Report
September 2023

Appendix A: Traffic Filter Monitoring Data and Evidence

Oxfordshire County Council
Our ref: 24194201
Client ref:

steer

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Prepared by:

Steer
14-21 Rushworth Street
London SE1 0RB

+44 20 7910 5000
www.steergroup.com

Prepared for:

Oxfordshire County Council
County Hall, New Road
Oxford OX1 1ND

Client ref:
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1 Introduction

Traffic filters Monitoring and Evaluation Plan

1.1 Steer is preparing a Monitoring and Evaluation (M&E) Plan for the traffic filters scheme. The M&E Plan will provide an opportunity to determine how effective the traffic filters are in reducing traffic levels in Oxford, as well as delivering other desired benefits resulting from this such as quicker and more reliable bus journeys, modal shift from private car to walking, cycling and public transport use, better air quality and reduced exposure to air pollution.

1.2 The monitoring will also provide an early mechanism to identify whether any changes are required, including to the scheme design and/or further supporting measures, to ensure scheme benefits are realised and/or to mitigate any negative impacts because of, for example, displaced traffic, economic effects and socio-distributional effects.

Scope

1.3 This document provides a gap analysis on the data currently available or being collected by the Council and others to inform decisions on the information to be collected, source of data, methods of collection, frequency and responsible team for collecting the data.

M&E data themes

1.4 This document is structured in line with the following data themes identified in the draft M&E Plan which is currently in development:

- Administration of traffic filter scheme
- Traffic flow data (including cycle)
- Bus data (journey times, demand)
- Road congestion and journey time data
- Air quality monitoring
- Collisions and monitoring
- Economic and business impacts
- User experience and behavioural surveys
- Reporting and assessment

1.5 A series of meetings have been held to provide us with a detailed understanding of data availability across these areas, and therefore to inform gap analysis, as summarised in Table 1-1.

Table 1-1: Meetings to inform gap analysis

Meeting/topic	Discussion areas
OCC iHUB team RE various data procured via iHUB and hosted in Alchera data-hub	• INRIX • Vivacity • Data-hub (Alchera) • LTCP Monitoring

(1 meeting with iHUB/ Alchera joint, 1 follow up with iHUB)	• LTN reporting
Alchera (2 meetings) RE data-hub	• Follow-up on detail of data, data query options for M&E, and visualisation.
Oxford City Council and Vale of White Horse Council RE air quality	• Coverage air quality monitoring • Approach to measurement of PMs/Nox
OCC RE traffic count data (OCC)	• Count data • Follow up on email re 'gaps'
National Highways RE traffic data and air quality data	• Traffic data • Air quality data
Oxford City and Oxford County Council RE economic data (2 meetings)	• Footfall • Shop vacancy • Business impacts • Spend data
Mastercard RE spend data	• Spend data / costs
Beauclair RE spend data	• Spend data / costs
OCC RE collisions data	• Approach to collision data collection
Bus data / CitySwift (previously held meetings with CS)	• Scope and coverage of CitySwift data
OCC RE 'Corrective Action Plan' (CAP)	• Approach to CAP

2 Administration of Traffic Filter Scheme

Introduction

2.1 The system that is used to administer the traffic filter permits and enforce the restrictions will provide a range of reporting data and opportunity for gathering feedback from users.

Evaluation themes and questions

2.2 Table 2-1 sets out the evaluation themes and key questions on how data from the traffic filter administration system may be used to evaluate impact.

Table 2-1: Evaluation themes and questions

Questions	Where addressed in M&E
Information and awareness • Was the traffic filter scheme and the requirement for permits understood by residents (in each of the 'day pass' areas)? • What the perception of the 'ease of use' and understanding of the permit application process?	User experience/ resident surveys (attitudinal) – see section 9
Permit applications • What was the level of permit applications from within the '100-day pass' area and within the '25-day pass' area? • What proportion of eligible applicants applied for permits?	Application data (quantitative)
Permit usage • How many permits used per day from within the '100-day pass' area and within the '25-day pass' area? • Compliance rate	Usage data (quantitative)
User experience • What was the average time taken between permit application and issue? (How does this compare with target time?)	Post application questionnaire
Changes through ETRO period • How did the above change over the course of the trial and pre-trial? • Were any changes made to the process?	M&E reporting

Monitoring data and evidence

There are three main sources of evidence from the Traffic Filter Permit System as summarised in Table 2-2.

