPERTY, PEOPLE)

5.1 The total City Centre Security Budget is £3,300K, spend to date £806K.

5.2 Total capital budget for £550k for the procurement, upgrade and replacement of the CCTV VMS system.

5.3 A fully costed business case and recommendations for a potential new Security Surveillance Hub will be presented to Cabinet in the Autumn.

6 RISK MANAGEMENT

6.1 A risk assessment related to the issues in this report has not been undertaken as the report is for information purposes and not seeking to make a recommendation

7 EQUALITIES

7.1 This report is intended to provide the Panel with information for discussion and does not make any recommendations therefore an EIA has not been carried out.

7.2 All individual elements of the approach to improving security with Bath and North East Somerset will be subject to an EIA where appropriate. Consideration of any additional needs of residents and visitors is embedded within scheme design principles and wider policy setting processes.

7.3 Significant engagement and adjustment was made to the City Centre Security proposals in light of the engagement with disability groups and individuals and an independent audit, resulting in significant changes to the original proposals. This includes the ability for Blue Badge Holders to enter Cheap Street and improvements to footways and crossing areas.

8 CLIMATE CHANGE

8.1 The City Centre Security Scheme is not predicated on achieving climate neutrality by 2030. However, the work being undertaken is likely assist in achieving carbon neutrality by 2030 for the following reasons:

(1) Reduction in general car parking within the restricted streets may encourage visitors to use more sustainable forms of accessing the City Centre, such as by public transport, walking or cycling

(2) The changes required for deliveries may encourage businesses to consider more sustainable forms of deliveries, eg ‘Last Mile Delivery’, Cargo Bike Deliveries, etc

9 OTHER OPTIONS CONSIDERED

9.1 None

10 CONSULTATION

10.1 This report has been cleared by the relevant officers in finance and legal services

Contact person	*Lynda Deane – Head of Service, City & Town Centre Management* *01225 396428*
Background papers	E3278 - Bath City Centre Security Cabinet Report – July 2022
Please contact the report author if you need to access this report in an alternative format	

Bath & North East Somerset Council

Improving People's Lives

Climate Emergency and Sustainability PDS Panel

Meeting on 27 June 2022, 4pm

Pixash, Keynsham Recycling Hub and Waste Modernisation projects
Kate Hobson, Project Manager

This report provides updates on:

- ✓ progress of the Pixash construction contract into full delivery and on programme with key milestones, and current activity
- ✓ the initiation of a programme of workstreams for the relocation of operational staff which includes significant transformation and change, vehicles and equipment, decant and release of depots and miscellaneous related tasks
- ✓ the plans for implementing the Waste modernisation projects following provisional capital programme entry in February 2022 budget report

1. Pixash, Keynsham Recycling Hub

i) First stage site clearance and tree/hedgerow removal works started on site at Pixash in mid-February. These works were completed and a continuation of groundworks and ongoing contract design development and mobilisation was achieved to ensure continuity to the full scheme start. The formal execution of the contract enabled the construction to proceed in line with the contract programme and overall approved budget. Future inflation risk on the build costs has been reduced through careful contract discussions with fixed inflation rates and an agreed pricing index on key materials, specifically steel. Other pricing risk allowance and a provisional extra VE sum have been identified separately and budget contingency remains where change, variation, and unforeseen events will be managed.

ii) Key milestones in the programme are:

November 2022 – Opening of the new public Recycling Centre. The existing public Recycling Centre at Pixash stays open until this time. The timing for the opening of the Reuse shop is to be determined, proposed to be February/March 2023.

Summer 2023 – Relocation of Waste, Recycling & Fleet operations to Pixash, from Midland Road, Ashmead Road and Locksbrook Road depots.

To note: The Midland Road public recycling centre will remain open until an alternative like for like Bath site is in place. This is being made clear in any communications.

iii) Current activity:

1) Appendix A contains aerial photos taken earlier in May, that show how the construction is moving ahead with drainage works and piling for foundations for specific areas within the site, as well as the access roads to the new public Recycling centre area.
2) On Wed 8 June, a change to the access to the existing Recycling Centre was made. A new entrance was opened on Pixash Lane, very close to the existing one, for public and operational access. This was necessary to install the new electricity substation needed for the Keynsham Recycling Hub. This PR was released, as well as comms activity on site to give advance notice to site users and local residents and businesses.
   https://newsroom.bathnes.gov.uk/news/next-phase-construction-works-keynsham-recycling-hub
3) The Traffic management orders also facilitate the approved s278 works - pavement widening & related works to improve walking & cycling access on Pixash Lane (East side, Southern end); widening of Worlds End Lane to 2 lanes, plus walk/cycle routes and by-pass lane for new public Recycling Centre.
4) A s73 planning submission has been made on behalf of Farrans by a planning consultant (Planning Sphere) seeking permission for a number of changes proposed as an outcome of the detailed design work that is in progress. Appendix B is an extract from the Design and Access Statement which summarises what's included in the application.

2. Relocation staff change project and other key workstreams

1) This involves a significant transformational and culture change project to drive improvement, efficiency and resilience. To include support being drawn from a number of other service areas such HR & OD, Business Change, Health Safety & Wellbeing and IT, as well as extra technical project officer resource.
2) Collection rounds will be reviewed and any necessary changes to collection days will be communicated to residents in advance. Switching to artic haulage for black bag and a review of our current HGV bulk-haul lorries servicing our Recycling Centres is important to maximise efficiencies.
3) With Midland Road public Recycling Centre to stay open, we are planning its operation as a stand-alone facility, mainly staffing and haulage considerations, for when the main operational relocation happens next summer. This will flow on into the new public RRC for Bath in future.
4) Formal break notices will need to be served at leased depots at Ashmead Road and Locksbrook Road, compliance with any lease obligations such as dilapidations and complete vacation with removal of any redundant equipment.

3. Waste modernisation projects

i) Replacement RRC for Bath: The Midland Road public recycling centre will remain open until an alternative like for like Bath site is in place. Project work has been initiated on potential site options, with a focus in the Odd Down area. Design and Planning development support is being procured, to progress feasibility appraisals and technical survey work.

ii) Bring Recycling Banks in Bath: Following agreement on the scope for these Bring Recycling Banks, external resource has now been recruited beginning in May to identify potential locations in Bath, carry out consultation with local residents and ward councillors, and produce a business case for each location by September. The target is a minimum of 3 bring recycling sites to service areas with a high density of residential properties within the edges of the city of Bath boundary (north, south, east and west), in areas of significant HMO's and flats (which don't already have their own bring recycling centre facilities) to supplement the kerbside recycling collection scheme for those with storage issues. These are the key target materials:

- Coloured and clear glass bottles and jars mixed; Plastics (bottles, pots, tubs and trays) and cans (steel and aluminium) mixed; Paper; Card; Textiles

iii) Plastic films & wrappers: collection facilities at our 3 RRCs and the above Bring Recycling Banks: There are currently no reprocessing facilities in the UK; through market testing, we've established that one company is planning to open a plant in South Wales. The timing for this is likely to be Summer 2023 at the earliest. These materials collected by supermarkets have generally been transported to the EU, which is politically unacceptable, and now unstable destinations due to the Russia-Ukraine war. Defra has announced mandatory kerbside collections of plastic films & wrappers from 2027, as part of the Plastic EPR through the Environment Bill; this would therefore be supported with funding to LAs.

Climate Emergency

Purpose-built infrastructure and investment in modern baling and sorting equipment for recyclate materials to increase recycling and reuse opportunities for our residents.

Carbon measurement matrices for recycling are complex due to the range and nature of recyclable materials. There isn't one suitable example available to compare recycling with any refuse treatment technologies, only landfill, which we have already minimised to near zero. This is a developing topic with Strategy colleagues monitoring Defra and other organisations' communications and developments, in this field.

Solar installations on roofs and canopies, rain-water collection and reuse for vehicle washing and watering planted ecology areas, energy efficient buildings, tree-planting, ecology and landscaping are examples of the features built-in through the design process.

Electricity charges have increased by up to 3xfold recently and gas up to 10xfold, so this has become increasingly important for financial as well as climate change reasons. The 3800m^2 (783kWp) solar panel array being installed will generate the amount of energy - in perfect sunlight conditions over 11.69 hours - enough to run Bath Transfer station for a month, based on current usage. We are working with colleagues in the Energy management and Sustainability teams to collate a valid baseline position of usage as well as cost, across our depots, to enable future consistent reporting.

The future replacement of refuse and recycling vehicles to electric powered vehicles is being factored in and infrastructure to future-proof the site has been of key importance. We use specialist route planning software for the refuse, recycling and garden waste rounds to minimise distances travelled, whilst collecting from every household in the district, and to avoid local community impacts wherever possible. The site is on the strategic road network for access to the ring road and motorway for the bulk haulage of waste and recycling to treatment and reprocessing sites in the West of England and across the UK. This will allow us to maximise the highest payload forms of transport, and so reduce carbon emissions for this part of the operation.

We are working with colleagues in the Sustainability team to establish a sound baseline position for the whole Council fleet, which has a big range of vehicles and powered equipment, from Ground maintenance equipment to Parking mopeds to Cleansing street sweepers and 80+ HGVs in Waste and Recycling.

- A litre of diesel has the same emissions whether used by an HGV or a car. Therefore, fuel type is the only variant which will impact on the emissions factor used to calculate fleet emissions
- A calculation of total council fleet emissions can therefore be made using total litres of petrol / diesel / gas oil used, and total KWh of electricity consumed by all council vehicles. Data gathering is in progress.
- Diesel vehicles which use AdBlue should have a slightly different emissions factor to diesel only vehicles, as CO_2 is one of the waste products when the AdBlue reacts with NOx emissions. Contact with BEIS to see if they have any advice.
- The emissions factor to apply to the fuel source changes year on year. For example, 2.68 kg CO_2e per litre of diesel last year, 2.51 kg per litre of diesel this year. This is because of the changing average biofuel blend in the UK of the petrol/diesel
- We are building into the specification of the new Fleet management software system that we are procuring, a number of fields to help with automating emissions reporting in future

Our construction contractor, Farrans, have their own climate change and environment policies and actions to implement through the construction itself.

An early example are the ultra-modern cabins that are in use as site offices, which feature: Energy B-Rated Cabins; Hybrid power system a combination of 60KVA generator with a battery storage unit (BSU); Fuel management utilising White HVO Fuel; Rainwater harvester system.

Community Engagement:

A detailed Communications plan by our Comms & Media team has been developed to link with Farrans' community engagement activity and social value delivery plan. The key elements are:

Council PRs; Updates and briefing for the local Ward Councillors, neighbouring Town and Parish Councils; newsletter for local businesses, residents, community groups; web-page progress updates; employment and training opportunities with our Business Growth team; council staff and departments linkages; and support with our Operations staff communications.

Equality:

As a front-facing service with significant touch points with all residents and households across the district, waste & recycling collections and public reuse and recycling centres have a core focus of equality and accessibility; Equalities Impact Assessments are updated at the time when service changes are planned and implemented.

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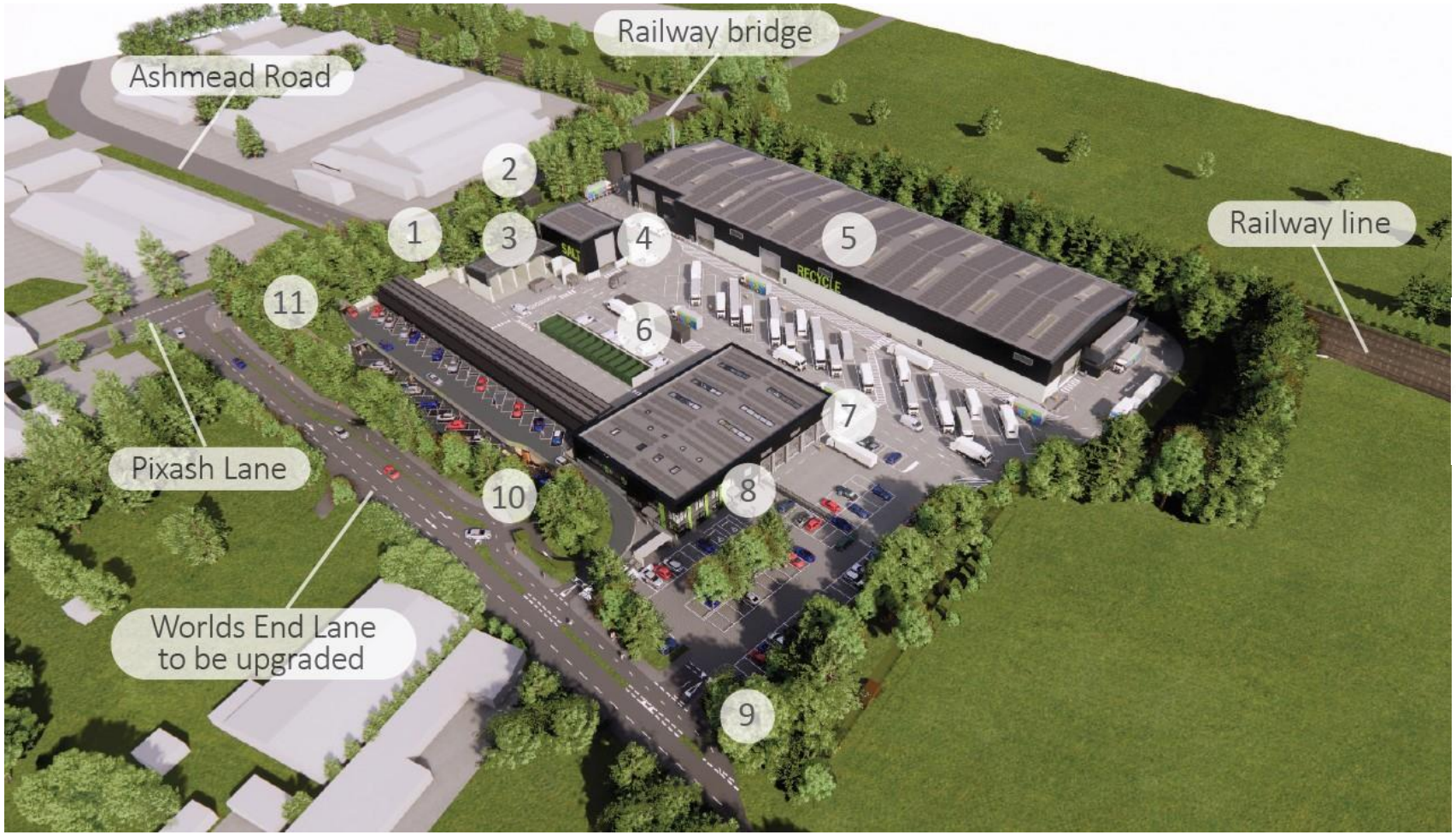
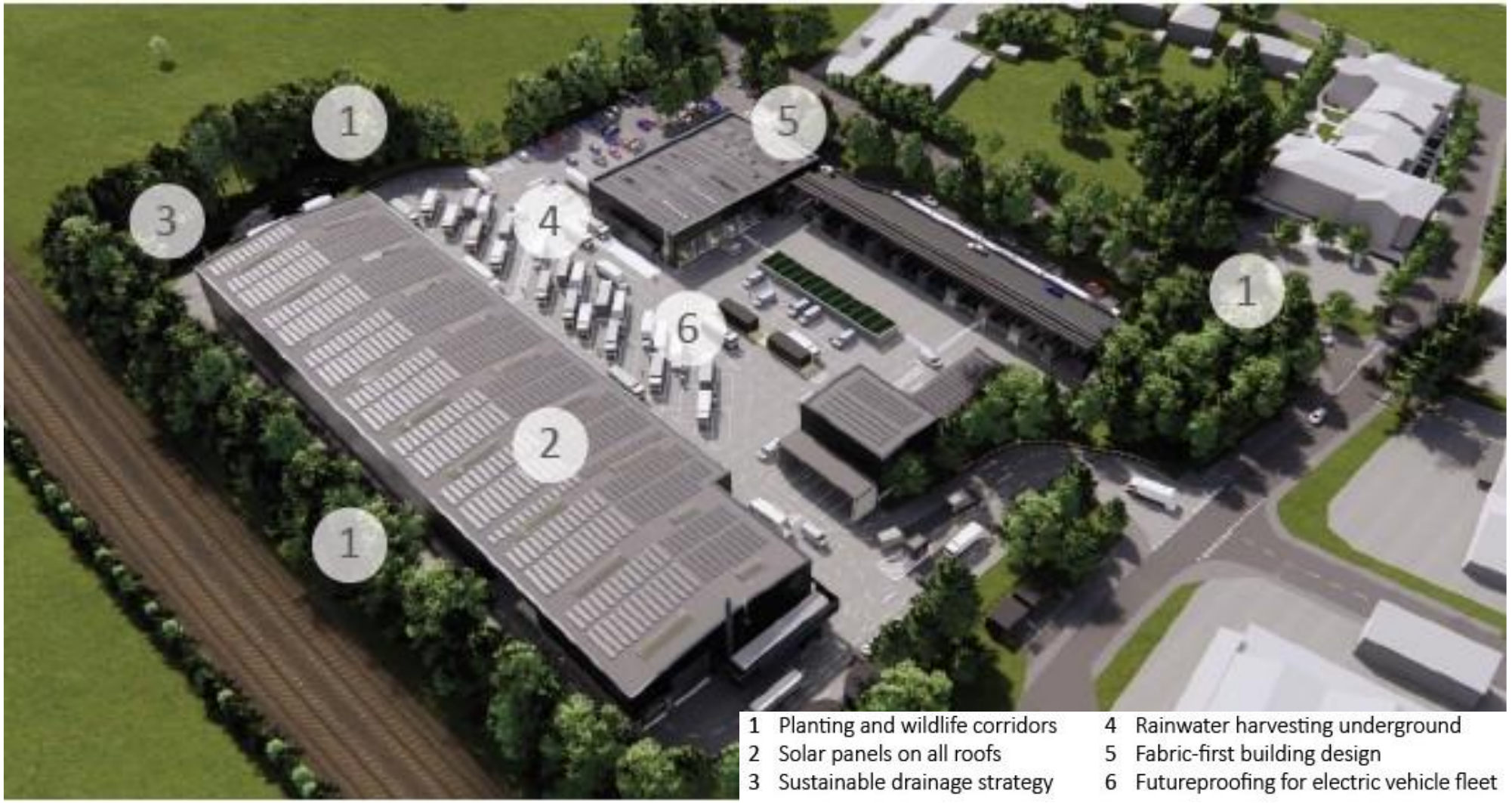


Architects' image looking north

1 Proposed access to operations area
2 Controlled site entrance & weighbridges
3 Trader Waste Transfer Station (TWTS) - semi-external compound
4 Salt Store
5 Material Recovery Facility (MRF) & Waste Transfer Station (WTS)
6 Central operations area
7 Vehicle servicing centre
8 Offices, Staff welfare Education facilities
9 Proposed access to car park
10 Proposed access to public Reuse & Recycling Centre (RRC)
11 Split-level design & off-highway queuing space

Aerial view looking north



1 Planting and wildlife corridors
2 Solar panels on all roofs
3 Sustainable drainage strategy
4 Rainwater harvesting underground
5 Fabric-first building design
6 Futureproofing for electric vehicle fleet

Aerial view looking south

Introduction

Planning consent has been obtained for the development of depot. Ref 21/00435/EREG03. Pre-commencement planning conditions have been discharged. The applicants, B&NES Council have appointed building contractors Farrans to complete the detailed design and construct the depot. Enablement works have commenced, construction is targeted to complete in 2023.

Detail design responsibility for the buildings lies with the contractor and their appointed team. Further design development has identified a number of areas where changes to the consented scheme are proposed.

This document has been prepared by Designscape Architects, who are retained as part of the contractor's design team, to accompany a Section 73 application for minor amendments to current planning consent. It outlines the changes proposed, why they are necessary and the likely impact upon the existing approved design.

Site plan indicating changes

Proposed Changes

The proposed changes include:

a. Site Plan

i. The alignment of the road running parallel with the northern boundary.

ii. The geometry of the in ramp accessing the upper deck of the RRC Building.

b. MRF Building

i. Building columns are positioned outside the perimeter concrete wall and are visible at low level. Cladding above is located outside the steel frame.

ii. Eaves gutters and rainwater down pipes are located externally.

iii. Perimeter safety guarding to roof edge

iv. Height of plant enclosure decks at either end of the building is increased.

v. Height of ground level concrete wall, below cladding on the north elevation increases

vi. The building footprint and ridge height remain the same as consented

c. Salt Barn and TWTS

i. A pre-fabricated timber framed dome is proposed in place of the previous rectangular, steel framed design.

ii. Perimeter safety guarding to roof edge of covered TWTS area

d. Office Workshop Building

i. A safety guard rail is proposed at the gable ends of the building, where the building parapet does not provide adequate edge protection.

e. Other

i. Detailed design development of the site-wide drainage system has led to some minor detail changes in order to adequately meet the drainage performance requirements of the site.

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Bath & North East Somerset Council			
MEETING:	**Climate Emergency and Sustainability Policy Development & Scrutiny Panel**		
MEETING DATE:	**27 June 2022**	EXECUTIVE FORWARD PLAN REFERENCE:	
		E	
TITLE:	**Bath Clean Air Plan 2021 update**		
WARD:	All		
AN OPEN PUBLIC ITEM			
List of attachments to this report: **Bath Clean Air Zone Annual Support Summary 2021** **Bath Clean Air Zone Annual Monitoring Report 2021 with supporting appendices**			

1 THE ISSUE

1.1 Poor air quality is the largest known environmental risk to public health in the UK. Investing in cleaner air and doing more to tackle air pollution are priorities for the UK government, as well as for Bath and North East Somerset Council (B&NES). B&NES has monitored and endeavoured to address air quality in Bath, and the wider B&NES area, since 2002.

1.2 In 2017, the Council was directed to introduce a Clean Air Zone (CAZ) to expedite the reduction of nitrogen dioxide concentrations in the centre of Bath and achieve compliance with government objectives in the shortest time possible and by 2021 at the latest. The CAZ was launched on 15 March 2021.

1.3 This report reviews the performance of the CAZ during its first year of operation and the progress which has been achieved in improving air quality throughout the city.

1.4 The report provides an update on the formal assessment of the scheme in 2021 by the Joint Air Quality Unit (JAQU, a joint department between DEFRA and DfT) and the progress achieved in fulfilling the Ministerial Directions served upon the council by central government.

2 RECOMMENDATIONS

The Panel is asked to:

2.1 Note the report and accompanying presentation at the Panel meeting and discuss the performance of the CAZ during the first year of operation.

3 THE REPORT

3.1 The Bath Clean Air Zone was launched on the 15 March 2021 and on receipt of air quality data from the first year of operation, JAQU are assessing whether the council has fulfilled the requirements of the three Ministerial Directions served since 2017, and achieved the required reductions in harmful nitrogen dioxide pollution in the shortest time possible.

3.2 Since the introduction of the CAZ the council has produced quarterly reports providing information on air quality, traffic flows and investigations into concerns of traffic displacement, which have now been brought together in an annual Bath Clean Air Zone Monitoring Report 2021. This annual report also provides additional data collected as part of the monitoring and evaluation plan, which was submitted as part of the CAZ Full Business Case in 2019.

3.3 The full Annual Report (and supporting appendices) is attached and is accompanied by a Summary Report which highlights the important points and messages. The key outcomes around the improvements in air quality are:

- Despite the impacts of Covid and Cleveland Bridge closure, nitrogen dioxide (NO_2) concentrations in the CAZ **reduced by 21% since the baseline year, 2019.** This is despite traffic flows in Bath largely returning to those seen pre-pandemic.

- There were three monitoring locations in Bath that, whilst having an overall reducing trend in concentrations, did not meet the annual limit value of 40 µg/m^3. They are:

  Walcot Parade 2 (43.1 µg/m^3), Wells Road (42.6 µg/m^3), and Dorchester Street (40.5 µg/m^3).

  The council awaits confirmation from JAQU as to how these sites will be treated in their formal assessment of the scheme, as these monitoring locations have been historically located and do not accord with the Air Quality Standards Regulations 2010 upon which the Ministerial Directive was issued and JAQU base their formal assessment.

  All of these sites do, however, sit within the scope of the Local Air Quality Management Framework monitoring regime and therefore remain an ongoing concern for the council.

- Air quality and traffic flows have been monitored outside of the CAZ to determine if the zone has simply displaced traffic and associated emissions, and findings show that nitrogen dioxide concentrations in urban area outside of the CAZ but within Bath, Bathampton and Batheaston **reduced by 22% since 2019.**

3.4 An appendix, providing nitrogen dioxide concentrations data on all monitoring locations in 2021, both within the CAZ and outside of the zone, can be found in Appendix 3 to the Annual Report.

3.5 Appendix 2 of the Annual Report provides updates on the investigations which have been carried out in response to concerns about potential displacement of chargeable vehicles, which may be trying to avoid the zone. A range of monitoring methods have been used as part of these investigations, including the deployment of automatic traffic counters and temporary ANPR (automatic recognition number plate) cameras to provide specific information on the compliance status of vehicles travelling along a particular part of the road network.

Of the 17 investigations, 7 locations have been determined as having no displacement impacts, 2 locations will be reviewed following the full re-opening of Cleveland Bridge, 2 locations have further monitoring in progress and 6 locations require ongoing monitoring at this stage.

3.6 From the launch of the scheme, the council has been keen to maintain awareness around driver behaviour, including the request not to idle engines unnecessarily. Bespoke signage has been produced and an online toolkit is now being developed so that educational material reinforcing the messages around anti-idling, can be downloaded and used by community groups.

3.7 The performance of the Bath Clean Air Zone scheme is being closely scrutinised by the JAQU in collaboration with Ipsos UK and the Institute for Transport Studies (ITS) based at the University of Leeds. In May 2022, a Central Evaluation Report was published on the impact of Local NO_2 Plans which provided insight on the first 6 months of data from the operation of the Bath scheme (March 2021- October 2021), as well as updates on the other live schemes in Birmingham and Portsmouth. Accepting that this is a very early-stage analysis, this report supports our local findings and key outcomes are:

- NO_2 levels in Bath have decreased since the CAZ was implemented. Taking into account COVID restrictions and the Cleveland Bridge closure, alongside an analysis of air quality in comparable locations, the suggestion is that the observed improved air quality can be partially attributed to the CAZ introduction.

- Evidence suggests that the CAZ has been successful in encouraging the enhancement of vehicle compliance. While COVID is the main driver for the observed fluctuations in the volume of traffic in the CAZ area in Bath, an analysis of the composition of the fleet driving into the CAZ area highlights a clear move toward compliant vehicles across all vehicle types.

- A comparison between air quality data in the B&NES CAZ and that in control sites in Reading, Oxford and Worthing suggests that improvements in air quality in Bath may be causally related to the B&NES CAZ. However, a longer time series of quality assured measurements is needed to improve the confidence and certainty of this conclusion.

- Following the CAZ introduction on March 15, 2021, there is no significant deviation in the weekday traffic flow trends (incrementally increasing January to July 2021) at any of the eight Automatic Traffic Counter (ATC) sites, whether outside the CAZ (three sites) or within (five sites). This suggests the CAZ launch had a minimal impact on the aggregate level of traffic inside and outside the CAZ area.

4 STATUTORY CONSIDERATIONS

4.1 The council has received a total of three separate Ministerial Directions throughout the development of the CAZ scheme, which require the council to fulfil its statutory duty to achieve compliance with the relevant air quality standards by 2021 at the latest and in any case, in the shortest time possible.

4.2 The formal assessment by JAQU as to whether the council has 'achieved success' with the Ministerial Directions is currently in progress. JAQU have provided the following points for information:

- JAQU understands that local monitoring shows that Bath is making good progress towards achieving legal compliance for Nitrogen Dioxide levels.

- JAQU is currently assessing the evidence that they have collected which will be independently reviewed.

- A report summarising JAQU's assessment of this evidence will be published in the autumn alongside assessments of other Local Authorities' plans.

4.3 Being ambitious in achieving compliance with air quality standards across Bath and the wider North East Somerset area, will result in widespread public health improvements and compliments the wider projects around decarbonisation and promoting more sustainable methods of travel.

5 RESOURCE IMPLICATIONS (FINANCE, PROPERTY, PEOPLE)

5.1 To reiterate, the purpose of enforcing the CAZ is to improve air quality and public health by bringing about sustainable behaviour change to reduce the number of highly polluting vehicles coming into the city. A summary of the financial position in 2021/22 is shown in the table overleaf:

	Zone Entry Charges £(M)	Penalty Charge Notices £(M)	Grant funding £(M)	Total £(M)
Income	2.62	2.96	2.02	7.62
Operating costs	2.48			2.48
Net surplus				5.14

5.2 Since launch, the CAZ scheme has generated £5.67 million from zone entry charges and penalty charge notices (to the end of March 2022) which is expected to drop year on year as behaviour change becomes embedded. Of this revenue, £2.70 million was generated via charges paid on time and those paid upon receipt of penalty charge notices. A further £2.97 million has been generated through fines for late payment.

5.3 The operational costs for the scheme in the first year amounted to £2.48M of which c£2.02M were offset against grant income.

5.4 Of the remaining surplus, £3.35M has been added to the smoothing and decommissioning reserves to cover future year costs and £2.5M is being allocated over the next two years to the City Region Sustainable Transport Settlement Fund (CRSTSF) (£1.79M allocated in 2021/22). The scheme is now at the point where smoothing reserves have been fully covered and surplus is being generated (assuming, that predicted future costs do not increase).

	Smoothing and decommissioning reserves £(M)	CRSTSF £(M)	Total £ (M)
Allocation of surplus in 2021/22	3.35	1.79	5.14

6 RISK MANAGEMENT

6.1 A risk assessment related to the issue and recommendations will be undertaken, in compliance with the council's decision-making risk management guidance.

7 CLIMATE CHANGE

7.1 Whilst CO_2 (carbon dioxide) is currently regarded as a climate change gas rather than a pollutant, it is anticipated that improving awareness about vehicle emissions will help facilitate the outcomes of local transport policies, reducing vehicle-related CO_2 emissions as well as NO_2 and particulate matter pollution.

8 OTHER OPTIONS CONSIDERED

8.1 None; this is an update report on the performance of the CAZ scheme in it's first year of operation.

9 CONSULTATION

9.1 Consultation has been carried out with the council's s.151 Officers, Director of Place Management, as well as the Cabinet Members for Climate Emergency and Sustainability and Transport.

Contact person	*Cathryn Brown, Clean Air Zone Manager 01225 477645*
Background papers	
Please contact the report author if you need to access this report in an alternative format	

Bath's Clean Air Zone
Annual report 2021

Bath & North East Somerset Council

Improving People's Lives

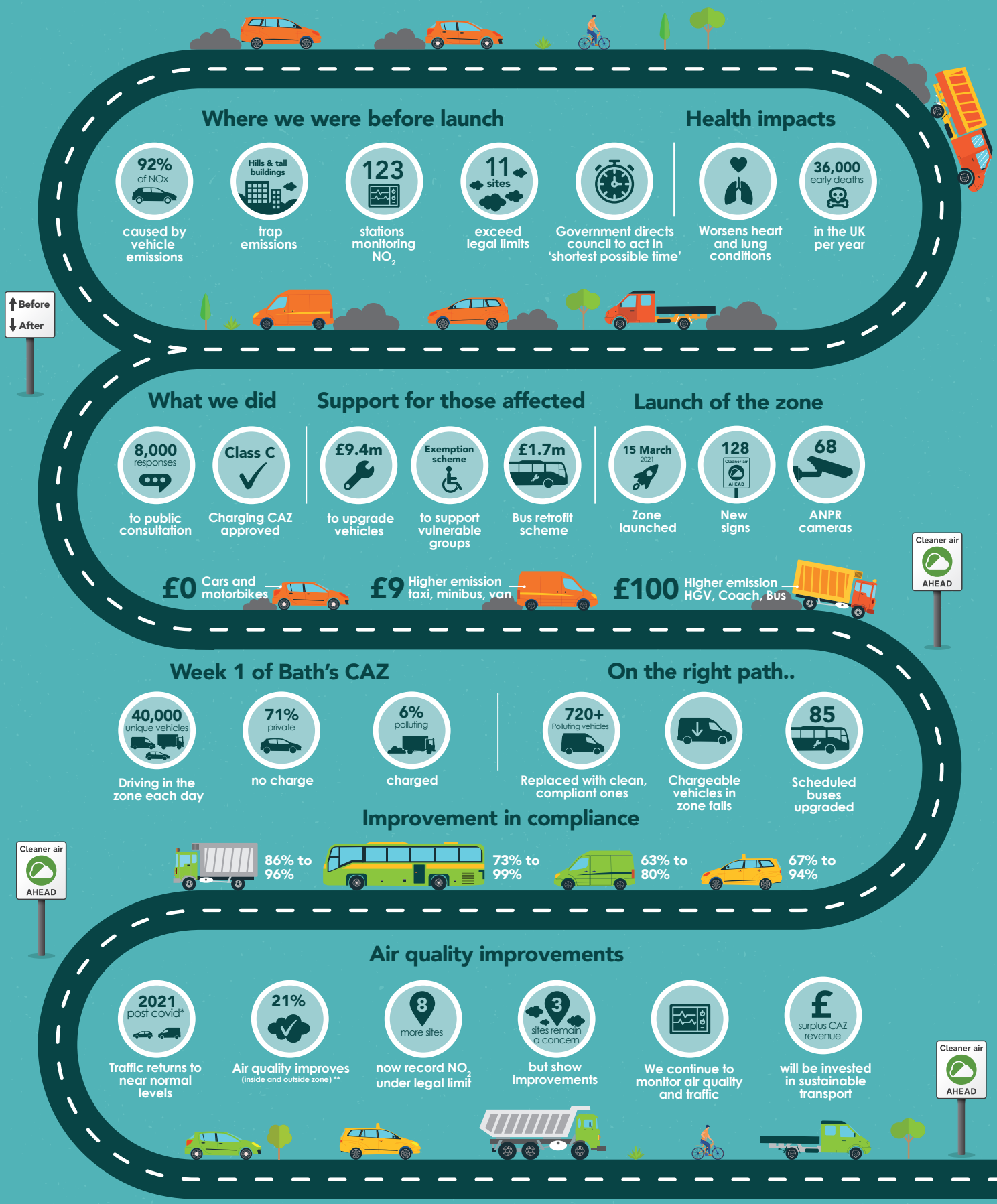
Contents

Supplied As Attachments:

Acronyms and Abbreviations

ANPR	Automatic Number Plate Recognition
AQMA	Air Quality Management Area
AQO	Air Quality Objective
ASR	Annual Status Report
ATC	Automatic Traffic Counter
AURN	Automatic Urban and Rural Network
BID	Business Improvement District
B&NES	Bath and North East Somerset Council
CAF	Clean Air Fund
CAP	Clean Air Plan
CAZ	Clean Air Zone
CSF	Critical Success Factor
CVRAS	Clean Vehicle Retrofit Accreditation Scheme
DEFRA	Department for the Environment, Food and Rural Affairs
DfT	Department for Transport
DVLA	Driver and Vehicle Licensing Authority
EU	European Union
FBC	Full Business Case
HGV	Heavy Goods Vehicle
JAQU	Joint Air Quality Unit
LAQM	Local Air Quality Management
LEP	Local Enterprise Partnership
LEV	Low Emissions Vehicle
LGV	Light Goods Vehicle
MTC	Manual Classified Counts
NO	Nitrogen Oxide
NO_2	Nitrogen Dioxide
NOx	Nitrogen Oxides
OS	Ordnance Survey
PCM	Pollution Climate Mapping
PCN	Penalty Charge Notice
PHGV	Private Heavy Goods Vehicle
PM	Particulate Matter
PM2.5	Particulate Matter with particles less than 2.5 micrometers diameter
PM10	Particulate Matter with particles less than 10 micrometers diameter
PRMS	Public Realm and Movement Strategy
TEA	Triethanolamine
TG	Technical Guidance
TMP	Traffic Management Plan
UK	United Kingdom
ULEV	Ultra-Low Emissions vehicle
UTC	Urban Traffic Control
UTMC	Urban Traffic Management and Control
VAT	Value Added Tax
WECA	West of England Combined Authority
WHO	World Health Organisation

Bath's Clean Air Zone 2021



Where we were before launch

- 92% of NOx — caused by vehicle emissions
- Hills & tall buildings — trap emissions
- 123 — stations monitoring NO_2
- 11 sites — exceed legal limits
- Government directs council to act in 'shortest possible time'

Health impacts

- Worsens heart and lung conditions
- 36,000 early deaths — in the UK per year

Before / After

What we did

- 8,000 responses — to public consultation
- Class C — Charging CAZ approved

Support for those affected

- £9.4m — to upgrade vehicles
- Exemption scheme — to support vulnerable groups
- £1.7m — Bus retrofit scheme

Launch of the zone

- 15 March 2021 — Zone launched
- 128 — New signs
- 68 — ANPR cameras

Cleaner air AHEAD

- £0 Cars and motorbikes
- £9 Higher emission taxi, minibus, van
- £100 Higher emission HGV, Coach, Bus

Week 1 of Bath's CAZ

- 40,000 unique vehicles — Driving in the zone each day
- 71% private — no charge
- 6% polluting — charged

On the right path..

- 720+ Polluting vehicles — Replaced with clean, compliant ones
- Chargeable vehicles in zone falls
- 85 — Scheduled buses upgraded

Improvement in compliance

- 86% to 96%
- 73% to 99%
- 63% to 80%
- 67% to 94%

Cleaner air AHEAD

Air quality improvements

- 2021 post covid* — Traffic returns to near normal levels
- 21% — Air quality improves (inside and outside zone) **
- 8 more sites — now record NO_2 under legal limit
- 3 sites remain a concern — but show improvements
- We continue to monitor air quality and traffic
- £ surplus CAZ revenue — will be invested in sustainable transport

Cleaner air AHEAD

Help us on our journey

- Most vehicles in Bath are cars
- 60% of car trips — start and end in Bath
- To help, please walk or wheel short trips
- 2+ — Consider using car-share or electric vehicles
- Consolidate your deliveries

Bath & North East Somerset Council

Improving People's Lives

*Annual average compared with 2019 (pre-Covid)
** compared with baseline year, 2019

Executive summary

In 2017, the Government directed Bath & North East Somerset (B&NES) Council to reduce nitrogen dioxide (NO_2) pollution in Bath to within the annual average limit of 40 micrograms per cubic metre ($\mu g/m^3$) in the shortest possible time, and by the end of 2021 at the latest.

This type of pollution is chiefly caused by road traffic, and extensive technical work showed that a charging clean air zone would be the only way to achieve success in the time frame. Clean air zones work by deterring certain higher emission vehicles from entering areas of high pollution by levying a daily charge on the driver, encouraging a more rapid replacement of polluting vehicles for cleaner, compliant ones than would otherwise naturally occur.

On 15 March 2021, the Council introduced a charging Class C Clean Air Zone (CAZ) in Bath's city centre to drive down NO_2 pollution at several locations which regularly exceed these NO_2 limits, in particular risking children's health and the health of our most vulnerable residents. In a Class C CAZ, private cars and motorbikes are not charged, regardless of emissions.

In Bath, significant financial support has been made available to individuals and businesses to replace non-compliant, chargeable vehicles regularly driving in the zone, and around 700 polluting vehicles have already been replaced using government funds. More information on how the CAZ works can be found in 'How to use this report'.

Aims and limitations of this report

This report provides an update and indicative view of how the CAZ has performed during the first year of operation during 2021. It looks at impacts on air quality, traffic flow and vehicle compliance and multiple other measures.

Due to Covid-19 having an unprecedented impact on travel behaviour in 2020, baseline data from the last representative year (2017-2019) has been used to measure the impact and effectiveness of the zone.

You can find out more about how we measure and present the data in the section 'How to use this report'; and there is a more detailed explanation of how we monitor at the end of the report in the 'Monitoring explained' section.

Key findings

A Clean Air Zone (CAZ) is needed in Bath to reduce air pollution to improve the health of people in the city. Everyone is affected by poor air quality and some people with respiratory problems are at particular risk if air pollution increases.

The CAZ was implemented in March 2021 and higher-emission vehicles are now charged to enter the zone. A Financial Assistance Scheme (FAS) and bus retrofit scheme were set up to upgrade or retrofit higher-emission vehicles. The Council **supported hundreds of people, businesses, and bus operators by upgrading or retrofitting over 700 vehicles** by the end of 2021. There is also an ongoing behaviour change campaign aimed at helping people travel more actively and sustainably in Bath and the wider district.

The Covid pandemic has greatly affected working habits and travel patterns since the winter of 2019/2020. The effects of the pandemic are far-reaching and a major change to traffic composition has been an increase in delivery vehicles – mostly vans and heavy goods vehicles – as people limit their travel. This change in traffic composition has been impacting local neighbourhoods in Bath.

During much of 2021, the Cleveland Bridge was also closed to traffic as structural repairs were carried out. The bridge normally carries around 17,000 vehicles per day and so the diversion of lighter vehicles through the centre of Bath will have had a significant impact on local air quality during 2021.

Despite the impacts of Covid and Cleveland Bridge, nitrogen dioxide (NO_2) concentrations in the zone **reduced by 21%** compared with the baseline year, 2019. This is despite traffic flows in Bath largely returning to those seen pre-pandemic.

Three sites in Bath did not meet the annual limit value of 40 µg/m^3 but all recorded decreasing trends.

- Walcot Parade 2
- Wells Road and
- Dorchester Street.

We have been monitoring air quality and traffic flows outside of the CAZ to determine if the zone has simply displaced traffic and associated emissions, and findings show that NO_2 concentrations in urban area outside of the CAZ but within Bath, Bathampton and Batheaston **reduced by 22%** compared with 2019.

In general, traffic outside of the zone does not appear to have increased, however there are some locations where there may be more commercial traffic. We have ongoing surveys to understand whether the CAZ is the cause of any displacement, but we know that during 2021, the Cleveland Bridge closure diversions have significantly impacted traffic flows. Private cars are not charged in the CAZ and have no reason to avoid the zone.

We have focused our work on sites within the zone that still have higher concentrations of NO_2 and areas where traffic is found to have been displaced.

We thank the public for supporting the Council to implement the zone which is helping to improve air quality and the health of people in Bath.

Summary of annual air quality results from within the CAZ (CAZ_Only):

2019 is used as our baseline, comparative year because it is the most recent year with pre-CAZ data not impacted by the Covid pandemic.

- Average 2021 annual nitrogen dioxide (NO_2) concentrations within the CAZ are **21 per cent lower than in 2019**, representing a reduction of 7.0 µg/m^3. This is the average reading from a total of 65 monitoring sites that recorded data in both 2019 and 2021, with at least 25% data capture at all sites.
- **Three sites** recorded an annual average NO_2 concentration **greater than 40 µg/m^3**. These sites were: Walcot Parade 2 (43.1 µg/m^3), Wells Road (42.6 µg/m^3), and Dorchester Street* (40.5 µg/m^3). **All these sites have an overall decreasing trend.***
- The number of sites exceeding 40 µg/m^3 decreased from 15% in 2019 to only 5% in 2021, **reducing by seven sites**.
- **None of the 65 sites** were found to have increased in NO_2 concentration since 2019.
- **Five sites** recorded annual average NO_2 concentrations **greater than 36 µg/m^3 but at or below 40 µg/m^3**. These sites were: Victoria Buildings* (40.0 µg/m^3), Anglo Terrace Façade (38.1 µg/m^3), Walcot Parade* (37.8 µg/m^3), Chapel Row 2* (36.2 µg/m^3), Gay Street 2* (36.1 µg/m^3). **All these sites have an overall decreasing trend**.

* Please see *Critical Success Factors* of the CAZ for information on how we consider the monitoring assessment criteria for each site and how these feed into the overall success of the scheme.

Summary of annual air quality results from within the wider Bath urban area (CAZ_Boundary):

- Average 2021 annual nitrogen dioxide (NO_2) concentrations within the wider Bath urban area (CAZ_Boundary) are **22 per cent lower than in 2019**, representing a reduction of 5.5 µg/m^3. This is the average reading from a total of 56 monitoring sites that recorded data in both 2019 and 2021, with at least 25% data capture at all sites. This demonstrates that air quality is consistently improving across the district.
- In 2021, **zero sites** within the wider Bath urban area (CAZ_Boundary) recorded **greater than 40 µg/m^3**. This is a **reduction of one site** compared to 2019 and represents a decrease in the number of sites exceeding 40 µg/m^3 from 2% in 2019 to 0% in 2021.
- **None of the 56 sites** were found to have increased in NO_2 concentration compared with 2019.

Summary of annual air quality results from within the wider district (Wider_B&NES):

- Average 2021 annual nitrogen dioxide (NO_2) concentrations within the wider region of B&NES (Wider_B&NES) are **18 per cent lower than in 2019**, representing a reduction of 5.3 µg/m^3. This is the average reading from a total of 29 monitoring sites that recorded data in both 2019 and 2021, with at least 25% data capture at all sites. This demonstrates that air quality is consistently improving across the district.

Summary of annual traffic flow figures:

We used 2017 or 2018 as baseline comparative years for traffic flow because they are the most recent years with pre-CAZ data, not impacted by the Covid pandemic and with good-quality data.

- Nationally, average traffic volumes returned to around pre-pandemic levels and the numbers of **LGVs and HGVs now exceed pre-pandemic levels** (Department for Transport).
- Average 2021 **traffic flows in Bath were generally below pre-pandemic levels**.
- In January 2021, traffic flows across all site groupings within the CAZ, wider Bath urban area and wider district, were **more than 35% below the baseline**.
- By the end of the year in December 2021, traffic flows were closer to pre-pandemic levels between **2% and 9% below the baseline**.
- Despite general traffic flows returning to near pre-pandemic levels, air quality is improving.
- Aside from the ongoing changes to travel habits due to Covid, traffic flows within Bath and the CAZ **were not representative** during July-December 2021 due to the full or partial closure of Cleveland Bridge which diverted lighter traffic through the city centre and heavier traffic away from the city centre along the A4 or A36.
- At some sites, where we have traffic monitoring close to air quality monitors it is clear **increased traffic flows caused increased NO_2 concentrations**, for example at Chapel Row. Increased traffic flow at these sites during the second half of 2021 was due to traffic diverting to avoid Cleveland Bridge.
- We are gathering extensive evidence to assess any potential traffic displacement due to the CAZ. Private cars, which represent most vehicles driving in the zone, are not charged. Increases in commercial vehicles seen in local communities may be due to a higher demand in home deliveries.

Summary of annual vehicle compliance and financial assistance scheme (FAS) figures:

- The Council's financial assistance scheme (FAS) offered local businesses and individuals grants and interest-free loans to replace or upgrade non-compliant vehicles regularly driving in the zone.
- Compliance rates **across all vehicle groups improved** between March and December 2021.
- **40,000 unique vehicles**, on average, were recorded in the zone each day, between the launch and end of 2021.
- Most vehicles recorded in the CAZ are private cars, with an average of **28,500 unique cars** recorded in the zone each day during 2021. This equates to **71% of all vehicles**. Private cars are not charged.
- An average of 1,146 non-compliant vehicles were seen in the zone each day, during the first four weeks of operation in March/April 2021 compared to 550 during the last four weeks of 2021, **a decrease of 52%**.
- Owners of over 1,500 vehicles applied for financial support to upgrade or retrofit their vehicle.
- In total, the Council's FAS supported the **upgrade of 722 vehicles** from higher emission to **cleaner, compliant ones** in 2021.
- The percentage of chargeable non-compliant vehicles (as a percentage of all traffic) entering the zone each week **reduced from 6% in the launch week** to an average of **1% by the end of 2021**.
- Van/LGV compliance rose from 63% during the launch week to **80% by the end of 2021**. 3,143 individual vans/LGVs (compliant and non-compliant) were recorded in the CAZ each day (on average) during 2021.
- The Council's FAS supported the **replacement of 594 vans/LGVs** from higher emission to cleaner, compliant ones during 2021.
- Taxi/PHV compliance rose from 67% during the launch week to around **93% by the end of 2021**. An average of 385 individual taxis/PHVs were recorded in the CAZ each day during 2021.
- The Council's FAS supported the **replacement or upgrade of 91 taxis/PHVs** from higher emission to cleaner, compliant ones during 2021.
- Bus/coach compliance rose from 73% during the launch week to around **99% by the end of 2021**. An average of 109 individual buses/coaches were recorded in the CAZ each day during 2021. Bus/coach numbers may be lower than normal due to the ongoing effects of Covid and perceptions around the use of public transport.
- The Council's FAS supported the **upgrade of 22 non-scheduled buses/coaches** from higher emission vehicles to cleaner, compliant ones during 2021. Scheduled buses are also considered below.
- HGV compliance for vehicles weighing greater than 3.5T but less than 12T rose from 86% during the launch week to around **96% by the end of 2021**. An average of 119 vehicles were recorded in the CAZ each day during 2021.
- HGV compliance for vehicles weighing greater than 12T rose from 93% during the launch week to around **96% by the end of 2021**. An average of 288 vehicles were recorded in the CAZ each day during 2021.

- The Council's FAS supported the **upgrade of 14 HGVs** from higher emission to cleaner, compliant ones during 2021.
- Minibus compliance varied considerably due to the relatively low number of minibuses recorded in the CAZ each day during 2021. The daily average minibus compliance was around 73%.
- The Council's FAS supported the **upgrade of 2 minibuses** from higher emission to cleaner, compliant ones during 2021.
- Out of a total fleet of 226 scheduled buses, 88 were non-compliant when the bus retrofit programme started. By the end of December 2021, **85 had been successfully retrofitted to meet CAZ emission standards** with financial support from the government. Three vehicles are awaiting the development of a retrofit solution which is now being progressed.

*Covid-19 pandemic conditions continue to effect traffic flows and travel behaviours. Further analysis and time will be required to assess the longer-term impact of the pandemic on air quality.

How to use this report

This report provides information on the CAZ's performance during 2021. The main areas we discuss are:

- air quality data
- traffic flow data
- and fleet compliance data

We also discuss:

- retail/ business/office space vacancy figures
- retail footfall surveys
- Park and Ride passenger data
- walking and cycling counts
- bus usage data
- stakeholder Feedback from Council User Group Forums
- taxi fares and unmet demand surveys
- Early Measures Fund, zero emission parking permits
- bus retrofit uptake/ compliance
- financial support scheme uptake
- travel advisor session uptake
- anti-idling enforcement
- weight restriction enforcement
- e-cargo scheme

Timescales and baseline data

To determine the effectiveness of the CAZ, we compare data collected since the launch of the CAZ with baseline data from similar periods before its launch, so that we can consider seasonal effects on air quality and traffic flow. For quarterly data, we compare like-for-like data from previous years, breaking the year into the following quarters:

- Quarter 1 (Q1) – January, February, March
- Quarter 2 (Q2) – April, May, June
- Quarter 3 (Q3) – July, August, September
- Quarter 4 (Q4) – October, November, December

The primary focus of this report is the year 2021. Given the unprecedented conditions brought about by the Covid-19 pandemic in 2020 (including significant changes in transport and travel behaviour), we have discounted 2020 figures for comparative purposes, unless otherwise stated in the report.

When reading the report please note the following:

- Annual air quality data is bias-adjusted and annualised, where appropriate, unless otherwise stated. In some cases, a further adjustment is important where we distance-adjust the result to the façade. This may be used when we are considering the compliance of a diffusion tube site within Local Air Quality Management (LAQM) guidance.
- All quarterly air quality data is raw, meaning it is not adjusted in any way (bias or annualisation), unless otherwise stated.
- We use baseline data from 2019 to compare air quality monitoring results (because the Covid-19 pandemic affected 2020 data very heavily).
- Air pollution is affected by the seasons so quarterly data is compared to the same quarter from the baseline year.
- We use data from 2017/18 to compare traffic flows because the Council has insufficient data for some periods including 2019.
- Traffic flows also vary according to the seasons.
- We look at data from the entirety of 2021, despite the zone only launching on 15 March 2021.
- We also look at longer-term trends from 2017 to end of 2021.
- There are many graphs in this report, and each has its own scale.

Where we gather data from/what locations

We have identified three site groupings for comparison of data and to establish the impact of the zone on traffic flows and air quality both inside and outside of the CAZ:

- The clean air zone (sites within the CAZ boundary which we call 'CAZ_Only').
- The boundary area (sites outside the CAZ boundary but within the urban area of Bath including Batheaston and Bathampton, which we call 'CAZ_Boundary').
- The wider area (sites outside of the Bath, Batheaston and Bathampton urban areas, but within the rural areas and district-wide urban areas in Bath & North East Somerset, which we call 'Wider_B&NES').

Climate summary 2021

Air pollution is affected by meteorological conditions. This is a brief roundup of the monthly climate for the year, as described by the Met Office.

- Around the UK, 2021 had temperature and sunshine levels, with rainfall levels slightly below average.
- The mean UK temperature was 1.0°C above the 1961-1990 baseline.
- The first part of 2021 was generally colder and wetter than average, with the second half of the year warmer than average. April and June were drier than normal while September was particularly warm.

As most (approximately 80%) of NO_2 from vehicle emissions occurs as a result of chemical reactions after being emitted as nitric oxide (NO), meteorological conditions are a significant factor in the resulting measured concentrations. NO_2 is usually higher in winter due to the cooler temperatures of catalysts, significantly compromising the reduction of NOx from emissions. Heatwaves also increase levels of NO_2. Long periods of unusual weather can result in annual measured concentrations becoming an outlier in a long-term trend.

Air quality data in this report is provisional and has not been adjusted to take account of weather conditions – a process known as de-weathering. This process is used to remove the impact of weather variations from trends so that we can see the impact of other measures such as the implementation of the CAZ or a lockdown.

Find more climatic information at:
https://www.metoffice.gov.uk/research/climate/maps-and-data/summaries/index

Cleveland Bridge closure

Cleveland Bridge was closed to all traffic on 28 June 2021 for emergency repairs. The bridge usually carries around 17,000 vehicles per day, and so the closure affected traffic flows throughout Bath. The bridge remained closed to traffic until November, when it partially reopened with a restricted width and single-way, signal-control. Large vans, small lorries (under 7.5t) and coaches are continuing to use the diversions.

As a result of the closure, traffic flows in and around Bath were impacted during the second half of 2021. The resultant diversions lead to traffic displacement into areas surrounding the CAZ. We used Automatic Number Plate Recognition (ANPR) cameras to identify vehicle compliance in areas where we were unsure whether vehicles were trying to avoid the CAZ or the bridge. It was difficult to identify whether vehicles were displaced because of the bridge closure, CAZ, or both. We delayed some traffic displacement monitoring until after the partial reopening of the bridge in November 2021 to help us understand where traffic was flowing as a result of the CAZ.

Find more information about the bridge renovation at:
https://beta.bathnes.gov.uk/cleveland-bridge-renovation-project/scheme-overview

Covid-19 and air quality

- Multiple lockdowns in response to the Covid-19 pandemic had a significant effect on transport and travel behaviour, locally and nationally, which is why we've discounted 2020 data (unless otherwise stated).
- National traffic volumes returned to pre-pandemic levels by mid-2021 and in the case of LGVs and HGVs, levels exceed those seen pre-pandemic due to the increase in e-commerce and home deliveries.
- Covid is still influencing how people behave. There are lower rates of public transport use and higher rates of home-working and commuting by car.
- Online shopping and home-deliveries are increasing, which is leading to more commercial vehicles on the roads. For example, in mid-September 2021, light goods vehicles increased to 112% of their pre-pandemic levels whilst heavy goods vehicles increased to 110% and cars reduced to 97%, respectively (Department for Transport statistics)[1].

[1] Department of Transport statistics from the Office for National Statistics. Economic activity and social change in the UK, real-time indicators, 2021
https://www.ons.gov.uk/economy/economicoutputandproductivity/output/bulletins/economicactivityandsocialchangeintheukrealtimeindicators/23september2021

World Health Organisation air quality targets update

The targets set for air pollution limits are initially set by the World Health Organisation's (WHO) Air Quality Guidelines and then the UK government considers the potential for adopting these targets. These guidelines are intended to inform the setting of air quality standards but are not ready-made targets for adoption. The WHO itself does not expect any country to simply adopt its guidelines without first undertaking the steps we plan to take before setting targets, including a fully costed analysis and developing a pathway to achieving the targets.

It is vital that the targets set are stretching but achievable, as well as appropriate to our national circumstances. That is why the government is working with internationally recognised experts to deliver the evidence to inform target setting. On 15 July 2021 the government published the advice received to date from the Air Quality Expert Group and the Committee on the Medical Effects of Air Pollutants. You can find the advice here: https://uk-air.defra.gov.uk/library/air-quality-targets

The WHO air quality targets were updated in 2021 to reduce the limits for some measures, including NO_2 and $PM_{2.5}$. The government is running a public consultation on the proposed $PM_{2.5}$ targets in 2022.

Further information

- You'll find more information on how we've measured and compared data in each individual section.
- As part of our obligations under the Local Air Quality Management (LAQM) legislation (part IV of Environment Act 1995) we issue an Annual Status Report (ASR) in June of each year. This sets out and comments on air quality data from the previous 12 months across the wider area. These can be found at: https://www.bathnes.gov.uk/services/environment/pollution/air-quality/reports
- You can also view an interactive map of historical NO_2 data collected from monitoring locations around the area, here: https://www.bathnes.gov.uk/services/environment/pollution-noise-nuisance/air-quality/air-quality-data-long-term
- At the end of this report is a section called 'Monitoring Explained' which has been included to help you understand some of processes used to gather the data for this report.

1. Background information

This section provides information on why we need a CAZ in Bath, the type of air pollution that we're trying to tackle, and how we decided on a Class C charging CAZ. Further information can be found in the Full Business Case at: www.bathnes.gov.uk/BathCAZ.

1.1 Air pollution

Air pollution is the leading environmental health risk to the UK public, with an estimated 28,000 to 36,000 deaths annually attributed to it in the UK alone[2].

Long-term exposure to air pollution is linked to premature death associated with lung, heart and circulatory conditions, while short-term exposure exacerbates asthma and increases hospital admissions.

There is evidence to suggest that despite strengthening environmental policies, the poorest in our society are being unfairly exposed to worse air pollution without seeing improvements[3]. Clean air is important for everyone and will alleviate stress on our health system, improve people's lives and make our society more equitable.

Types and causes of air pollution

There are different causes and sources of air pollution. Historically, combustion of fossil fuels for energy, such as coal, produced smoke and sulphur dioxide (SO_2).

A major source of poor air quality in the UK contributing to nitrogen dioxide (NO_2) pollution and particulate matter (PM) pollution, is road traffic.

Particulate matter pollution, referred to as PM_{10} or $PM_{2.5}$, is made up of tiny bits of material from all sorts of places including smoke from fires, exhaust fumes, smoking or the dust from brake pads on vehicles. These particles are too small to see, and we can breathe them in without noticing.

Nitrogen dioxide (NO_2) comes from burning fuels or other materials, so levels are especially high around roads. But they are also produced from home gas boilers, bonfires, and other sources as well. You cannot see or smell nitrogen oxides, but they mix with the air we breathe and are absorbed into our bodies. Vehicle exhaust emissions contribute 35 per cent of all UK nitrogen oxide emissions (NOx) which is the single greatest source[4].

[2] Public Health England. Review of interventions to improve outdoor air quality and public health, 2019 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938623/Review_of_interventions_to_improve_air_quality_March-2019-2018572.pdf

[3] Air Quality Management Resource Centre, UWE. Emissions vs exposure: Increasing injustice from road traffic-related air pollution in the United Kingdom, 2019 https://www.sciencedirect.com/science/article/pii/S1361920919300392

[4] DEFRA. Air quality: explaining air pollution – at a glance, 2019. https://www.gov.uk/government/publications/air-quality-explaining-air-pollution/air-quality-explaining-air-pollution-at-a-glance

How does air pollution affect our health?

Air pollution particles and gases enter our bodies and can damage our cells in different ways. They usually get into our lungs first and can then move into our blood to reach organs such as our heart and brain.

Any amount of pollution can be damaging to our health, but the more that you are exposed to, the bigger the risk and the larger the effect on you and your family. Some people are more vulnerable to the impacts of air pollution than others. Those more at risk from air pollution include children, pregnant, older people, and those with lung and heart conditions (such as asthma, chronic obstructive pulmonary disease (COPD), lung cancer, coronary artery disease, heart failure and high blood pressure).

Air pollution in Bath

Historically, annual average nitrogen dioxide (NO_2) concentrations have regularly exceeded the legal limit of 40 µg/m^3 at several locations in Bath, and this is chiefly caused by vehicle emissions.

The problem is exacerbated by Bath's topography. The city sits in the bottom of a valley surrounded by hills, and its central roads are flanked by tall buildings. This means that in certain conditions vehicle emissions can get trapped in the atmosphere causing high levels of NO_2 in some locations.

Particulate matter in Bath was not found to exceed legal limits for either PM_{10} (particulate matter less than 10 micrometers in diameter) or $PM_{2.5}$ (particulate matter less than 2.5 micrometers in diameter), except at times when there were meteorological or other events that caused spikes in these pollutants, nationally. Bath is within the permitted number of PM2.5 24-hour exceedances in a year. There has been a downward trend in levels of PM in Bath since 2017.

Health impacts in Bath of NO_2 pollution

- NO_2 contributes to as many as 36,000 early deaths in the UK each year
- It irritates and inflames the lining of airways – which can worsen asthma and make breathing difficult among those with lung disease (such as bronchitis and emphysema). In Bath, around 12,000 people suffer from asthma
- Research shows that high levels of NO_2 can affect children's lung development and that children who grow up in highly polluted areas are more likely to develop asthma.

How we monitor air quality

B&NES has been monitoring air pollution for many years, reviewing the monitoring sites regularly, more recently to ensure coverage of key CAZ locations and potential diversion routes around the zone. Three pollutants are measured around the district: NO_2, PM_{10} and $PM_{2.5}$.

There are currently over 150 locations where NO_2 is measured, including 50 key sites with higher levels of pollution where three diffusion tubes are located at each location to improve data confidence.

To read more about how air quality is measured and analysed in relation to the effectiveness of Bath's CAZ, see the Impacts of the CAZ on Air Quality section.

To find out more information about air quality across B&NES go to:
https://www.bathnes.gov.uk/services/environment/pollution/air-quality

1.2 Why we need a charging CAZ

Following a successful ruling in 2017 by the Supreme Court, in a case brought against the government by Client Earth, the government directed Bath and North East Somerset (B&NES) Council to reduce the annual mean NO_2 concentration in Bath to within the legal limit value of 40 µg/m^3 in 'the shortest possible time' and 'by the end of 2021 at the latest'.

At the time of writing this report, the Joint Air Quality Unit (JAQU) is considering its formal assessment of whether the Council is on track to achieving success with the Ministerial Direction.

We immediately undertook significant technical work to understand what measures would be required to comply with air quality limits, establishing that a charging clean air zone would be the only measure capable of delivering the behaviour change necessary to improve air quality, to within legal limits, by the end of 2021.

A CAZ works by deterring higher emission vehicles from driving in the most polluted areas of the city by levying a charge, encouraging a more rapid replacement of polluting vehicles for cleaner, compliant ones than would otherwise occur.

Other cities around the UK have implemented CAZs including Birmingham (Class D) and Portsmouth (Class B). More cities are implementing CAZs, with some likely going live in 2022, including Bradford and Bristol. More cities will follow in the following years.

The government has provided all the funds required for us to prepare and implement the CAZ, work is overseen by the government's Joint Air Quality Unit (JAQU) and subject matter experts are also independently verifying the work being done.

The CAZ is one of many measures being introduced across the area to improve our health and the natural environment. In March 2019 the Council declared a Climate Emergency, resolving to provide the leadership to achieve carbon neutrality in Bath and North East Somerset by 2030[5]. In July 2020, the Council declared an Ecological Emergency, resolving to work with local and national partners to resist the destruction of natural habitats through planning policy and development management.

[5] Bath and North East Somerset Council. Climate Emergency, 2021 https://www.bathnes.gov.uk/climate-emergency

1.3 How we decided on a class C charging CAZ

The options for Bath to achieve success were a Class D charging clean air zone, charging all higher emission vehicles including cars and motorbikes or a Class C charging clean air zone, charging all higher emission vehicles except private cars and motorbikes but including additional traffic management.

We engaged extensively with the public throughout 2018/19 before reaching a decision on a Class C charging clean air zone. The overwhelming opinion was that while we needed to tackle pollution, a class C charging CAZ would strike a better balance by tackling pollution while also protecting central businesses and vulnerable residents that might be disproportionally affected by charging higher emission cars.

Technical modelling suggested that we could achieve success with a Class C CAZ provided we also introduced traffic measures at Queen Square to address a particular NO_2 hotspot on Gay Street.

In addition, it was agreed that significant financial support would be given to local individuals and businesses to help them replace polluting vehicles regularly entering the zone with cleaner, compliant ones. This mitigation would reduce the impact of charges on affected businesses, while further reducing emissions.

The full business case for the CAZ was approved by central government in January 2020 and can be read here:
https://beta.bathnes.gov.uk/policy-and-documents-library/baths-clean-air-zone

1.4 How Bath's CAZ works

Bath CAZ is a Class C charging clean air zone, which means that daily charges apply to the following higher emission vehicles driving in the zone that do not comply with Euro 6/VI (diesel), or Euro 4/IV (petrol) emissions standards:

- Taxis, private hire vehicles (PHVs), vans (including pick-ups and N1 campervans), minibuses, and light goods vehicles (LGVs) - £9 per day
- Buses, coaches, heavy goods vehicles (HGVs) and private heavy goods vehicles (PHGVs) - £100 per day
- A discounted charge of £9 per day is available for private (PHGVs), such as larger motorhomes and horse transporters, once registered with the Council.

Cars and motorbikes (except for taxis and PHVs) are not charged in a Class C CAZ, regardless of their emissions standard. This includes campervans classed as M1 on their V5C.

Importantly, the Council is not keen to penalise or make money from the zone. Its priority is to inform people about the charge, deter polluting vehicles from entering the zone, and encourage those with chargeable, non-compliant vehicles regularly entering the zone to upgrade their vehicles with financial support, if required.

Revenue from charges and fines is used to pay for the running of the scheme. Any money made over and above this must be reinvested in sustainable transport projects.

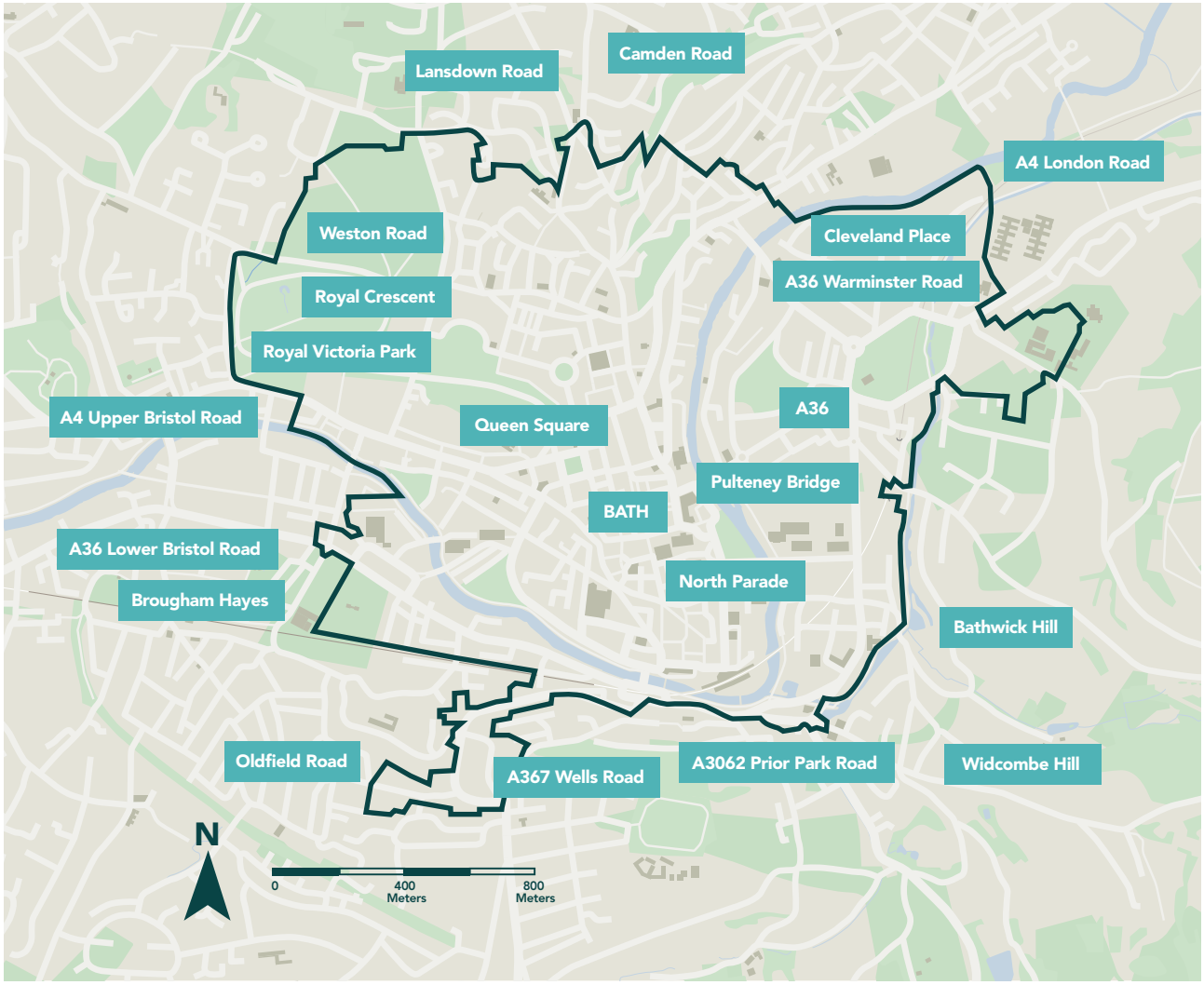
Zone boundary

The zone covers the very centre of the city (see Figure 1), but its boundary is designed to ensure that annual average NO_2 concentrations both inside and outside the zone are within the legal limit by the end of 2021, as per the government's directive.

The Clean Air Zone is as small as possible to minimise the social, economic and distributional impact of the scheme. However, it's also designed to capture as many non-compliant vehicle movements as possible across the city to ensure air quality improves both inside and outside the zone.

See the 'Impact of the CAZ on Air Quality' section for a map showing where NO_2 monitoring sites are currently located across the city.

Figure 1- A map of the CAZ boundary.



Exemptions

National exemptions apply permanently for ultra-low emission vehicles, hybrid and alternatively fuelled vehicles, disabled passenger tax class vehicles, disabled tax class vehicles, military vehicles, historic vehicles, and vehicles with retrofit technology accredited by the Clean Vehicle Retrofit Accreditation Scheme (CVRAS).

Local exemptions apply temporarily for two or four years (and for shorter periods) for certain vulnerable groups, hard-to-replace vehicles, and to encourage applications to the financial assistance scheme to upgrade or replace non-compliant vehicles. The range was developed in response to feedback from our public consultations and to mitigate the impact of charges on certain groups.

For more information on local exemptions see www.bathnes.gov.uk/CAZexemptions

Schemes to support and encourage vehicle compliance

Alongside zone charges that deter the use of non-compliant vehicles in the zone (and encourage owners to upgrade their vehicles), the Council introduced two government-funded schemes that help to mitigate the impact of charges on businesses/individuals regularly travelling in the zone while also contributing to air quality improvements:

- A financial assistance scheme for businesses and individuals regularly travelling in the zone to help replace or retrofit up to 1,500 polluting, chargeable vehicles with cleaner, compliant ones (via grants and or interest-free finance worth £9.4 million)
- A bus retrofit scheme to financially support local bus operators to retrofit the engines of all remaining non-compliant buses on scheduled routes in the city so that they meet the new emission standards i.e., are compliant with Euro VI diesel standards (worth £1.7 million)

The financial assistance scheme is currently closed to new applicants to ensure that there is enough funding for each application. The Bus retrofit scheme is largely complete, with three outstanding retrofits delayed while a specific retrofit solution is designed for the vehicles.

2. Assessing the impacts of Bath's CAZ

The purpose of the CAZ is to reduce nitrogen dioxide (NO_2) concentrations in Bath to within the annual average limit of 40 micrograms per cubic metre ($\mu g/m^3$) in the shortest possible time, and by the end of 2021 at the latest.

To show that we've met this requirement, we will need to evidence that the annual average concentrations of NO_2 recorded at every valid monitoring site (according to JAQU's criteria) in Bath (both inside and outside of the zone) do not exceed 40 $\mu g/m^3$.

However, in addition to air quality, the zone's introduction also impacts on traffic flow, vehicle compliance, business and personal travel behaviour, and the local economy.

Data is therefore continually collected on a range of measures so that we can assess the impact of the zone and identify any emerging trends in air quality and other criteria that may need corrective action. The Council is committed to monitoring and reporting on these measures at various intervals and the full list, including a reporting timeline is included in Table 1.

We have already introduced additional traffic and air quality monitoring in areas where the public has expressed concern about potential displacement effects. For more information see **Appendix 2: Investigating Traffic Displacement Concerns**.

The purpose of our quarterly reports is to provide an indicative view of the zone's performance, looking at three key measures: air quality data, traffic flow data and vehicle compliance data. These reports also include data on the financial assistance and bus retrofit schemes because of their influence on fleet compliance.

The purpose of our annual report is to provide a more in-depth view of the zone's performance with extra secondary measures considered. It also considers the success of individual sites with regards to the annual limit value. Where sites record NO_2 concentrations above or near the limit value, we focus in on how we can take corrective action to address this issue.

Our progress towards compliance (known as 'achieving success') is currently being reviewed by JAQU. However, we understand that the Council must initially demonstrate success at all valid monitoring sites and maintain this for a further two years at least. At this point, it is considered that the necessary behaviour change is embedded enough to ensure that, without the zone, average mean nitrogen dioxide concentrations would remain below the limit value.

Table 1- Data collection and collation for Bath CAZ annual reporting.

Measure	Data to be Used	Rationale for Inclusion	Data Collection Methods	Frequency of Data Output
M1: Air quality data	NO_2 concentrations data collected at existing monitoring locations in Bath and wider B&NES	To understand changes in air quality data, particularly NO_2 concentrations.	Diffusion tubes and real time monitoring	Quarterly and annually
M2: Traffic Flows	Traffic flows in and around the CAZ areas are collected to understand the changes in traffic flows as a result of the scheme.	To understand changes in traffic flows along key corridors and links on the highway network. This includes possible 'rat-run' routes flagged by residents during consultation.	ANPR cordon and ancillary Manual Classified Counts (MTC) or Automated Traffic Counts (ATC) on key roads or perceived 'rat-runs'	Quarterly and annually
M3: Vehicular fleet information	Number of compliant/ non-compliant vehicles travelling within Bath	To understand changes in the type of vehicles travelling in Bath.	ANPR cordon, cross-referencing with DVLA vehicle database	Quarterly and annually
M4: Retail/ business/office space vacancy figures	Vacancy statistics from internal council data (B&NES economy and growth team). Market data from property consultants. Purchasing Managers Index.	To assess economic impacts of the CAZ .	Internal data collection as part of ongoing process. Regular property market reports published by property consultants in the public domain could also be used.	Annually
M5: Retail footfall surveys	Footfall data from Bath Business Improvement District data and internal council data.	To understand changes to the number of people entering shops in Bath as well as the time they spend in each shop.	Bath BID and B&NES collect this data as part of ongoing processes.	Annually

M6: Park and Ride passengers data	Occupancy statistics (Cloud Amber) and bus ticket data (First). Monitor fleet mix	To understand changes in the number of people and the type of vehicle using the P&R into Bath.	Collected as part of ongoing monitoring activities by operators. ANPR at entrance to Park and Rides	Annually
M7: Walking and cycling counts	Pedestrian and cycle counts on key arterial routes	To understand changes in the number of people walking and cycling on key routes within Bath.	Commissioning of new surveys	Annually
M8: Bus usage and fare data	Occupancy statistics (Cloud Amber) and bus ticket data (First).	To understand changes in the number of people using the bus on each route into Bath.	Collected as part of ongoing monitoring activities by operators.	Annually
M9: Stakeholder Feedback from Council User Group Forums	Stakeholder Feedback covering relevant elected members, stakeholder groups, the LEP. Voice Box survey. Protected groups survey.	Understand the views of stakeholders to scheme delivery and impacts, and to understand some of the less quantified effects, including package effects.	Part of the on-going consultation process for transport strategies in the City.	Annually
M10: Taxi fares and unmet demand	Taxi fare data and unmet demand surveys	To understand changes to fares and demand on taxis to assess the economic impacts of the CAZ	Collected as part of ongoing monitoring activities by operators.	When unmet demand surveys are performed (every three years)
M11: Early Measures Fund – Zero-Emission Parking Permits	Statistics on zero-emission vehicle parking permits scheme uptake	To guage popularity	Collected as part of the parking permit scheme operation	Annually, and finally in 2022 when the scheme has ended

M12: Bus retrofit uptake/ compliance data	Statistics on bus retrofit scheme uptake and bus compliance	To understand changes to bus fleet operating in Bath.	Collected by ANPR cameras, as part of ongoing monitoring activities by operators and from the retrofit scheme	Quarterly and annually
M13: Financial support scheme uptake	Statistics on financial support scheme uptake	To understand the success and popularity of the financial support schemes in changing to compliant vehicles	Collected as part of the financial support scheme operation	Quarterly and annually and finally after the scheme has ended
M14: Travel advisor session uptake	Statistics on meetings with travel advisors	To understand the overall success of travel advisors and	Collected as part of the travel advisor scheme operation	Quarterly and annually
M15: Anti-idling enforcement	Data from enforcement action for anti-idling	To understand the success of the measure in reducing idling	Collected as part of the anti-idling enforcement scheme operation	Annually
M16: Weight restriction enforcement	Data from enforcement action for anti-idling	To understand the success of the measure in enforcing weight restrictions	Collected as part of the weight restriction enforcement scheme operation (from Trading Standards)	Annually
M17: Only-mile delivery uptake	Statistics on only-mile delivery uptake	To understand the success of the only-mile delivery measure with businesses	Collected as part of the delivery and servicing plans operation	Quarterly and annually

3. Impacts of the CAZ on air quality

The purpose of the CAZ is to reduce nitrogen dioxide (NO_2) concentrations in Bath to within the annual average limit of 40 micrograms per cubic metre (µg/m^3) in the shortest possible time, and by the end of 2021 at the latest. 40 µg/m^3 is the legal limit set for NO_2 in the Environment Act 1995 and the Bath and North East Somerset Council Air Quality Direction 2019[6].

To show that we've met this requirement, we will need to evidence that the annual average levels of NO_2 recorded at every valid monitoring site in Bath (both inside and outside of the zone) does not exceed 40 µg/m^3. This is also in line with the Critical Success Factors (CSF) developed as part of the Full Business Case for the scheme.

3.1 Critical success factors of the CAZ

To successfully monitor and evaluate the performance of the CAZ, two critical success factors (CSF) were developed.

The primary CSF seeks to deliver compliance (in the shortest possible time) with the NO_2 concentration limit values outlined in the 2008 EU Air Quality Directive (AQD). This directive sets out sighting guidelines for monitoring locations. The Pollution Climate Mapping Model (PCM) used by JAQU in their assessment of our scheme, uses locations based on these requirements. To ensure that a receptor is compliant with AQD guidelines, it must be at least 25m away from a junction, 0.5m away from the nearest obstruction (including building façades), represent 100m stretch of road and be 1.5-4m high. An ideal location is 4m from the road and 2m high. Additionally, as the AQD looks at NO_2 concentrations at the point of monitoring, results are not adjusted to the façade, unlike the requirements on an Local Air Quality Monitoring (LAQM) site.

Currently not all 123 diffusion tube receptor sites in Bath comply with AQD guidelines because many have been in position for several years to comply with LAQM positioning (see below), enabling us to compare air quality with previous years.

The secondary CSF aims to deliver a scheme which leads to compliance with the Local Air Quality Management (LAQM) Air Quality Objectives for NO_2 concentrations. As LAQM focuses on NO_2 concentrations at the point of relevant public exposure (façades of schools, care homes, hospitals etc) NO_2 concentrations are adjusted to the nearest façade. Unlike the AQD requirements, sites can be placed on junctions and within 0.5m of a building façade, providing there is relevant public exposure.

[6] Environment Act 1995 Bath and North East Somerset Council Air Quality Direction, 2019 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/800802/air-quality-direction-bath-2019.pdf

Have we achieved success?

At the time of writing, JAQU is considering its formal assessment of the scheme after its first year of operation to identify whether we have met our legal obligation as outlined within the original Directive to reduce NO_2 concentrations in Bath.

In making this assessment they will consider each monitoring location against the criteria published in the Air Quality Standards Regulations 2010. Two diffusion tube monitoring sites, Walcot Parade 2 and Wells Road, remain in exceedance of legal limits. However, the position of the diffusion tubes which, by necessity, sit very close to a building facade, do not accord with the Air Quality Standards Regulations 2010 on which the directive was issued. They do, however, sit within the scope of the Local Air Quality Management Framework and therefore remain an ongoing concern.

We await the outcome of the formal assessment in due course.

3.2 How we collect and measure air quality data

We have measured air quality in Bath and North East Somerset since the mid-1990s. Currently we measure nitrogen dioxide (NO_2) and Particulate Matter ($PM_{2.5}$ and PM_{10}) concentrations, using multiple methods.

Automatic analysers measure NO_2 and PM in four permanent roadside locations in Bath. They take hourly readings of air pollution concentrations and provide more accurate readings than diffusion tubes. One of these monitoring stations is linked to the UK Automatic Urban and Rural Network (AURN) which provides national coverage of a range of pollutants.

Diffusion tubes are light, mobile and can be placed in many locations around the area, usually 1 to 15 metres from the road or at the kerbside (less than 1 metre from the road) and around 2-3 metres above ground level. The ambient air reacts with a chemical reagent in the tube so that NO_2 concentrations can be measured. The tubes are exposed to the air for one month before they are collected and sent to a laboratory for analysis. There are currently over 150 diffusion tube locations across Bath & North East Somerset.

In recent years, average annual levels of particulate matter pollution in Bath have not exceeded the legal limit of 40 µg/m^3 for PM_{10} and 25 µg/m^3 for $PM_{2.5}$. Occasional 24-hour exceedances occur but only at times when there were meteorological or other events that caused spikes in these pollutants, nationally. Whilst we continue to measure it, PM data will not form part of the quarterly or annual reports.

Comparing air quality data inside and outside of the zone

The Council has committed to assessing whether the introduction of the CAZ would lead to displacement impacts in areas outside of the zone's boundary.

To establish the impact of the zone on air quality in surrounding areas, and trends inside and outside of the zone, we present air quality data for the following areas:

- The clean air zone (sites within the CAZ boundary which we call 'CAZ_Only')
- The boundary area (sites outside the CAZ boundary but within the urban area of Bath including Batheaston and Bathampton, which we call 'CAZ_Boundary')
- The wider area (sites outside of the Bath, Batheaston and Bathampton urban areas, but within the rural areas and district-wide urban areas in Bath & North East Somerset, which we call 'Wider_B&NES')

A note on air quality monitoring locations

As of 2021 there are 163 diffusion tube monitoring sites across Bath and North East Somerset that contribute to the results in this report. There are a further four automatic analysers located within Bath.

66 sites are located in the clean air zone (Figure 2) and 57 in the city's urban area outside of the zone's boundary (Figure 3), with a further 40 in the wider district. We have reported on monitoring sites with long-term data or that will remain in place for a long time. There are more diffusion tube locations not included in this analysis because they are in place temporarily.

When analysing results, we have only considered like-for-like data in most cases, meaning if a diffusion tube site was not in place in a baseline year, we have not included it in the calculation. This is to ensure robust analysis.

Figure 2- A map showing the Clean Air Zone and the automatic analyser (squares) and diffusion tube (triangles) locations in Bath © Crown Copyright 2021. License number 100023334.

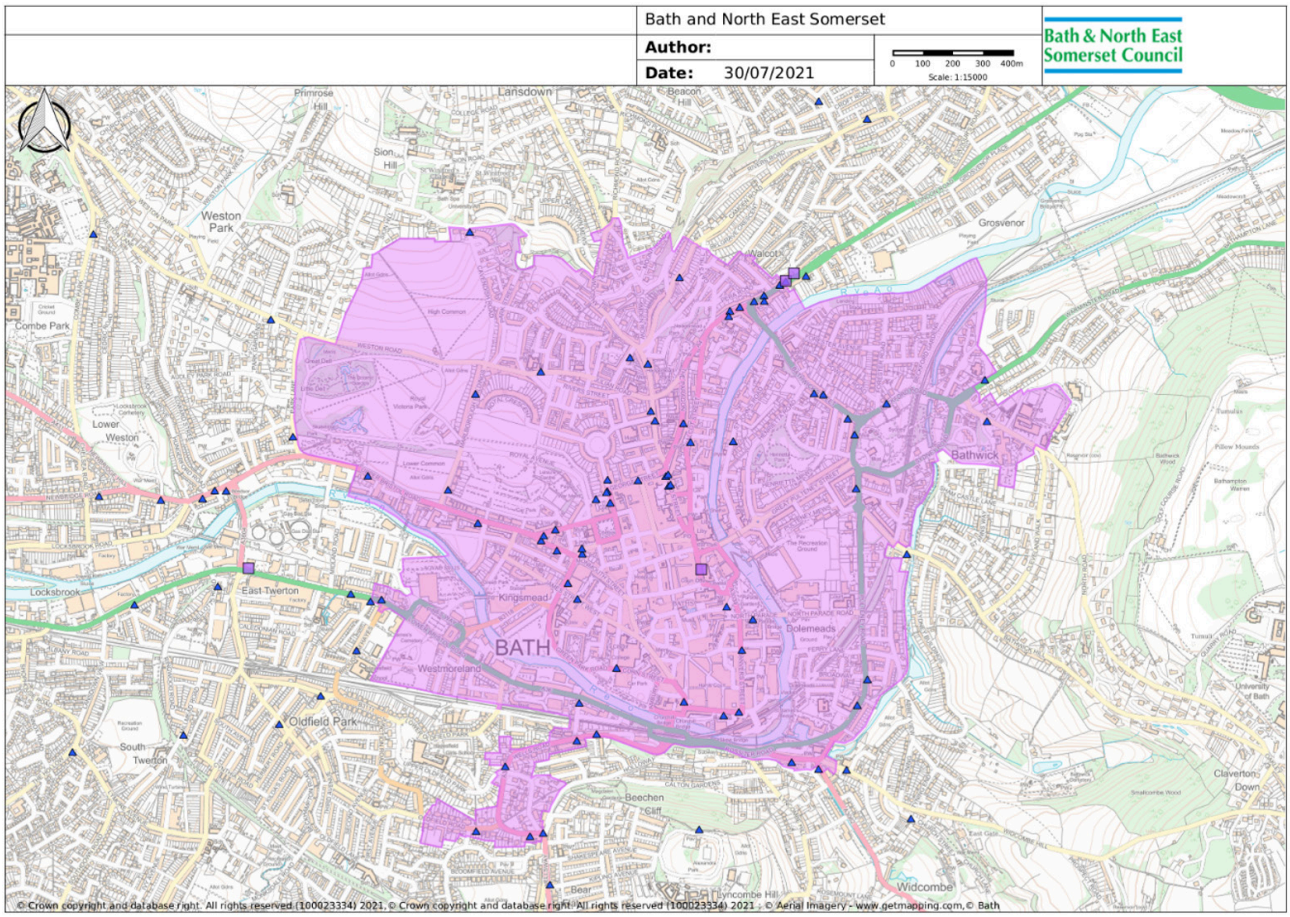
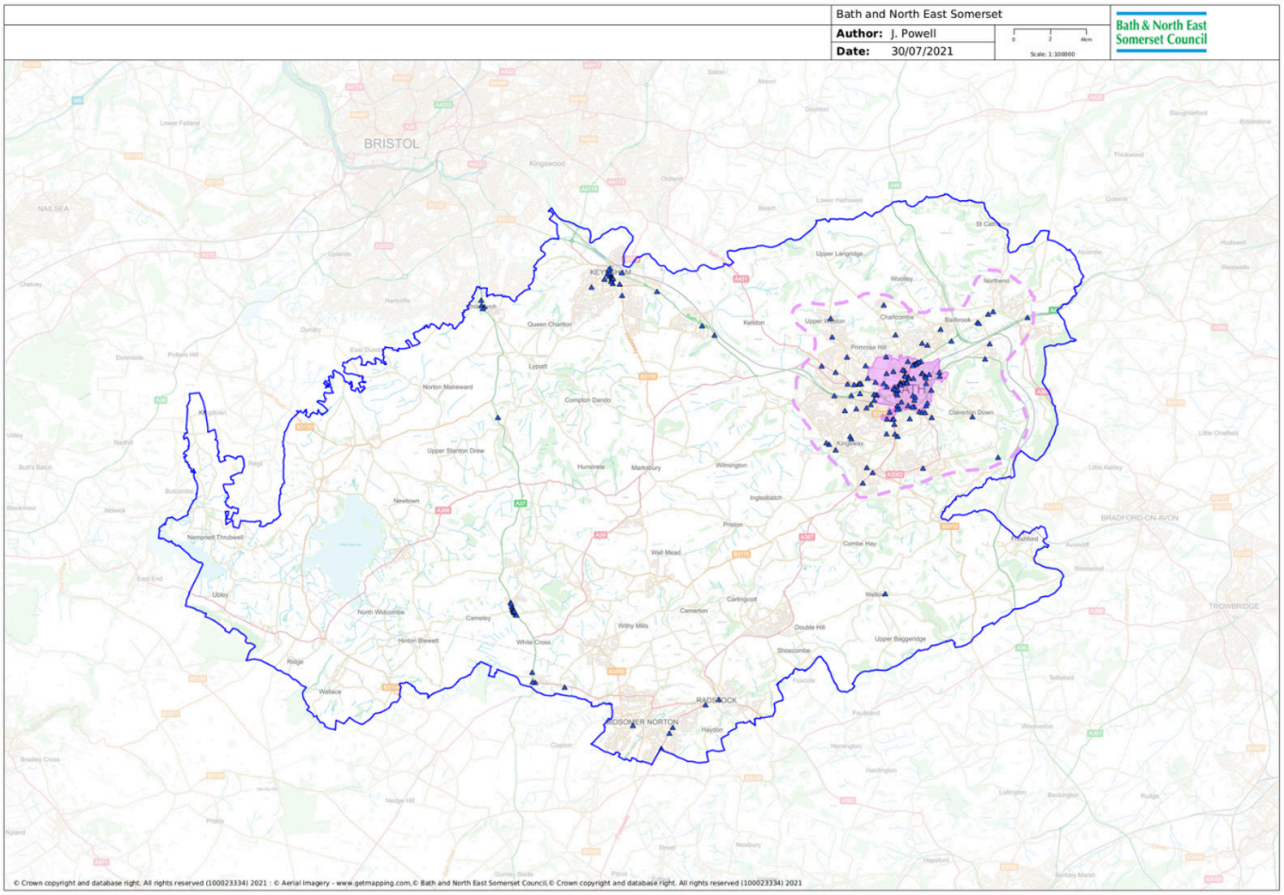


Figure 3 - A map showing diffusion tube locations in three site groupings: The wider district of Bath and North East Somerset (the blue line; Wider_B&NES), the wider Bath urban area outside of the CAZ (the dotted pink line; CAZ_Boundary) and the CAZ (the pink area; CAZ_ Only). © Crown Copyright 2021. License number 100023334.



Numbers of diffusion tube sites in each location

Table 2 shows the growing number of diffusion tube air quality monitoring sites across B&NES. Additional sites were chosen based on the air pollution dispersion model developed for the CAZ Full Business Case, enabling us to check the impact of the CAZ against what was modelled.

Triplicate sites are where three diffusion tubes are co-located at one monitoring site to improve accuracy. These are located where annual NO_2 concentrations are predicted to be greater than 34 µg/m^3. The NO_2 concentration from each triplicate diffusion tube is averaged to produce one result for the site, so triplicate measurements are only counted once for analysis.

Table 2- Number of diffusion tube sites providing annualised data (triplicate sites are averaged, so only considered one location) from 2019 to the end of 2021, in the three site groupings.

Period	CAZ_Only	CAZ_Boundary	Wider_B&NES
2019	65	56	29
2020	65	56	34
2021	66	57	40

Most of the air quality data shown in this report comes from averaging monthly diffusion tube results. We also report data from four automatic analysers located in Bath.