Table 2-2: Traffic filter permit system - evidence

Monitoring data	Evidence provided
Permit usage data application Website/Portal [assessment of applications - before journey]	*Information provides:* • Number of applications; and • Time taken to process/approve applications. *Disaggregation of data based on:* • Day-pass area; • Period (by week to months); • Application profile by households; and • Applicant profile (e.g. age).
Permit usage and compliance data [assessment of journeys based on permits per day / period]	*Usage – based on website/portal:* • How many permits 'used' per day/week/period? These measure 'people/cars'. *Usage & Compliance – based on ANPR data:* • Usage based on 'trips'. • What was the level of compliance – number and proportion (i.e. what number/proportion of trips entered without having a permit/exemption)?
User experience	*Applicant user survey:* • Questionnaire survey (optional, post application) • Questionnaire survey

Note: User experience of traffic filters also examined through resident surveys and business panel / surveys, as described in sections 8 and 9.

Proposed monitoring approach

2.5 Our suggested approach is outlined below.

Permits application M&E

- OCC will administer the permits system
- OCC can 'query' the system to obtain up-to-date data at any point
- A 'dashboard' of key outputs is prepared at agreed intervals.
  - Monthly in 3-months prior to traffic filter implementation and during course of ETRO.
  - The dashboard reporting would be specified and reporting 'automated' insofar as possible.

User survey data

- OCC would draft and administer the 'user survey', based on similar surveys currently used to gain user responses on parking permit applications.
  - This could be 'queried' at any point.
  - Dashboard reporting aligned with the above.

Usage and compliance

- OCC would report on levels of non-compliance.

Evidence gaps/options

- None

M&E procurement and costs

- Ensure the above captured in procurement specification for 'back office' systems.
- User survey – OCC to estimate costs.

3 Traffic Flow and Cycle Flow Data

Introduction

3.1 Traffic flow is the single most important indicator to monitor. Traffic reduction in the city represents the main 'first order' effect of scheme. The impact on traffic levels is fundamental to achievement of a range of traffic filter scheme objectives, and also represents a key potential adverse impact of the scheme due to traffic re-routing effects.

Evaluation themes and evaluation questions

3.2 Evaluation themes and evaluation questions that traffic flow data will help to answer are shown in Table 3-1.

Table 3-1: Evaluation themes and questions

Theme	Questions	Where addressed in M&E
What was the impact on users and traffic at the traffic filter locations?	**Effect on traffic Levels** • What was the impact on traffic levels at traffic filter locations? • How did this compare with the forecast level of impact? • How do these impacts vary by mode / traffic filter location? **Changes through ETRO period** • Were any changes made to the traffic filters during the process? [e.g. Hollow Way] • Did compliance rates change over time (i.e. during the course of the trial)?	Traffic filter data on flows and compliance (quantitative) M&E Reporting
What impact have traffic filters had on traffic flows?	**What have been the overall impact across areas / key locations?** • City centre, inner city and outer city model reference sites and monitoring rings; • Impact on the A34 and ring road; and • Impact on specific links e.g. Woodstock Road and Botley Road. **How do impacts vary by vehicle type?** • Car, LGV, HGV etc. **How do impacts vary by day and time period?** • Peak, inter-peak and PM peak; • Weekdays vs weekends; and • Hours of traffic filter operation (7am to 7pm) versus other periods – is there an increase in traffic pre-7am and post-7pm? **Changes through ETRO period** • Were any changes made to the traffic filters during the process?	Traffic count data (quantitative) M&E Reporting

	• Did traffic flows change during the course of the trial?	

OCC monitoring data and evidence

3.3 A range of traffic flow data is available which, taken together, provides comprehensive coverage of flows across the city. The OCC data falls into two broad categories:

- 'Live'/ongoing count sites (BlackCat, Vivacity and traffic filter ANPR). These provide high-quality data, readily accessible, with breakdown by vehicle class.
- 'Periodic' data. These are collected for specific times of year and some have more limited user-class breakdown.