Measuring air quality to take account of seasonal effects

Annual average concentrations are useful because they account for varying seasonal cycles of pollutants such as:

- Meteorological conditions, for example wind, precipitation, and temperature
- And to a lesser degree, human sources of air pollution, for example increased energy generation for heating in winter or increased agricultural activities in spring.

This is also why we compare air quality data against similar time periods, for example comparing data from 2021 Q4 to the baseline of 2019 Q4. Further information on monitoring can be found in the 'Monitoring Explained' section at the end of the report.

4. Annual air quality results, 2021

The following results reflect the annual mean from the entire year of 2021. The original launch date for the CAZ was November 2020, postponed to 15 March 2021 due to the Covid-19 pandemic. The CAZ was not active from 1 January 2021 until 15 March 2021 but businesses and individuals may have been taking steps to prepare for it i.e., replacing chargeable vehicles.

We analyse historical data to identify longer-term trends, as well as focussing closely on the sites which do not meet the 40 µg/m^3 annual limit value. We compare 2021 data with baseline data from 2019. 2020 data has been discounted as a baseline because of Covid-19's unprecedented effect on traffic and travel behaviour.

The full monthly diffusion tube results can be found in the Air Quality Data appendix.

Focus sites

Here we look at the recent and longer-term data of sites within the CAZ (CAZ_Only) and wider Bath urban area (CAZ_Boundary) that recorded NO_2 concentrations during 2021 above 36 µg/m^3. All other areas across the city have quarterly average levels below 36 µg/m^3 (90% of the annual limit value) and are therefore excluded from the table.

Table and figures included in this section:

- Table 3: Sites within the CAZ and Bath's wider urban area that recorded an NO_2 concentration greater than 40 µg/m^3 in 2021.
- Table 4: Sites within the CAZ and Bath's wider urban area that recorded an NO_2 concentration greater than 36 µg/m^3 but less than 40 µg/m^3 in 2021.
- Table 5: A breakdown of the overall number of sites recording above 36 µg/m^3 and 40 µg/m^3 in 2021.
- Table 6: Annual average NO_2 concentration in 2019 and 2021.
- Figure 4: A map of the CAZ with the three diffusion tube sites which recorded an annual average NO_2 concentration greater than 40 µg/m^3 in 2021.
- Figure 5: Long term trend at sites recording greater than 40 µg/m^3 in 2021.
- Figure 6: Long term trend at sites recording greater than 36 µg/m^3 in 2021.

Table 3: NO_2 concentrations at locations where the annual average exceeded 40 µg/m³ in 2021, within the CAZ_Only and CAZ_Boundary site groupings. TA= triplicate average site.

Site ID	Site	Site Grouping	2019 Annual concentration (µg/m³)	2021 Annual concentration (µg/m³)	Change (µg/m³)
DT020 (TA)	Wells Road*	CAZ_Only	45.4	42.6	-2.8
DT042	Dorchester Street*	CAZ_Only	48.0	40.5	-7.5
DT224 (TA)	Walcot Parade 2*	CAZ_Only	55.2	43.1	-12.1

*Please note that whilst these sites record concentrations over 40 µg/m³ as an annual average, they site location is not compliant with the Air Quality Standards Regulations. See Critical Success Factors, page XX

Table 4: NO_2 concentrations at locations where the annual average concentration exceeded 36 µg/m³ but remained at or below 40 µg/m³, within the CAZ_Only and CAZ_ Boundary site groupings. TA= triplicate average site.

Site ID	Site	Site Grouping	2019 Annual concentration (µg/m³)	2021 Annual concentration (µg/m³)	Change (µg/m³)
DT060	Victoria Buildings	CAZ_Only	44.1	40.0	-4.1
DT198 (TA)	Walcot Parade	CAZ_Only	48.7	37.8	-10.9
DT222 (TA)	Anglo Terrace Façade	CAZ_Only	49.0	38.1	-10.9
DT248(TA)	Chapel Row 2	CAZ_Only	38.3	36.6	-1.7

Table 5: The total number of sites within the CAZ and wider Bath urban area, which recorded greater than 40 µg/m³ and 36 µg/m³ NO_2 concentrations during 2019 and 2021. The total number of sites reporting during each period is shown along with the proportion of sites recording greater than 40 µg/m³ and 36 µg/m³ because the total number of sites is variable. Note that sites which recorded above 40 µg/m³ will also have recorded above 36 µg/m³.

CAZ_Only and CAZ_ Boundary	Total no. sites reporting	No. sites >40 µg/m³ average	Proportion sites >40 µg/m³ (%)	No. sites >36 µg/m³	Proportion sites >36 µg/m³ (%)
2019	121	11	9	27	22
2021	123	3	2	7	6
Change	2	-8	-7	-20	-16

Comments and key findings:

- This data considers annual data from all sites within the CAZ and the surrounding urban area
- Three sites (Wells Road, Walcot Parade 2, Dorchester Street) record an annual mean concentration above 40 µg/m^3. As stated, these sites are not compliant with the Air Quality Standards Regulations 2010 but are valid for monitoring under LAQM. When the results are façade adjusted under the LAQM framework, DT042 (Dorchester Street) recorded an annual mean of 34.6µg/m^3, DT224 (Walcot Parade 2), 41.2µg/m^3, and DT020 (Wells Road) remains at 42.6µg/m^3 (as the tube is sighted close to the façade).
- Five sites (Victoria Buildings, Walcot Parade, Anglo Terrace Façade, Gay Street 2, Chapel Row 2) recorded an annual mean concentration above 36 µg/m^3, but below 40 µg/m^3.
- No sites recorded an increase in NO_2 concentration between the baseline year of 2019 and 2021.
- In Bath, 20 fewer sites recorded concentrations above 36 µg/m^3 compared with 2019 and 8 fewer sites recorded concentrations over 40 µg/m^3.
- In the wider Bath urban area in 2021, 2% of sites recorded greater than 40 µg/m^3; 7% sites recorded greater than 36 µg/m^3.

The three sites in the zone which recorded annual average NO_2 concentrations above 40 µg/m^3, are being given extra consideration by the Council on ways to reduce air pollution. A map of the three sites which recorded above 40 µg/m^3 at the monitor is provided in Figure 4.

The following investigates the longer-term history of air pollution at sites which recorded concentrations above 36 µg/m^3 (within 10% of 40 µg/m^3), with some useful background information.

Walcot Parade

A high volume of traffic passes the monitors. Traffic signals at the junction where the monitor is, means that traffic stopping and starting can increase emissions as vehicles pull away from a stop light. The catalytic converter in a vehicle cools down as it remains stationary, and this can cause higher NOx emissions when it pulls away. This effect can be worse for larger vehicles like buses.

Wells Road

This has high concentrations but with a downward trend. High concentrations are due to high traffic volumes. This could also be influenced by the catalytic converter of vehicles getting cold whilst coasting down a long hill. The monitor location is where the road flattens out and so vehicles are required to use their engine for the first time in a while.

Dorchester Street

At Dorchester Street, despite high concentrations, there is a long-term downward trend. High concentrations are due to high traffic volumes, particularly with high proportion of buses using the street. The monitor is also located by traffic lights so there is a lot of stop/start emissions (as explained above).

A note on distance adjusting:

Nitrogen dioxide concentrations reduce rapidly as you move away from the source (road). A LAQM receptor for nitrogen dioxide is a residential property, school, hospital etc. If a monitor is located at a roadside/kerbside location, then the concentrations are distance adjusted using a diffusion tube processing tool to calculate the concentration at the building façade. This is only carried out on concentrations which are above 36 µg/m^3 (within 10% of 40 µg/m^3) and we have not performed this calculation on any results in this report. It is an important for consideration when considering the success of the CAZ.

Figure 4: A map of the CAZ which highlights three sites (DT020- Wells Road; DT042- Dorchester Street; DT224- Walcot Parade 2) which recorded above 40 µg/m^3 at the monitor. © Crown Copyright 2022. License number 100023334.

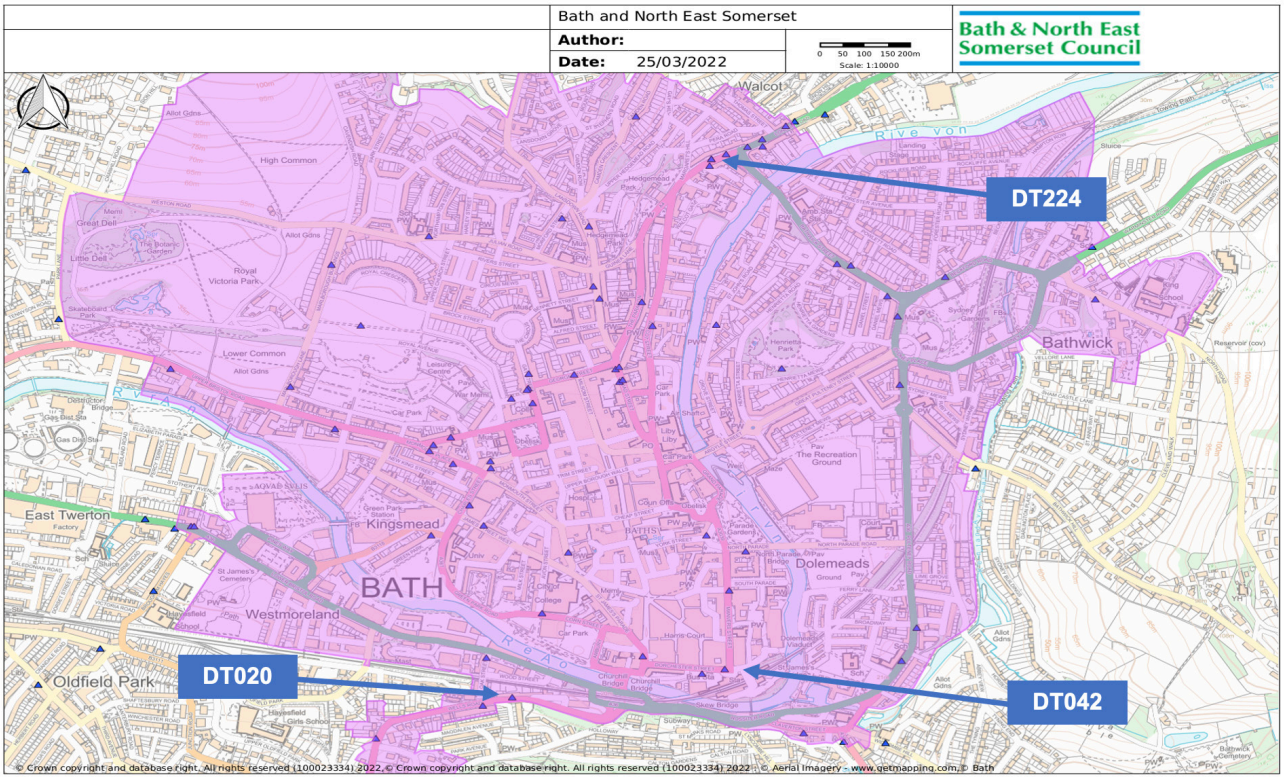
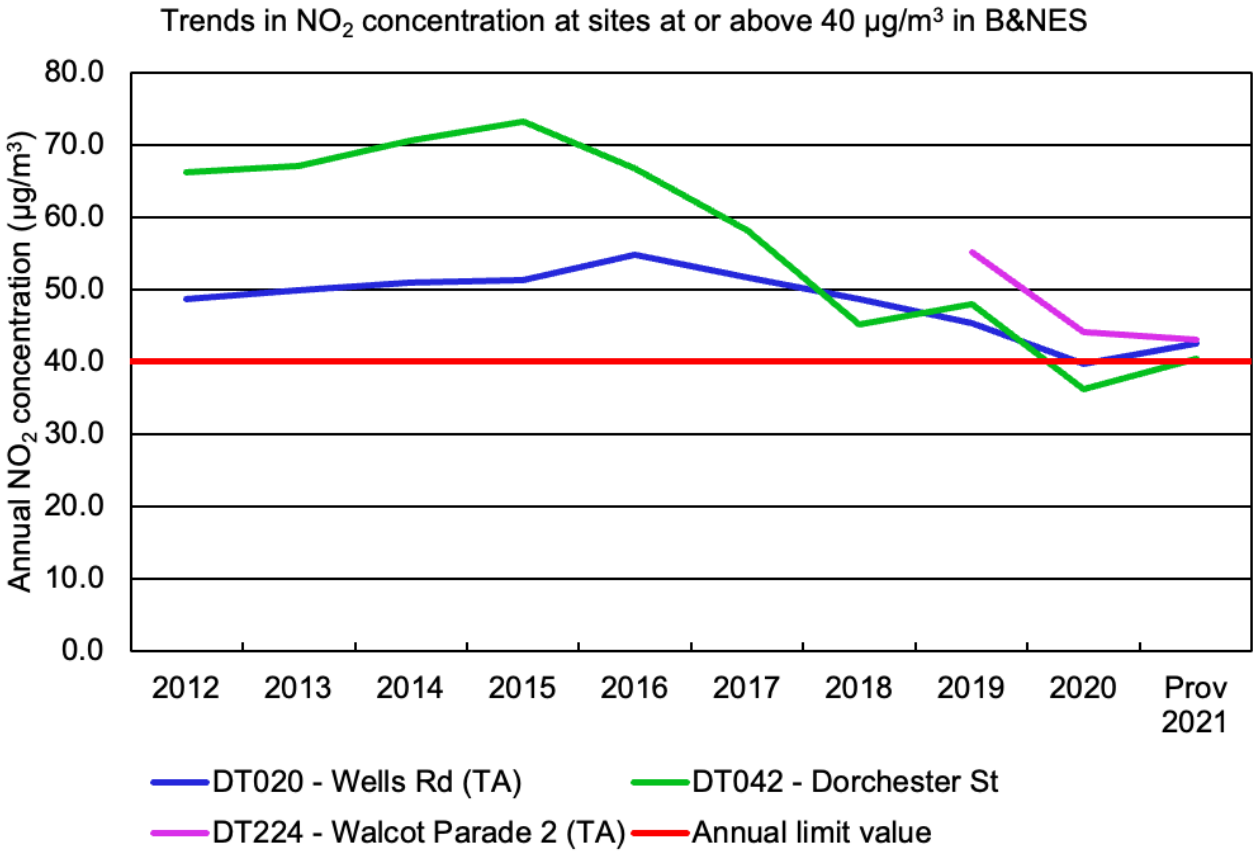


Figure 5, below, shows the NO_2 concentration over the last ten years at the sites which recorded the highest annual average concentrations in 2021. The trend is shown for as long as each site has been in place. Some sites have only monitored data in the last few years.

Figure 5: Up to ten-year trend in NO_2 concentration at sites recording annual mean concentrations of NO_2 above 40 µg/m^3 in 2021.

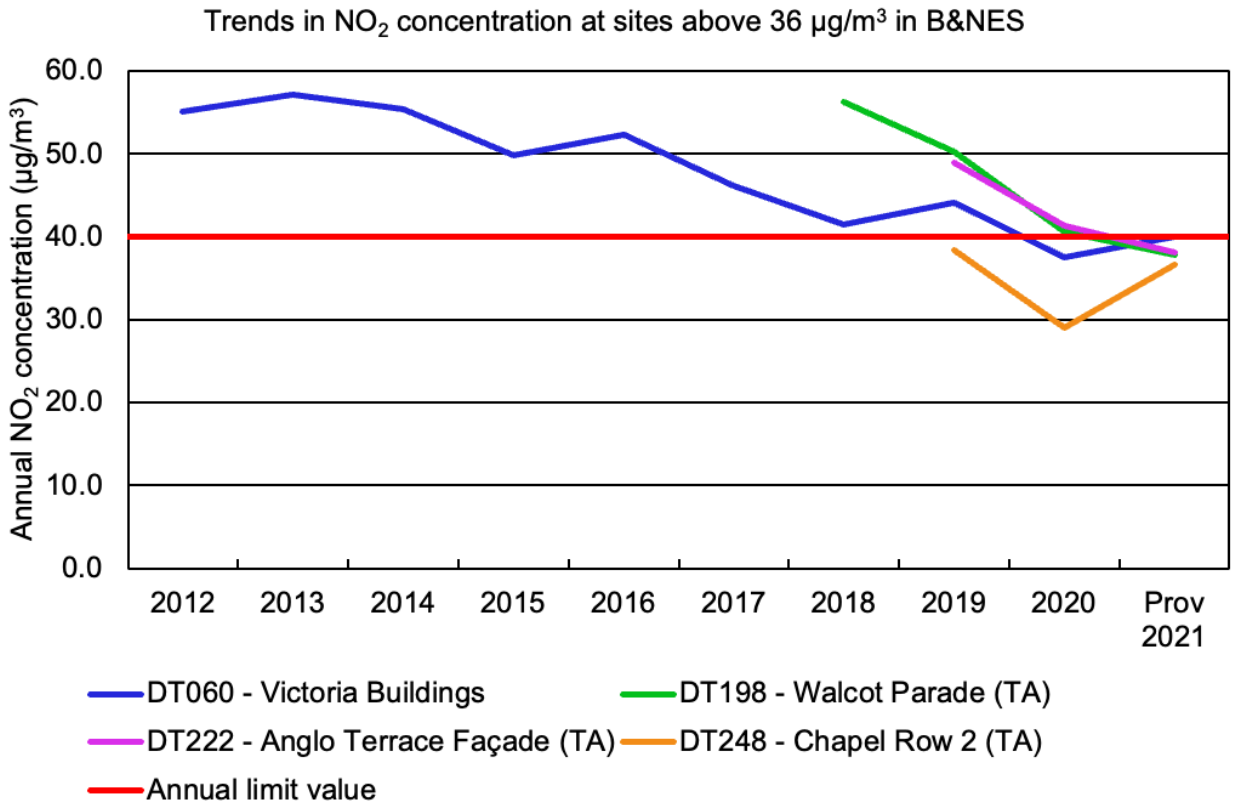


Comments and key findings:

- All sites have an overall decreasing trend
- The two sites which have been recording data for the longest period reached a peak in 2015/16 before reducing. A slight increase at DT020 and DT042 between 2020 and 2021 is almost certainly due to increasing traffic levels associated with the end of the pandemic and the Cleveland Bridge closure. Evidence of locally changing traffic flows affecting air quality is presented later in the report.
- Regarding the increase in NO_2 concentration at Wells Rd in 2015-2016, the diffusion tube was moved to its current location from slightly further up the hill, so it was closer to the residential properties (Figure 4).
- General fleet improvements may be a leading cause of decreasing NO_2 concentration after 2015 as the Euro 6/VI emission standard came into force.
- By the end of 2021, almost all scheduled buses in Bath have been upgraded or retrofitted to meet emissions standards, this will have contributed to the improvement in air quality at all sites in Bath.

Figure 6, below, shows the NO_2 concentration over the last ten years at the sites which recorded above 36 µg/m³ but at or below 40 µg/m³ annual measurement in 2021. The trend is shown for as long as each site has been in place. Some sites only began measuring data in the last few years.

Figure 6: Up to ten-year trend in NO_2 concentration at sites that recorded annual mean concentrations above 36 µg/m³ in 2021



Comments and key findings:

- All sites have an overall decreasing trend.
- Of the sites recording above 36 µg/m³ there has been an overall decrease, except at DT234 and DT248 which have not significantly changed since 2019.
- Traffic flows increased on Chapel Row during the second half of 2021 with the closure of Cleveland Bridge and there is further analysis identifying this link between increased traffic and higher NO_2 concentration, later in the report.
- The ongoing reducing trend in concentrations at Anglo Terrace Façade (DT222) in 2020 and 2021 may be associated with the Cleveland Bridge closure.
- General fleet improvements may be a leading cause of decreasing NO_2 concentration after 2015 as the Euro 6/VI emission standard came into force.

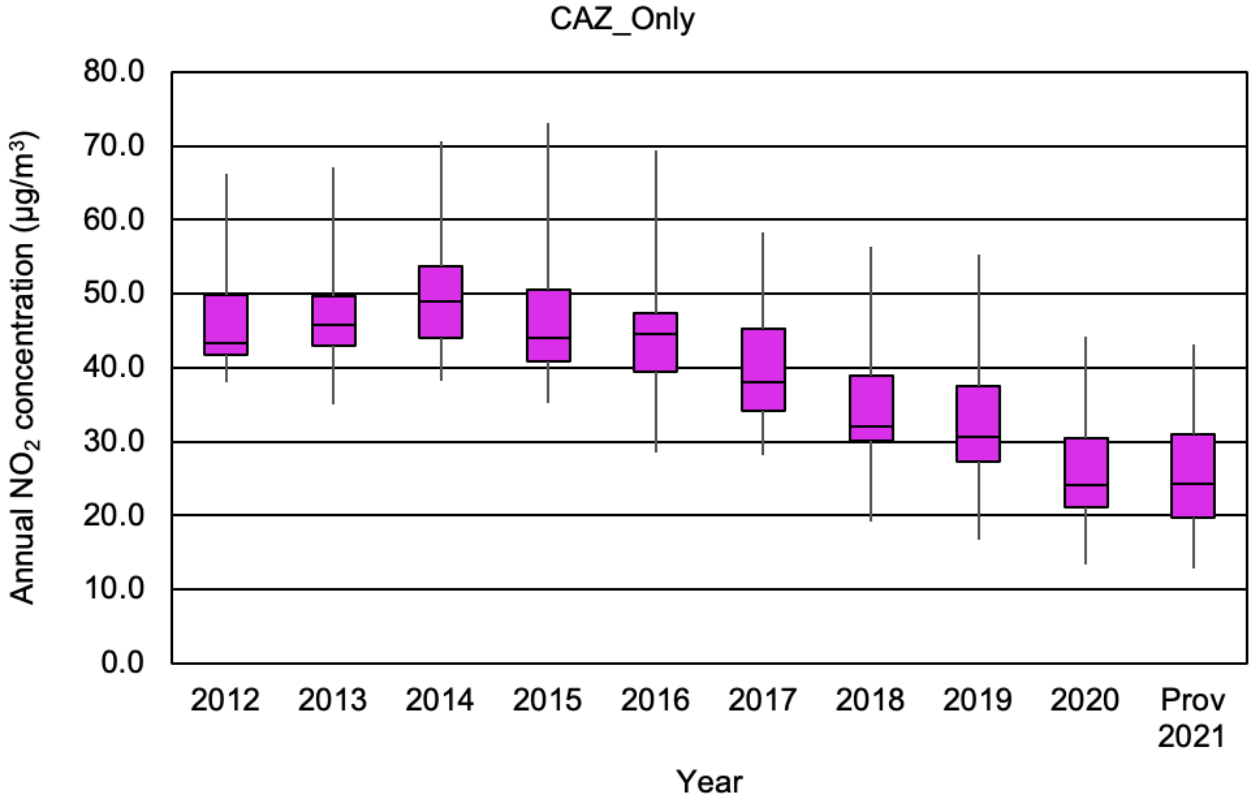
We are focussing on options for improving the air quality in locations where NO_2 concentrations are above 40 µg/m³ or 36 µg/m³ (within 10% of the annual limit value). The following section investigates long-term trends in NO_2 concentration across the CAZ and CAZ_Boundary as a whole.

Long-term trends

It is important to investigate individual sites where the NO_2 concentrations are high or increasing. It is also important to understand longer-term and more wide-ranging trends. Figure 7, below, shows boxplots of sites within the CAZ for the last 10 years.

Figure 7: Boxplots showing the range in NO_2 concentrations over the last 10 years in monitoring sites within the CAZ.

The whiskers show the minimum and maximum annual average NO_2 concentrations during that year. The bottom of the pink box shows the first quartile, the black line in the box is the median result and the top of the pink box is the third quartile. The box therefore represents the inter-quartile range, where 50% of the data is found.

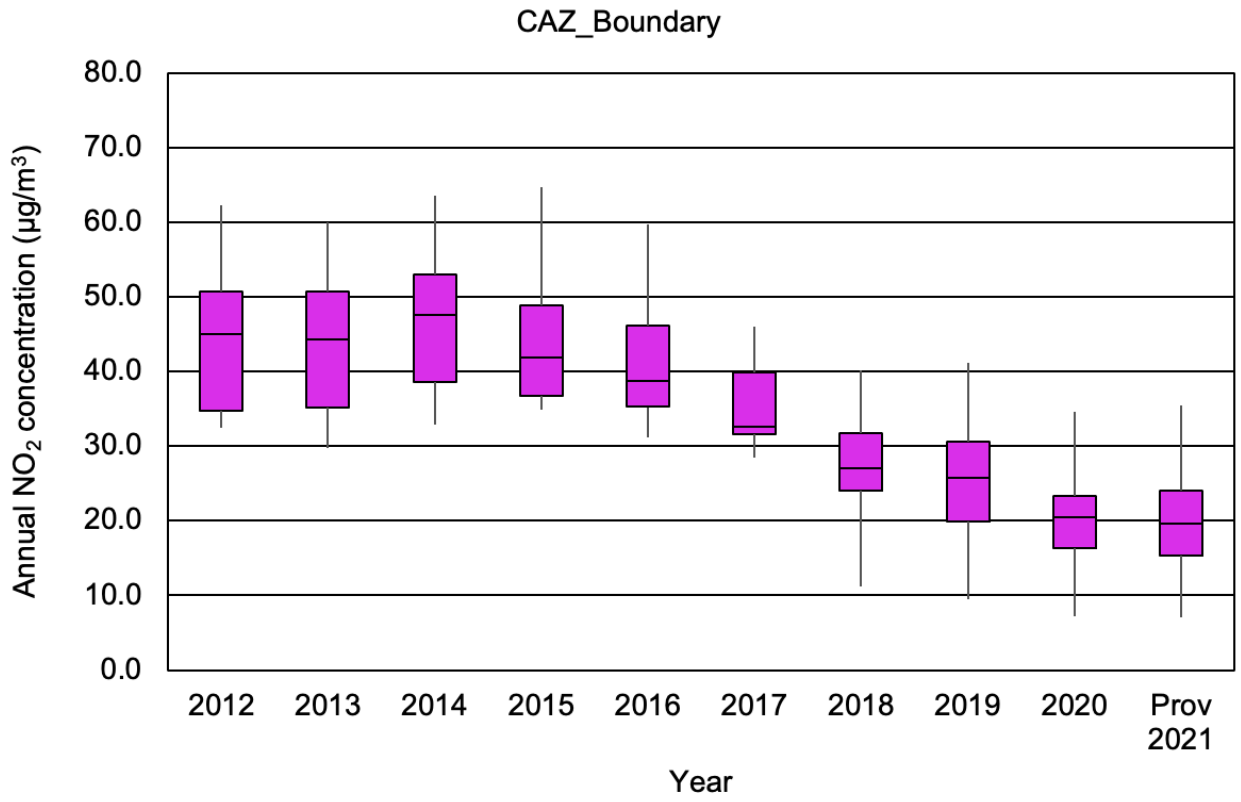


Comments and key findings:

- There is a clear decrease in the full range of data from 2014 onwards, that then stabilises between 2020 and 2021.
- Aside from the slight increase in median NO_2 during 2021 because of Covid and lower traffic in 2020, the last increase in median NO_2 was in 2016.
- The minimum and maximum data decreases so that the minimum 2012 datapoint is almost as low as the maximum 2021 datapoint.
- The provisional 2021 data shows that the interquartile range and median results remain relatively unchanged when compared to 2020.
- NO_2 concentrations in 2020 were lower than expected due to the Covid pandemic and lockdowns, so it is not unexpected that 2021 did not record lower concentrations than 2020.

Figure 8, below, shows boxplots of sites in the urban area outside of the CAZ for the last 10 years.

Figure 8: Boxplots showing the range in CAZ_Boundary NO_2 concentrations over the last 10 years. The whiskers show the minimum and maximum annual average NO_2 concentrations during that year. The bottom of the pink box shows the first quartile; the black line in the box is the median result; the top of the pink box is the third quartile. The box represents the inter-quartile range, where 50% of the data is found.



Comments and key findings:

- The CAZ_Boundary data shows a greater interquartile range in the earlier years than in the CAZ, which may represent the fact the wider urban area contains many monitoring sites located next to busy roads and those which are much less urban, thus resulting in a greater range of concentrations
- The interquartile range reduces in size through time. This is despite there being an increase in sites but may be because the reducing NO_2 concentration is approaching background levels towards 2021.
- Like the CAZ_Only grouping, the maximum 2021 data is almost at the same concentration as the minimum 2012-2016 data.
- The decrease in NO_2 is most pronounced between 2016-2020, but again the pandemic will have affected 2020.

An alternative way to consider the data is to plot in histograms. The blue columns in Figure 9 and 10 below relate to the data in 2019, while the green columns relate to 2021 data.

Figure 9: A histogram showing the number CAZ sites listed in 'bins' of annual NO_2 concentration in both 2019 and 2021.

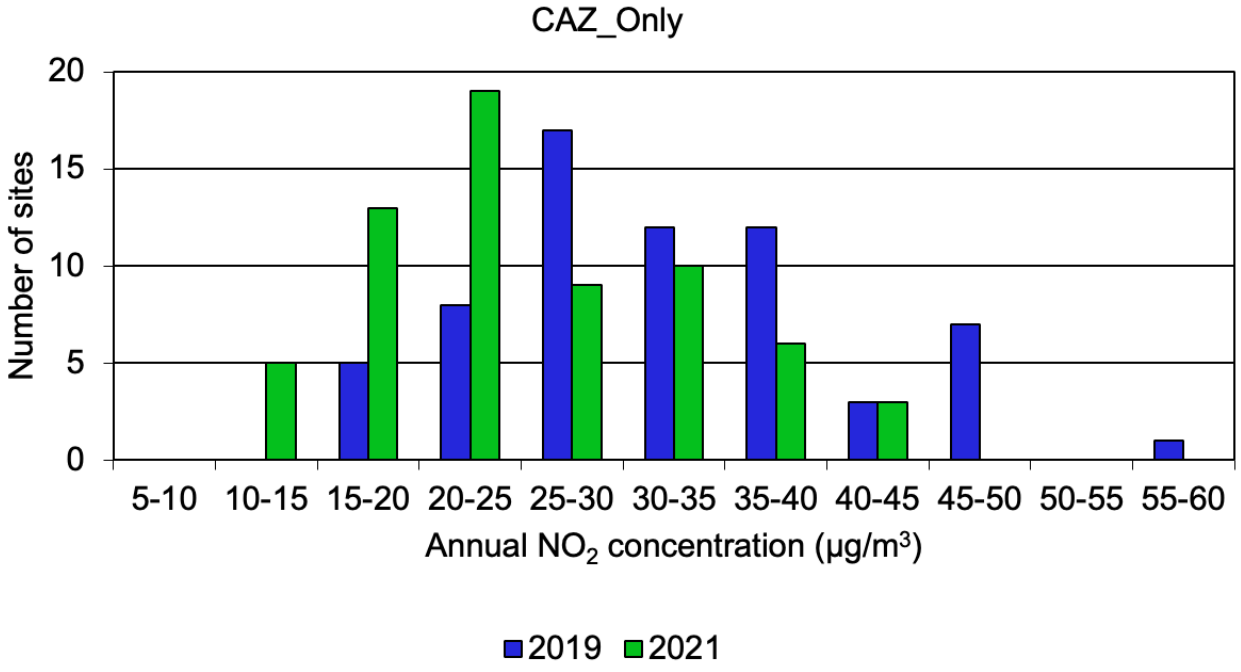
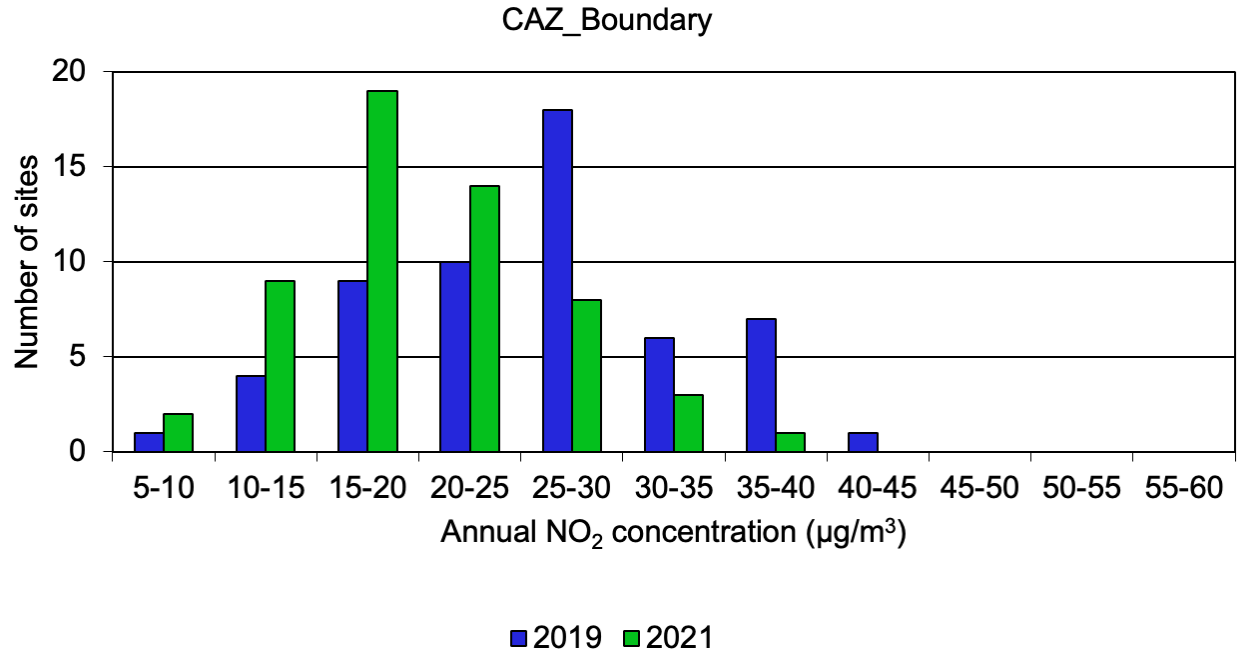


Figure 10: A histogram showing the number of CAZ sites listed in 'bins' of annual NO_2 concentration in both 2019 and 2021.



Comments and key findings:

- There is a clear shift as more 2021 sites are found in the lower bins than in 2019.
- Zero sites recorded above 45 µg/m^3 during 2021 whilst many sites did so in 2019.

Table 6 provides the breakdown of the NO_2 concentrations across the three site groupings. The average annual NO_2 concentration across all three site groupings is shown dependent on how many sites were recording data during both 2019 and 2021.

Table 6: Provisional annual NO_2 concentrations across the three site groupings.

Period	CAZ_Only NO_2 (µg/m^3)	CAZ_Boundary NO_2 (µg/m^3)	Wider_B&NES NO_2 (µg/m^3)
2019	32.4	25.4	29.1
2021	25.5	20.0	23.7
Change 2019 – 2021 (µg/m^3)	-7.0	-5.5	-5.3
Change 2019 – 2021 (per cent)	-21.4%	-21.5%	-18.4%
Number of sites reporting results	65	56	29

Comments and key findings:

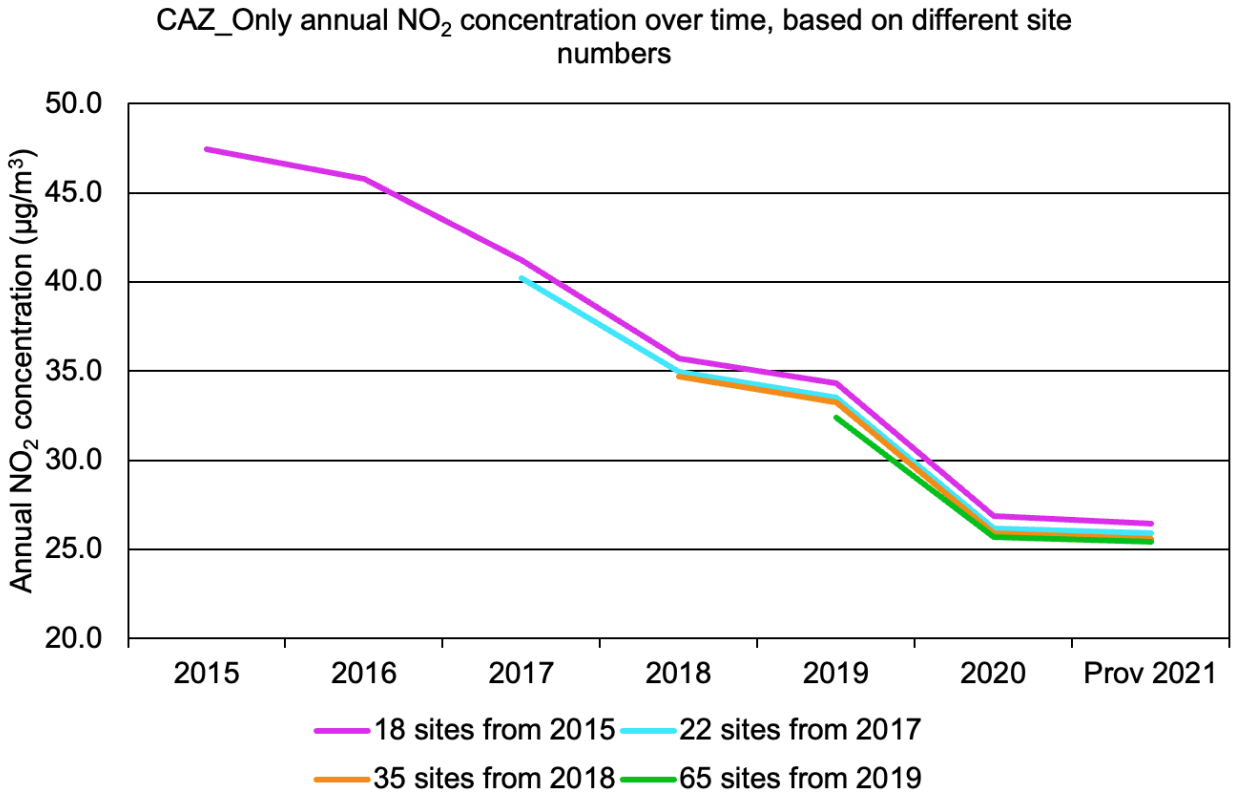
- NO_2 concentrations fell across all groupings. This is most pronounced in the CAZ_Only (-21%) and CAZ_Boundary groupings (-22%) and least pronounced in the Wider_B&NES grouping (-18%).
- Note that the baseline NO_2 concentration in 2019 is different across the three groupings. The CAZ_Only grouping has a greater actual NO_2 reduction when compared to the other groupings despite the percentage decrease being lower.
- Notably, NO_2 concentrations have decreased in the CAZ and its surrounding area, the CAZ_Boundary, by similar amounts suggesting that air quality improvements are not being limited to the CAZ.

The trends in all three site groupings are promising. The difference in site numbers in each grouping will most likely not affect the overall results by a significant amount, and this is explained further in the following section.

Evaluating diffusion tube annual monitoring

It's useful to look at what average annual NO_2 concentrations would be in different years, depending on how many sites we had in operation. We would expect that the annual average for a site grouping with a lower number of sites in operation would be less accurate. However, our analysis indicates that this is not the case as shown in Figure 11 below.

Figure 11: A graph showing the average annual NO_2 concentration over time from sites based in the CAZ, based on different site numbers.



As more monitoring sites are added each year, the data is enriched and the overall annual NO_2 concentration for that area becomes more accurate.

Looking into longer-term trends, Figure 11 shows the annual NO_2 concentration between 2015 and 2021. Each line represents the average annual NO_2 concentration according to the number of sites monitored. The pink line represents 18 sites that have been recording since 2015. Over time, monitoring sites were added to increase our understanding of the NO_2 concentration in certain areas, as well as improving data overall. Sites are often chosen in areas where high pollution is believed to exist.

Comments and key findings:

- All the data lines follow the same overall trend suggesting if you have a reasonable number of sites located within the CAZ, the results and their trend, are similar.
- Overall, more monitoring sites reduce the average NO_2 concentration slightly with the largest difference seen between the lowest number of sites (18) and the highest (66).
- In 2021, all four years produce annual average results within 1 µg/m^3 of each other, despite there being a difference of up to 47 sites
- This suggests that within the CAZ, at least, we can expect there to be little difference to overall average trends if more sites are monitored. Of course, it is still important to locate new sites to understand localised pollution.
- When analysing annual average trends, it is most accurate to use the greatest amount of available data possible, so we focus on the 65 sites in place in 2019 and 2021.

All the data analysed and discussed to this point has been diffusion tube data. Diffusion tubes are small, cost-effective, and easy to site near sources of emissions like roadsides. They are passive monitors which are sent to a laboratory monthly for analysis to produce a monthly NO_2 concentration and used to determine an annual average.

Automatic analysers are more accurate but costly and larger. These machines detect the NO_2 concentration every hour but cannot be sited easily around a district. In Bath, there are four automatic analysers (Figure 2). Their readings are used to calculate a local bias which corrects the diffusion tube data. A national bias is calculated using nationwide diffusion tubes and automatic analysers, and we compare our local bias to this national average to understand differences.

Further information on all the types of monitoring discussed in this report, can be found in the 'Monitoring Explained' section at the end.

Automatic analyser trends

The previous results discuss the results of our diffusion tube monitoring. With hundreds of diffusion tubes sited around the CAZ and wider B&NES district, they are useful for understanding trends in air quality across the district and localised air pollution, but they are not as accurate as automatic analysers.

The locations of our four automatic analysers can be found in Figure 2, earlier in this report. These machines are bulky and cannot be moved so while they are more accurate than diffusion tubes, they are less useful for localised air pollution or wider geographical trends.

Table 7: Shows data from the four automatic analysers in Bath.

Year	NO_2 concentration (µg/m³)			
	A4 London Road	Chelsea House	Guildhall	Windsor Bridge
2016	-	29	34	33
2017	-	29	30	33
2018	-	26	29	30
2019	29	22	27	29
2020	28	20	19	23
2021	27	18	20	23

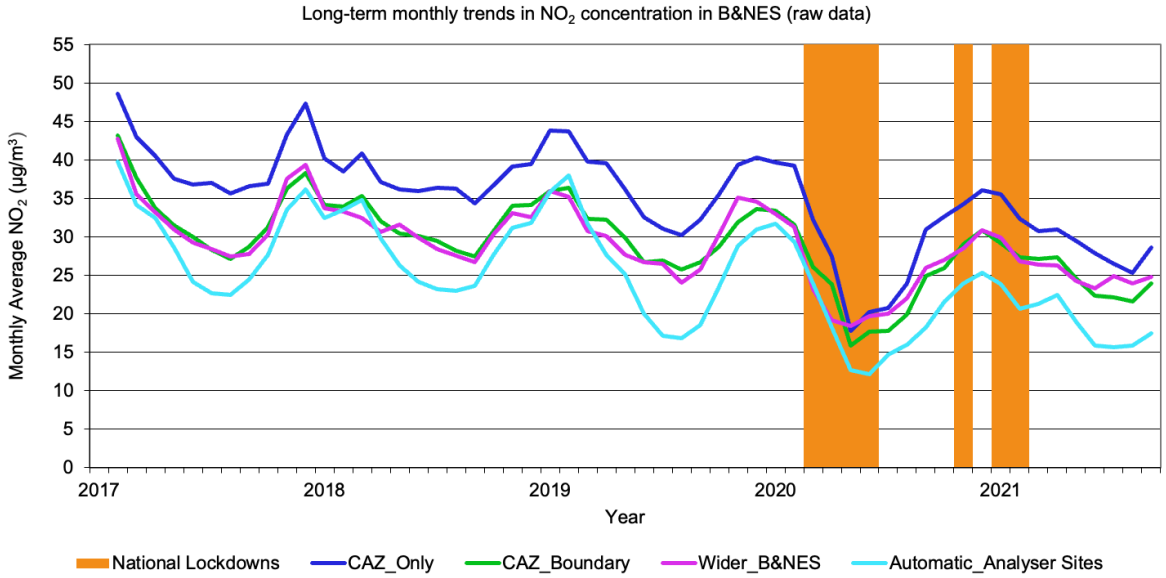
Comments and key findings:

- All four automatic analysers recorded annual average NO_2 concentrations below the 40 µg/m³ annual limit value.
- The largest decrease since 2016 was found at the Guildhall with a 14 µg/m³ decrease over 5 years.
- The A4 London Road site recorded the highest NO_2 concentration in 2021 but at 27 µg/m³ this is still well below the limit value.

Monthly long-term data

Figure 12: Monthly average diffusion tube NO_2 concentrations in B&NES from 2017 to 2022, separated into the three site groupings (raw, unadjusted data) alongside the average of three automatic analyser sites in Bath (Chelsea House, Guildhall, Windsor Bridge). A fourth automatic analyser site on the A4 has limited NO_2 data so was omitted.

Figure 12, above, shows the monthly average readings that were taken from 54 long-term monitoring diffusion tube sites (18 within the CAZ, 12 in the urban area outside of the CAZ, and 24 in the wider area outside of Bath) and three automatic analysers at Chelsea House, the Guildhall and Windsor Bridge in Bath.



Comments and key findings:

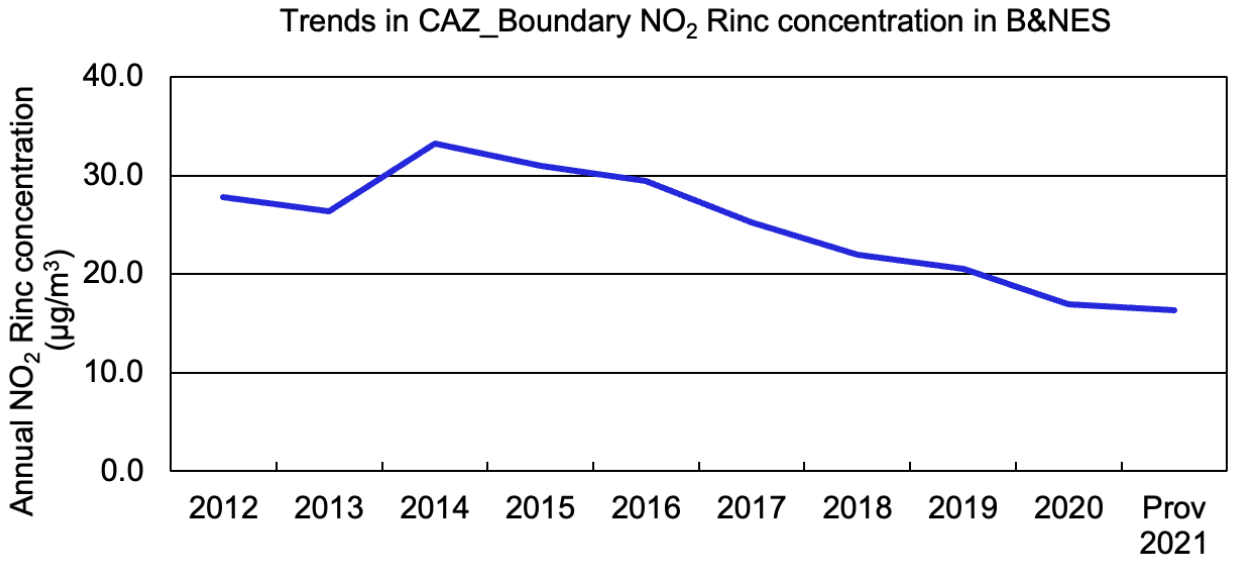
- The data used in this analysis is raw monthly data and is unadjusted
- For comparison purposes, we have only included and compared sites that have been in place since 2017 (dozens of additional monitoring sites have been added since 2017 which are not included).
- The automatic analyser data is lower than that of the diffusion tubes for multiple reasons. One reason is that data is more accurate than diffusion tubes which need to be adjusted with a bias using data from the automatic analyser. Also, there are only three data sources for the automatic analysers.
- There is a general downward trend with average monthly NO_2 concentrations falling since 2017. This is likely due to the natural replacement of older, more polluting vehicles with cleaner, compliant ones.
- Clean Air Zones seek to accelerate natural replacement rates to rapidly improve fleet compliance. Due to Covid-19, the natural replacement rate has stalled as new vehicle registrations declined during the pandemic. The CAZ has helped to maintain some this replacement rate, rather than increase it[7].
- There is a clear seasonal trend in the data, with increased NO_2 concentrations in the winter. This is part of the reason why there is an upturn in the trend at the end of 2021, despite improvements, as well as traffic returning to pre-pandemic levels.
- Increased winter NO_2 concentrations are primarily due to:
    - lower vehicle catalyst temperatures meaning exhaust emissions abatement technology is less effective.
    - increased emissions from domestic sources, such as gas flues.
    - the fact that NO_2 is retained in colder air for longer than warmer air.
- A marked decrease in mid-2020 is due to significantly less traffic on the roads because of Covid-19 restrictions.

[7] Department for Transport, 2021 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1021032/vehicle-licensing-statistics-april-to-june-2021.pdf

Roadside increment

The roadside increment (Rinc) of NO_2 concentration shows the changes in traffic related NO_2 concentration derived by subtracting the background NO_2 concentration from the average NO_2 concentration. The graph below (Figure 13) shows a deeper understanding of the contribution of traffic to the NO_2 concentration near the CAZ.

Figure 13: Trends in Rinc in the CAZ_Boundary area since 2012.



Comments and key findings:

- In this analysis, the Rinc of the annual average of NO_2 concentration from seven sites (which have data since 2012) within the CAZ_Boundary area, minus the annual Alexandra Park NO_2 concentration average.
- The Rinc is useful as it demonstrates the proportion of NO_2 pollution from road traffic sources, as opposed to other sources e.g., gas boilers.
- Background sites are positioned away from roads to avoid localised pollution from road traffic. In Bath, the urban background location is at Alexandra Park, which is in the urban area outside of the CAZ.
- We have sited new background locations around B&NES in all three site groupings to improve data collection
- Rinc enables you to calculate what proportion of NO_2 pollution comes from vehicles on local roads, with a more representative measurement of background air pollution over several square kilometres.
- There is a clear decreasing trend in the Rinc since 2014 due to natural fleet upgrades and the introduction of Euro 6 in 2015.
- The Rinc in 2020 was likely lower than it would have been due to Covid lockdowns. In 2021, traffic returned to pre-pandemic levels, but the Rinc still decreased.

5. Impacts of the CAZ on traffic flow

A clean air zone is primarily designed to improve the compliance of vehicles driving in polluted areas rather than reducing traffic volumes i.e., it is aimed at reducing pollution, not congestion.

However, road traffic is the most significant cause of NO_2 pollution in Bath, so we monitor any changes in traffic flow in and around the zone and on the highway network around the city. This data helps us understand whether the zone is negatively impacting air quality and/or road safety on other roads.

5.1 How we measure changes in traffic flow

We monitor the direction and volume of traffic on specific routes using manual classified counts (MTC), automated traffic counts (ATC) and automatic number plate recognition (ANPR) cameras.

Our report focuses on key roads inside and outside the clean air zone and on connecting highways. Traffic flows are continually monitored at various locations across the city and, for the purpose of monitoring the impact of the CAZ, are reported quarterly and annually.

To understand the impact of the zone we compare data from a similar time frame in 2017 or 2018. We have discounted data from 2020 due to the unprecedented impact on traffic and travel caused by the Covid-19 restrictions. In addition, the Council has insufficient data for the year 2019. Sometimes there is no baseline data to draw on if the monitoring location is new or temporary.

It is important to remember that not all vehicles are chargeable, and most vehicles have no need to avoid the zone or seek alternative routes. Our traffic counts record any traffic movement, regardless of the vehicle type or compliance status.

Online shopping and home-deliveries are increasing, which is leading to more commercial vehicles on the roads. In mid-September 2021, light goods vehicles increased to 112% of their pre-pandemic levels while heavy goods vehicles increased to 110%. Cars reduced to 97% of their pre-pandemic level. (Department for Transport statistics).

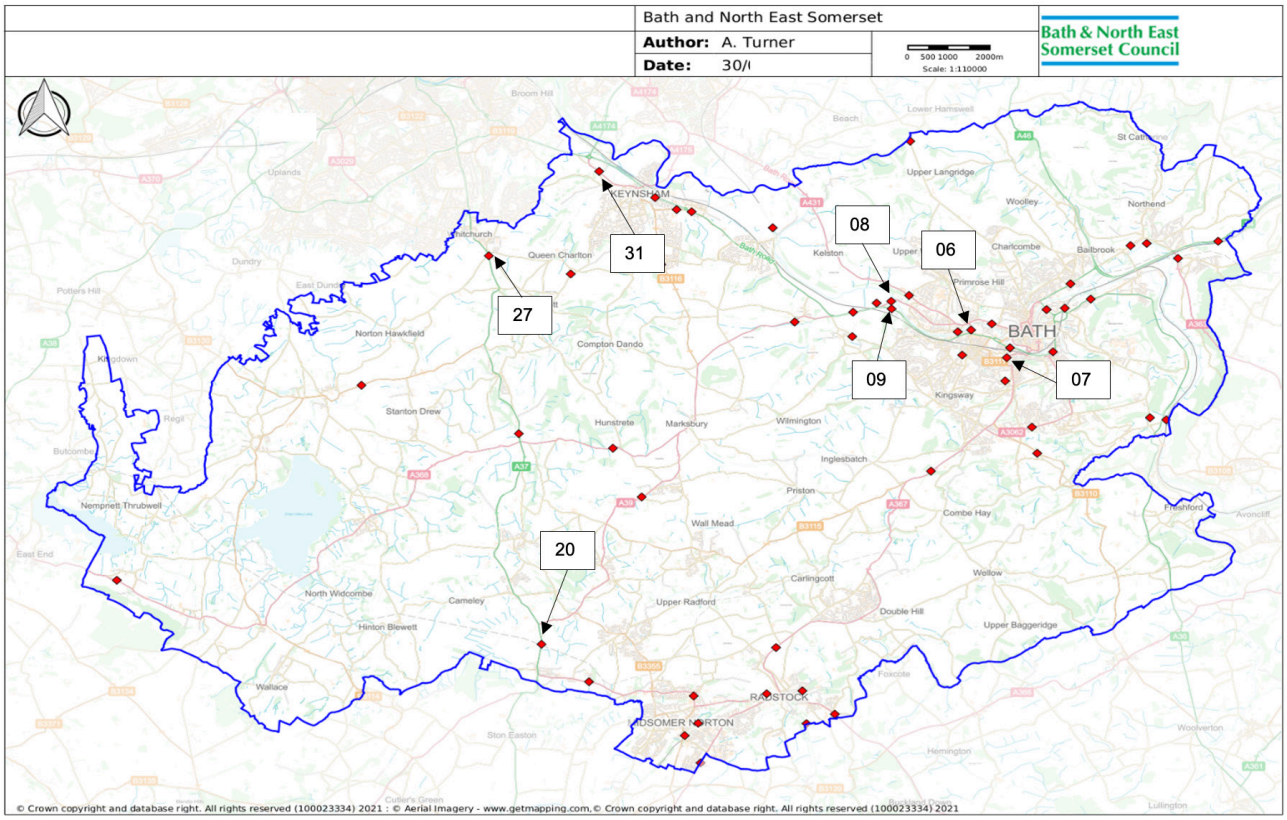
Figure 14 shows a map of the wider area, including the city of Bath, where automatic traffic counts (ATCs) are in place to analyse traffic flow. A list of the locations used in the analysis can be found in Table 8. These permanent ATCs were selected as they were in use prior to the introduction of the CAZ and can therefore be used for comparison purposes.

Where possible we have used three sites from each site grouping to draw conclusions. In the case of the CAZ, only one site had consistent data. Other monitoring methods such as temporary ANPR cameras will be used to monitor areas of perceived concern. For more information see **Appendix 2: Investigating traffic displacement concerns**.

Table 8: ATC locations from Figure 14 in their site grouping.

Site ID	Location	Site Category
06	A3064 Windsor Bridge, North of Stable Yard	CAZ_Boundary
07	A367 Wells Road- North of Hayesfield Park	CAZ_Only
08	A4 Newbridge Road, East of A36 Lower Bristol Road	CAZ_Boundary
09	A36 Lower Bristol Road, East of Newbridge	CAZ_Boundary
20	A37 Farrington Gurney, South of A39	Wider_B&NES
27	A37 Bristol Road Whitchurch, South of Norton Lane	Wider_B&NES
31	A4175 Durley Hill, West of Durley Hill	Wider_B&NES

Figure 14: ATC locations (red diamonds) used for traffic flow analysis. The number refers to the site ID which can be found in Table 8. © Crown Copyright 2021. License number 100023334.



5.2 Traffic flow data results

Annual and quarterly traffic flow data is analysed here to identify short and long-term trends. This section outlines data from the selected ATCs and is used to identify trends in and around the CAZ. Later in the report, and primarily in Appendix 2, we discuss areas of potential CAZ traffic displacement, how we investigate these and what measures we are putting in place to avoid displacing traffic.

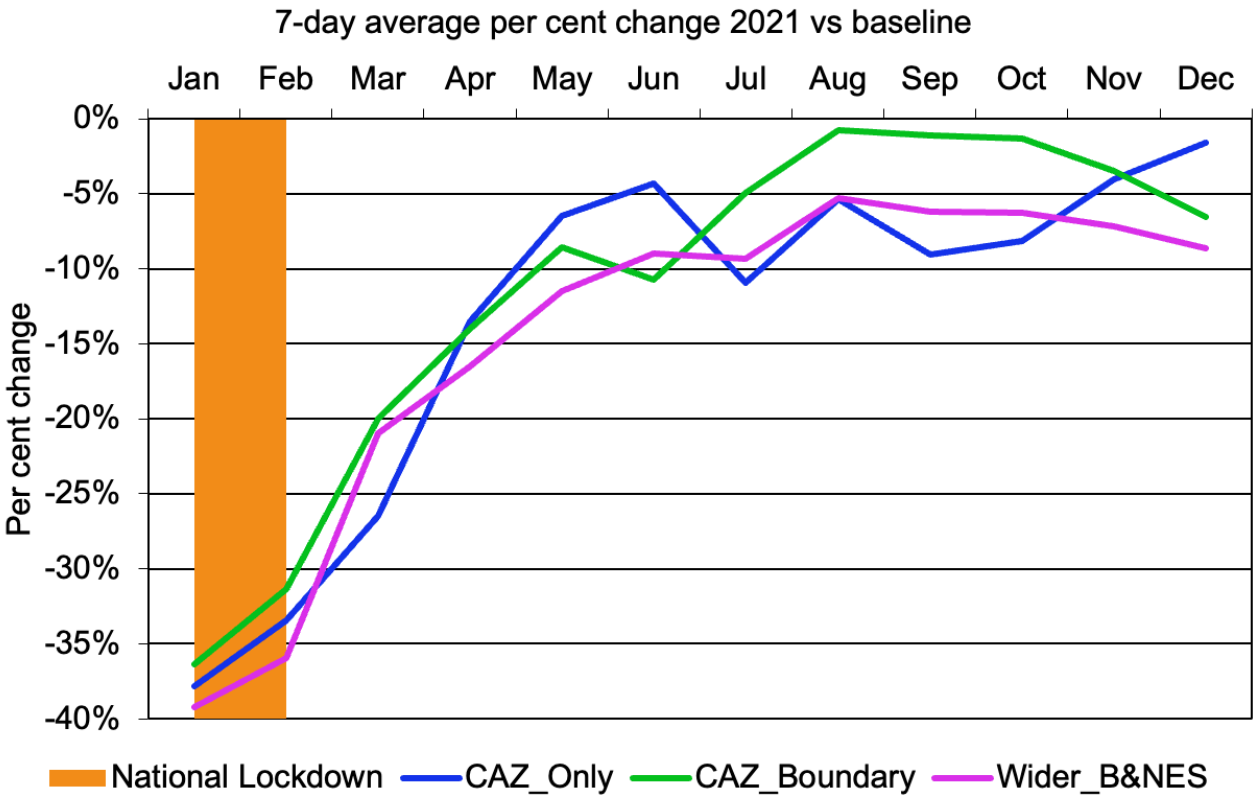
Table 9: Two-way traffic flow data for ATCs by site grouping from the last year with representative data (2017 or 2018) and 2021. The highlighted orange quarter was when a national lockdown was in place, restricting movements.

Year	Quarter	7-day average		
		CAZ_Only	CAZ_Boundary	Wider_B&NES
2017/ 2018	1	16574	14426	15779
	2	16930	15168	17002
	3	17021	14799	16815
	4	17146	14653	16207
2021	1	10718	10210	10699
	2	14670	13486	14906
	3	14482	14464	15645
	4	14908	14110	15020

Table 10: Percentage change in average monthly traffic flows from 2017/18 to 2021. The bottom row shows the average change between the years.

Month	7-day average		
	CAZ_Only	CAZ_Boundary	Wider_B&NES
January	-38%	-36%	-39%
February	-33%	-31%	-36%
March	-26%	-20%	-21%
April	-14%	-14%	-17%
May	-6%	-9%	-11%
June	-4%	-11%	-9%
July	-11%	-5%	-9%
August	-5%	-1%	-5%
September	-9%	-1%	-6%
October	-8%	-1%	-6%
November	-4%	-3%	-7%
December	-2%	-7%	-9%
Average change 2017/2018 to 2021	-13%	-12%	-15%

Figure 15: 2021 traffic levels compared to the baseline year across all site groupings



Comments and key findings:

- At the beginning of 2021, during the Covid pandemic lockdown in January/ February, traffic in all areas was 35% below pre-pandemic levels.
- At the end of the final lockdown in Spring 2021, traffic levels increased to between 5% and 15% below normal pre-pandemic levels.
- Traffic volume returned to within 10% of pre-pandemic levels in all areas by August 2021.
- Traffic flows in the zone returned to pre-pandemic levels by December 2021, while those in the urban area outside the CAZ returned to pre-pandemic levels by August 2021 (before decreasing again towards the end of the year).
- Only one site was used to analyse the area within the CAZ so some caution must be used when drawing conclusions.
- In addition, the closure of Cleveland Bridge is known to be significantly affecting the levels and directions of traffic flow throughout the entire second half of 2021 (28 June 2021- November 2021: full closure; November 2021 onwards: partial closure).
- Nationally, traffic levels have generally returned to pre-pandemic levels (Department for Transport)[8].

[8] Department of Transport statistics from the Office for National Statistics. Economic activity and social change in the UK, real-time indicators, 2021 https://www.ons.gov.uk/economy/economicoutputandproductivity/output/bulletins/economicactivityandsocialchangeintheukrealtimeindicators/23september2021

Diurnal traffic flow trends

An 'inner-cordon' traffic survey has been carried out in Bath using data from eleven ATCs (Figure 16), that are roughly around the zone's boundary. The survey has not been consistent and there is missing data, but it can offer insights into the diurnal trends in traffic flow in the city centre to help us understand changing travel behaviours.

Figure 16: Map of inner-cordon ATC sites for hourly traffic flow analysis.

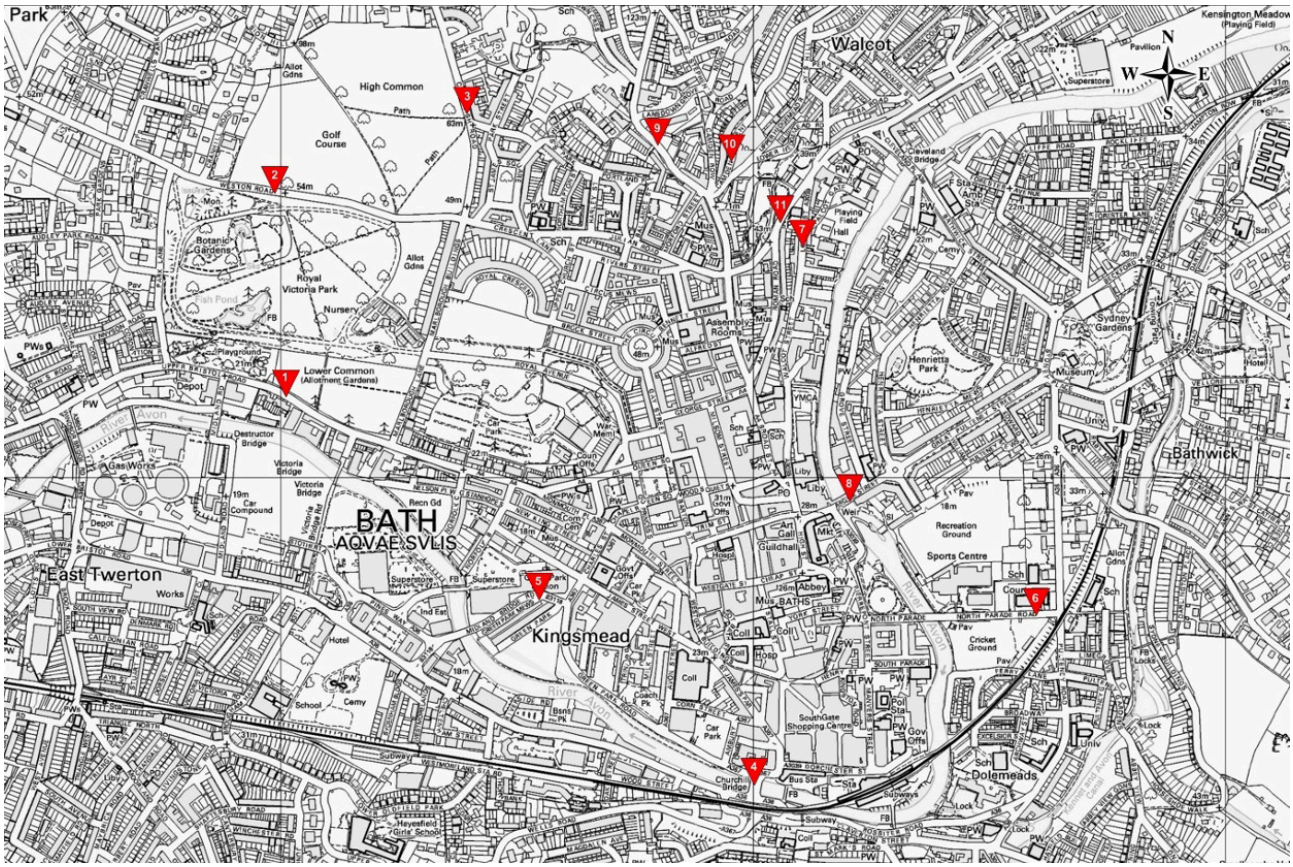
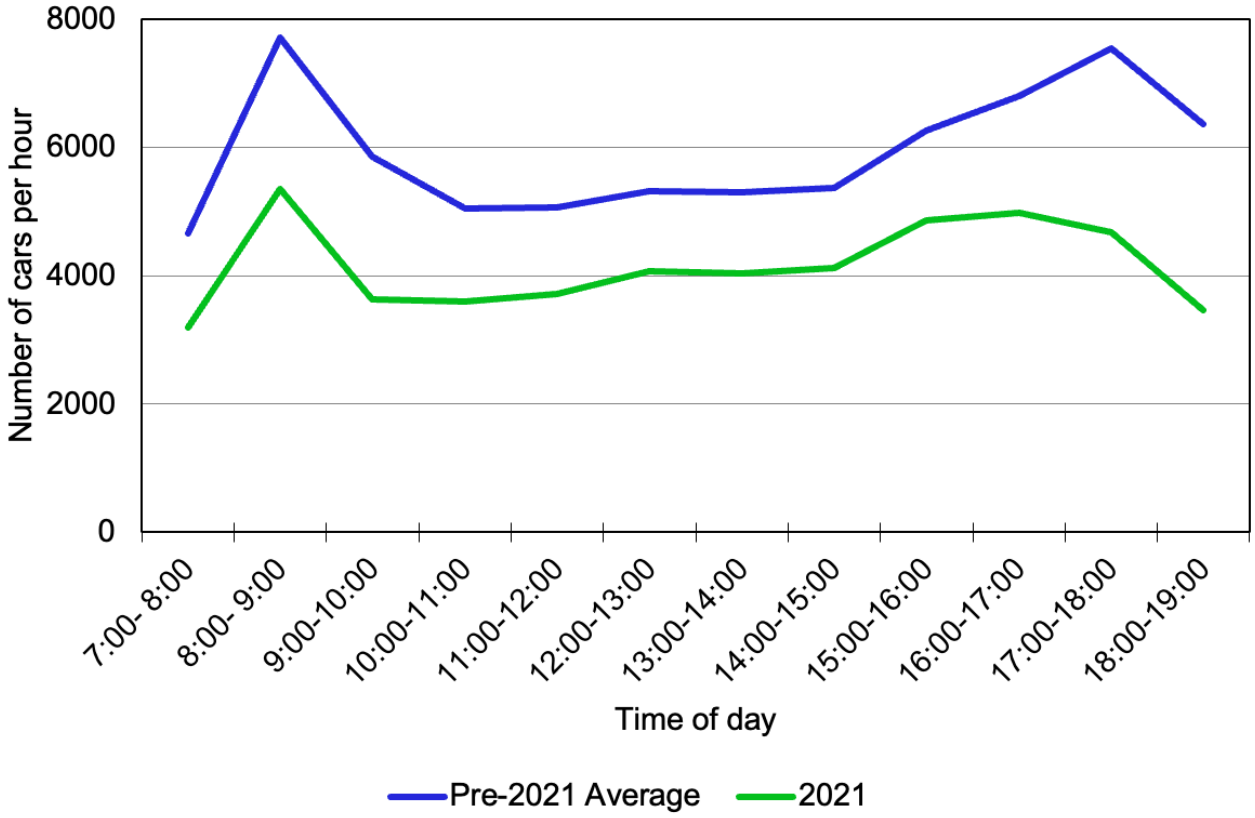


Figure 17, below, shows the number of cars passing eleven ATCs within Bath city centre (split over a day) to illustrate changes that occurred in 2021. The pre-2021 average is from 2000-2020 without 2014 and 2019 which equates to an 18-year average.

Figure 17: Bath inner cordon car count over the time of day. The pre-2021 average draws on data from 2000-2020.



Comments and key findings:

- Fewer cars travelled through the inner cordon in 2021 compared to the pre-2021 average. The morning peak (8-9am) saw almost 8,000 cars on average (pre-2021) but in 2021, we recorded around 5,000 cars on average.
- Throughout the day in 2021, 2,000 fewer cars were recorded per hour than the pre-2021 average (and up to 3,000 fewer were recorded in the evening).
- The Covid pandemic has contributed to the changes, with a lockdown in early 2021, increased working from home and online shopping.
- In 2021, the morning peak remains between 8-9am while the evening peak is reduced. Pre-2021 shows a peak between 5-6pm whereas there is a more extended and less pronounced peak in 2021 between 3-6pm.

Background on traffic flows in 2021

Travel patterns have changed significantly in the last few years due to the pandemic.

While pre-pandemic statistics show that rural areas traditionally had higher rates of home working (at around 32% compared with urban areas at around 13%[9]), this has risen to 36% post-pandemic (according to a snapshot of the proportion of people home-working in the UK in January 2022).

With less people going to work at all times of day, and a noticeably diminished evening peak hour (Figure 17), traffic movements are spread across the day, potentially reducing the impact of highly concentrated air pollution due to less congestion. In addition, more people may be leaving their homes at different times of the day for shopping or leisure, taking the pressure of roads at peak times.

Home deliveries and e-commerce have also increased, reaching a record 35% of all retail spend[10]. This may account for greater numbers of vans and HGVs on local roads.

The overall picture by the end of 2021 shows traffic generally returning to just below pre-pandemic levels but with different patterns due to a shift in work and travel behaviours.

5.3 Local links between traffic levels and air quality

We are carefully monitoring traffic in locations where annual or quarterly average NO_2 concentrations remain above 40 µg/m^3 or have an increased quarterly average concentration.

In some locations we have traffic flow data collected from either ATCs or the zone's ANPR cameras, which are located very close to diffusion tube sites. These sites can be used to assess the relationship between traffic flows and NO_2 concentrations in a specific location. However, it's important to note that vehicle emissions are not the only source of NO_2, so traffic volume and composition are not the only determining factors of total concentrations.

In the fourth quarter of 2021 (Oct to Dec), four sites recorded an average NO_2 concentration above 40 µg/m^3 as well as an increased concentration, when compared to the fourth quarter in 2019 (Dorchester Street, St James Parade, Wells Road 4 and Chapel Row 2). Two of these sites (Chapel Row and Wells Road) have diffusion tube data and traffic flow data located within 20 metres of each other.

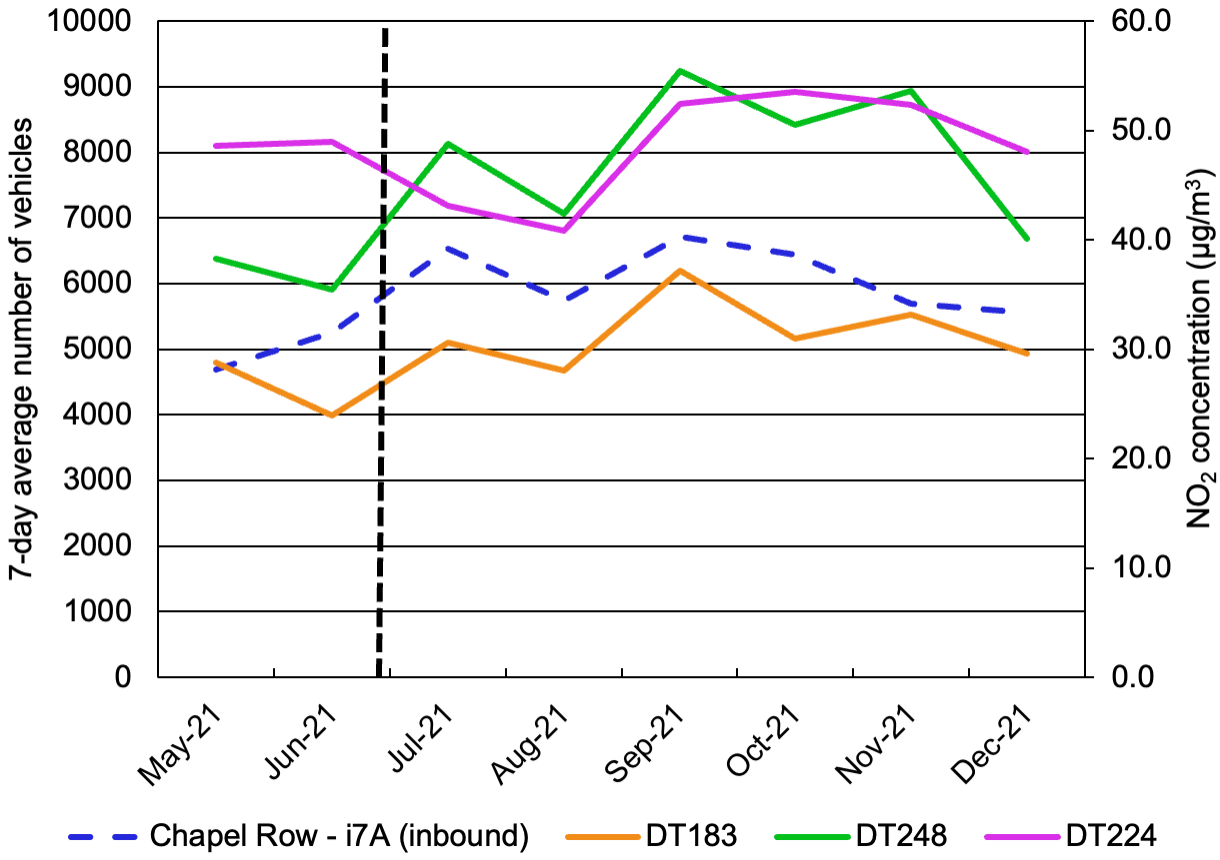
[9] DEFRA. Statistical Digest of Rural England, 2020. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/984921/Home_Working_Dec_2020_final_with_cover_page.pdf

[10] ONS. Retail sales, Great Britain, January 2021. https://www.ons.gov.uk/businessindustryandtrade/retailindustry/bulletins/retailsales/january2021

Chapel Row

At Chapel Row, NO_2 concentrations increased in the summer months. The likely cause is an increase in traffic volumes through this area, as NO_2 concentrations track the changes in traffic flow (Figure 18)

Figure 18: One-way eastbound traffic flow on Chapel Row (left y-axis) plotted with NO_2 concentrations of diffusion tubes (DT183, DT248, DT224; right y-axis). The closure of Cleveland Bridge is shown by the dotted black line, traffic flow is represented by the blue dotted line (Chapel Row – i7A (inbound).



During the summer of 2021 the daily number of vehicles travelling through Chapel Row inbound towards Queen Square rose from 4,500 in May 2021 to nearly 6,500 during the summer months (Figure 18). The increase in traffic was mainly due to a diversion in place due to the closure of Cleveland Bridge for essential repairs.

The bridge fully closed to traffic on 28 June 2021. The official diversion directed vehicles over Windsor Bridge, with expected increases in traffic on the A4 and A36. Vehicles below 7.5T were able to use central routes through the city centre. Traffic flows during the second half of 2021 were affected by the closure, with drivers finding alternative routes through Bath. As of November 2021, the bridge had reopened to light traffic in a two-way shuttle mode.

The NO_2 concentrations at both diffusion tubes located on Chapel Row mirror the traffic flow trend into Queen Square. DT248 is located on the north side of the road (the side the traffic flow data comes from) while DT183 is located on the south side of the road.

In addition to these observations, our highways team noted an increase in peak outbound/ eastward flows at the Walcot Parade junction during the Cleveland Bridge closure. This increase in the outbound number of vehicles during the peak hour was from around 500 vehicles per hour pre-bridge closure, to around 650 vehicles per peak hour after the bridge closure. Traffic that would have previously arrived at the junction from Cleveland Bridge, instead approached via Walcot Parade (during the closure and continued partial closure).

The width restriction on the bridge and shorter green time for traffic approaching the bridge, resulted in less demand on the Walcot Parade junction. Walcot Parade eastbound traffic was, as a result, given more green time, therefore allowing a better flow of traffic eastwards on the London Road. The consistent flow contrasts to the normal flow which is stopped by traffic signals allowing vehicles to move onto and off the bridge.

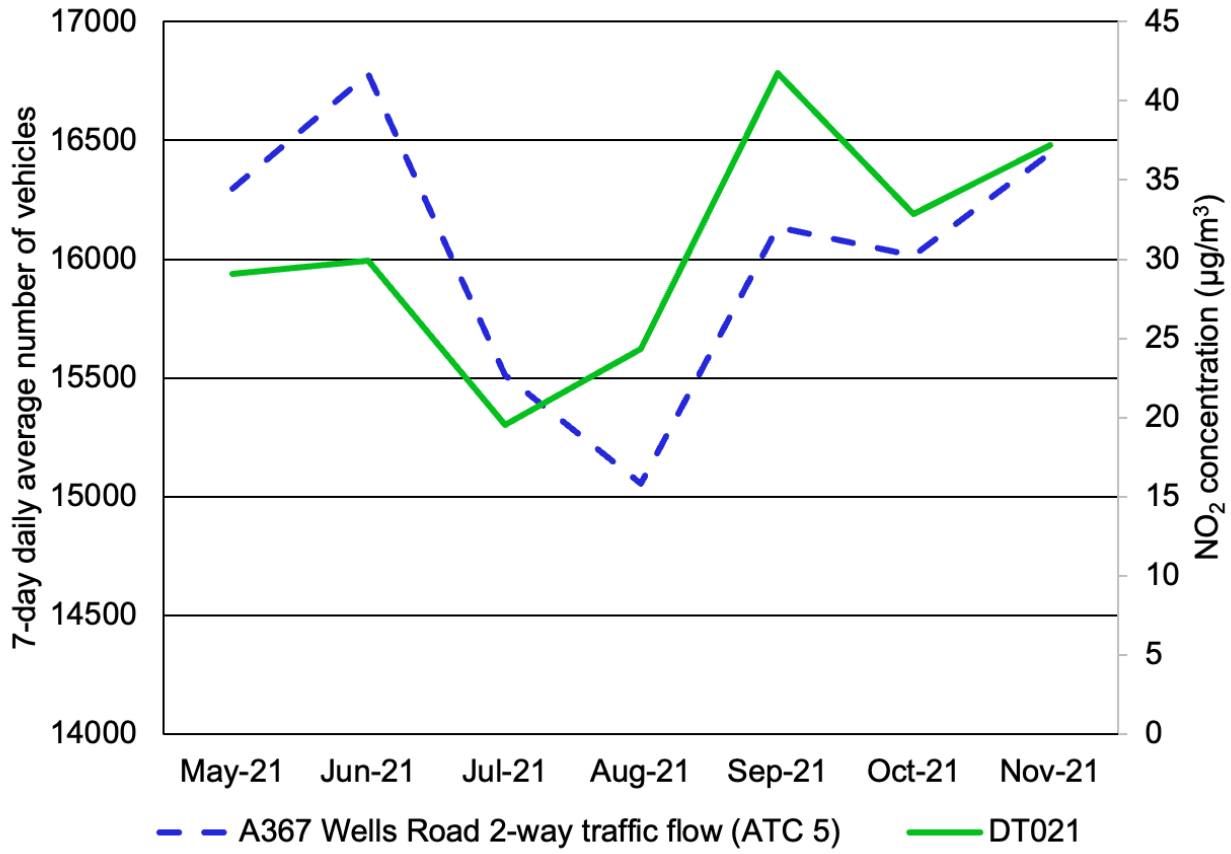
This may be why NO_2 concentrations at the worst-performing diffusion tube, Walcot Parade 2 (DT224), reduced by 22%, from 55.2 µg/m^3 in 2019, to 43.1 µg/m^3 in 2021. This contrasts to the NO_2 concentration at Chapel Row (DT248) where NO_2 concentrations decreased by only 4% from 38.3 µg/m^3 in 2019 to 36.6 µg/m^3 in 2021. This much smaller reduction in NO_2 could be due to the increased traffic on Chapel Row.

The bridge closure allows more capacity on London Road and Walcot Parade but with less stop starting. The reduction in stop-starting reduces the amount of acceleration events and cooling of catalysts, resulting in lower emissions of NOx.

Wells Road

The other site which has both ATC and diffusion tube locations within a short distance of each other, is Wells Road. The two-way traffic flow and closest diffusion tube are shown in Figure 19. Again, the trend for NO_2 concentrations, closely follows the trend for traffic volumes. These results demonstrate how fluctuating traffic flows can directly affect local air quality.

Figure 19: Two-way traffic flow on A367 Wells Road (north of Hayesfield Park; left y-axis) plotted alongside the NO_2 concentration of diffusion tube site Wells Road/ Upper Oldfield Park (DT021; right y-axis).



The Council monitoring these locations, including real-time monitoring, to understand which vehicles are producing the most significant emissions and why.

The following section describes our commitment to monitor areas of potential traffic displacement due to the CAZ. A CAZ will always cause some level of displacement, but air quality has improved in the boundary area outside of the zone, more so than within the zone itself.

6. Areas of potential traffic displacement

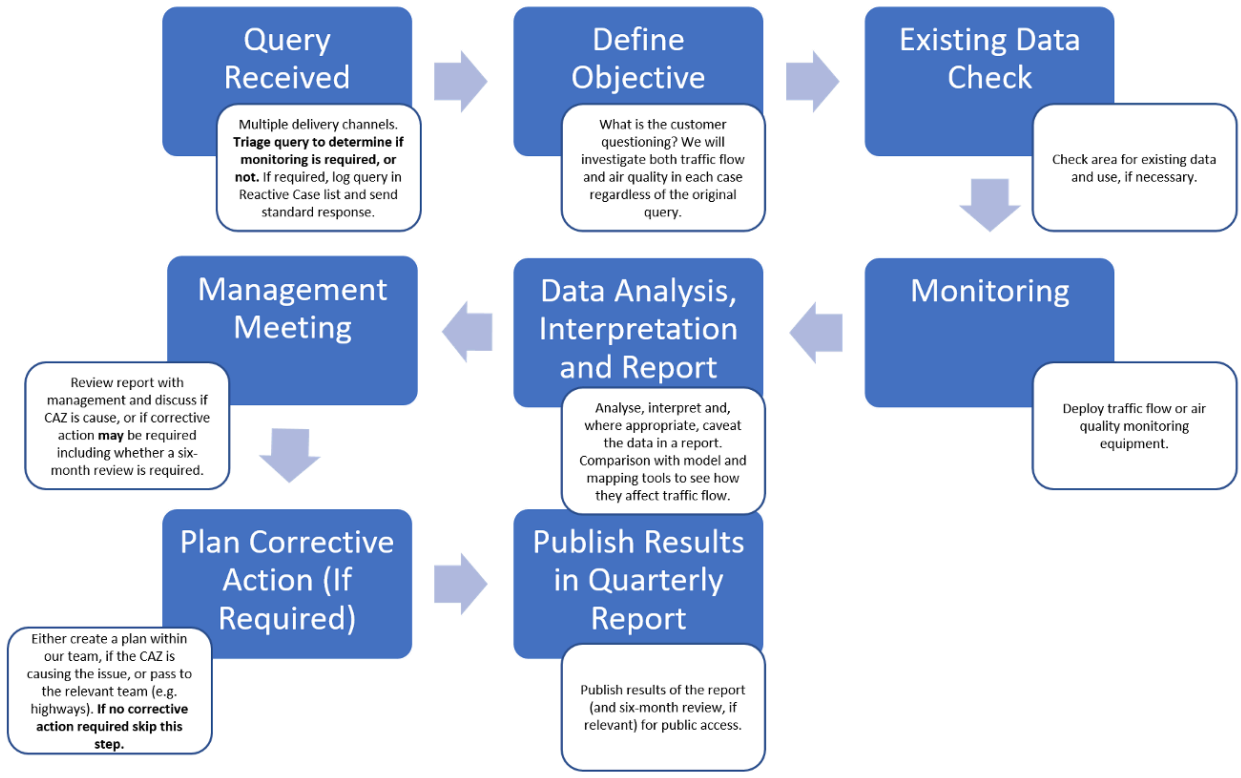
A key commitment of the Council was to monitor any concerns arising from the introduction of the CAZ. The purpose is to improve vehicle compliance rates while minimising the impact on normal traffic flows. Nationally, average traffic volumes have returned to pre-pandemic levels and the numbers of LGVs and HGVs on the network are now exceeding pre-pandemic levels (Department for Transport).

We are actively investigating over a dozen discrete locations where the public have expressed concern about a perceived increase in traffic in their communities since the launch of the CAZ. All locations logged and active are set out in **Appendix 2**.

How we're investigating possible traffic displacement

From the launch of the CAZ in March 2021, comments from residents about potential CAZ-related impacts have been logged and investigated. Figure 20 shows the process we have put into place when following up these queries.

Figure 20: A process map showing the details of the traffic displacement process followed when a query is received.



Comments about traffic displacement:

- The pandemic was an unforeseen event that was not predicted and inevitably, traffic flows have been impacted in a way outside of any modelling done for the Full Business Case.
- In early 2021, there were lower levels of traffic, particularly cars, although the increase of home deliveries has increased to a record 35% of all retail spend[11], which accounts for a proportion of the greater numbers of LGVs and HGVs in local communities. As lockdown restrictions have lifted the numbers of commercial vehicles have increased beyond pre-pandemic levels.
- In June 2021, Cleveland Bridge closed to traffic for urgent repairs to the structure of the bridge. Despite partially reopening in November 2021, the impact of the closure of the bridge displaced traffic throughout the second half of 2021.

Overview of cases:

Please see Appendix 2 for more detailed traffic displacement monitoring information.

- Some locations were due to be monitored again after the full reopening of Cleveland Bridge, however, unexpected structural repairs to the bridge meant this was delayed. Therefore, given the partial bridge closure these surveys were arranged at a time where the disruption to traffic would be minimal.
- ANPR surveys were repeated at Lyndhurst Road (Oldfield Park), Whiteway Road and Lansdown Lane to understand the traffic composition.
- We are aware that the monitoring survey at Charlcombe Lane in October 2021 may have been affected by a partial road closure within the area. This survey was therefore repeated in June using three temporary automatic traffic counters.
- We are continuing to monitor NO_2 concentrations at Twerton High Street to understand the trends in results.
- Upon reviewing Old Newbridge Hill there have been no further concerns regarding traffic displacing as result of the CAZ. However, the Traffic Regulation Order surrounding a new weight restriction is still being developed with highways.
- We reviewed and undertook further monitoring in the following areas of investigation: Upper Camden Place, Southdown Road, Shophouse Road, Penn Hill Road, Englishcombe Lane and Cavendish Road.
- We reviewed the following areas of investigation where no discernible increase or concerning traffic issues were found: Rosemount Lane, Sham Castle Lane, Prior Park Road and Norton St Philip. These cases will be removed from the appendix in the following report.

[11] ONS. Retail sales, Great Britain: January 2021.
https://www.ons.gov.uk/businessindustryandtrade/retailindustry/bulletins/retailsales/january2021

7. The impact of the CAZ on fleet compliance

Transport is widely acknowledged as a key driver of air quality issues. It is estimated that around 92% of all Nitrogen Oxide (NO_x) emissions in the wider area are attributable to road traffic. Older vehicles generally emit more NO_x as recent technological advances in selective catalytic reduction has led to a lowering of NO_x emissions from vehicles, particularly those with a Euro 6 standard.

The purpose of the CAZ is to speed up the natural replacement of older, more polluting vehicles with cleaner, compliant ones that meet the city's minimum emission standards. It does this by levying charges on owners of non-compliant vehicles that don't meet emission standards (i.e., pre-euro 6 diesel and pre-euro 4 petrol vehicles), so that they are incentivised to upgrade or replace their vehicle sooner than they might otherwise do (to avoid paying a daily charge). In Bath, financial assistance is available to help support businesses and individuals that need help to do this, mitigating the impact of charges.

Improvements in Bath's fleet are brought about in the following ways:

- Naturally as part of regular fleet upgrade programmes and because of pressure on manufacturers from government, environmental organisations and the public to improve vehicle emissions.
- More recently and locally, as a specific reaction to the introduction to Bath's CAZ and other zones around the country e.g., drivers bringing forward plans to upgrade or replace older vehicles to avoid charges.
- And in response to direct Council and government-funded interventions to encourage upgrades, including a bus retrofit scheme and the financial assistance scheme which offers grants and or interest-free finance to those regularly driving in the zone to replace non-compliant vehicles.

To understand whether the CAZ is working to reduce emissions and air quality, we are monitoring rates of vehicle compliance in the zone.

7.1 How we measure fleet compliance in Bath

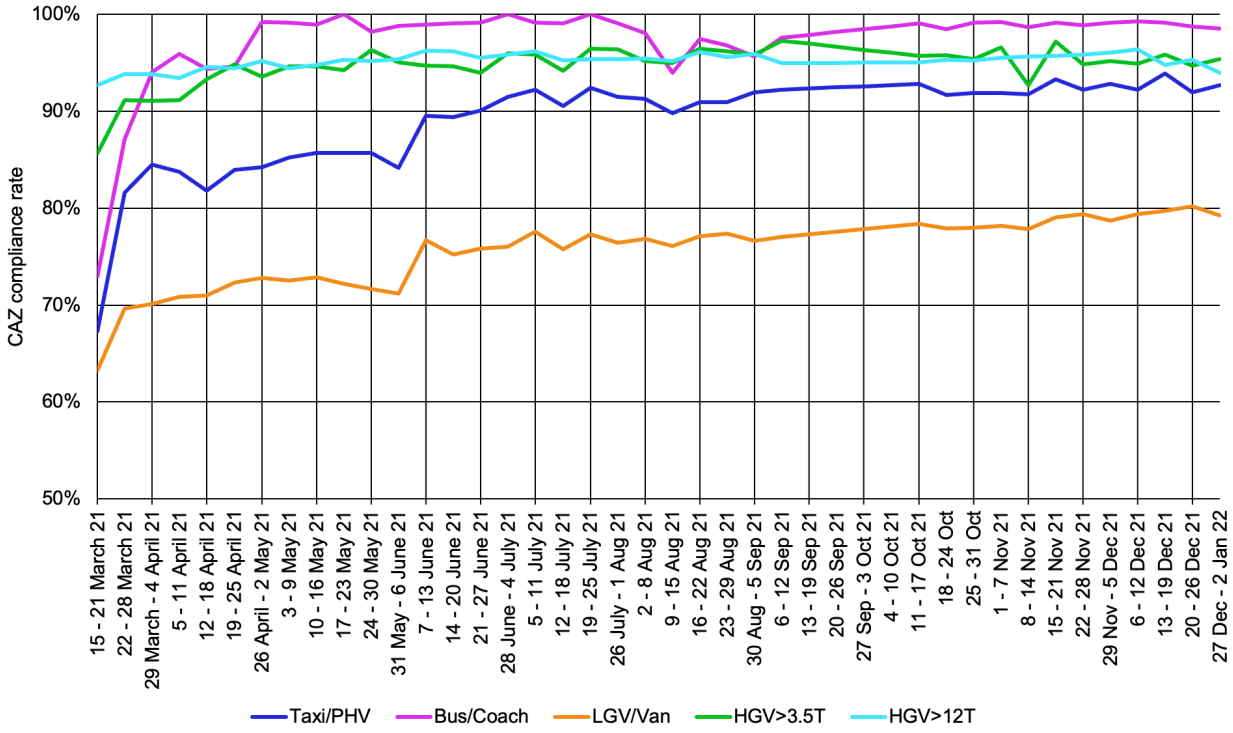
We measure changes in fleet composition using data gathered from 68 automatic number plate recognition (ANPR) cameras positioned around the perimeter of Bath's CAZ, and within the zone itself. Where traffic displacement concerns have been raised outside of the zone, and we have determined that there is an increase in traffic flow, additional compliance monitoring is being undertaken using temporary ANPR cameras. See: Appendix 2.

The camera captures individual number plates which are then cross referenced with a DVLA vehicle database to establish the number of vehicles in the zone on any given day, the type of vehicle captured in the zone e.g. bus, HGV, van etc., its age, and the euro standard of the vehicle (if available). This enables us to understand the number of compliant vehicles driving in the zone and in areas of potential traffic displacement. This is presented as a percentage of total vehicles driving in these areas each week.

To understand how fleet compliance in the zone has changed following the introduction of the CAZ, we are looking at weekly data from the cameras. We include data from our additional temporary monitors in the traffic displacement section of the report.

7.2 Vehicle compliance data for Bath CAZ

Figure 21: Vehicle compliance rates within the CAZ as a 7-day average. Please note the y-axis compliance rate starts at 50%.



Comments and key findings:

- 40,000 unique vehicles drive in the zone each day, on average (compliant, non-compliant, chargeable and non-chargeable vehicles)
- A vehicle is compliant when it meets the minimum emission standards for Bath's CAZ i.e., it's either euro 6 diesel, euro 4 plus petrol, hybrid, alternatively fuelled vehicles or an electric vehicle.
- Most vehicles in the zone are private cars, with 28,500 unique private cars seen in the zone each day during 2021. This equates to 71% of all vehicles.
- Private cars and motorbikes are not charged
- The percentage of chargeable non-compliant vehicles (as a percentage of all traffic) entering the zone each week fell from 6% in the launch week to 1% by the end of 2021.
- 1,146 non-compliant vehicles were seen in the zone, on average, each day, during March/April compared to 550 each day, on average, during December 2021, a decrease of 52%.
- Bus/coach compliance rose from 73% during the launch week to around 99% by the end of 2021. 109 individual buses/coaches were recorded, on average, in the CAZ each day during 2021.
- HGV compliance for vehicles weighing greater than 12T rose from 93% during the launch week to around 96% by the end of 2021. An average of 288 vehicles were recorded in the CAZ each day during 2021.
- HGV compliance for vehicles weighing greater than 3.5T but less than 12T rose from 86% during the launch week to around 96% by the end of 2021. An average of 119 vehicles were recorded in the CAZ each day during 2021.

- Taxi/PHV compliance rose from 67% during the launch week to around 93% by the end of 2021. An average of 385 individual taxis/PHVs were recorded in the CAZ each day during 2021.
- Van/LGV compliance rose from 63% during the launch week to 80% by the end of 2021. 3,143 individual vans/LGVs (compliant and non-compliant) were recorded in the CAZ each day (on average) during 2021.
- Rates of compliance are anticipated to continue to improve in the next year, particularly with respect to the supply of compliant LGVs which have been impacted most significantly by the pandemic.
- Compliance was supported through the government-funded financial assistance scheme and bus retrofit schemes, in addition to drivers upgrading outside of the schemes.

8. The impact of the CAZ on other measures

We committed to measuring the impact of the zone on the city of Bath, in terms of footfall, business, retail, public transport etc to understand any adverse or positive effects. The plan was published prior to the Covid pandemic and during the public consultations when we were potentially proposing a class C charging CAZ that would also charge private cars.

After significant consultation, a charging zone C (not charging private cars) was approved and the CAZ was launched five months later than planned in March 2021, more than a year into the Covid pandemic.

Please note: The following measures may well have been disproportionately affected by Covid-19 and many of our partners, providing data, have concluded that the effect of Covid is far greater than that of the CAZ. Nonetheless, we have considered each measure to assess the effect of the zone.

8.1 Retail, business, and office space vacancy rate

Vacancy figures for buildings within Bath are considered to assess whether the CAZ has had an impact on the number of businesses operating in Bath, with a view to ensure the economic impacts of the CAZ are not negative.

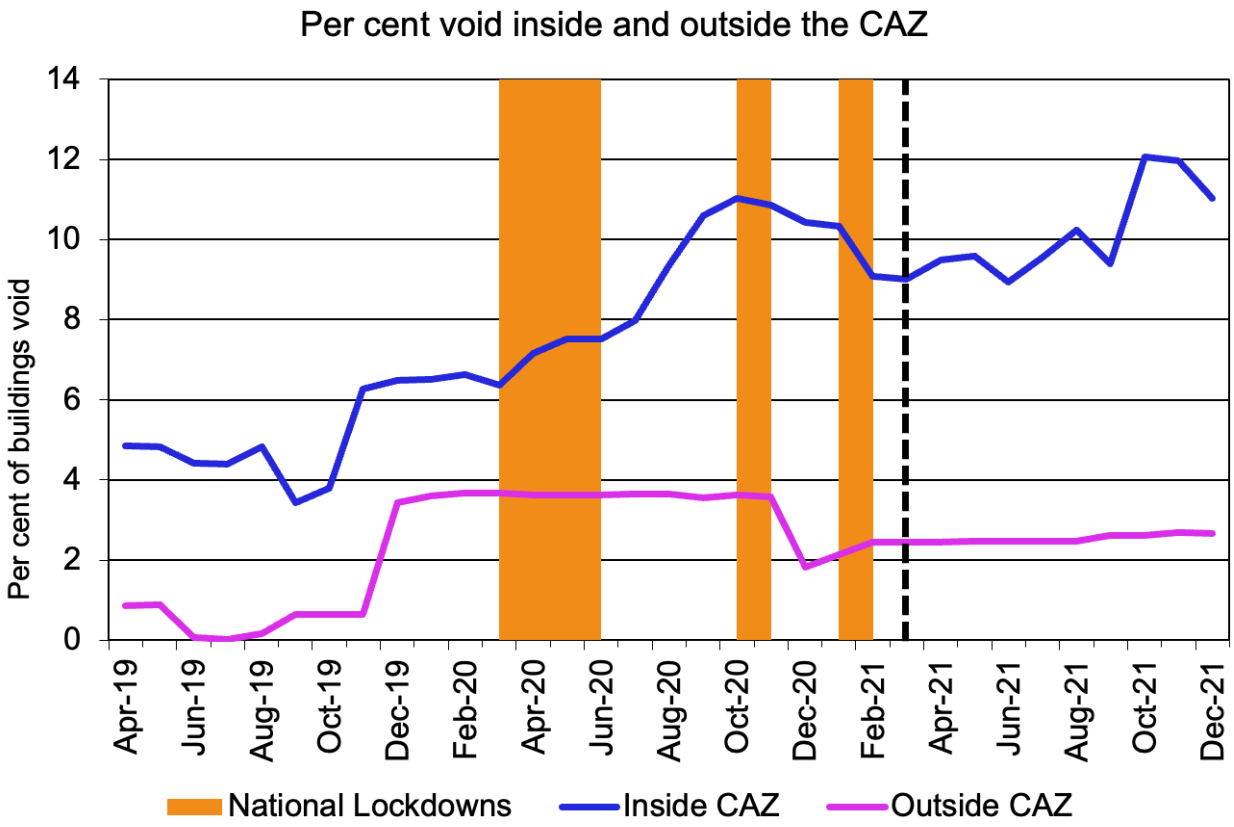
This data is continually collected by the Council's Property Services team, in relation to its own assets. Most of the Council-owned properties are within the CAZ.

The theoretical rent is the full amount the Council could collect if all the Council-owned properties were filled. In mid-2019 (pre-pandemic) the Council had a total theoretical rent of approximately £16,500,000 inside the CAZ and approximately £510,000 outside the CAZ. By mid-2021 these values had fallen to approximately £14,500,000 inside the CAZ and risen to approximately £540,000 outside the CAZ.

To add context to the general picture, rental values in the centre of Bath have dropped dramatically in the last few years, with rents now approximately 30-40% below what they were 5 years ago. The reason the theoretical rent has dropped is largely due to the impact of Covid, together with the move of some retailers to online retailing, reducing demand for business space in the centre of cities.

Figure 22 below shows the percentage of the Council-owned buildings which are vacant at a given time.

Figure 22: The percentage of Council-owned buildings vacant. The CAZ launch is shown by the dotted black line.



Comments and key findings:

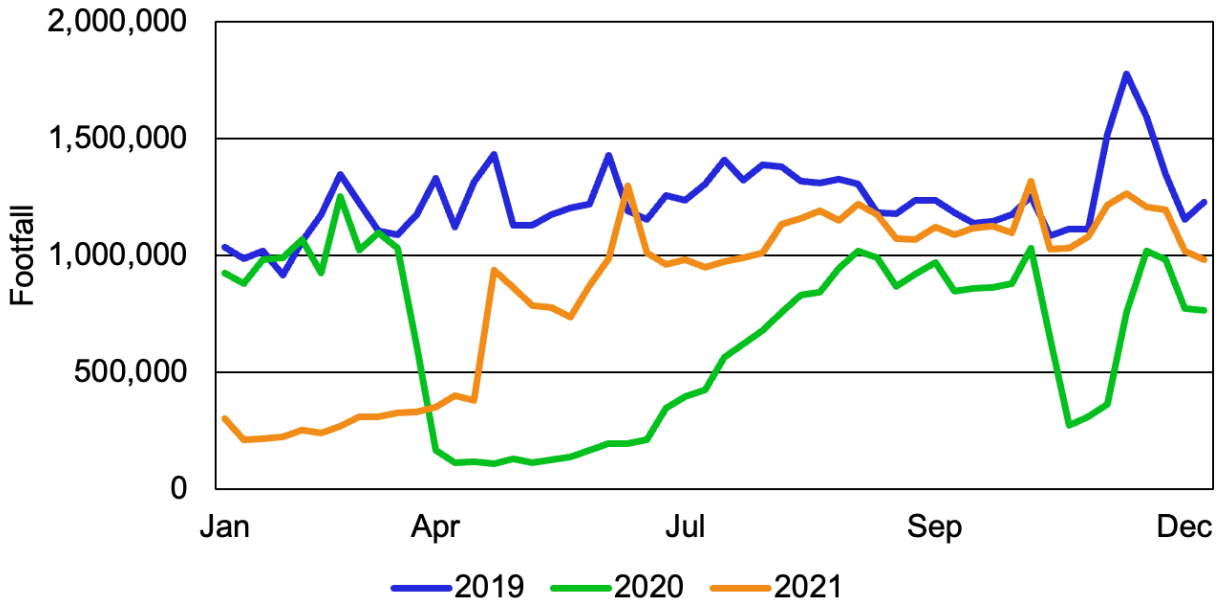
- The percentage of Council-owned buildings which are vacant within the CAZ has risen from 5% in mid-2019 to 11% by the end of 2021.
- The percentage of Council-owned buildings which are vacant outside of the CAZ has risen from around 1% in mid-2019 to 3% by the end of 2021, however there are fewer Council-owned properties outside of the CAZ.
- The recent increase in the vacancy rate can be attributed to Covid with a clear increase in the CAZ vacancy rate after the first lockdown.
- There was very little change in the vacancy rate inside or outside the CAZ within the first six months of the CAZ.

8.2 Retail footfall rates

Footfall data from Bath Business Improvement District (BID) has been analysed to understand the number of people in Bath. The data is collected by Bath BID and is not the Council's own data.

Figure 23 shows the total footfall in Bath from 2019 until 2022, from the following locations: Burton Street, House of Fraser (Milsom Street), Milsom Street, Northgate Street, Sawclose, Southgate Street. The three national lockdowns are highlighted on the graph.

Figure 23: Footfall data in Bath city centre from the Bath BID. Data is collected from the following locations: Burton Street, House of Fraser (Milsom Street), Milsom Street, Northgate Street, Sawclose, Southgate Street.



Comments and key findings:

- Prior to the pandemic in 2019, footfall figures remain relatively stable, with peaks associated with some holidays such as Easter and a more defined peak at Christmas.
- In 2020, there are three sudden drops in footfall, firstly a sudden and extended drop in April 2020 during the first lockdown; later in 2020, there is another drop around the Autumn lockdown; and finally, the last lockdown can be seen in early 2021.
- There are clear returns to higher footfall after each lockdown and by mid-2021, footfall had almost returned to pre-pandemic levels.
- It appears that people are keen to return to Bath City Centre and its businesses when restrictions are not in place.
- The Christmas boom in shopping seen in 2019, cannot be seen in 2020 and 2021. This may be related to Covid levels and restrictions being implemented around these times. Plus, there was no Christmas market with its significant marketing budget to promote the city.

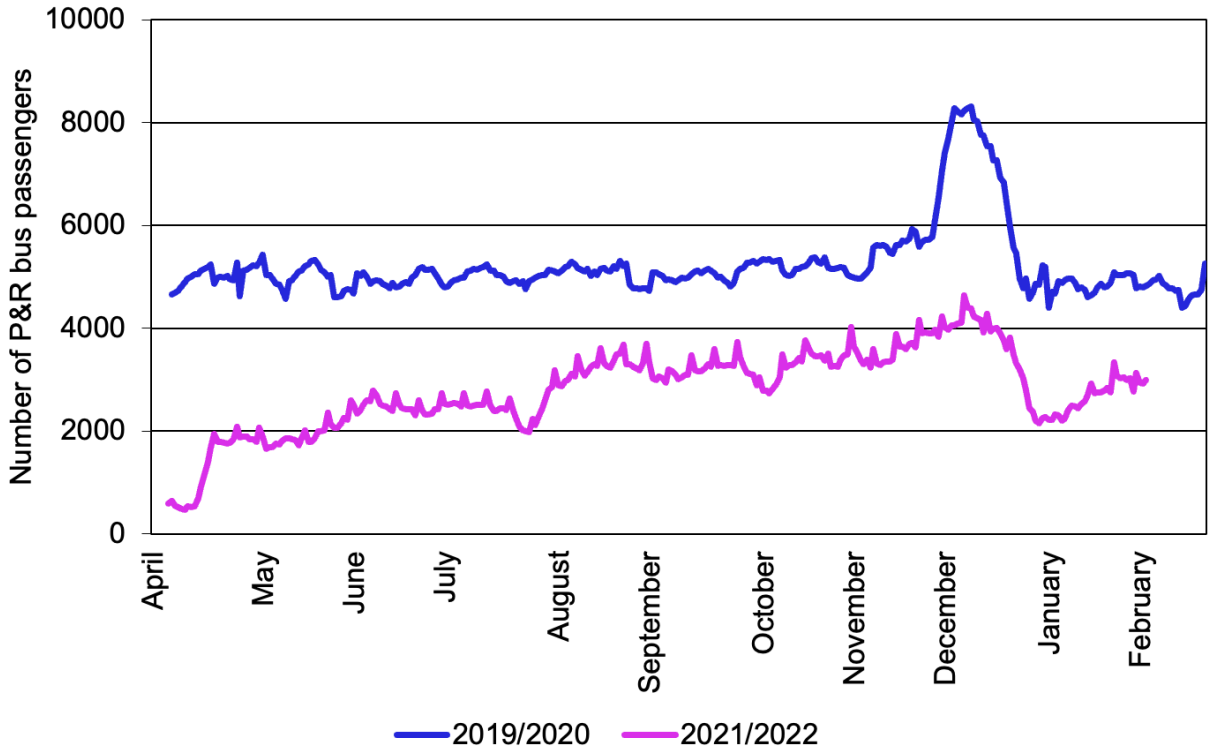
Bath BID VISA data shows that Bath has had a good post-pandemic recovery, and that the city is keeping pace, particularly around the food and drink sectors. Key factors could be Bath's outdoor appeal and the growth of outdoor eating spaces. There have been multiple campaigns aimed at highlighting Bath to UK visitors during the pandemic, for example, Rediscover Bath run by Bath BID in collaboration with Visit West, Visit Bath and Visit England.

As footfall figures remain high at the end of 2021, it is important to understand how people are travelling into the city and whether they are changing their habits as the pandemic is beginning to end.

8.3 Park and ride passenger rates

Park and Ride (P&R) data is collected by bus operators and contributed by WECA and shown graphically for 2019-2022 in Figure 24. The data is used to understand people's travel habits into the city of Bath. The P&R sites are located at Lansdown to the north of Bath (878 spaces), Newbridge to the west (698 spaces) and Odd Down to the south (1230 spaces). P&R can be an attractive method of travelling into Bath because of the price of parking being more expensive in the city centre than the P&R and because congestion can be an issue in the city centre.

Figure 24: Total daily Park & Ride bus passenger numbers for the three P&R sites in Bath: Lansdown, Newbridge and Odd Down. Note the figures are collected based on a financial year. The number of daily passengers has been smoothed in the figure to reduce the effect of weekday and weekend variation.



Comments and key findings:

- The average P&R bus ridership was stable throughout most of the year at around 5,000 daily passengers throughout most of 2019 prior to the pandemic, with an increase in people using the services around Christmas.
- The Covid pandemic clearly reduced passenger numbers with less than 1,000 riders per day after the third and final lockdown in Spring 2021.
- Ridership increased in 2021 but never returned to pre-pandemic levels, probably as people were still worried about Covid and more people were working from home.
- People taking the P&R in Winter 2021/2022 peaked at around 4,000 which is half that see in 2019/2020.
- In the Autumn and Winter of 2021/2022 people taking the park and ride averaged around 3,000 people daily.

While footfall data (Figure 23) has shown that Bath city centre has recovered from Covid, in terms of shoppers entering the city, the Park and Ride passenger numbers remain below what would be expected. This implies that people are not using the P&R as much as before and therefore travelling into the city via other means.

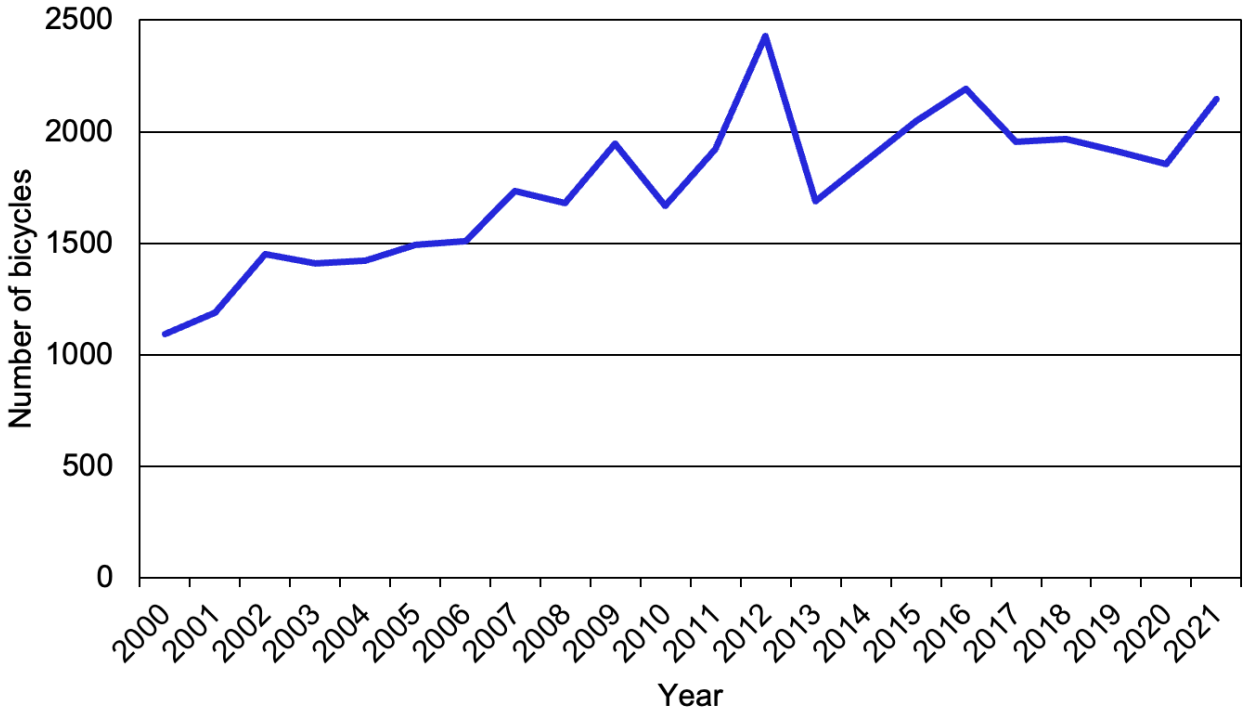
The Council aims to make Bath more attractive to people walking, cycling and using public transport. Alongside the CAZ, the Liveable Neighbourhoods scheme is working to reduce the dominance of cars on our roads and make our streets safer for walkers and cyclists.

8.4 Cycling counts

Cycling counts are collected by the Council to understand how people are travelling in Bath. Increasing active and sustainable transport is part of the wider Council strategy due to the associated health benefits of walking and cycling. The Council measures cycle numbers using a network of automatic traffic counters (ATCs) that can detect bicycles passing over them. Figure 25, below, shows the overall number of bicycles detected passing over eleven inner-Bath ATC sites.

Note: The data is from one day per year so can be significantly affected by bad weather.

Figure 25: Bath inner cordon bicycle count trend over the last 21 years.

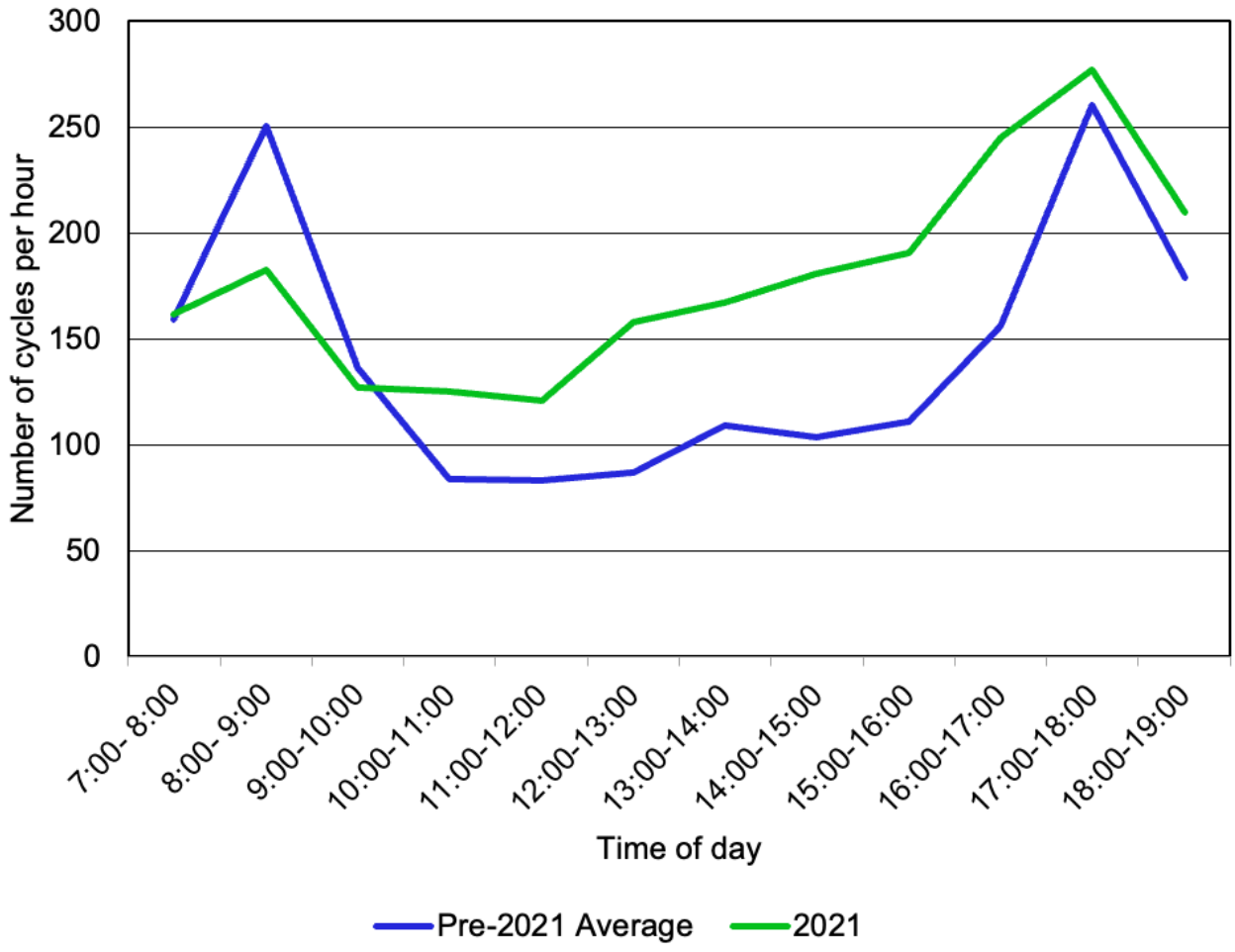


Comments and key findings:

- This survey is carried out on one day during the year so the weather can significantly change the number of people cycling that day.
- People choosing to travel by bicycle has increased in Bath since 2000.
- In 2021, more than double the number of bicycles were recorded compared to 20 years earlier.
- A peak in 2012 could be related to the London 2012 Olympics, which spurred interest in cycling around the UK.
- The Covid pandemic has boosted cycling with more people avoiding public transport modes.
- Schemes promoting active and sustainable travel are gaining traction across the country and in Bath, with Liveable Neighbourhoods as well as the CAZ promoting behaviour change.

Figure 26, below, shows the number of bicycles passing the same eleven ATCs but split over a day, to illustrate changes that occurred in 2021. The pre-2021 average is from 2000-2020 without 2014 and 2019 equating to an 18-year average.

Figure 26: Bath inner cordon bicycle count over the time of day. The pre-2021 average uses data from 2000-2020.



Comments and key findings:

- The pre-2021 daily spread of bicycles clearly shows a morning (8-9am) and evening (5-6pm) peak where rush hour existed.
- The hourly number of cycles in 2021 exceeds that of the pre-2021 average, except before mid-morning.
- The 2021 daily spread of bicycles retains both a morning and evening peak within the same time periods but both peaks are less pronounced, particularly the morning one.
- The lower 2021 morning peak would be consistent with more flexible working due to the Covid pandemic.
- Peak hours still exist in 2021 however the morning peak is diminished, potentially due to more people working from home.
- The evening peak in 2021 is less pronounced but there is a gentle increase in the number of bicycles from around midday implying that the commuting time has become more fluid, or people are travelling for different reasons such as shopping during the afternoon.

8.5 Bus usage rates

Now the scheme is operational, we have reviewed the available bus usage statistics and are unable to draw any meaningful conclusions. This is due to the absence of a pre-pandemic (2019) baseline and fluctuating numbers of operators. Additionally, this data includes journey data for trips across the whole of B&NES and not just into Bath.

8.6 Stakeholder feedback from council user groups

Ipsos Mori have produced an in-depth report investigating how the CAZ has affected people in deep-dive case studies.

8.7 Taxi fares and unmet demand rates

The taxi survey performed by the Council is only an indication of customer demand on Hackney Carriages and not the wider taxi trade. The last survey was carried out before the CAZ was introduced and the next survey is scheduled for 2023. No change in the number of Hackney Carriage licenses has been issued since 2015 and there will be no more changes until 2023 at the earliest. There has been no decrease in the number of licenses issued since 2015 and the cap is set at 125. The Hackney Carriage fares are reviewed annually and are determined by indices set from the Office for National Statistics. Our licensing team have suggested that the introduction of the CAZ has had no impact on the Council Hackney Carriage license numbers or fares.

8.8 Early measures fund – zero-emission vehicles parking permits

On 1 April 2019 we introduced a scheme to reduce the cost of parking permits for zero-emission vehicles. Discounts on the standard permit prices were available across a range of parking permit types. There was a total of 170 reduced price permits available each year for three years from April 2019. The number of zero-emission vehicle parking permits issued is outlined in Table 11, below.

Table 11: Number of zero-emission parking permits issued per financial year.

Year	Number ULEV permits issued
2019-2020	18
2020-2021	30
2021-2022	43

The number of permits issued grew each year, although never reached the total number of permits available. We expect growth in the local zero-emission market to continue and this will be beneficial for air quality.

Ultra-Low Emission Vehicles (ULEVs), which include hybrids, made up 5% of all private cars seen in the CAZ at around 1,500 per day of a total approximate 30,000 private cars. This number is growing.

8.9 Bus retrofit uptake and compliance rates

Traffic and air quality modelling prepared for the CAZ Final Business Case included the assumption that all scheduled public bus services would be compliant (euro VI) standard by its launch. At the time, 88 out of a fleet of 226 scheduled buses operating in Bath were non-compliant.

To prepare for launch, the Council secured government funds to support bus operators to upgrade the remaining 88 buses with engine emissions abatement technology as certified by the Clean Vehicle Retrofit Accreditation Scheme (CVRAS).

In autumn 2020, agreements were finalised with six bus operators to commence installation of the retrofit technology as soon as possible. In addition, two buses not operating as a public-registered bus service (Wessex Water) were upgraded (replaced with new Euro 6 buses). Some coaches were retrofitted through the Council 's financial assistance scheme.

Approximately £1.7 million was awarded towards grants to operators to retrofit buses operating on public registered bus services.

Comments and key findings:

- By the end of September 2021 (six months after the launch of the zone), 85 out 88 non-compliant buses operating as public buses in central Bath were successfully retrofitted with emission abatement technology.
- Preliminary reporting suggests that on average the NOx reduction for retrofitted vehicles exceeds the 80% target set as part of CVRAS and therefore the vehicles are operating in line with compliant/Euro VI standards.
- Overall, compliance for buses is close to 100% and the final three retrofits are scheduled for completion in spring 2022.

8.10 Financial support scheme uptake rates

To mitigate the impact of charges and further support air quality improvements, the Council has invested £9.4 million of government funds in a financial assistance scheme that offers grants and interest-free loans to businesses and individuals wishing to replace non-compliant, chargeable vehicles with cleaner, compliant ones.

Businesses and individuals could apply for funding to upgrade or retrofit the vehicle if they passed a basic eligibility test, proving that they travel at least two days per week on average in the zone over a 60-day period. Those passing the test could then apply for grants and/or interest loans via the Council's approved vehicle asset finance providers.

Table 12 below shows the number of vehicles that, by the end of December, were eligible to be replaced and the number of vehicles replaced.

Table 12: Vehicles eligible for the financial assistance scheme and the number of vehicles already replaced up to the end of December 2021.

Vehicle category	Number of vehicles eligible for FAS funding to upgrade/ retrofit	Number of vehicles upgraded by businesses using FAS funding at end of Dec 21
M1 (taxis or private hire vehicles as private cars are compliant)	150	91
M2 (minibuses)	4	2
M3 (buses and coaches)	21	21
N1 (light goods vehicles i.e., vans)	1346	594
N2; N3 (heavy goods vehicles <12T; HGVs >12T)	38	14
Total	1559	722

*The two minibuses upgraded were LGVs and so included in those figures, below.

Comments and key findings:

- By the end of 2021, 1,559 vehicles had passed basic eligibility tests, and 722 vehicles have already been replaced.
- 596 non-compliant LGVs (including 2 minibuses) regularly travelling in the zone and 91 taxis/PHVs have already been replaced through the scheme
- HGVs already have a higher compliance rate across the UK and in Bath and were therefore not a priority for the financial assistance scheme. However, 38 HGVs regularly travelling into Bath have been approved for finance and 14 have been replaced.
- Around 650 individuals and businesses have been supported through the scheme.
- At the end of December 2021, there were 119 active exemptions for vulnerable businesses that were eligible for finance but failed credit checks
- At the end of December 2021, approx. £4.8 million had been spent upgrading and retrofitting vehicles via the financial assistance scheme.

8.11 Travel advisor session uptake rates

The Council's team of Travel Advisors has been the main point of contact for people applying to the Financial Assistance Scheme (FAS). They work to provide information to people and support them through the FAS process.

During 2021, Travel Advisors contacted a total of 1,716 people, informing and guiding people through the CAZ Financial Assistance Scheme. They subsequently helped to fit 1,768 vehicles with telematic devices to establish eligibility for funding. A further 40-50 people submitted their own telematics data to the Council for analysis.

A total of 1,559 vehicles were deemed eligible for funding to upgrade or retrofit the vehicle, and at the end of 2021, a total of 722 vehicles had been successfully upgraded or retrofit through the FAS.

8.12 Anti-idling enforcement

Since the scheme was launched, the Council has been keen to maintain awareness around driver behaviour including the request not to idle engines, especially in locations where vulnerable people could be subjected to pollution, e.g., schools.

Bespoke signage has been developed and erected in locations of concern following engagement with local communities. After a review, the Council is adopting an educational, proactive approach and developing an online toolkit to enable material to be downloaded and used by residents and community groups.

8.13 Weight restriction enforcement

A webform for members of the public to report allegations of breaches of weight restrictions has been developed and officers within public protection are responding to complaints and carrying out proactive monitoring of roads carrying out weight restriction limits.

8.14 E-cargo scheme

The council hopes to encourage more sustainable delivery practices within the city to further support air quality improvements, tackle congestion, and help reach carbon neutral targets by 2030.

In 2021, the council secured £500,000 from the government to support the use of e-cargo bike deliveries within Bath. E-cargo bike couriers offer fast, zero-carbon deliveries for businesses who need to transport small-medium sized packages over a short distance. This delivery method offers businesses an affordable, eco-friendly alternative to fossil-fuelled deliveries made by vans.

The E-Cargo Bath scheme encourages businesses in Bath to trial deliveries with e-cargo bike couriers to reduce the number of vehicles on our roads.

The scheme hopes to inspire businesses to adopt e-cargo bike deliveries in the longer term and prove that sustainable delivery practices are cost efficient in comparison to traditional delivery methods.

Businesses in Bath can register their interest in the scheme online and are contacted if eligible. Travel advisors work closely with e-cargo bike operators and businesses to arrange a trial with an e-cargo bike courier. If the two-week trial is successful, there is opportunity to discuss longer subsidised trials to help businesses achieve a sustainable transition to e-cargo bike deliveries.

9. Conclusions

The high levels of NO_2 concentrations recorded in Bath present a public health risk that's not acceptable to the Council, or to central government. Any amount of pollution can be damaging to our health, but the more pollution you are exposed to, the greater the risk and larger the effect. Some people are more vulnerable to the impacts of air pollution than others. Those more at risk from air pollution include children, pregnant and older people; people with lung conditions such as asthma, chronic obstructive pulmonary disease (COPD) and lung cancer; and people with heart conditions such as coronary artery disease, heart failure and high blood pressure.

The Council is committed to reporting on the impact of the CAZ on air quality, traffic flow and vehicle compliance on an annual and quarterly basis so that we can monitor progress towards our target. This target is to reduce NO_2 concentrations to below the annual limit value of 40 µg/m^3 at all individual monitoring locations in Bath.

This report has set out related data and key findings from 2021, and, as highlighted in our summary, the trends are encouraging. Air quality is improving across the entire district, despite traffic returning to near pre-pandemic levels.

Post-Covid, Bath experienced the best economic recovery of any UK city, and this boost has been seen in footfall figures remaining high for the city centre. Despite this, bus usage figures have remained lower than those seen pre-pandemic meaning it is likely people are travelling into Bath by car. Changing behaviours and travel patterns associated with Covid-19 continue to affect people.

Air quality conclusions

Average nitrogen dioxide (NO_2) concentrations within the CAZ in 2021 are 21% lower than in 2019, representing a reduction of 7 µg/m^3. A reduction of 22% or 5 µg/m^3 was also recorded in the urban area outside of the zone.

Despite this improvement, annual average concentrations of NO_2 at three sites still exceed 40 µg/m^3. We will continue to monitor these sites closely. In 2019, 11 sites in Bath exceeded the limit value.

The fact that air quality is improving outside the CAZ shows that it is not negatively impacting other areas.

Every diffusion tube site within the CAZ recorded lower NO_2 concentrations compared to 2019. These results show good progress towards all sites soon meeting the annual limit value.

Traffic flow conclusions

Nationally, traffic flows have returned to pre-pandemic levels. Average traffic flows in Bath were 35% below pre-pandemic levels in January, but by the end of 2021 were 2-9% below pre-pandemic levels. Traffic outside of the zone's boundary did not increase compared to baseline figures.

A key commitment of the Council is to monitor any concerns arising from the introduction of the CAZ. In 2021, traffic flows were substantially impacted by the Covid-19 restrictions during the first half of the year, and the closure of Cleveland Bridge during the second half of the year. We are investigating several locations where the public has expressed concerns over a perceived increase in traffic in their communities since the zone's launch. These locations are outlined in Appendix 2.

Vehicle compliance conclusions

The CAZ is encouraging the purchase of new or second hand compliant, lower emission vehicles and discouraging motorists with polluting vehicles, with the desired effect of improving local air quality.

40,000 unique vehicles a day enter the zone, however 71% of these are private cars which are not charged. By the end of 2021, 550 non-compliant, chargeable vehicles were seen in the zone each day, compared to 1,142 per day during the first week of launch in March. This is despite the overall number of vehicles travelling in the zone increasing each week (from around an average of 32,500 per day in March to 43,000 in December 2021) as lockdown eased.

By the end of 2021 more than 720 of Bath's most polluting vehicles had been replaced or upgraded via the council's financial assistance scheme and more vehicles are being replaced by the scheme, and independently, each day.

Next steps

The significant reductions in NO_2 concentrations across the area are heartening but with three locations still exceeding the limit value, there is still work to do. We will be focusing our efforts on these areas in the coming months.

We would like to thank the public for their support and continue to urge all residents to do their bit by walking, cycling, or taking public transport whenever they can.

10. Monitoring Explained

10.1 Air Quality Monitoring Techniques

There are multiple methods whereby data on air quality is obtained.

Automatic Analyser

High-resolution measurements can be taken by automatic analysers that draw in ambient air. There are four of these instruments located within B&NES that are constantly monitoring air quality. The locations of the automatic analysers can be seen in Figure 2. One of the automatic analysers makes up part of the Automatic Urban and Rural Network (AURN) which feeds back to a national monitoring network. The data produced by these machines is compared with that of diffusion tubes to ensure accurate results.

Diffusion Tubes

Less expensive than automatic analysers, diffusion tubes can be located on existing street furniture. Due to the ease of deployment, hundreds of diffusion tubes can be located within a district building a picture of air pollution over a large area. Current locations of diffusion tubes can be seen in Figures 2 and 3. The tubes are exposed to ambient air for one month, before being sent to a laboratory for analysis. Data is then adjusted to consider laboratory or other inaccuracies before an annual mean is derived. Diffusion tubes are passive samplers and consist of a small plastic tube containing a chemical reagent called triethanolamine (TEA), in the case of NO_2 monitoring.

10.2 Traffic Monitoring Techniques

There are multiple methods whereby data on traffic flow and composition is obtained.

Automatic Number Plate Recognition (ANPR)

As part of the CAZ project, ANPR cameras were installed within and at entry/exit points to the zone, forming a cordon. The cameras focus on the numberplates of vehicles and then the vehicle information can be drawn from the DVLA database. Further useful data can be generated from matching entries into the system. For example, journey times through the CAZ.

Automatic Traffic Count (ATC)

Permanent Automatic Traffic Counters

As part of ongoing traffic monitoring, that was in place pre-CAZ, there are permanent ATCs at multiple locations in the district. Current locations of ATCs can be seen in Figure 8. These counters are built into the road and continuously monitor data on vehicle volume, speed and classification.

Temporary Radar Automatic Traffic Counters

To quickly respond to potential traffic displacement issues, it is important to have monitoring equipment that is ready to deploy at short notice. Temporary radar ATCs can be fastened to existing street furniture and monitor vehicle volume and speed.

Video Survey Equipment

Much like Temporary radar ATCs, video survey cameras are easy to install on existing street furniture, at short notice. These cameras do no record vehicle speed but do record vehicle volume and classification, which can be useful in cases where it is important to know the type of vehicles using a route. These cameras can be used to assess how many vehicles enter/ exit junctions, which can be important.

Manual Traffic Counts

At times, manual traffic counts are superior to automatic equipment. Enumerators can be employed to manually count vehicles passing a specific point.

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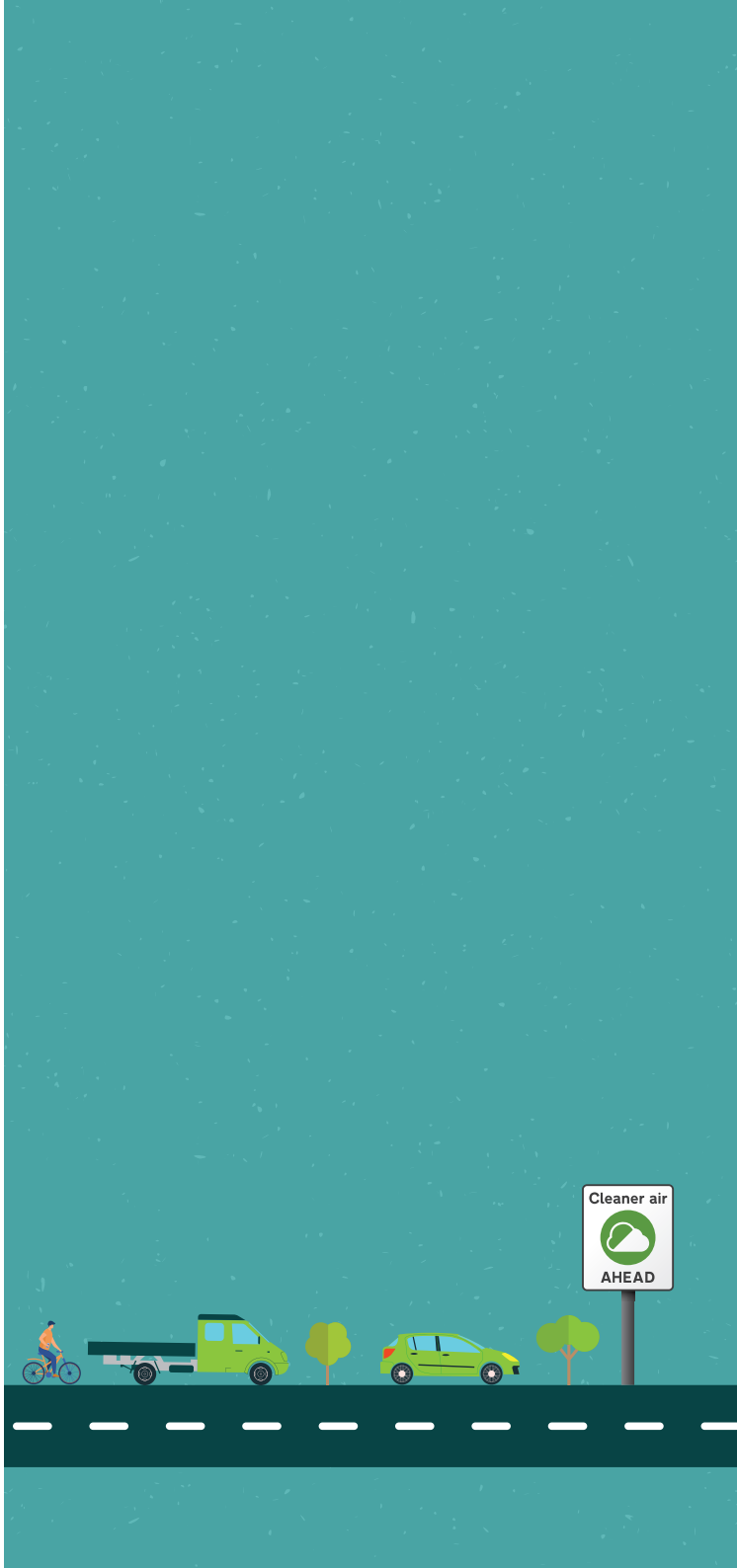
Bath's Clean Air Zone

Annual report summary 2021

Bath & North East Somerset Council

Improving People's Lives

Contents



Introduction

For years, several locations in Bath have suffered unacceptable levels of air pollution which has put people's health at risk, especially those with heart and lung conditions. The chief contributor is road traffic, responsible for up to 92% of the city's nitrogen dioxide (NO_2) concentrations.

In 2017, the government directed the council to drive down NO_2 to within legal limits in the 'shortest possible time' and by the end of 2021 at the latest.

The Air Quality Standards Regulations 2010 require that the annual mean concentration of NO_2 must not exceed 40 micrograms per cubic metre of air ($\mu g/m^3$). In Bath, however, we have witnessed annual mean NO_2 concentrations regularly exceeding 60 $\mu g/m^3$ in some locations.

Following the ministerial direction, we undertook significant technical work which showed that a charging clean air zone would be the only measure capable of driving the levels of behaviour change required to meet this target.

During 2018, we held several well-attended public consultations resulting in the council's decision to approve a class C charging clean air zone. We also secured sufficient funds from the government to install the zone and provide financial support to help local motorists replace their polluting vehicles.

The zone was launched on 15 March 2021, charging all higher emission vehicles to drive in the city centre. This excludes private cars and motorbikes which do not have to pay in a class C zone. A higher emission vehicle has a pre-euro 6 diesel or pre-euro 4 petrol standard engine.

caused by vehicle emissions

Government directs council to act in 'shortest possible time'

Summary of findings

Data collected from air quality monitoring stations in 2021 indicate that the zone is working to improve air quality across the city.

Compared with 2019 (our pre-Covid baseline year) we note the following:

- a decreasing trend in NO_2 concentrations at all sites in Bath
- a 21% reduction in annual mean NO_2 concentrations within the zone
- a 22% reduction in annual mean NO_2 concentrations in the urban area outside the zone
- 8 fewer sites exceeding the limit value of 40 µg/m^3 (as an annual mean).

In 2019, 11 sites in Bath exceeded the limit value for annual mean NO_2 concentration, reducing to three sites in 2021. These sites all show decreasing trends, but they remain a concern and are being carefully monitored.

Additionally, by the end of December 2021, we saw 50% fewer chargeable, polluting vehicles driving in the zone than we saw during the first week of launch (March 2021). The council's financial assistance scheme has contributed to this reduction, helping to replace around 720 polluting vehicles (regularly driven in the zone) with cleaner, compliant ones.

Covid-19 lockdowns and the temporary closure of Cleveland Bridge (June to November 2021), have had a significant impact on the volume and direction of traffic through the city, which means the impact of the zone alone on air quality remains inconclusive until further data is collected during 2022.

Our work is overseen by the government's Joint Air Quality Unit (JAQU) and experts are also independently verifying our work. We keenly await the outcome of the government's review of our Annual Report and associated data.

The zone is one of many council initiatives across the Bath & North East Somerset area that will help improve air quality, promote sustainable transport and tackle the climate emergency.

Other cities around the UK have also introduced zones, including Birmingham (Class D) and Portsmouth (Class B). More cities are introducing zones, with some likely going live in 2022/23 including Bradford and Bristol.

Our findings are explained in more detail on page 12-15 and in our full Annual Report.

Within the zone

Urban area outside of the zone

Air pollution in Bath

Air pollution is a leading public health risk with an estimated 28,000 to 36,000 deaths annually attributed to it in the UK[1]. A major source of poor air quality contributing to nitrogen dioxide (NO_2) pollution and particulate matter (PM) pollution, is road traffic.

Particulate matter pollution, referred to as PM_{10} or $PM_{2.5}$, is made up of tiny bits of material from all sorts of places including smoke from fires, exhaust fumes, smoking or the dust from brake pads on vehicles. These particles are too small to see, and we can breathe them in without noticing.

Nitrogen dioxide (NO_2) comes from burning fuels or other materials, so concentrations are especially high around roads. But they are also produced from home gas boilers, bonfires, and other sources. You cannot see or smell nitrogen oxides, but they mix with the air we breathe and are absorbed into our bodies. Vehicle exhaust emissions contribute 35 per cent of all UK nitrogen oxide emissions (NOx) which is the single greatest source[2].

Particulate matter pollution in Bath was not found to exceed legal limits and there has been a downward trend in levels in Bath since 2017. However, annual average nitrogen dioxide (NO_2) concentrations have regularly exceeded the legal limit of 40 µg/m^3 at several locations in the city, chiefly caused by vehicle emissions.

The problem is made worse by Bath's topography. The city sits in the bottom of a valley surrounded by hills, and its central roads are flanked by tall buildings. This means that in certain conditions vehicle emissions get trapped, causing high levels of NO_2 in certain locations. In general, areas outside of the city, even where traffic levels are high, do not experience such high levels of NO_2 because the pollution can disperse more quickly.

[1]Public Health England. Review of interventions to improve outdoor air quality and public health, 2019 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938623/Review_of_interventions_to_improve_air_quality_March-2019-2018572.pdf

[2]DEFRA. Air quality: explaining air pollution – at a glance, 2019. https://www.gov.uk/government/publications/air-quality-explaining-air-pollution/air-quality-explaining-air-pollution-at-a-glance

You cannot see or smell nitrogen oxides, but they mix with the air we breathe and are absorbed into our bodies.

trap emissions

How air pollution affects our health

Air pollution particles and gases enter our bodies and can damage our cells in different ways. They usually get into our lungs and can then move into our blood to reach organs such as our heart and brain.

Any amount of pollution can be damaging to our health, but the more that you are exposed to, the bigger the risk and the larger the effect on you and your family. Some people are more vulnerable to the impacts of air pollution than others.

Those more at risk from air pollution include children, pregnant, vulnerable and older people, including those with lung and heart conditions (such as asthma, chronic obstructive pulmonary disease, lung cancer, coronary artery disease, heart failure and high blood pressure).

Long-term exposure to air pollution is linked to premature death associated with lung, heart and circulatory conditions, while short-term exposure can cause asthma attacks and increase hospital admissions. Research shows that high levels of NO_2 can affect children's lung development and that children who grow up in highly polluted areas are more likely to develop asthma.

Clean air is important for everyone. It will alleviate stress on our health system, improve people's lives and make our society more equitable.

Worsens heart and lung conditions

in the UK per year

Why we need a charging zone

A charging clean air zone works by levying a charge on motorists with older polluting vehicles i.e., pre-euro 6 diesel or pre-euro 4 petrol vehicles. Both the inconvenience and the charge is designed to discourage motorists from driving in polluted areas (the zone) and speed up the natural replacement of polluting vehicles with cleaner, compliant ones that do not incur a charge.

Because excessive pollution in Bath is mostly caused by vehicle emissions, encouraging cleaner, less polluting vehicles is an effective way to quickly drive down pollution without restricting vehicle use in the city centre.

In Bath, the clean air zone was introduced alongside a financial assistance scheme which is helping local businesses and individuals to replace or upgrade polluting vehicles regularly driven in the zone.

The Euro 6/VI emission standard came into force in 2015 and has significantly reduced emissions, particularly for buses and coaches with larger diesel engines. A separate fund has supported bus companies to upgrade scheduled, higher emission buses to Euro VI standard.

Why we don't charge private cars

The two options capable of meeting the target set for us by the government were a Class D charging clean air zone (charging all higher emission vehicles including cars and motorbikes) or a Class C charging clean air zone (charging all higher emission vehicles, except private cars and motorbikes) alongside additional traffic management.

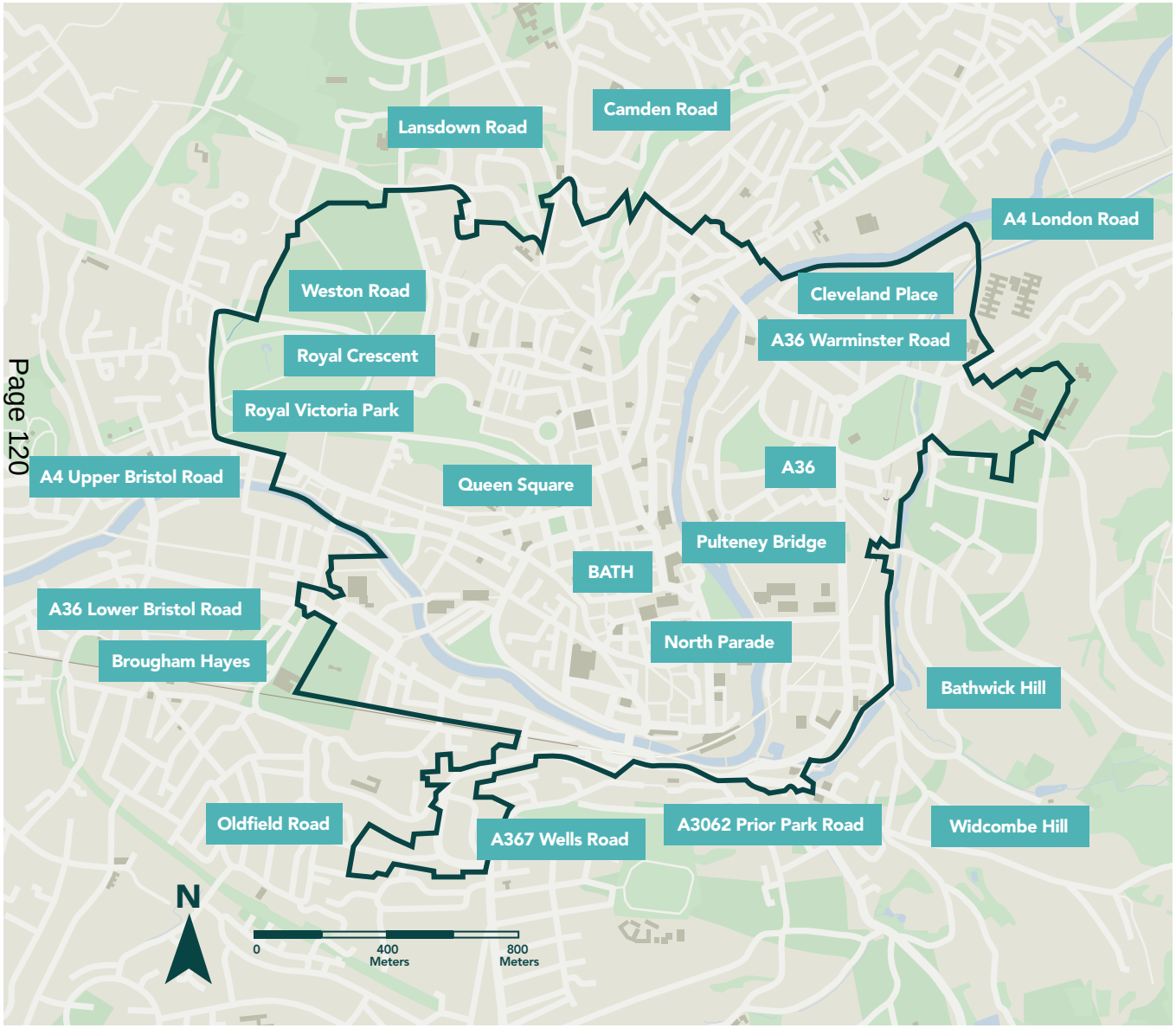
We engaged extensively with the public throughout 2018/19. The overwhelming opinion was that while we needed to tackle pollution, a class C CAZ would strike a better balance by tackling pollution while also protecting businesses and vulnerable residents that might be disproportionally affected by charging higher-emission cars.

Technical modelling suggested that we could achieve success with a Class C CAZ provided we also introduced traffic measures at Queen Square to address a particular NO_2 hotspot on Gay Street.

To further reduce emissions, the council was able to offer financial support to local businesses and individuals to help replace or upgrade many of the city's larger, more polluting vehicles.

The full business case for the CAZ was approved by central government in January 2020.

Zone boundary



The Clean Air Zone is as small as possible to minimise the social and economic impact of the scheme.

It's also designed to capture as many non-compliant vehicles as possible driving in the wider area to help tackle pollution both inside and outside of the zone.

How Bath's CAZ works

Bath's CAZ is a Class C charging clean air zone, which means that daily charges apply 24 hours a day, 7 days a week, 365 days a year to the following higher emission vehicles driving in the zone:

- Taxis, private hire vehicles (PHVs), vans (including pick-ups and N1 campervans), minibuses, and light goods vehicles (LGVs) - £9 per day
- Buses, coaches and heavy goods vehicles (HGVs) and private heavy goods vehicles (PHGVs) - £100 per day
- A discounted charge of £9 per day is also available for PHGVs, such as larger motorhomes and horse transporters, once registered with the Council.

Cars and motorbikes are not charged in a Class C CAZ, regardless of their emissions standard (except for taxis and PHVs).

A higher emission vehicle is any vehicle that does not comply with Euro 6/VI diesel or Euro 4/IV petrol emissions standards, and which is neither a compliant hybrid or a fully electric vehicle (ultra-low emission vehicle).

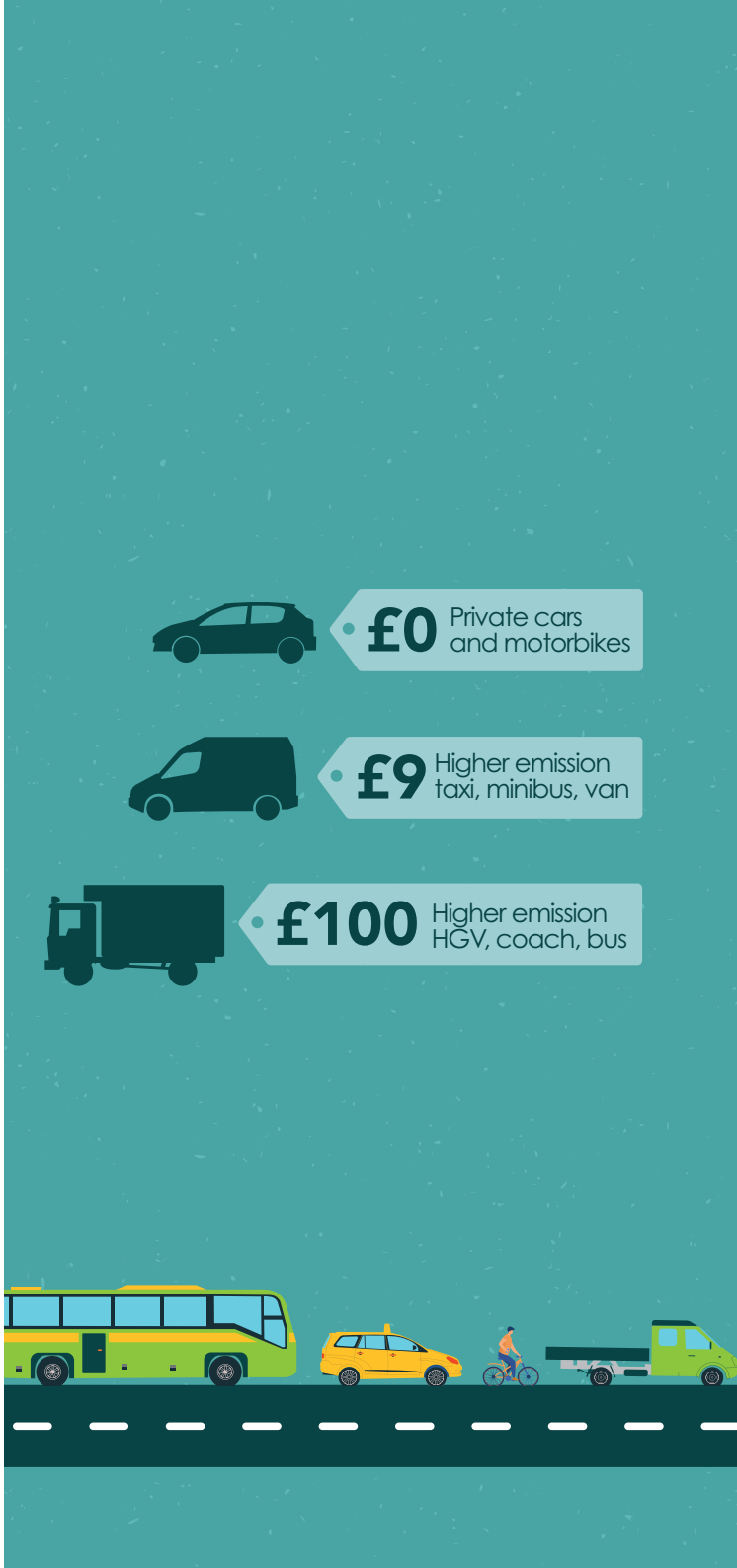
Motorists can use their registration number to check whether charges apply in any UK clean air zone by going to www.gov.uk/clean-air-zones

Exemptions

National exemptions apply permanently for ultra-low emission vehicles, hybrid and alternatively fuelled vehicles, disabled passenger tax class vehicles, disabled tax class vehicles, military vehicles, historic vehicles, and vehicles with retrofit technology accredited by the Clean Vehicle Retrofit Accreditation Scheme (CVRAS).

Local exemptions apply temporarily for two or four years (and for shorter periods) for certain vulnerable groups, hard-to-replace vehicles, and to encourage applications to the council's financial assistance scheme to upgrade or replace non-compliant vehicles.

For more information on local exemptions see www.bathnes.gov.uk/CAZexemptions



Financial assistance to upgrade or replace vehicles

£9.4 million of government funding was allocated to upgrade or replace polluting vehicles through the council's financial assistance scheme.

Eligible businesses and individuals could apply to the council's approved finance providers for interest-free finance (with a maximum repayment period of 60 months), plus grants of up to 35% of the net upgrade/replacement cost of the vehicle. They could also call on the support of a council advisor to assist them through the process.

To be eligible for the scheme, a local businesses or individual had to travel at least two days a week in the zone in a non-compliant chargeable vehicle and provide evidence of this using data from a telematic tracking device, fitted in the vehicle for 60 days.

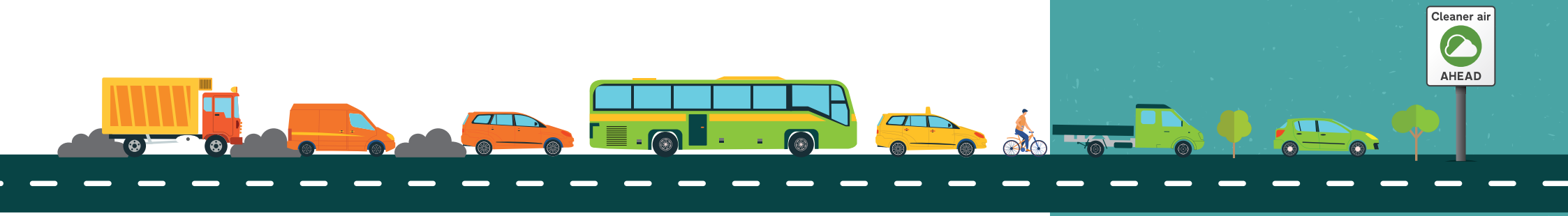
The scheme launched in November 2020 and by the end of 2021 it had helped replace 722 polluting vehicles with cleaner compliant ones. By the end of March 2022, 814 vehicles had been replaced. By the middle of 2022 we expect to see up to 1000 polluting vehicles replaced with the help of our scheme.

Supply chain issues have resulted in delays, so we are supporting drivers who have replacement vehicles on order with short-term exemptions. Vulnerable businesses and individuals with Euro 4 or 5 diesel vehicles who applied for and were eligible for finance, but failed the credit checks, were also eligible for an exemption.

"We are committed to supporting the CAZ - working together helps make our city a better place."
Centurion Travel

"Our CAZ compliant fleet has raised our environmental profile – helping us win new work."
Bath Property Maintenance

"Retrofitting our coaches through the scheme was a really cost effective way of increasing our fleet compliance - we are pleased our coaches can be used and not made redundant."
Berkley Coaches



How revenue from the zone is spent

Charges in the zone are designed to change behaviours rather than generate income for the council. The council's priority has been to inform people about the charge, deter polluting vehicles from entering the zone, and encourage those with chargeable, non-compliant vehicles regularly entering the zone to upgrade their vehicles with financial support.

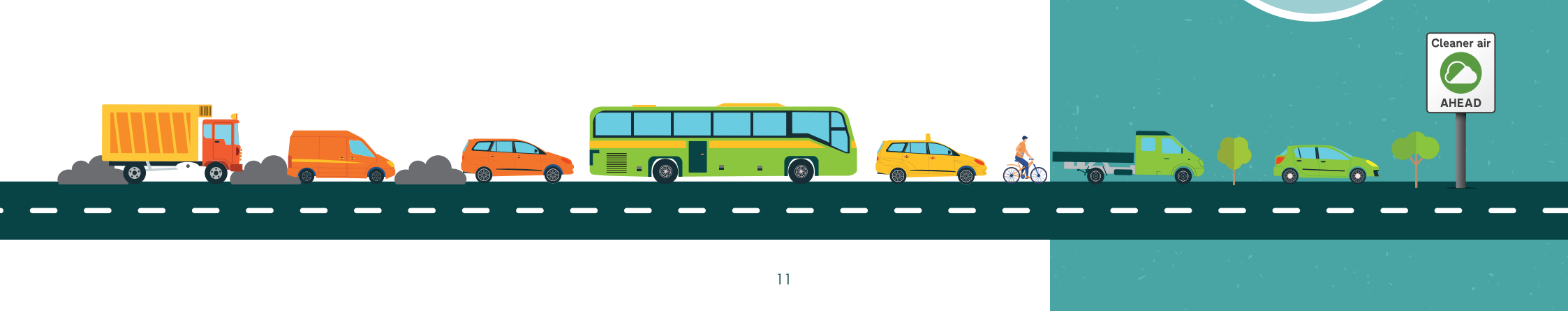
Revenue from charges and fines is used to pay for the running of the scheme. Any money made over and above this must be reinvested in sustainable transport projects.

Financial information on the zone is outside the scope of the Annual Report. However, in the first year of operation the zone generated £5.6 million from charges and penalty charges notices.

In Spring 2022, we took the decision to allocate £2.5 million of surplus revenue over the next two years to the West of England's Combined Authority (WECA) fund for sustainable transport improvements across the region.

£5.6m
from charges and penalties

£2.5m
surplus donated to sustainable transport improvements



Findings

The following sections highlight the main findings of the Annual Report looking at the zone's impact on air quality, traffic flow and vehicle compliance.

Covid-19 had an unprecedented impact on travel behaviour in 2020, so we draw on baseline data from 2019 to measure the effectiveness of the zone on air quality. We also use baseline data from 2017/18 to help us understand the impact of the zone on traffic flows. This is the latest year with sufficient comparable traffic count data.

For more information on how we measure and present the data please see the full report.

How we monitor air quality

We have measured NO_2, PM_{10} and $PM_{2.5}$ in Bath and North East Somerset since the mid-1990s. Four automatic analysers measure NO_2 and particulate matter in permanent roadside locations in Bath. Lighter, mobile diffusion tubes measuring only NO_2 concentrations are placed at 160 kerbside locations.

66 diffusion tubes are in the clean air zone, 57 in the city's urban area outside of the zone, and a further 40 in the wider district. 50 key sites with higher levels of pollution have three diffusion tubes at each location to improve data confidence.

For more information about air quality across the area go to: https://www.bathnes.gov.uk/services/environment/pollution/air-quality

The impact of Covid-19 and Cleveland Bridge

The impact of the Covid pandemic is far-reaching. We've seen significant changes to traffic composition, including reduced peak-time traffic in the mornings, a greater spread of traffic throughout the city across the day, and a sharp increase in e-commerce and home deliveries, with more vans driving in our neighbourhood streets.

From June 2021, Cleveland Bridge was closed to traffic for structural repairs, reopening to cars and smaller vans in November. It will not open to heavier vehicles, such as larger vans, HGVs, buses and coaches until the structural repairs are complete. The bridge normally carries around 17,000 vehicles per day that were diverted through the centre of Bath or, for heavier vehicles, onto the A36 Warminster Road and A4 Bath Road. Air quality has been affected across the city.

Air quality results

There are clear indications that the clean air zone is working to improve air quality across the area, not just within the zone.

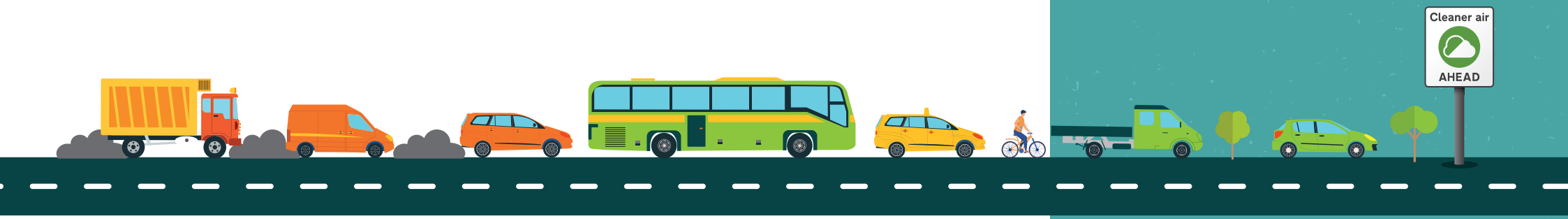
- All monitoring sites within and outside the zone saw an overall decreasing trend, with annual average NO_2 concentrations lower than 2019.
- Overall, the annual mean nitrogen dioxide (NO_2) concentration for 2021 in the zone is 21% lower than in 2019. This is an average reduction of 7 µg/m³*.
- The number of sites in the zone exceeding the legal limit value of 40 µg/m³ as an annual average fell from 10 sites in 2019 to 3 sites in 2021.
- Sites recording more than 40 µg/m³ as an annual mean are:
  - Walcot Parade 2: 43.1 µg/m³ in 2021 compared with 55.2 in 2019
  - Wells Road: 42.6 µg/m³ compared with 45.2 in 2019
  - Dorchester Street: 40.5 µg/m³ compared with 55.2 in 2019

- Overall, the annual mean nitrogen dioxide (NO_2) concentration for 2021 in the urban area outside the zone is 22% lower than in 2019. This is an average reduction of 5.5 µg/m³**.
- In 2021, no monitoring sites in the urban area outside the zone recorded an annual mean NO_2 concentration above the limit value of 40 µg/m³.
- Overall, the annual mean NO_2 concentration in the wider Bath and North East Somerset area is 18% lower than in 2019.

Some sites showed higher NO_2 concentrations as a quarterly average, but not as an annual average. Meteorological conditions (the weather) and local transport issues, such as diversions, influence pollution levels. Therefore, to determine trends and measure improvement, we always use annual mean (average) concentrations.

*This is the average reading from a total of 65 monitoring sites that recorded data in both 2019 and 2021, with at least 25% data capture at all sites.

**This is the average reading from a total of 56 monitoring sites that recorded data in both 2019 and 2021, with at least 25% data capture at all sites.



Traffic volume and flow results

Looking at traffic trends helps us understand the impact of the zone on traffic displacement and air quality.

The zone inevitably creates some traffic displacement because motorists with more polluting vehicles will seek to avoid it until they can upgrade or replace their vehicle. However, we monitor areas of concern to ensure that any displacement does not contribute to deteriorating air quality, safety, or amenity.

The closure of Cleveland Bridge and the impact of the Covid-pandemic on traffic flow means that we cannot draw clear conclusions on the impact of the zone on traffic displacement in 2021.

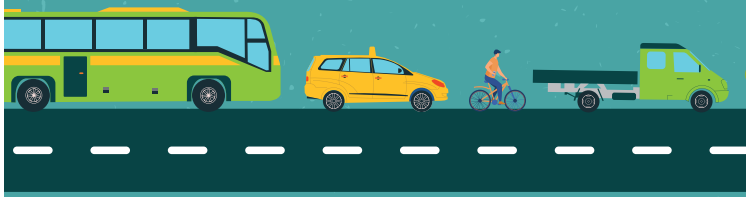
We use data from 2017/18 for comparing traffic flows, because there is insufficient data for periods in 2019.

You can find out more about the locations we are monitoring in our full report (Appendix 2)

- Nationally, traffic volumes returned to pre-pandemic levels by May 2021 at 101% of levels recorded before the first lockdown in February 2020.
- In Bath and North East Somerset, traffic levels are near to, but have not yet returned to pre-pandemic levels in any area.
- Compared to 2017/18, traffic volumes in 2021 were, on average, 13% lower within the zone, 12% lower in the urban areas outside the zone, and 15% lower in the wider B&NES area.
- The first half of 2021 saw significantly lower traffic volumes due to Covid-19 pandemic lockdowns. By December 2021, traffic in the zone had recovered to just below pre-pandemic levels.
- The work-from-home culture developed during the pandemic means traffic pattens have changed. There remains a morning and evening peak but the evening peak has reduced in intensity and is spread over more hours.
- The closure of Cleveland bridge significantly affected both the levels and direction of traffic from the end of June through November.
- Lighter vehicles could divert through the centre of town and past known NO_2 hotspots, and heavier vehicles along the A4 and A36.
- At sites where we monitor both traffic and air quality, there is indication that short term increases in traffic have caused air quality to deteriorate, despite an overall improvement at all sites when we look at annual mean concentrations.
- Chapel Row saw increased traffic volumes following the closure of Cleveland Bridge, coinciding with deteriorating air quality in the final quarter of the year.

An increase in e-commerce and home deliveries means we're seeing more vans on neighbourhood streets that are unlikely to be related to clean-air-zone avoidance.

We continue to monitor air quality and traffic flow



Vehicle compliance results

Charging clean air zones are designed to encourage people to replace older, polluting vehicles more quickly than they might otherwise.

To support motorists affected by charges and to further improve air quality, we introduced a generous financial assistance scheme worth £9.4 million to help local businesses and individuals replace polluting vehicles with cleaner, compliant ones.

Cars and motorbikes are not charged, regardless of emissions, and compliance rates are expected to improve naturally over the next few years.

A bus retrofit scheme, worth £1.4 million, was also introduced to encourage the upgrade of all scheduled buses in Bath to Euro 6/VI standard.

Compliance, or a compliant vehicle, means a vehicle that meets the minimum emission standards for the zone, which is Euro 6 diesel, a Euro 4 plus petrol vehicle, a compliant hybrid or an ultra-low emission vehicle.

Replaced by the end of 2021

Applied for financial support to upgrade/ retrofit

Driving in the zone by Dec 2021

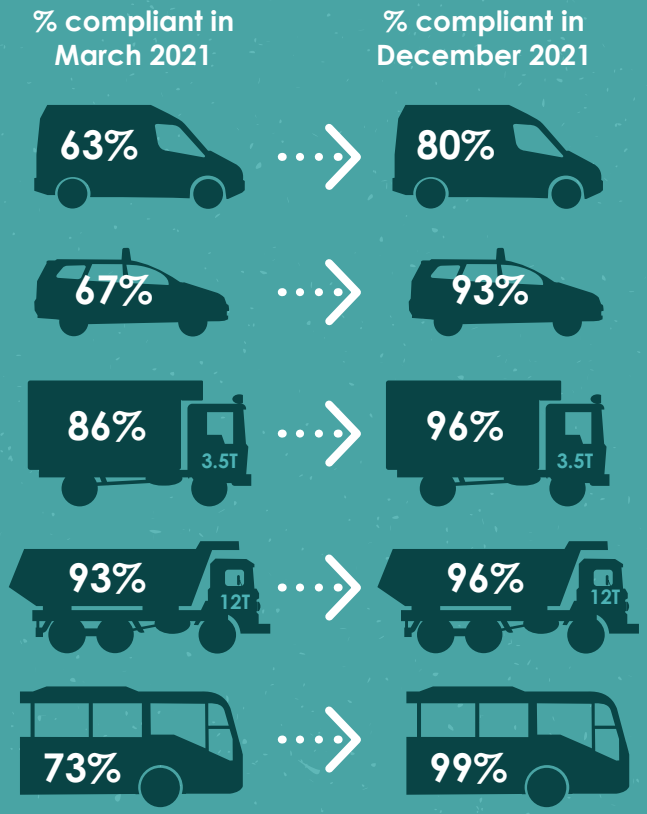
Key findings for fleet compliance as an impact of the zone and our mitigation/support are as follows:

- On average, 1,146 vehicles driven in the zone each day in March were non-compliant and chargeable. By December, this had halved to 550.
- Owners of over 1,500 vehicles applied for financial support to upgrade or retrofit their vehicle. 722 polluting vehicles were replaced by the end of 2021.
- We expect to upgrade 1,000 vehicles by the middle of 2022 through our financial support scheme. Delays are due to supply chain issues.
- 594 polluting vans have now been replaced with cleaner, compliant ones via the council's financial assistance scheme (with hundreds more replacements expected in the coming months).
- 91 polluting taxis/private hire vehicles have now been replaced with cleaner, compliant ones via the council's scheme.
- 22 non-scheduled, polluting buses and coaches have now been replaced via the council's scheme.
- Out of a total fleet of 226 scheduled buses, 88 were non-compliant when the bus retrofit programme started. By the end of December 2021, 85 of these had been successfully retrofitted to Euro VI standard. Three vehicles await a retrofit solution due to a shortage of parts.
- 14 non-compliant, chargeable HGVs have now been replaced via the Council's scheme (HGV compliance was already high at up to 93% compliance at the launch of the zone).

Driving in the zone each day

Travelling each day in the zone are cars

% improvement in compliance by vehicle type



Next steps

We are heartened to see air quality improving across the area and we would like to thank the public for its support, but we recognise that there is still more to do to drive down pollution at all locations in Bath.

- We await the government's review of our annual report and recommendations, now due autumn 2022.
- We will continue to operate and enforce a class C clean air zone and monitor air quality, traffic flow and vehicle compliance.
- We'll pay particular attention to sites that continue to exceed legal limits and consider specific initiatives to help.
- We will re-open our financial assistance scheme to encourage more businesses to upgrade or replace their vehicles.
- We will continue to promote long-term, sustainable habits around transport and private car use in line with the council's Journey to Net Zero policy.

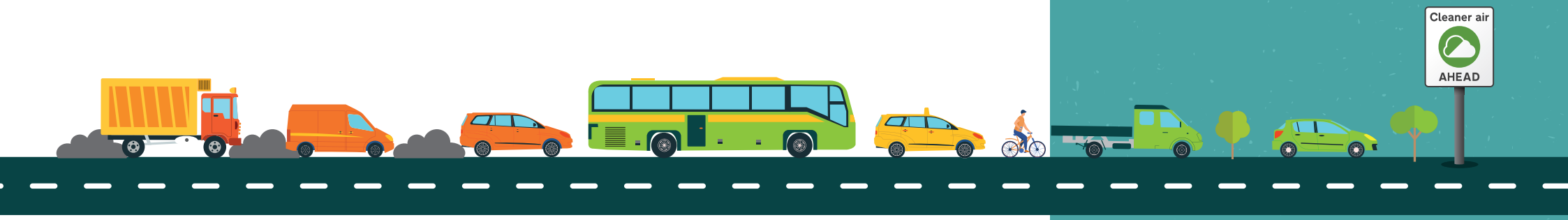
How you can help

There's lots you can do to help us drive down pollution in Bath.

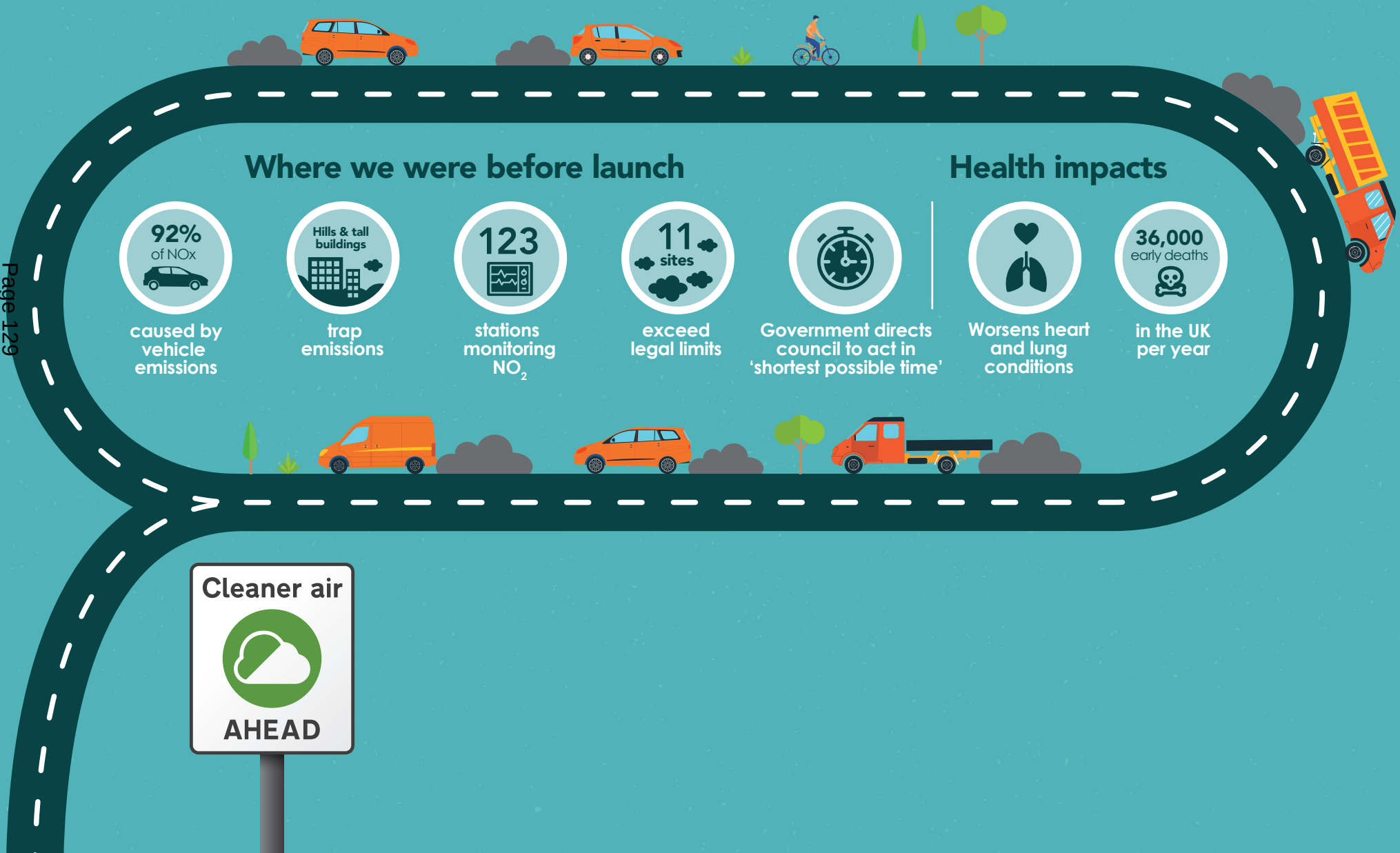
- Walk or cycle your short journeys in the city
- Consider taking public transport or using the park and ride
- When you replace your vehicle, consider a new or second-hand Euro 6 or 6d diesel vehicle, a compliant petrol vehicle, or an ultra-low emission vehicle
- Consider car-clubs and car-shares.

Further reading

- The Annual Report (in full) is available here.
- Additional information is available in the Cabinet Report, due July 2022.
- Read more information on the zone and how it works at www.bathnes.gov.uk/BathCAZ
- Read more about our Journey to Net Zero



Where we were



What we did

What we did

- **8,000** responses — to public consultation
- **Class C** — Charging CAZ approved

Support for those affected

- **£9.4m** — to upgrade vehicles
- **Exemption scheme** — to support vulnerable groups
- **£1.7m** — Bus retrofit scheme

Launch of the zone

- **15 March 2021** — Zone launched
- **128** Cleaner air AHEAD — New signs
- **68** — ANPR cameras

£0 Cars and motorbikes

£9 Higher emission taxi, minibus, van

£100 Higher emission HGV, Coach, Bus

Cleaner air AHEAD

Week 1 of Bath's CAZ

- **40,000** unique vehicles — Driving in the zone each day
- **71%** private — no charge
- **6%** polluting — charged

On the right path..

- **720+** Polluting vehicles — Replaced with clean, compliant ones
- Chargeable vehicles in zone falls
- **85** — Scheduled buses upgraded

Improvement in compliance

- 86% to 96%
- 73% to 99%
- 63% to 80%
- 67% to 94%

Cleaner air AHEAD

Improvements

Air quality improvements

2021 post covid*
Traffic returns to near normal levels

21%
Air quality improves (inside and outside zone) **

8 more sites
now record NO_2 under legal limit

3 sites remain a concern
but show improvements

We continue to monitor air quality and traffic

£ surplus CAZ revenue
will be invested in sustainable transport

Help us on our journey

Most vehicles in Bath are cars

60% of car trips
start and end in Bath

To help, please walk or wheel short trips

2+
Consider using car-share or electric vehicles

Consolidate your deliveries

*Annual average compared with 2019 (pre-Covid)
** compared with baseline year, 2019

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Bath's Clean Air Zone
Appendix 1

Bath & North East Somerset Council

Improving People's Lives

Appendix 1: Measuring the impact of the CAZ – Reporting timeline

Table 13 below is taken from the Monitoring and Evaluation Plan in the Full Business Case for Bath's Clean Air Plan and identifies the data that's required to measure the impact of Bath's Clean Air Zone on specific areas, the rationale for including it, how the data is collected and at what frequency.

Table 13 - Data collection and collation as planned from the Monitoring and Evaluation Plan.

Measure	Data to be Used	Rationale for Inclusion	Data Collection Methods	Frequency of Data Collection
M1: Air quality data	NO_2 concentrations data collected at existing monitoring locations in Bath and wider B&NES	To understand changes in air quality data, particularly NO_2 concentrations.	Diffusion tubes and real time monitoring	Baseline (pre-scheme) then continuous monitoring.
M2: Traffic Flows	Traffic Flows in and around the CAZ areas will be collected to understand the changes in traffic flows as a result of the scheme.	To understand changes in traffic flows along key corridors and links on the highway network. This will include possible 'rat-run' routes which may have been created by the CAZ, so responding to consultation concerns by residents in specific areas.	ANPR cordon and ancillary Manual Classified Counts (MTC) or Automated Traffic Counts (ATC) on key roads or perceived 'rat-runs'	Baseline (pre-scheme) then continuous monitoring.
M3: Vehicular fleet information	Number of compliant/ non-compliant vehicles travelling within Bath	To understand changes in the type of vehicles travelling in Bath.	ANPR cordon, cross-referencing with DVLA vehicle database	Baseline (pre-scheme) then continuous monitoring.
M4: Retail/business/ office space vacancy figures	Vacancy statistics from internal council data (B&NES economy and growth team). Market data from property consultants. Purchasing Managers Index.	To understand changes to the number of businesses operating in Bath in order to assess economic impacts.	Internal data collection as part of ongoing process. Regular property market reports published by property consult-ants in the public domain could also be utilised.	Baseline (pre-scheme) then annually.

M5: Retail footfall surveys	Footfall data from Bath Business Improvement District data and internal council data.	To understand changes to the number of people entering shops in Bath as well as the time they spend in each shop.	Bath BID and B&NES collect this data as part of ongoing processes.	Baseline (pre-scheme) then annually.
M6: Park and Ride passengers data	Occupancy statistics (Cloud Amber) and bus ticket data (First). Monitor fleet mix	To understand changes in the number of people and the type of vehicle using the P&R into Bath.	Collected as part of ongoing monitoring activities by operators. ANPR at entrance to Park and Rides	Baseline (pre-scheme) then biannually.
M7: Walking and cycling counts	Pedestrian and cycle counts on key arterial routes	To understand changes in the number of people walking and cycling on key routes within Bath.	Commissioning of new surveys	Baseline (pre-scheme) then annually.
M8: Bus usage and fare data	Occupancy statistics (Cloud Amber) and bus ticket data (First).	To understand changes in the number of people using the bus on each route into Bath.	Collected as part of ongoing monitoring activities by operators.	Baseline (pre-scheme) then annually.
M9: Stakeholder Feedback from Council User Group Forums	Stakeholder Feedback covering relevant elected members, stakeholder groups, the LEP. Voice Box survey. Protected groups survey.	Understand the views of stakeholders to scheme delivery and impacts, and to understand some of the less quantified effects, including package effects.	Part of the on-going consultation process for transport strategies in the City.	1, 3, 5 years after scheme opening.
M10: Taxi fares and unmet demand	Taxi fare data and unmet demand surveys	To understand changes to fares and demand on taxis in order to assess the economic impacts	Collected as part of ongoing monitoring activities by operators.	Baseline (pre-scheme) then annually.
M11: Early Measures Fund - ULEV Parking Permits	Statistics on ULEV scheme uptake	To understand the popularity	Collected as part of the parking permit scheme operation	Baseline (pre-scheme) then biannually.
M12: Bus retrofit uptake/ compliance data	Statistics on bus retrofit scheme up-take and bus compliance	To understand changes to bus fleet operating in Bath.	Collected by ANPR cameras, as part of ongoing monitoring activities by operators and from the retrofit scheme	Baseline (pre-scheme) then biannually.

M13: Financial support scheme uptake	Statistics on financial sup-port scheme uptake	To understand the success and popularity of the financial support schemes in changing to compliant vehicles	Collected as part of the financial support scheme operation	Biannually after scheme roll-out.
M14: Travel advisor session uptake	Statistics on meetings with travel advisors	To understand the overall success of travel advisors and	Collected as part of the travel advisor scheme operation	Biannually after scheme roll-out.
M15: Anti-idling enforcement	Data from enforcement action for anti-idling	To understand the success of the measure in reducing idling	Collected as part of the anti-idling enforcement scheme operation	Biannually after scheme roll-out.
M16: Weight restriction enforcement	Data from enforcement action for anti-idling	To understand the success of the measure in enforcing weight restrictions	Collected as part of the weight restriction enforcement scheme operation (from Trading Standards)	Biannually after scheme roll-out.
M17: Delivery and servicing plans uptake	Statistics on delivery and servicing plans uptake	To understand the success of the delivery and servicing plans measure with businesses	Collected as part of the de-livery and servicing plans operation	Biannually after scheme roll-out.

Bath's Clean Air Zone
Appendix 2

Bath & North East Somerset Council

Improving People's Lives

Appendix 2: Investigating traffic displacement concerns

The purpose of Bath's Clean Air Zone is to reduce air pollution and improve vehicle compliance in line with minimum emission standards, while minimising the impact of the CAZ on normal traffic flows in and around Bath.

Traffic flows have been substantially impacted by the Covid-19 lockdowns in 2020 and are now returning to pre-pandemic levels[1] and in the case of LGV's and HGV's, exceeding pre-pandemic levels . Data gathered from permanent automatic traffic counts in and around the zone tell us that in 2021, general traffic flows across a 7-day week were down by 12% in the urban area outside of the zone, and down by 15% in the wider B&NES area, compared with 2017/2018 (our baseline years).

Additionally, as published within the Central Evaluation Report produced by Ipsos UK, it was further found that there *is no significant deviation in the weekday traffic flow trends (incrementally increasing January to July 2021) at any of the eight ATC sites, whether outside the CAZ (three sites) or within (five sites). This suggests the CAZ launch had a minimal impact on the aggregate level of traffic inside and outside the CAZ area*[2]*.

A key commitment for the council is to monitor any concerns arising from the introduction of the CAZ, so we are investigating 17 discrete locations where the public has expressed concern over a perceived increase in traffic in their communities since the zone's launch. In addition, we have provided extra permanent ANPR cameras to monitor traffic flows and fleet composition through Bathampton where the community expressed concerns about potential displacement during the development of the Full Business Case.

Traffic modelling was completed at the Full Business Case stage of the CAZ. This modelling provided a forecast on how the scheme may affect the volumes of traffic in Bath once a charging CAZ was introduced. Where applicable within this appendix, we refer to the modelling forecast when making comments about monitoring outcomes. The Transport Modelling Forecast Report can be accessed using the following link: https://beta.bathnes.gov.uk/sites/default/files/2020-10/appendix_evi_674726.br_.042.fbc-17_t4_transport_model_forecast_draft.pdf

The areas of concern, and what we're doing to log, investigate and monitor these are listed in the figures and table below. The work is ongoing and will be updated in subsequent reports.

In terms of air quality, we report the nearest diffusion tube data for the area in question, to understand the local air quality situation. The legal limit for annual average NO_2 pollution is 40 µg/m^3. To ensure compliance with the Ministerial Direction, we are generally concerned with any site where NO_2 concentrations are currently over 36 µg/m^3, to ensure that they don't breach the 40 µg/m^3 limit as an annual mean.

Throughout this report we mention the traffic volumes during AM-peak, PM-peak, and inter-peak times. The AM peak refers to the hour where the highest volume of traffic occurs during the morning. The PM-peak refers to the hour where the highest volume of traffic occurs during the evening, the inter-peak period is between these two times.

[1] Office for National Statistics. Economic activity and social change in the UK, real-time indicators, 2021. https://www.ons.gov.uk/economy/economicoutputandproductivity/output/bulletins/economicactivityandsocialchangeintheukrealtimeindicators/23september2021

[2] Department for Environment, Food and Rural Affairs. Evaluation of local NO_2 plans, 2022. http://randd.defra.gov.uk/Default.

Additionally, traffic volumes are often averaged using both a 5-day and 7-day average. A 5-day average has been calculated using the volumes recorded Monday-Friday (weekday). A 7-day average has been calculated using all seven days of the week.

Throughout this report we also reference a range of monitoring methods, the following bullet points outline these methods and the data that they provide.

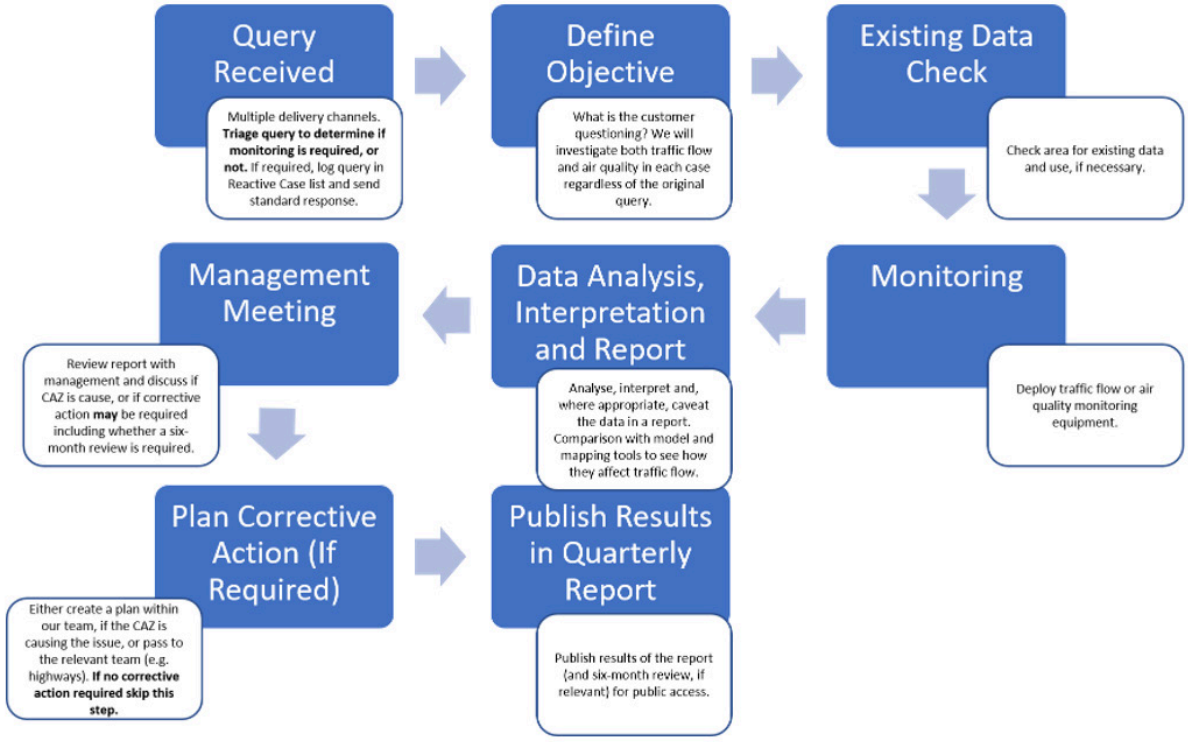
- **Temporary Radar Counter**- Records the volume of traffic only. No speed or classification data is available.
- **Temporary Automatic Traffic Counters (ATC)**- Records the volume and speed of vehicles. The classification is also recorded however, this is based on axle-distance so is not always accurate, particularly when classifying cars/vans and small HGVs
- **Temporary automatic number plate recognition camera (ANPR)**- ANPR cameras can accurately record the volume and classification of vehicles. In addition, the compliance status of the vehicle can also be determined by the vehicle's registration number., i.e. whether a vehicle is of Euro 6 diesel or Euro 4 petrol standard.

*Traffic flow data is published in the CAZ Annual Performance Report 2021 accompanying this appendix. Due to unprecedented changes in travel behaviour during the Covid-19 lockdowns, we are discounting data from 2020 for comparison purposes. In 2019 there was insufficient data collected for comparison purposes, and 2017 has also been used where months within 2018 were unavailable.

How we're investigating possible traffic displacement

Since the launch of the CAZ in March 2021, we have logged and investigated comments from residents about potential CAZ-related impacts. Figure 1 shows the process for following up and investigating these queries.

Figure 1: Process for following up and investigating traffic displacement concerns



The following summary table provides an update on the locations of concern that are within this appendix and the status of the case regarding the monitoring we have completed.

Location of Concern	Status of case
Whiteway Road	Ongoing monitoring required
Lansdown Lane	Ongoing monitoring required
Oldfield Park (Lyndhurst Road)	Ongoing monitoring required
Charlcombe Lane	Ongoing monitoring in progress
Upper Camden Place	Review required after the full reopening of Cleveland Bridge
Southdown Road	Monitoring complete- no displacement issues confirmed
Old Newbridge Hill	Monitoring complete- no displacement issues confirmed
Twerton High Street	Ongoing monitoring in progress
Shophouse Road	Ongoing monitoring required
Rosemount Lane	Monitoring complete- no displacement issues confirmed
Sham Castle Lane	Monitoring complete- no displacement issues confirmed
Prior Park Road	Monitoring complete- no displacement issues confirmed
Bradford Road and Brassknocker Hill	Review required after the full reopening of Cleveland Bridge
Penn Hill Road	Monitoring complete- no displacement issues confirmed
Englishcombe Lane	Ongoing monitoring required
Norton St Philip	Monitoring complete- no displacement issues confirmed
Cavendish Road	Ongoing monitoring required

Locations in the vicinity of Whiteway Road, Lansdown Road and Oldfield Park have been regularly monitored in response to concerns about potentially displaced traffic since the launch of the CAZ in March 2021. Within this appendix, we have provided detailed information on the recent temporary ANPR monitoring which took place in these locations, the outcomes of this monitoring and how it compares to our previous investigations.

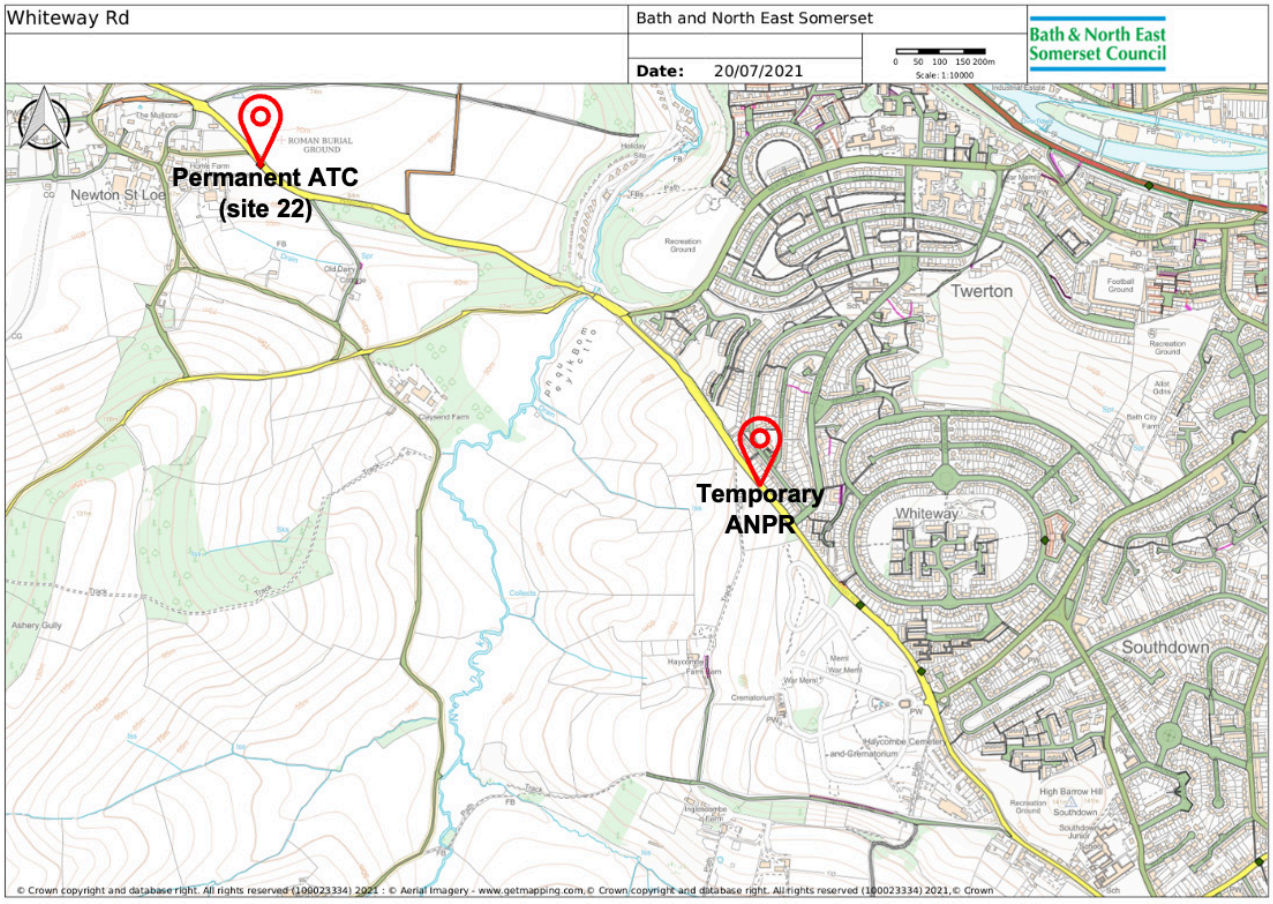
1.Whiteway Road ANPR report

Site Locations

Figure 2 shows the permanent ATC location on Pennyquick Hill along with the temporary ANPR location on Whiteway Road. Temporary ANPR surveys were deployed, and data used in this analysis were from the following dates:

- 2021 ANPR Survey- 25/09 – 1/10
- 2022 ANPR Survey- 25/04 – 01/05

Figure 2



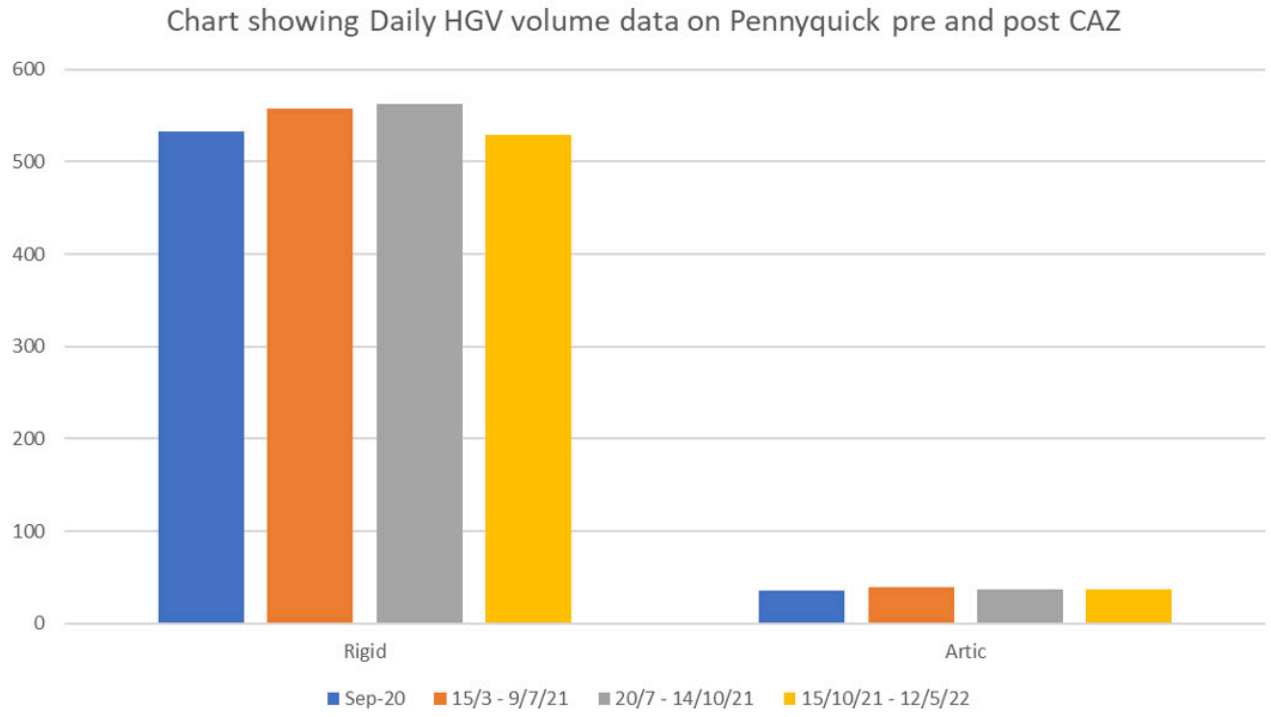
HGV Analysis

Vehicle classification data from Site 22 has been analysed from the following time periods:

- September 2020- this has been used as a pre-CAZ implementation baseline for HGVs. National data has shown that HGV volumes are at or exceeding pre-pandemic volumes.
- 15th March to 19th July 2021- used within first survey
- 20th July to 14th October 2021- used within second survey
- 15th October to 12th May 2022- used within the latest survey

Figure 3 presents the findings of analysis from the permanent ATC on Pennyquick Hill, note that September 2020 is the baseline period.

Figure 3



When compared to July-October 2021, the data for October-May 2022 has shown a 6% decrease in rigid HGVs, with articulated HGVs remaining the same. Furthermore, overall HGV volumes in the most recent survey period are very similar to the September 2020 baseline. This indicates that there has been no increase in HGV volumes on Whiteway Road as a result of the CAZ.

In addition, the data shows that as a percentage of overall traffic volumes, HGVs accounted for 4.5% of all traffic in September 2020, compared to 4.2% in the two most recent monitoring periods.

Analysis of compliant and non-compliant vehicles

Using the following categorisation method, we have been able to determine whether vehicles travelling along Whiteway Road are classified as compliant or non-compliant. Note that cars are not charged within CAZ, therefore are not included in the below.

Compliant vehicles:

- Diesel and Euro 6 or newer
- Petrol and Euro 4 or newer
- Electric & hybrid

Non-compliant & Exempt vehicles:

- Diesel and Euro 5 or older
- Petrol and Euro 3 or older

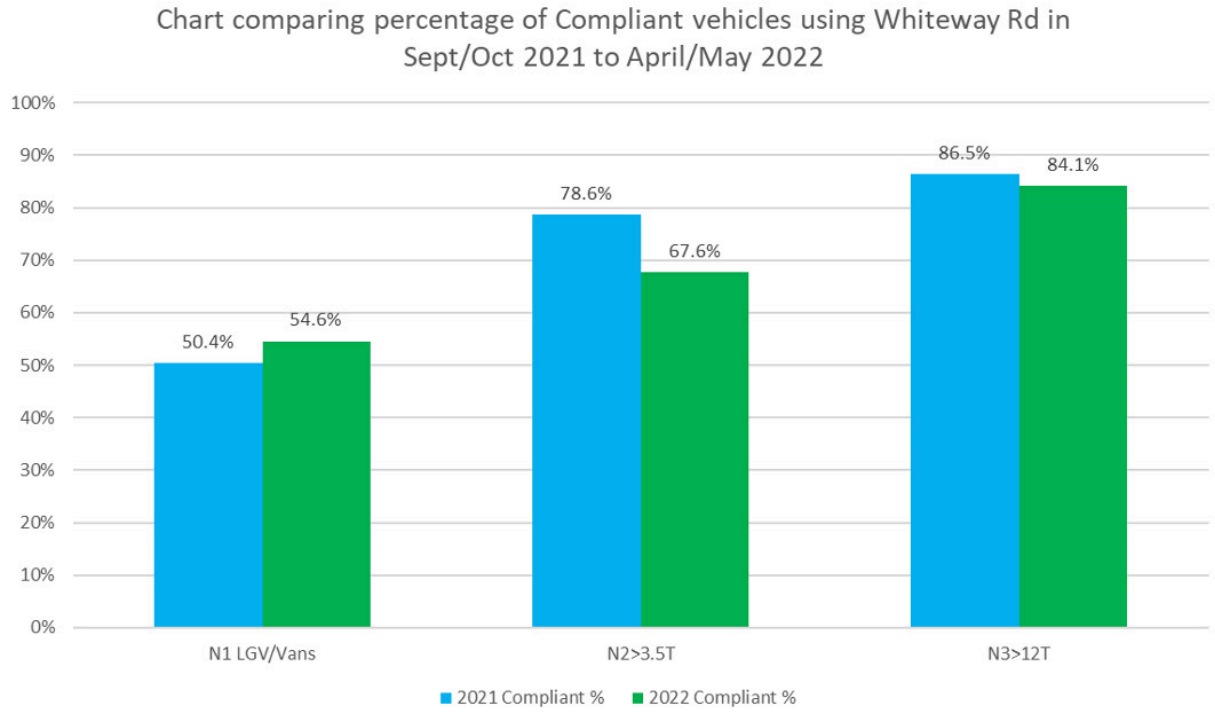
Table 1 shows the split of compliant and non-compliant vehicles seen on Whiteway Road throughout the 7-day temporary ANPR survey that was deployed in April 2022. Note that bus/coach data is not shown within this dataset as the DVLA data does not include information regarding retrofit treatments, therefore, the compliance status would be inaccurate.

Table 1

		Not Compliant or Exempt				Compliant				
	Total number of vehicles seen in the 7 day survey period	Diesel & Euro Status 1-5	Petrol & Euro 1-3	Total Not Compliant or Exempt	2022 Not Compliant or Exempt %	Diesel & Euro 6	Petrol & Euro 4 or newer	Electric	Total Compliant	2022 Compliant %
N1 LGV/Vans	16466	7357	26	7383	44.8%	8861	117	9	8987	54.6%
N2>3.5T	717	229	0	229	31.9%	485	0	0	485	67.6%
N3>12T	912	144	0	144	15.8%	767	0	0	767	84.1%

Figure 4 shows the percentage of compliant vehicles travelling along Whiteway Road in the 2021 and 2022 temporary ANPR surveys. As seen within the graph, the compliance rate of light goods vehicles has increased by just over 4%, whilst HGV compliance has decreased slightly.

Figure 4



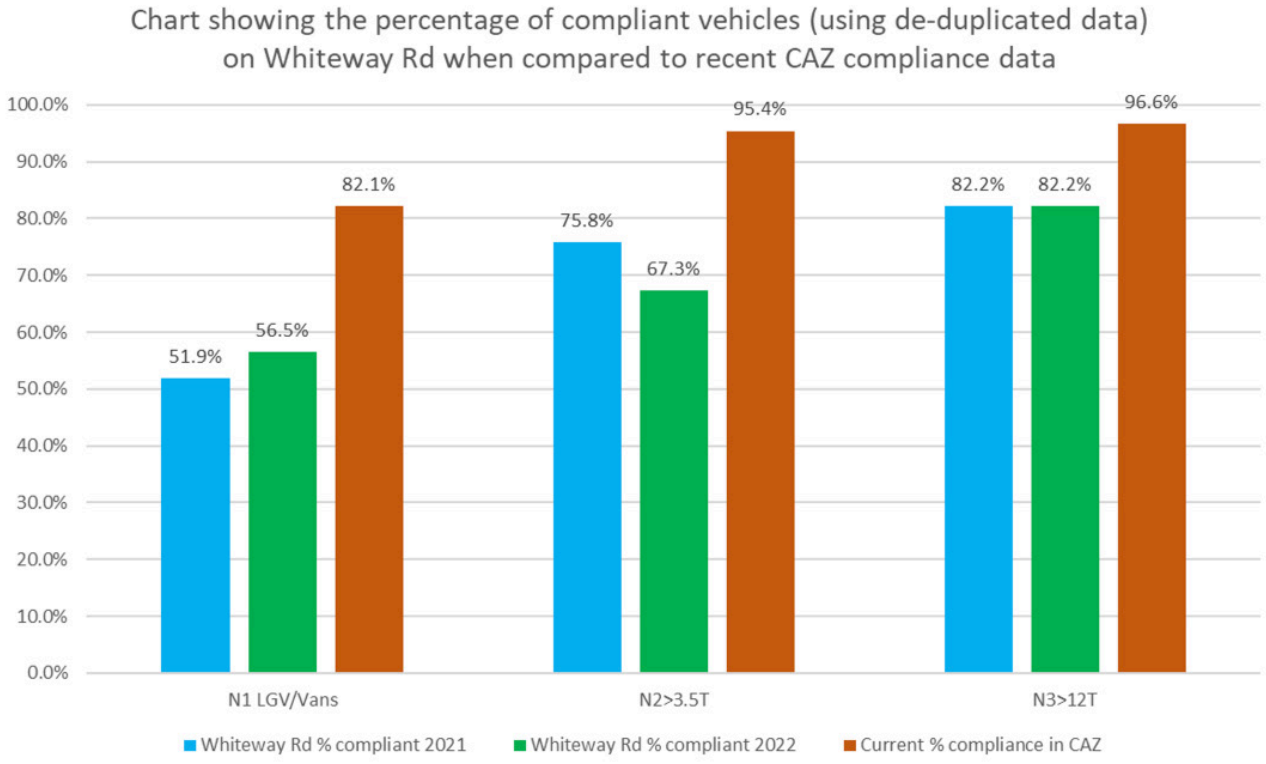
Comparison of compliance between Whiteway Road and the CAZ

The traffic data recorded within the CAZ is de-duplicated before being used for analysis. This means that only one entry per vehicle per 24-hour is retained and any other entries from that vehicle within the same period would be removed (00:00 – 23:59hrs). To ensure that the same type of data is being compared, de-duplication has also been carried out on the data recorded along Whiteway Road.

For example, if an LGV with the VRN 'A123 ABC' travelled along Whiteway Road on three occasions during a 24-hour period (00:00 to 23:59hrs), only one trip is retained, and the others are deleted.

Figure 5 shows a comparison of vehicle compliance between Whiteway Road and the CAZ. Note that cars are not charged within the CAZ and are therefore not included in this analysis.

Figure 5



The key objective of these monitoring surveys was to determine whether there has been an increase in non-compliant, chargeable vehicles using Whiteway Road because of the CAZ. As there is no compliance data available pre-CAZ it is difficult to draw conclusions, however, Figure 5 does show that the general compliance of vehicles travelling along Whiteway Road is less than those travelling within the CAZ.

Prior to the implementation of the CAZ, small increases in traffic flow along Whiteway Road were modelled due to the additional traffic management measures along Queen Square. These additional measures around Queen Square may cause traffic to divert through other routes, therefore, modelling predicated an increase in the inter-peak flows along Whiteway Road (between 10:00-16:00)[3].

Additionally, it was modelled that this potential increase in traffic may result in a small net increase in NO_2 concentrations in the vicinity of Twerton[4]. However, NO_2 concentrations at both sites located along Whiteway Road have decreased when compared to the 2019 baseline.

While compliance rates do remain lower than within the CAZ, we are encouraged by the improvements along Whiteway Road and will continue to monitor traffic and air quality trends. Furthermore, an additional ANPR survey will be scheduled for September 2022 to provide a direct comparison with 2021 and allow us to understand any emerging trends.

[3] Jacobs. T4 Transport Modelling Forecast Report, 2020. https://beta.bathnes.gov.uk/sites/default/files/2020-10/appendix_evi_674726.br_.042.fbc-17_t4_transport_model_forecast_draft.pdf

[4] Jacobs. Distribution and Equalities Impact Analysis, 2019. https://beta.bathnes.gov.uk/sites/default/files/2020-10/appendix_g_674726.br_.042.fbc-19_social_distributional_impacts.pdf

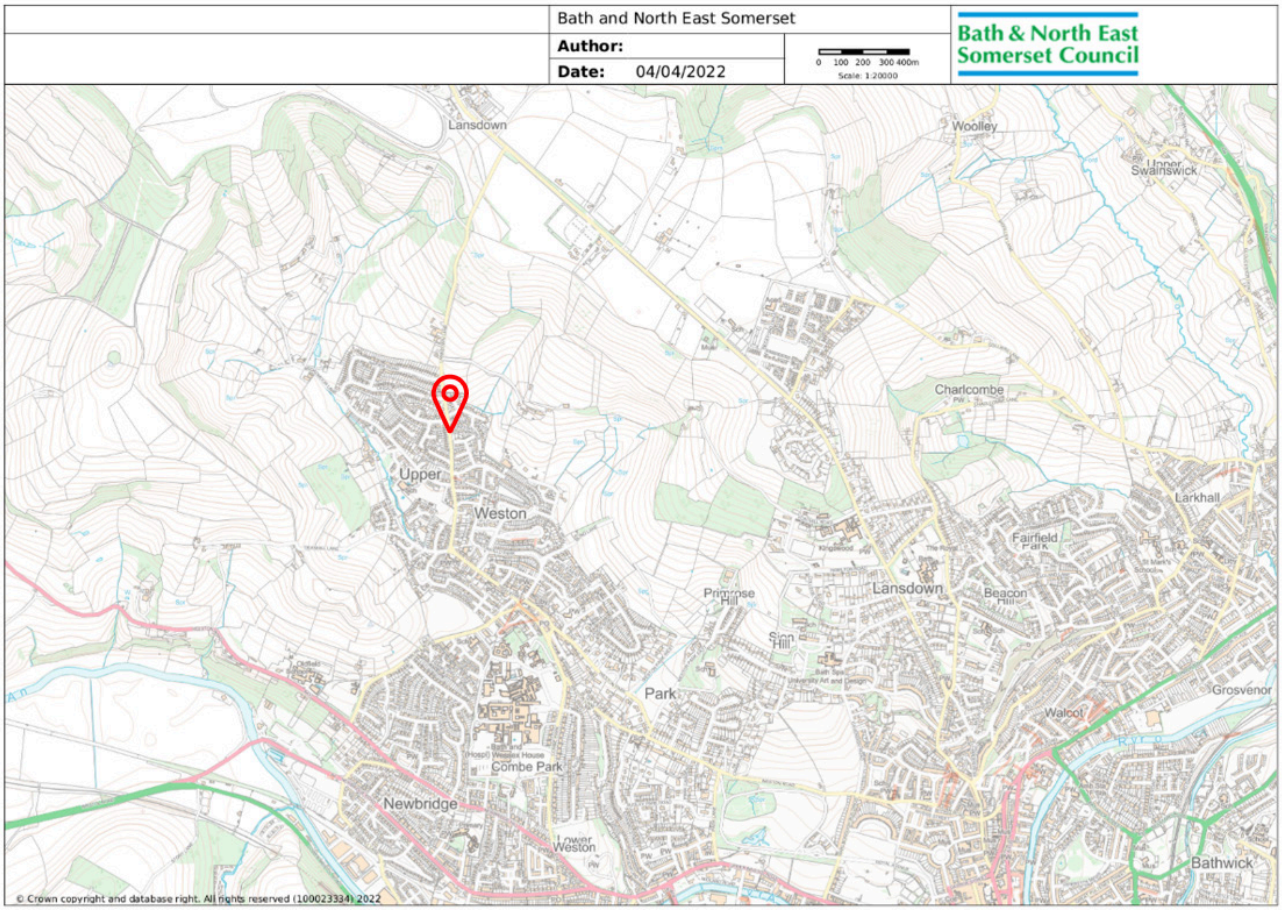
2. Lansdown Lane ANPR report

Site Locations

Figure 6 shows the site locations of the temporary ATC and ANPR surveys that took place on Lansdown Lane, the same location was used for both sets of surveys. Temporary ATC surveys were carried out in 2018, 2019 and 2021. The ANPR surveys were deployed on the following dates:

- 2021 survey- 20/08 – 26/08
- 2022 survey- 26/04 – 01/05

Figure 6



Overall Vehicle Volume

Figure 7 shows the average total number of vehicles traveling along Lansdown Lane in both a 5-day and 7-day average. When compared to the baseline years, the April 2022 survey shows traffic volumes to be similar with 2019, and slightly lower than 2018. When compared to October 2021, traffic volumes were on average 9% lower in 2022 along Lansdown Lane.

Figure 7

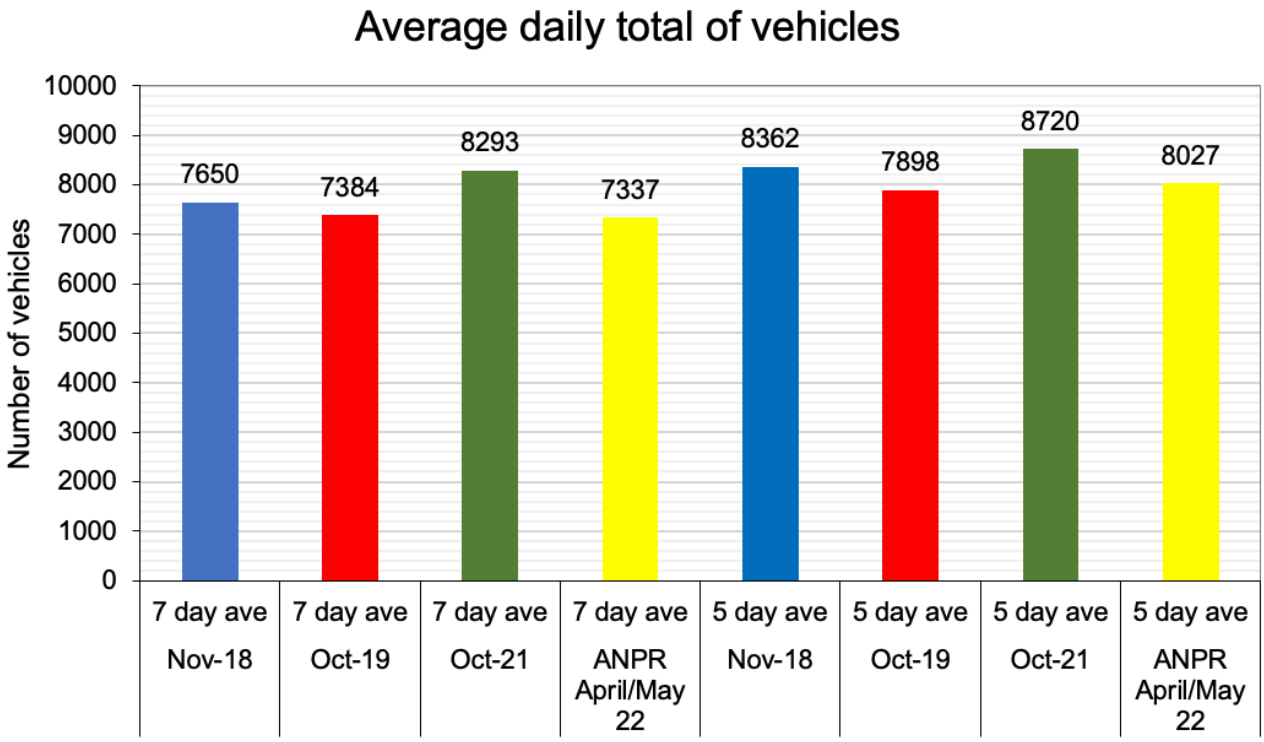
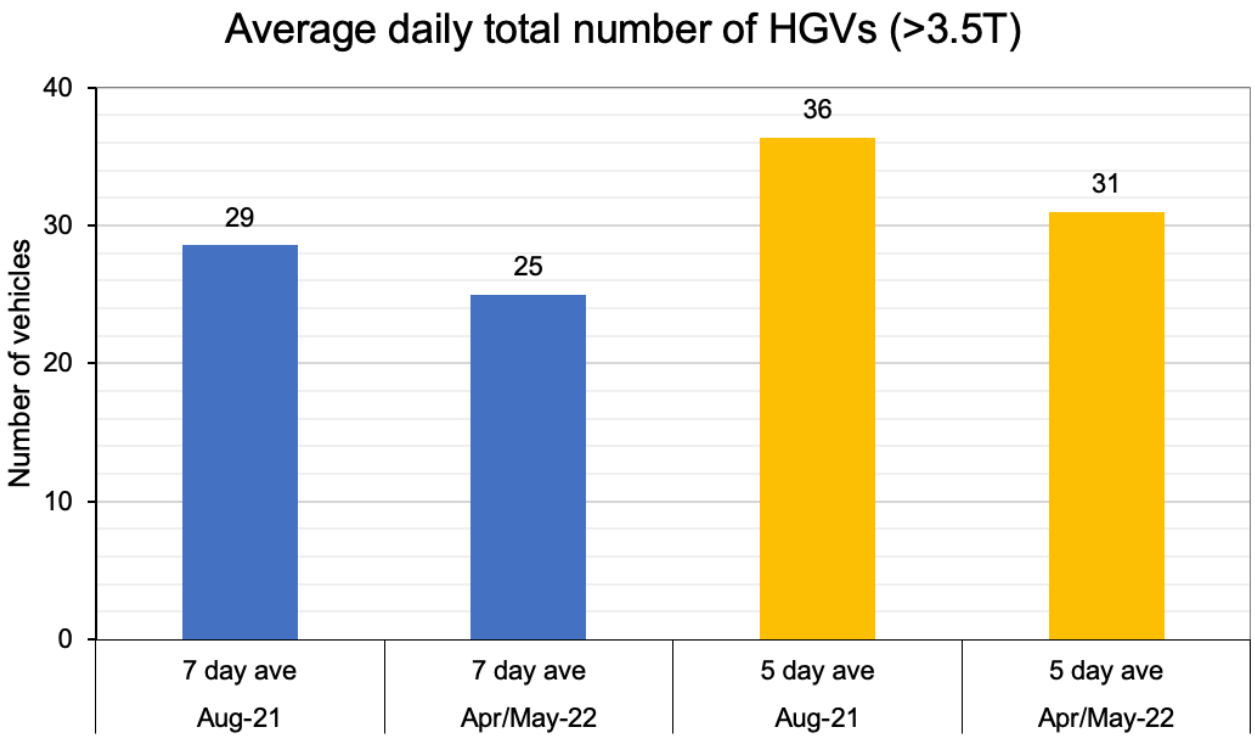


Figure 8



HGV volumes along Lansdown Lane

In 2018 and 2019 the temporary ATC surveys along Lansdown Lane used tube counters to gather classification data. These surveys use axle-distance to classify the vehicles, and as a result it cannot reliably differentiate between some larger cars, LGVs and small HGVs. Therefore, the pre-CAZ and post-CAZ ANPR surveys cannot be meaningfully compared.

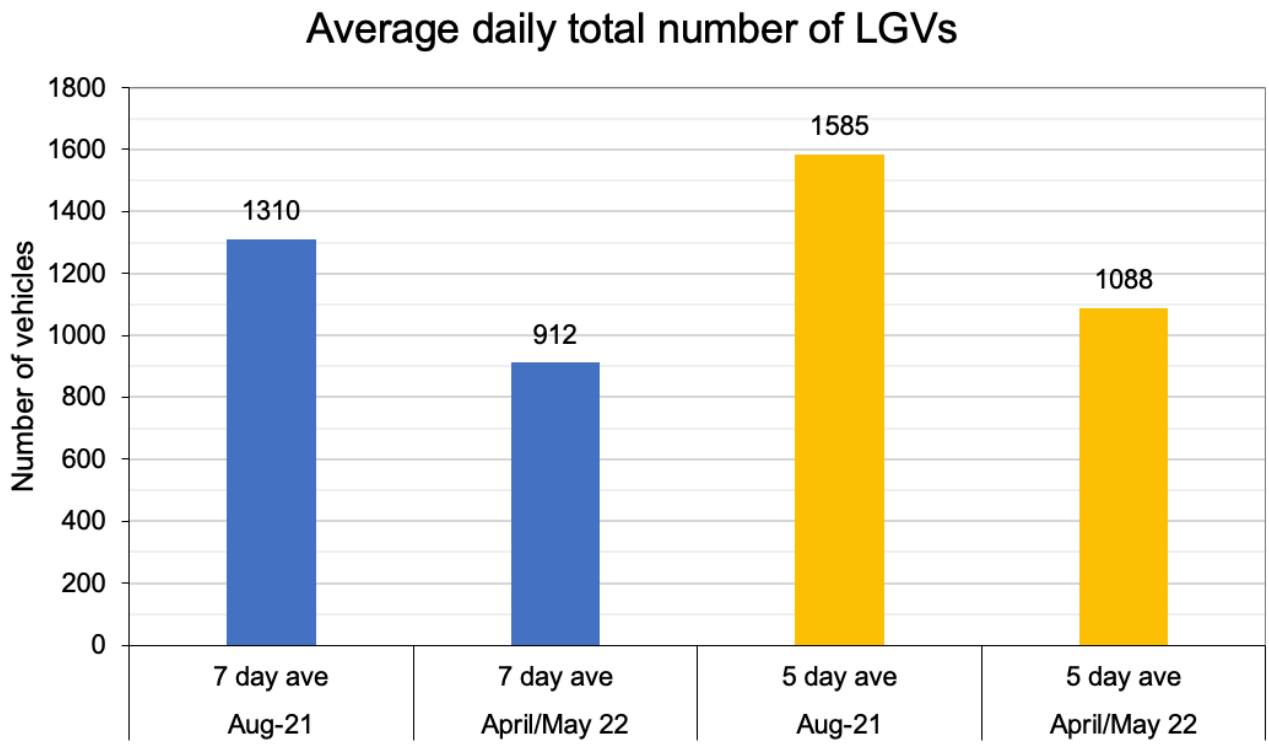
However, a comparison can be made between the 2021 and 2022 ANPR surveys, as this method of classification is far more accurate. In April 2022, the survey found a 14% reduction in HGVs (greater than 3.5 tonnes) along Lansdown Lane when compared to August 2021. A further breakdown on the numbers of HGVs can be seen in Figure 8.

LGV volumes

In 2018 and 2019 the temporary ATC surveys along Lansdown Lane used tube counters to gather classification data. As stated above, this method cannot be used to accurately classify vehicles, therefore, a comparison can only be made between the 2021 and 2022 ANPR surveys.

When compared to August 2021, the April 2022 survey has shown at least a 30% reduction in the number of LGVs travelling along Lansdown Lane. A further breakdown of LGVs can be seen below in figure 9.

Figure 9



Analysis of compliant and non-compliant vehicles

By using the categorisation following method, we have been able to determine whether vehicles travelling along Lansdown Lane are classified as compliant or non-compliant. Note that cars are not charged within the CAZ, therefore are not included in the below.

Compliant vehicles:

- Diesel and Euro 6 or newer
- Petrol and Euro 4 or newer
- Electric & hybrid

Not Compliant & Exempt vehicles:

- Diesel and Euro 5 or older
- Petrol and Euro 3 or older

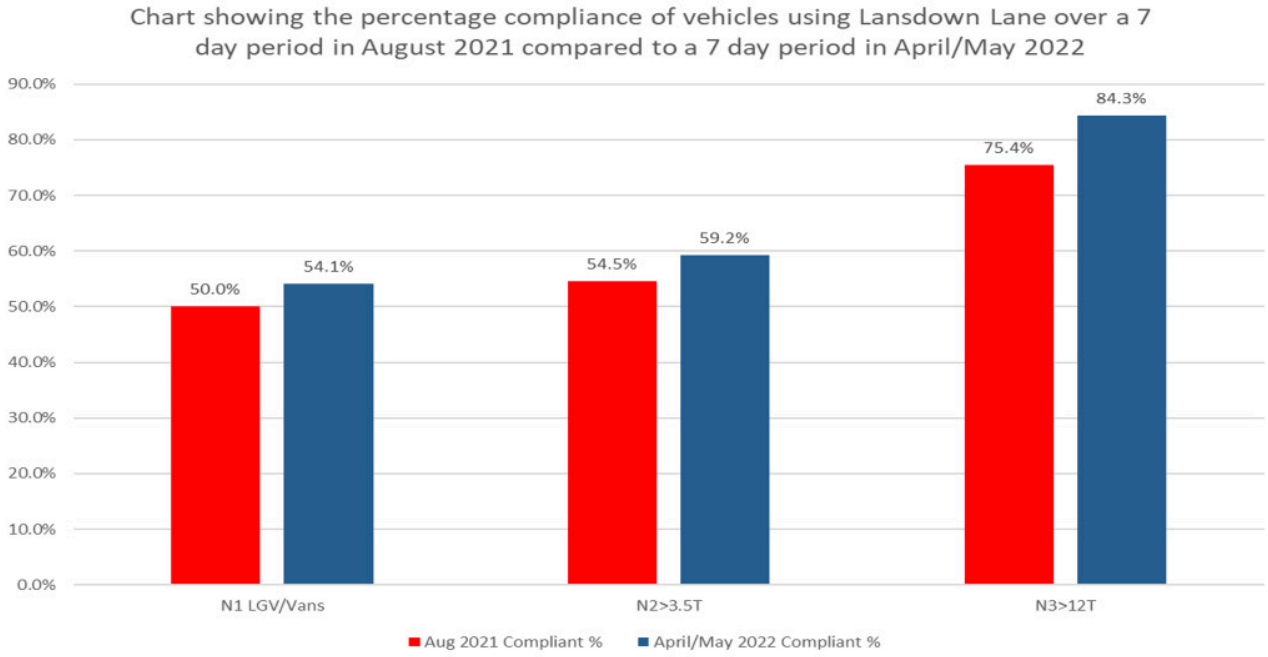
Table 2 shows the split of compliant and non-compliant vehicles seen on Lansdown Lane throughout the 7-day temporary ANPR survey that was deployed in April 2022. Note that bus/coach data is not shown within this dataset as the DVLA data does not include information regarding the retrofit treatments, therefore, the compliance status would be inaccurate.

Table 2

	Total number of vehicles seen in the 7 day survey period	Not Compliant or Exempt				Compliant				
April/May 2022		Diesel & Euro Status 1-5	Petrol & Euro 1-3	Total Not Compliant & Exempt	Not Compliant & Exempt %	Diesel & Euro 6	Petrol & Euro 4 or newer	Electric	Total Compliant	Compliant %
N1 LGV/Vans	6385	2925	8	2933	45.9%	3394	40	18	3452	54.1%
N2>3.5T	125	51	0	51	40.8%	73	0	1	74	59.2%
N3>12T	51	8	0	8	15.7%	43	0	0	43	84.3%

Figure 10 shows the percentage of compliant vehicles travelling along Lansdown Lane in the 2021 and 2022 temporary ANPR survey. It can be seen that compliance has increased throughout the LGV and HGV categories.

Figure 10



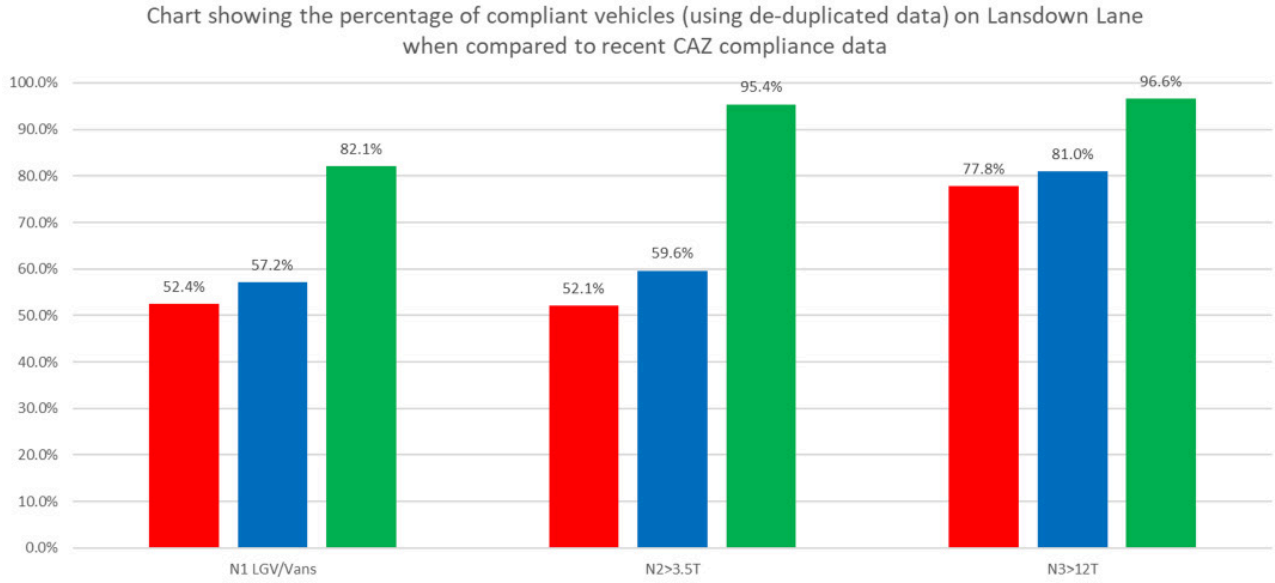
Comparison of compliance between Lansdown Lane and the CAZ

The traffic data recorded within the CAZ is de-duplicated before being used for analysis, this means that the only one entry per vehicle per 24-hour is retained and any other entries from that vehicle within the same period would be removed (00:00 – 23:59hrs). To ensure that the same type of data is being compared, de-duplication has also been carried out on the data recorded along Lansdown Lane.

For example, if an LGV with the VRN 'A123 ABC' travelled along Lansdown Lane on three occasions during a 24-hour period (00:00 to 23:59hrs), only one trip is retained, and the others are deleted.

Figure 11 shows a comparison of vehicle compliance between Lansdown Lane and the CAZ. Note that cars are not charged within the CAZ and are therefore not included in this analysis.

Figure 11



The key objective of these monitoring surveys was to determine whether there has been an increase in non-compliant vehicles using Lansdown Lane as a result of the CAZ. As there is no compliance data available pre-CAZ launch it is difficult to draw conclusions, however, figure 11 does show that the general compliance of vehicles travelling along Lansdown Lane is less than those travelling within the CAZ.

However, we are encouraged by the increase in compliance and will continue to monitor any changes in traffic volumes and air quality. We will look to re-monitor this location in September 2022 so a direct comparison can be drawn with the September 2021 survey, this will allow us to understand any emerging trends.

3. Oldfield Park Area ANPR report

Site locations

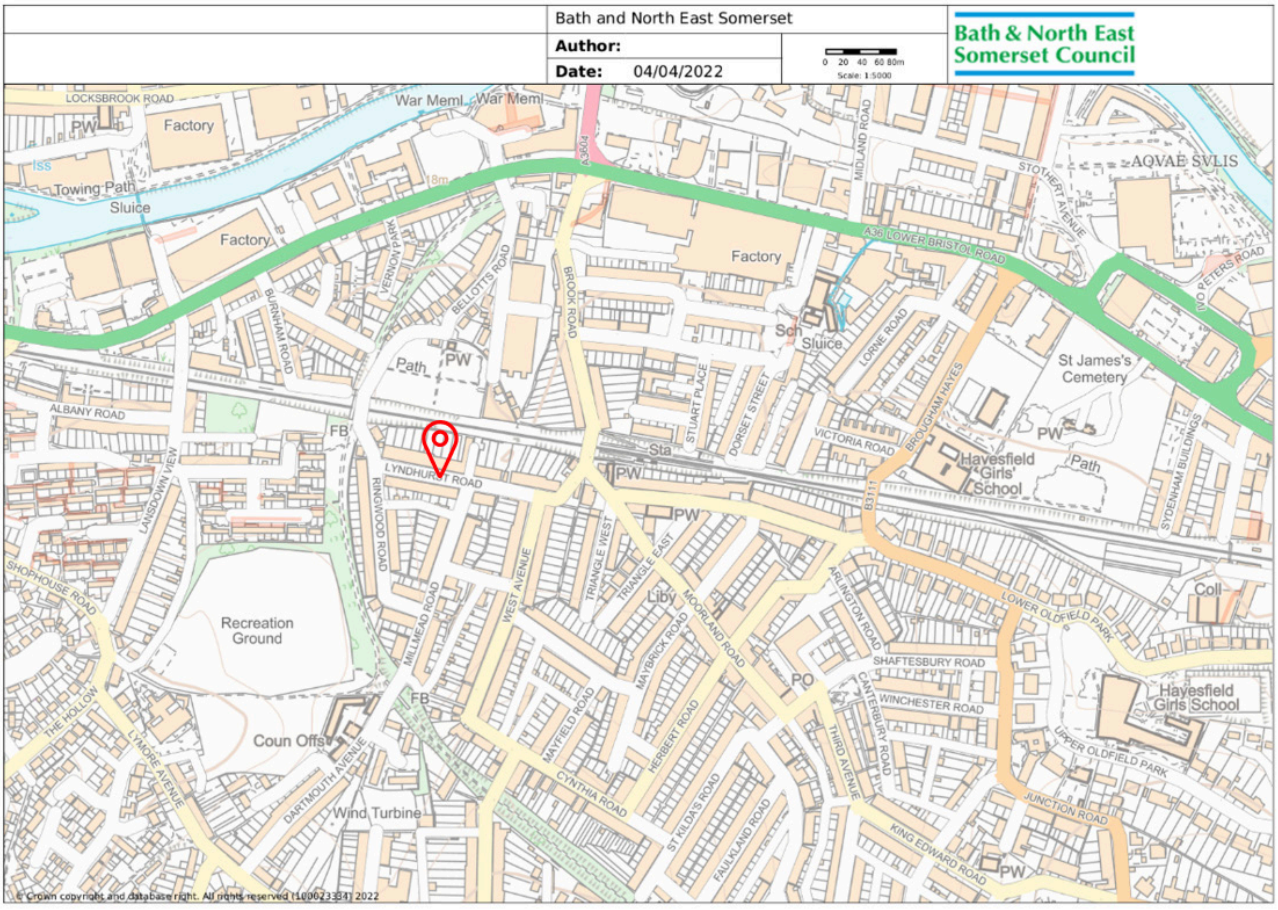
In response to perceived increases in HGVs along Lyndhurst Road as a result of the CAZ, a temporary ATC (pneumatic tube survey) was caried out along Triangle North onto Lyndhurst Road in July 2021 that indicated around 311 HGVs were using this route per week. This was thought to be potentially caused by vehicles using Lyndhurst Road to reach the A36 Lower Bristol Road instead of Livingstone Road/Brougham Hayes to reach the Moorland Road shopping area and avoid entering the CAZ.

ANPR cameras were then deployed to obtain a more accurate breakdown of vehicle types using the route westbound, and to understand whether these vehicles would be compliant with the CAZ.

Figure 12 shows the site locations of the temporary ANPR surveys that took place on Lyndhurst Road, the same location was used for both sets of surveys. The surveys took place on the following dates:

- 2021 survey- 20/08 – 26/08
- 2022 survey- 25/04 – 01/05

Figure 12



Classification of vehicles travelling westbound towards Lower Bristol Rd

In July 2021, the temporary ATC recorded far more HGVs/buses than the reality that is shown by the ANPR cameras, the data from the surveys can be seen below in table 3. When compared to the ANPR survey in August 2021, data collected in April 2022 has shown a 5% decrease in LGV volumes. The number of HGVs (over 3.5t but not exceeding 12t) has remained consistent, with 7 of these vehicles travelling westbound per weekday. The number of HGVs exceeding 12t has increased when compared to 2021, to 7 vehicles per weekday, however, these vehicles are 94% compliant so do not appear to be avoiding the CAZ.

Table 3

Total volume as a weekday average travelling westbound on Lyndhurst Rd towards Lower Bristol Rd					
April/May-22 ANPR		Aug-21 from ANPR		July-21 from tube counter	
M1 car	1899	M1 car	1621	Car and light van	1338
N1 LGV/Vans	315	N1 LGV/Vans	332		
M2 Minibus	0	M2 Minibus	0	Two axle truck/bus or larger	311
M3 Coach/Bus	0	M3 Coach/Bus	0		
N2>3.5T	7	N2>3.5T	6		
N3>12T	7	N3>12T	1		
Total	2228	Total	1961	Total	1649

Analysis of compliant and non-compliant vehicles

By using the following method, we have been able to determine whether vehicles travelling along Lyndhurst Road are classified as compliant or non-compliant. Note that cars are not charged within the CAZ, therefore are not included in the below.

Compliant vehicles:

- Diesel and Euro 6 or newer
- Petrol and Euro 4 or newer
- Electric & hybrid

Not Compliant & Exempt vehicles:

- Diesel and Euro 5 or older
- Petrol and Euro 3 or older

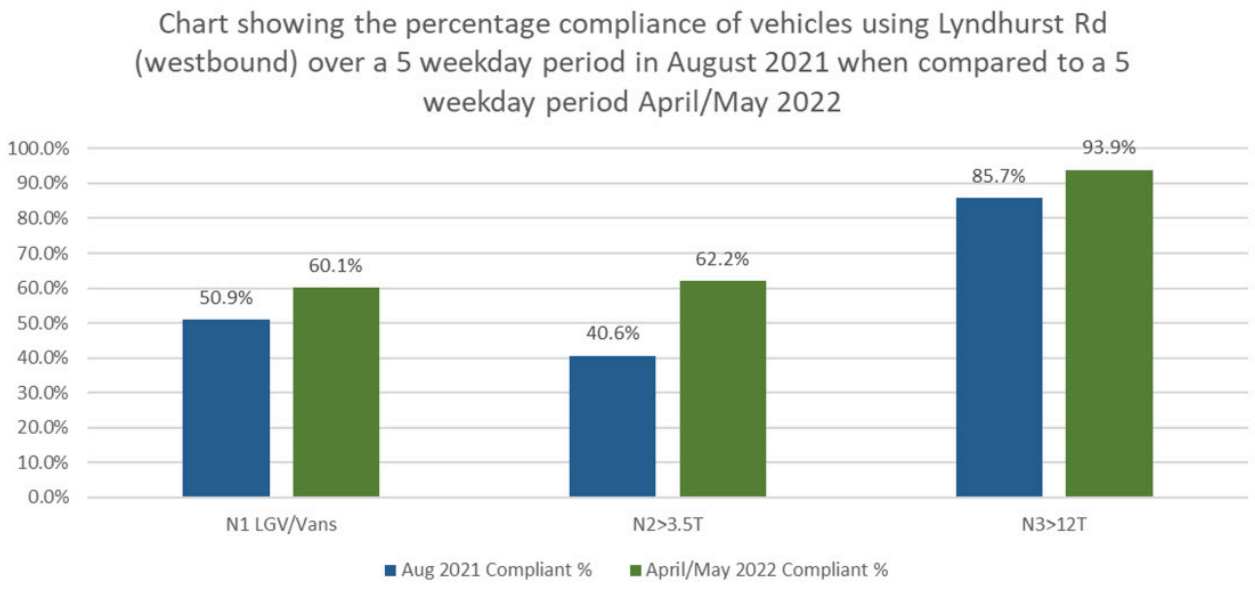
Table 4 shows the split of compliant and non-compliant vehicles seen on Lyndhurst Road throughout the 7-day temporary ANPR survey that was deployed in April 2022. Note that bus/coach data is not shown within this dataset as the DVLA data does not include information regarding the retrofit treatments, therefore, the compliance status would be inaccurate.

Table 4

		Not Compliant or Exempt				Compliant				
April/May 2022	Total number of vehicles seen in the weekday period travelling westbound	Diesel & Euro Status 1-5	Petrol & Euro 1-3	Total Not Compliant & Exempt	Not Compliant & Exempt %	Diesel & Euro 6	Petrol & Euro 4 or newer	Electric	Total Compliant	Compliant %
N1 LGV/Vans	1575	618	4	622	39.5%	921	12	14	947	60.1%
N2>3.5T	37	14	0	14	37.8%	23	0	0	23	62.2%
N3>12T	33	2	0	2	6.1%	31	0	0	31	93.9%

Figure 13 below shows the percentage of compliance along Lyndhurst Road in August 2021 and April 2022. It can be seen that compliance has increased throughout the LGV and HGV categories.

Figure 13



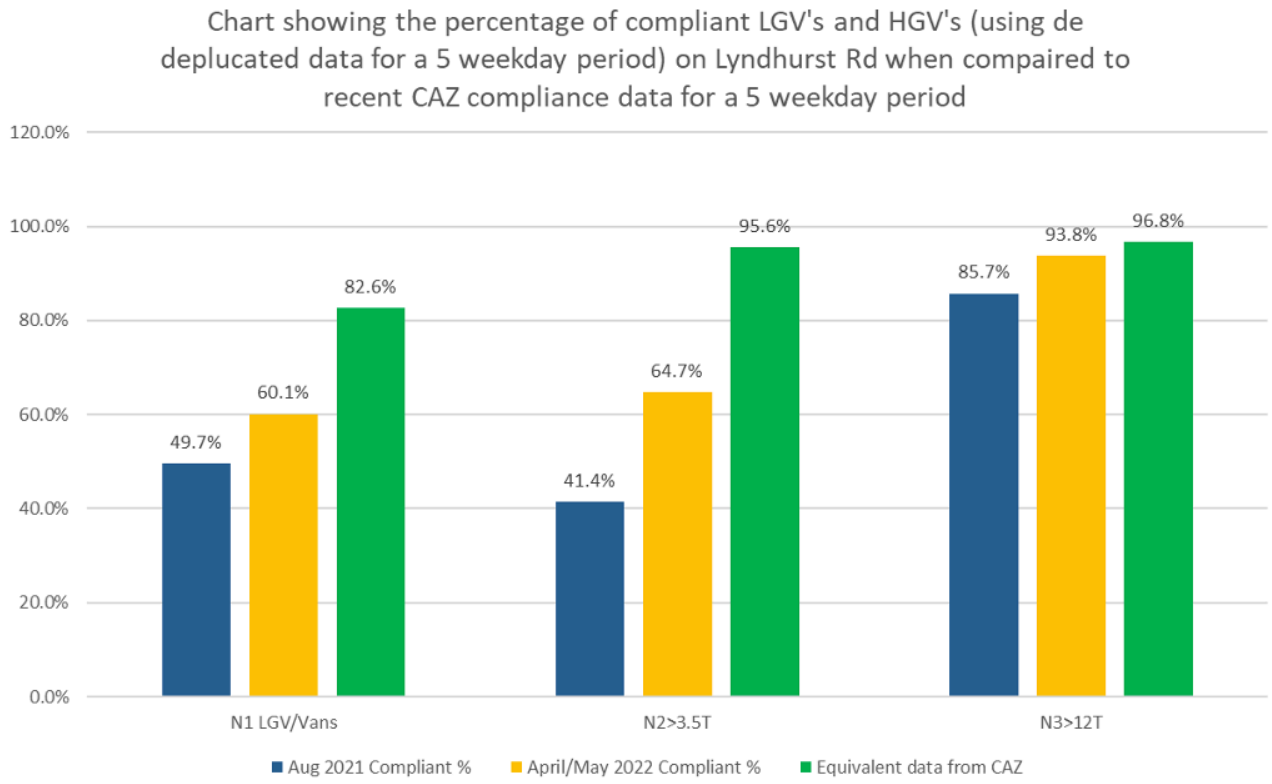
Comparison of compliance between Lyndhurst Road and the CAZ

The traffic data recorded within the CAZ is de-duplicated before being used for analysis, this means that the only one entry per vehicle per 24-hour is retained and any other entries from that vehicle within the same period would be removed (00:00 – 23:59hrs). To ensure that the same type of data is being compared, de-duplication has also been carried out on the data recorded along Lyndhurst Road.

For example, if an LGV with the VRN 'A123 ABC' travelled along Lyndhurst Road on three occasions during a 24-hour period (00:00 to 23:59hrs), only one trip is retained, and the others are deleted.

Figure 14 shows a comparison of vehicle compliance between Lyndhurst Road and the CAZ. Note that cars are not charged within the CAZ and are therefore not included in this analysis.

Figure 14



The key objective of these monitoring surveys was to determine whether there has been an increase in non-compliant HGVs using Lyndhurst Road as a result of the CAZ. As there is no compliance data available pre-CAZ launch it is difficult to draw conclusions, however, figure 14 does show that the general compliance of vehicles travelling along Lyndhurst Road is less than those travelling within the CAZ.

Conclusions

The pneumatic tube counter used in July 2021 registered far more vehicles as HGVs than the ANPR surveys in 2021 and 2022. The pneumatic tubes counters used in July 2021 classify vehicles by wheelbase and number axles, and is therefore, not always accurate. Whereas an ANPR camera uses the type approval classification of the vehicle provided by the DVLA. In July 2021, 258 of the 311 vehicles registered as HGVs/buses were recorded as a 3-axle HGV and 44 were recorded as a 2-axle HGV with a wheelbase >3.2m. If these are removed from the HGV numbers, this leaves 9 HGVs per day, which is a similar number to those captured by the ANPR. This may suggest that the pneumatic tube counters find it difficult to differentiate between vans and smaller HGVs and may incorrectly categorise a van as an HGV.

Overall, we are encouraged by this increase in compliance and will continue to monitor any changes in traffic volumes and air quality. We will look to re-monitor this location in September 2022 so a direct comparison can be drawn with the September 2021 survey, this will allow us to understand any emerging trends.

The areas of investigation presented below in Table 5, are areas which have not been subject to temporary ANPR surveys, instead, other methods of monitoring have been used.

Table 5: Further Locations of investigation.

Area for investigation	Status	Initial monitoring undertaken	Traffic monitoring results	Air quality monitoring results	Secondary monitoring (if required)	2022 review
Charlcombe Lane	Further monitoring complete.	Three temporary radar automatic traffic counters for a 7-day period in July 2021. Singular diffusion tube air quality monitoring.	The 5-day average shows that the morning and after-noon peak flows are significantly lower in 2021 than compared with 2019. Interpeak traffic flows are slightly higher than in 2019, however, this is replicated on other roads since the pandemic, with lower morning peak flows and higher interpeak flows.	The post-CAZ NO_2 concentration at Charlcombe Lane measured at 10 µg/m^3 in 2021 compared to 14 µg/m^3 in 2019.	At the request of the Parish Council, this location was re-monitored in October 2021. Monitoring found a weekday decrease of 19-23% and a 7-day average decrease of 13-17% when compared to the 2019 baseline period. Average speed was at or below the 20mph limit. Note: the results above may have been impacted by a partial road closure so this location will be re-monitored. However, it is collectively acknowledged that there is unlikely to be displacement related to the CAZ in this location.	Monitoring surveys in May 2022 were carried out along Charlcombe Lane, however, issues with the monitoring equipment meant the data recorded was inaccurate. These temporary ATC surveys were therefore repeated and deployed on 6th June 2022 for a 7-day period. An update will be provided once the data has been received and analysed.

Upper Camden Place	Further monitoring complete.	One temporary radar automatic traffic counter deployed in July 2021 for a period of 7-days. Singular diffusion tube air quality monitoring.	The volume of traffic on Camden Road is down 25% in July 2021 compared to June 2021. On average 2021 daily total volumes on Camden Road are 12% lower compared to 2017. However, traffic in general was still 8% down on pre-pandemic levels in B&NES when monitoring was carried out.	The post-CAZ NO_2 concentration at Upper Camden Place measured at 19 µg/m^3 in 2021 compared to 25 µg/m^3 in 2019.	No further monitoring required at this stage, due to no discernible increase in traffic volumes. This will be reviewed in 6 months.	A further radar ATC survey was carried out in April 2022. When compared to July 2021, traffic volumes had increase 30% across a 5-day and 7-day average. However, as mentioned traffic was still down 8% on pre-pandemic levels in this base-line period. When compared to 2017, 2022 volumes were down 23% across a 5-day average and 22% across a 7-day average. It is possible that this location may be affected by displacing traffic as a result of the partial Cleveland Bridge Closure. Therefore, it will be re-monitored after the full reopening.
Southdown Road	Further monitoring complete.	One temporary radar automatic traffic counter deployed in July 2021 for a period of 7-days. Singular diffusion tube air quality monitoring.	Comparing 2021 data to 2019 the traffic levels on Southdown Road have dropped 13.4% (5-day average) and 11.4% (7-day average). The AM peak has significantly reduced whilst the PM peak has reduced slightly.	The nearest available monitoring site from South-down Road was Coronation Avenue. The NO_2 concentration at this location in 2021 was 15 µg/m^3 compared to 20 µg/m^3 in 2019.	No further monitoring required at this stage, due to no discernible increase in traffic volumes. This will be reviewed in 6 months.	A further ATC survey was carried out in April 2022. When compared to the 2019 baseline period traffic levels on Southdown Road have decreased by 1% across both a 5-day and 7-day average. The AM peak remains marginally lower than the baseline with the PM peak slightly higher at an earlier time in the evening.

Old Newbridge Hill	Monitoring complete.	Neo Traffic Data using one automatic tube counter plus one Miovision camera for turning count analysis for a 7-day period during July 2021. Singular diffusion tube air quality monitoring.	Overall traffic volume is lower in 2021 compared to 2019; further analysis is required to understand whether the pro-portion of HGVs, out of the total traffic using the road, has changed.	The post-CAZ NO_2 concentration at Old Newbridge Hill meas-ured at 25 µg/m^3 in 2021 compared to 29 µg/m^3 in 2019 Q3.	New weight limit restriction being explored for this lo-cation together with further monitoring, if necessary. This will be reviewed in 6 months.	Upon reviewing Old Newbridge Hill there have been no further concerns regarding traffic displacing as result of the CAZ. However, the Traffic Regulation Order sur-rounding a new weight restriction is being de-veloped with Highways.
Twerton High Street	Initial monitor-ing in progress.	Singular diffusion tube installed in August 2021 for a period of at least 3-months.	N/A	As this diffusion tube was installed mid-way through 2021 there is not a 2019 baseline, however, in 2021 NO_2 was recorded at 31 µg/m^3.	Monitoring will be contin-ued at this site until we can under-stand the trends.	Upon reviewing this location in 2022, diffu-sion tube monitoring along Twerton High Street will re-main in place until we can fully under-stand emerging trends.
Shophouse Road	Further monitor-ing complete.	Neo Traffic Data using one tube counter (speed and classification) for a 7-day period in July 2021. Singular diffusion tube air quality monitoring.	Overall vehicle numbers are high-er than in 2019. HGV numbers are also high-er when compared with the 2019 baseline however, in 2019 HGVs accounted for 8% of all vehicles on Shophouse Road and in 2021 they accounted for 7%.	The nearest available monitoring site from Shophouse Road was The Hollow. The NO_2 concen-tration at this location in 2021 was 21 µg/m^3 compared to 24 µg/m^3 in 2019 Q3.	Whilst modelling predicted a slight in-crease in traffic volumes in this location, monitoring will be reviewed after the full reopening of Cleveland Bridge. This will be reviewed in 6 months.	A further ATC survey was carried out in May 2022. When compared to July 2021 there has been a 5% drop in HGVs and a small decrease in total traffic volumes. However, both the 2021 and 2022 surveys do remain higher than the 2019 baseline. Some of the in-crease may be accounted for due to the modelled in-crease in interpeak traffic along The Hollow. Additionally, the occa-sional full road closure along Jews Lane may also cause traffic to divert along Shophouse Road. However, this location will be re-viewed in 6-months' time so the trends can be further understood.

Rosemount Lane	Monitoring complete.	One temporary radar automatic traffic counter deployed for a 7-day period in July 2021. Singular diffusion tube air quality monitoring.	During July 2021, data collected shows a reduction in traffic volumes of 56% over a 7-day period when compared to a 2016 baseline. Data shows that most vehicles use the route east (downhill) but very few travel up the steep hill.	The nearest available monitoring site is at Greenway Lane. The NO_2 concentration at this location in 2021 was 11 µg/m^3 compared to 16 µg/m^3 in 2019 Q3.	No further monitoring required at this stage, due to no discernible increase in traffic volumes. This will be reviewed in 6 months.	Upon reviewing Rosemount Lane there have been no further concerns regarding traffic volumes and air quality. This case will be removed from the appendix in the following quarter.
Sham Castle Lane	Monitoring complete.	One temporary radar automatic traffic counter deployed for a 7-day period in July 2021. Singular diffusion tube air quality monitoring.	There is no pre-CAZ baseline for Sham Castle Lane, however, by analysing the traffic volumes during peak times an indication of overall volumes can be understood. The peak of traffic appeared between 1600-1700hr where 21 vehicles were recorded within the hour. The next highest volume was 14 vehicles within an hour.	The nearest available monitoring site from Sham Castle Lane was North Road. The NO_2 concentration at this location in 2021 was 13 µg/m^3 compared to 17 µg/m^3 in 2019.	No further monitoring required at this stage, due to no discernible increase in traffic volumes. This will be reviewed in 6 months.	Upon reviewing Sham Castle Lane there have been no further concerns regarding traffic volumes and air quality. This case will be removed from the appendix in the fol-lowing quarter.
Prior Park Road	Monitoring complete.	Neo Traffic Data using one automatic tube counter for a 7-day period in July 2021. Singular diffusion tube air quality monitoring.	Monitoring along Prior Park Road during June/July 2021 showed an increase of 14% in weekday traffic volumes when compared to 2017.	The post-CAZ NO_2 concentration at Prior Park Road measured at 23 µg/m^3 in 2021compared to 33 µg/m^3 in 2019.	A 6-month review will be carried out after the full reopening of Cleveland Bridge.	Upon reviewing Prior Park Road there have been no further concerns regarding traffic volumes and air quality. This case will be removed from the appendix in the fol-lowing quarter.

Bradford Road/ Brassknocker Hill	Initial monitoring complete.	One permanent automatic traffic counter located on both Brad-ford Road and Brassknocker Hill. Singular diffusion tube air quality monitoring at both locations.	Data from the permanent ANPR camera at Brad-ford Road between the months April-September 2021 has shown a 4% increase west-bound and a 1% increase east-bound in HGVs when compared to a September 2020 baseline (7-day aver-age). HGVs were back to pre-pandemic levels at this baseline period (Depart-ment of Transport). Data from the permanent ANPR camera at Brassk-nocker Hill between the months April-September 2021 has shown a potential increase of 19% north-bound and 6% south-bound in HGVs when compared to a September 2020 baseline (7-day average).	The post-CAZ NO_2 con-centration at Bradford Road measured at 21 µg/m^3 in 2021 compared to 28 µg/m^3 in 2019. The post-CAZ NO_2 con-centration at Brassknock-er Hill measured at 26 µg/m^3 in 2021 compared to 37 µg/m^3 in 2019.	A 6-month review will be carried out after the full reo-pening of Cleveland Bridge, as well as investigating those vehicles which are breaking the 7.5t weight restriction on Brassknocker Hill.	Upon reviewing Brass-knocker Hill it is likely that the in-crease in HGVs can be associ-ated with the closure of Cleveland Bridge, therefore, this location will be re-viewed after its re-opening. Additionally, the issues surrounding those vehicles breaching the 7.5t weight restriction on Brassknocker Hill is an enforcement issue which be investigated further by the Trading Standards team.
Penn Hill Road	Further monitoring complete.	One temporary radar automatic traffic counter deployed in August 2021 for a 7-day period. Singular diffusion tube air quality monitoring.	Monitoring in Au-gust 2021 showed a weekday av-er-age of 6938 vehicles per day, and a 7-day average of 6399 vehicles per day. Whilst there is no pre-CAZ baseline at this location, comparing this data to surrounding areas sug-gests these volumes are as expected. However, this site will be reviewed in 6-months' time.	The nearest available monitoring site from Penn Hill Road was Weston High Street. The NO_2 con-centration at this location in 2021 was 18 µg/m^3 compared to 22 µg/m^3 in 2019.	This will be reviewed in 6 months.	A further ATC survey was carried out in April 2022. When compared to the August 21 base-line period traffic levels had increased less than 1% across a 5-day and 7-day average. However, numbers do remain low. The AM peak in 2022 is much more pronounced when compared to the 2021 baseline pe-riod, this is likely to be linked to people returning to work post-pandemic. The PM peak re-mains the same.

Englishcombe Lane	Further monitoring complete.	Two temporary radar automatic traffic counters deployed in September 2021 for a period of 7-days. Singular diffusion tube air quality monitoring.	Monitoring along Englishcombe Lane during September 2021 showed a potential increase in aver-age weekday traffic volumes when compared to a January 2021 baseline. However, this baseline will have seen significantly lower traffic volumes due to the national lockdown.	The post-CAZ NO_2 concentration at Englishcombe Lane measured at 11 µg/m^3 in 2021 compared to 14 µg/m^3 in 2019.	A 6-month review will be carried out after the full reopening of Cleveland Bridge to establish whether the non-compliant vehicles are seeking to avoid zonal chargers.	2 further radar ATC surveys were carried out in May 2022. When compared to September 2021 monitoring has shown on average an 19% increase in weekday traffic. In addition, the AM-peak and PM-peak have shown a 15% increase when compared to September 2021. However, there was a modelled increase at Englishcombe Lane in the PM peak hour. However, at the time this survey was completed, roadworks along Moorland Road diverted a bus route, and potentially other traffic onto Englishcombe Lane. Therefore, this location will be re-monitored in July to help us under-stand any emerging trends.
Norton St Philip	Monitoring complete.	One permanent automatic traffic counter located on the B3110 northwest of Midford. Singular diffusion tube air quality monitoring.	Monitoring at Nor-ton St Phillip has shown a decrease of 16% in weekday car and light good vehicle volumes when compared to 2017. Heavy vans and minibuses have decreased by 4%, with HGVs and articulated lorries also decreasing by 10% when compared to a 2017 baseline.	The nearest available monitoring site from the permanent automatic traffic counter on the B3110 was Bradford Road. The NO_2 concentration at this location in 2021 was 21 µg/m^3 compared to 28 µg/m^3 in 2019.	No further monitoring required at this stage, due to no discernible increase in traffic volumes. This will be reviewed in 6 months.	Upon reviewing the case surrounding Norton St Phillip there have been no further concerns regarding traffic volumes and air quality. This case will be removed from the appendix in the fol-lowing quarter.

Cavendish Road	Further monitoring complete.	One temporary radar automatic traffic counter deployed for a 7-day period in October 2021. Triplicate diffusion tube air quality monitoring.	Monitoring of traffic volumes along Cavendish Road during October 2021 showed a potential increase of 17% in weekday traffic volumes when compared to 2017.	The post-CAZ NO_2 concentration at Cavendish Road measured at 14 µg/m^3 in 2021 compared to 17 µg/m^3 in 2019.	A 6-month review will be carried out after the full reopening of Cleveland Bridge.	A further ATC survey was carried out in May 2022. When compared to October 2021, traffic volumes have decreased by 4% as a weekday aver-age. Additionally, there was a 2% reduction in the weekday AM-Peak and a 7% reduction in the PM-Peak. However, volumes of traffic do still show a potential increase of 13% when compared to the 2017 baseline period. Mean speed was recorded at 24mph. As modelled at the Full Business Case stage of the CAZ, additional traffic using Cavendish Road as a route back to Lansdown Road was a potential outcome associated with the Queen Square Traffic Management Scheme[5]. This location will therefore be re-viewed and re-monitored in 6-months' time to understand any emerging trends.

[5] Jacobs. Queen Square Traffic Management Scheme, 2020.
https://beta.bathnes.gov.uk/sites/default/files/2020-10/appendix_cii_674726.br_.42.fbc-09_queen_square_traffic_management_scheme.pdf

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Bath's Clean Air Zone
Appendix 3

Bath & North East Somerset Council

Improving People's Lives

Appendix 3: Full 2021 annual diffusion tube NO_2 data

The following tables outline the 2021 annual average nitrogen dioxide (NO_2) concentrations in micrograms per cubic metre (µg/m^3) for sites within the Bath Clean Air Zone (CAZ_Only), the boundary area surrounding (including the urban areas of Batheaston and Bathampton; CAZ_Boundary) and those sites within the wider B&NES district (Wider_B&NES).

Table 1- showing sites within the CAZ_Only (sites within the CAZ boundary) site grouping which were recording data in 2021. 66 sites in total were used for analysis. TA = triplicate average (where three diffusion tubes are located at one site and an average of all three taken).

Site ID	2019 NO_2 concentration (µg/m^3)	2021 NO_2 concentration (µg/m^3)	Change (µg/m^3)
DT003 - Broad St	37.5	28.8	-8.7
DT004 - George St	29.7	22.2	-7.4
DT005 - Gay St - Top	30.6	23.0	-7.6
DT009 - Upper Bristol Rd	30.5	24.3	-6.2
DT014 - Bathwick St	33.0	19.7	-13.4
DT015 - Beckford Rd	27.5	19.7	-7.8
DT016 - Warminster Rd	31.0	21.8	-9.1
DT017 - Widcombe School (TA)	29.4	20.3	-9.1
DT018 - Widcombe High St	23.1	17.4	-5.8
DT020 - Wells Rd (TA)	45.4	42.6	-2.8
DT021 - Wells Rd /Upper Oldfield Park	37.2	27.6	-9.6
DT037 - Charlotte St (TA)	30.8	24.3	-6.5
DT039 - Manvers St	32.6	25.0	-7.6
DT042 - Dorchester St	48.0	40.5	-7.6
DT043 - St. James Parade	38.7	34.5	-4.3
DT045 - James St West	28.3	24.0	-4.3
DT060 - Victoria Buildings	44.1	40.0	-4.1
DT087 - Oak Street	29.2	21.5	-7.7
DT090 - Anglo Terrace (TA)	49.6	33.2	-16.4
DT145 - Lansdown Road	26.3	20.1	-6.2
DT147 - Terrace Walk	29.3	19.8	-9.6
DT148 - Julian Rd (TA)	26.1	19.6	-6.5
DT149 - Camden 3	25.1	19.0	-6.1
DT153 - North Road	16.6	12.9	-3.7
DT156 - Corn Street	27.6	21.8	-5.8
DT157 - Charles Street	27.3	22.4	-4.9
DT158 - Paragon 2	31.8	24.5	-7.3
DT159 - Walcot Street	25.7	19.1	-6.6

DT160 - North Parade Road	34.2	23.1	-11.2
DT172 - London Road 2 (TA)	47.9	31.1	-16.8
DT173 - Upper Bristol Road 2	33.2	25.7	-7.5
DT180 - Wells Road 2 (TA)	34.8	30.3	-4.5
DT182 - Gay Street - Lower (TA)	42.4	32.9	-9.5
DT183 - Chapel Row	29.7	25.7	-4.0
DT198 - Walcot Parade (TA)	50.2	37.8	-12.4
DT207 - Darlington Street	38.0	26.7	-11.3
DT211 - St John's Road	21.1	14.0	-7.1
DT212 - Oldfield Road	19.5	14.2	-5.3
DT213 - Marlborough Lane (TA)	20.7	18.2	-2.4
DT214 - Marlborough Buildings (TA)	19.6	16.1	-3.4
DT215 - Queen Parade Place (TA)	17.6	15.3	-2.3
DT216 - Monmouth Place (TA)	26.0	24.4	-1.6
DT217 - Cavendish Road (TA)	16.8	13.6	-3.2
DT219 - Morford Street	21.3	17.7	-3.6
DT221 - Gay Street - façade	35.9	27.7	-8.3
DT222 - Anglo Terrace façade (TA)	49.0	38.1	-10.8
DT223 - Canton Place (TA)	37.5	25.6	-11.9
DT224 - Walcot Parade 2 (TA)	55.2	43.1	-12.1
DT225 - Cleveland Terrace (TA)	37.5	32.2	-5.3
DT227 - Wells Road 3 (TA)	40.4	32.4	-7.9
DT232 - Lansdown Road 3 (TA)	29.4	23.2	-6.2
DT233 - Lansdown Road 4 (TA)	28.2	22.9	-5.2
DT234 - Gay Street 2 (TA)	39.8	36.0	-3.8
DT235 - Wells Road 4 (TA)	36.9	35.1	-1.9
DT236 - Pulteney Terrace (TA)	29.8	21.0	-8.8
DT237 - Broad Street 2	35.2	30.8	-4.3
DT238 - Broad Street 3 (TA)	33.8	28.6	-5.2
DT239 - Broad Street 4 (TA)	36.7	31.8	-4.8
DT240 - Bathwick Street 2 TA)	30.4	18.1	-12.3
DT241 - Bathwick Street 3 (TA)	24.0	15.0	-9.0
DT242 - Charlotte Street 2 (TA)	24.0	18.8	-5.2
DT243 - Sydney Place (TA)	30.3	20.9	-9.4
DT246 - Dorchester Street 2 (TA)	38.6	31.1	-7.6
DT247 - Monmouth Place 2 (TA)	29.9	26.1	-3.8
DT248 - Chapel Row 2 (TA)	38.3	36.6	-1.7
DT288 - Victoria Buildings Façade	N/A	29.1	N/A

Table 2- showing sites within the CAZ_Boundary (sites outside the CAZ boundary but within the urban area of Bath including Batheaston and Bathampton) site grouping which were recording data in 2021. 57 sites in total were used for analysis. TA = triplicate average (where three diffusion tubes are located at one site and an average of all three taken).

Site ID	2019 NO_2 concentration ($\mu g/m^3$)	2021 NO_2 concentration ($\mu g/m^3$)	Change ($\mu g/m^3$)
DT008 - Windsor Bridge	28.1	22.5	-5.6
DT026 - Upper Wellsway	27.0	22.5	-4.5
DT034 - Newbridge Rd	31.2	21.6	-9.6
DT052 - Walcott Terrace (TA)	36.1	25.3	-10.9
DT055 - Lambridge	36.2	27.9	-8.3
DT058 - Batheaston - London Rd West A	25.0	20.9	-4.1
DT062 - Argyle Terrace	37.2	33.5	-3.8
DT084 - Bearflat	30.4	23.5	-7.0
DT085 - RUH North	26.4	22.2	-4.2
DT091 - Bathampton High Street	23.1	18.4	-4.7
DT094 - Batheaston - London Rd West B	25.5	20.0	-5.5
DT130 - Batheaston - London Road West C	26.1	19.7	-6.4
DT142 - Prior Park Road	32.8	23.3	-9.5
DT143 - Rackfield Place	26.2	21.4	-4.7
DT150 - Brougham Hayes	29.5	22.2	-7.2
DT151 - Widcombe Hill	26.7	19.2	-7.5
DT152 - Bathwick Hill	25.2	18.3	-6.8
DT154 - Bradford Road	27.9	21.0	-6.9
DT155 - Newbridge Hill 2	18.4	12.4	-5.9
DT163 - A4 Box Road, Batheaston	22.7	13.9	-8.9
DT165 - Brassknocker Hill	36.7	26.1	-10.6
DT166 - A36 Bathampton	27.7	18.8	-8.9
DT167 - Weston High St	22.3	18.4	-3.9
DT168 - Englishcombe Lane	13.5	10.9	-2.6
DT169 - Eastbourne Ave	22.8	17.5	-5.3
DT171 - Frome Road/Upper Bloomfield	26.8	23.2	-3.6
DT179 - Upper Bristol Road 3 (TA)	36.7	26.9	-9.7
DT181 - Wellsway	33.2	26.1	-7.1
DT185 - Greenway Lane	16.3	10.9	-5.5
DT186 - Coronation Ave	20.2	15.4	-4.9
DT187 - Stanley Road West	23.4	18.1	-5.3
DT188 - Moorland Road	22.3	16.7	-5.6
DT189 - Old Newbridge Hill	29.3	25.2	-4.1
DT190 - Church Street	13.5	10.6	-2.9
DT191 - Batheaston - Mill Lane	19.0	15.3	-3.7
DT192 - Fairfield Road	16.1	12.3	-3.7
DT193 - Granville Road	9.5	7.2	-2.3
DT194 - Brooklyn Road	16.2	12.4	-3.8

DT195 - Lansdown Lane	20.7	18.2	-2.6
DT196 - Oakley	28.2	17.6	-10.6
DT197 - Rush Hill	24.5	19.5	-5.0
DT199 - Hensley Road	12.9	9.7	-3.2
DT200 - Millmead Road	15.5	13.0	-2.5
DT201 - The Hollow	23.7	20.5	-3.2
DT202 - Charlcombe	14.2	10.3	-3.9
DT206 - Park Lane (TA)	31.1	24.1	-7.1
DT209 - Bellots Road	18.8	15.1	-3.7
DT210 - Red Lion Roundabout	32.6	28.2	-4.4
DT218 - Weston Road	19.0	15.1	-3.9
DT226 – AURN* (TA)	31.5	26.9	-4.6
DT228 - Lower Bristol Road 2 (TA)	28.8	24.7	-4.1
DT229 - Lower Bristol Road 3 (TA)	35.9	30.1	-5.8
DT230 - Upper Bristol Road 4 (TA)	35.4	35.5	0.1
DT231 - Upper Bristol Road 5 (TA)	41.2	32.1	-9.1
DT244 - Whiteway	18.4	16.9	-1.5
DT245 - Whiteway 2	25.0	19.5	-5.5
DT276 - Twerton High Street	N/A	30.8	N/A

*Automatic Urban and Rural Network- These diffusion tubes are located at our Automatic Urban and Rural Network monitoring site located on A4 London Road.

Table 3- showing sites within the Wider_B&NES (sites outside of Bath, Batheaston and Bathampton urban areas, but with the rural areas and district wide urban areas of B&NES) site grouping which were recording data in 2021. Some sites which were recording in 2021 do not have a 2019 baseline as they were installed at a later period. 40 sites in total were used for analysis. TA= triplicate average (where three diffusion tubes are located at one site and an average all of three taken.

Site ID	2019 NO_2 concentration ($\mu g/m^3$)	2021 NO_2 concentration ($\mu g/m^3$)	Change ($\mu g/m^3$)
DT032 - Whitchurch	33.4	28.1	-5.4
DT033 - Keynsham (Kelston Road)	12.0	9.6	-2.4
DT063 - Keynsham - Station Rd	25.0	20.7	-4.3
DT064 - Keynsham - Charlton Rd B	27.6	23.1	-4.4
DT065 - Keynsham - Charlton Rd A	26.6	22.5	-4.1
DT066 - Keynsham - High St A	31.8	27.5	-4.3
DT067 - Keynsham - Somerfield	30.6	24.6	-5.9
DT068 - Keynsham - Temple St	19.3	16.0	-3.3
DT069 - Keynsham - Rock Road	22.4	20.1	-2.3
DT070 - Keynsham - Bath Hill	22.8	17.6	-5.2
DT075 - Saltford - The Crown	30.4	23.0	-7.4
DT077 - Saltford - Bath Rd	26.5	19.3	-7.1
DT096 - Temple Cloud 1 (TA)	56.4	44.2	-12.2
DT098 - Whitchurch 2	30.1	23.7	-6.4
DT100 - Whitchurch 4	24.9	21.3	-3.6
DT101 - Whitchurch 5	36.0	30.4	-5.6
DT107 - Keynsham - Bath Hill (South)	32.7	28.4	-4.2
DT108 - Temple Cloud 2 (TA)	39.0	30.3	-8.7
DT109 - Temple Cloud 3 (TA)	36.1	29.4	-6.7
DT112 - Keynsham - Ashton Way	20.9	19.3	-1.6
DT113 - Keynsham - West View Rd	15.2	12.8	-2.4
DT114 - Keynsham - Victoria Church	23.4	19.3	-4.0
DT115 - Keynsham - High Street B	20.7	13.7	-7.0
DT116 - Keynsham - Fish Bar	22.1	16.5	-5.6
DT134 - Farrington Gurney 2	38.8	32.1	-6.7
DT136 - Farrington Gurney 3	37.3	29.2	-8.0
DT138 - Farrington Gurney 5	35.6	28.4	-7.3
DT141 - Keynsham A4	30.9	25.2	-5.7
DT174 - Pensford 3	34.8	32.0	-2.7
DT252 - Temple Cloud 9 (TA)	N/A	34.0	N/A
DT253 - Temple Cloud 10 (TA)	N/A	39.4	N/A
DT254 - Temple Cloud 11 (TA)	N/A	34.3	N/A
DT255 - Temple Cloud 12 (TA)	N/A	37.5	N/A
DT257 - Farrington Gurney - Sunnyside	N/A	18.9	N/A
DT258 - Radstock - Frome Road	N/A	23.3	N/A
DT266 - Keynsham - Avon Mill Lane	N/A	17.9	N/A
DT268 - Westfield 4	N/A	24.5	N/A
DT269 - Westfield 5	N/A	14.2	N/A
DT270 - Westfield 6	N/A	21.4	N/A
DT271 - Westfield 7	N/A	25.3	N/A

Bath & North East Somerset Council

CLIMATE EMERGENCY AND SUSTAINABILITY

This Forward Plan lists all the items coming to the Panel over the next few months.

Inevitably, some of the published information may change; Government guidance recognises that the plan is a best assessment, at the time of publication, of anticipated decision making. The online Forward Plan is updated regularly and can be seen on the Council's website at:

http://democracy.bathnes.gov.uk/mgPlansHome.aspx?bcr=1

The Forward Plan demonstrates the Council's commitment to openness and participation in decision making. It assists the Panel in planning their input to policy formulation and development, and in reviewing the work of the Cabinet.

Should you wish to make representations, please contact the report author or, Democratic Services (). A formal agenda will be issued 5 clear working days before the meeting.

Agenda papers can be inspected on the Council's website.

Ref Date	Decision Maker/s	Title	Report Author Contact	Director Lead
27TH JUNE 2022				
27 Jun 2022	**Climate Emergency and Sustainability Policy Development and Scrutiny Panel**	**Clean Air Zone Update**	Cathryn Brown Tel: 01225 477645	Chief Operating Officer
27 Jun 2022	**Climate Emergency and Sustainability Policy Development and Scrutiny Panel**	**Recycling Hub Plans**	Kate Hobson, Carol Maclellan Tel: 01225 395207, Tel: 01225 394106	Chief Operating Officer
27 Jun 2022	**Climate Emergency and Sustainability Policy Development and Scrutiny Panel**	**City Centre Security Programme Implementation Update**	Lynda Deane Tel: 01225 396428	Chief Operating Officer
18TH JULY 2022				
18 Jul 2022	**Climate Emergency and Sustainability Policy Development and Scrutiny Panel**	**Retrofitting**	Jane Wildblood Tel: 01225 477685	Director of Sustainable Communities

Ref Date	Decision Maker/s	Title	Report Author Contact	Director Lead
18 Jul 2022	**Climate Emergency and Sustainability Policy Development and Scrutiny Panel**	**Electric Vehicle Charging Points**	Chris Major Tel: 01225 39 4231	Director of Sustainable Communities
18 Jul 2022	**Climate Emergency and Sustainability Policy Development and Scrutiny Panel**	**Local Plan Partial Update**	Simon De Beer Tel: 01225 477616	Director of Sustainable Communities
19TH SEPTEMBER 2022				
19 Sep 2022	**Climate Emergency and Sustainability Policy Development and Scrutiny Panel**	**Gulls Strategy**	Aled Williams Tel: 01225 396625	Chief Operating Officer
19 Sep 2022	**Climate Emergency and Sustainability Policy Development and Scrutiny Panel**	**Renewables**	Jane Wildblood Tel: 01225 477685	Director of Sustainable Communities

Ref Date	Decision Maker/s	Title	Report Author Contact	Director Lead
19 Sep 2022	**Climate Emergency and Sustainability Policy Development and Scrutiny Panel**	**Heritage Services Strategic Approach**	Robert Campbell	Director of Sustainable Communities
14TH NOVEMBER 2022				
14 Nov 2022	**Climate Emergency and Sustainability Policy Development and Scrutiny Panel**	**Council House Building Programme**	Graham Sabourn Tel: 01225 477949	Director of Sustainable Communities
14 Nov 2022	**Climate Emergency and Sustainability Policy Development and Scrutiny Panel**	**Annual Homelessness Update**	Graham Sabourn Tel: 01225 477949	Director of Sustainable Communities
14 Nov 2022	**Climate Emergency and Sustainability Policy Development and Scrutiny Panel**	**Planning Performance**	Simon De Beer Tel: 01225 477616	Director of Sustainable Communities
ITEMS TO BE SCHEDULED:				

Ref Date	Decision Maker/s	Title	Report Author Contact	Director Lead
	Climate Emergency and Sustainability Policy Development and Scrutiny Panel	**WECA Spatial Development Strategy**	Simon De Beer Tel: 01225 477616	Director of Sustainable Communities
	Climate Emergency and Sustainability Policy Development and Scrutiny Panel	**Littering Review (progress report)**	Carol Maclellan Tel: 01225 394106	Director of Sustainable Communities
	Climate Emergency and Sustainability Policy Development and Scrutiny Panel	**Discovery Card Review**		Director of Sustainable Communities
	Climate Emergency and Sustainability Policy Development and Scrutiny Panel	**Bath Quays North Regeneration**		Chief Operating Officer

The Forward Plan is administered by **DEMOCRATIC SERVICES**: Democratic_Services@bathnes.gov.uk

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