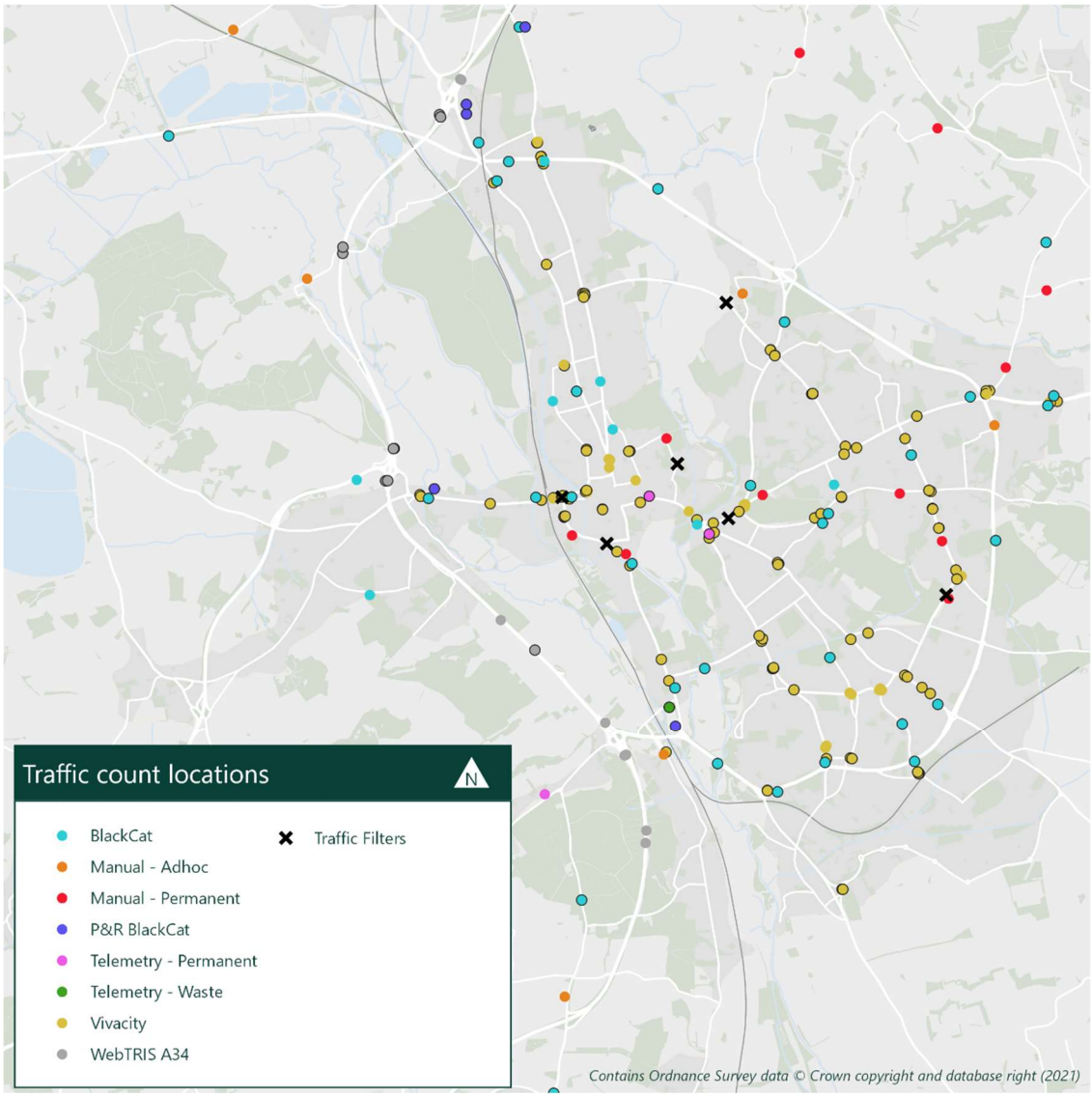
3.4 OCC traffic monitoring data is summarised in Table 3-2.

Table 3-2 Summary of OCC traffic monitoring data

Type (measurement and data source)	Coverage	Frequency of collection	Disaggregation (potential)
Traffic filter ANPR data and PCN data	Six traffic filter locations	• Ongoing • Assume 'live' from 3-months before ETRO start to get 'before' data	• By traffic filter location • By day / time of day • By vehicle type
Live (Blackcat) traffic counters	33 sites throughout city (see Figure 3-1)	• Ongoing 'live' data • Dates back to 2018 / 2019	• By day / time of day • By vehicle type • Some have cycle / others not • Speed crossing induction loop
Vivacity Labs cameras	190 data points, of which 155 within the city, from Vivacity Cameras (see Figure 3-1)	• Ongoing 'live' data Dates - vary by camera	• By day / time of day • By vehicle type
Other permanent counts	10 sites throughout city (see Figure 3-1)	Data is being recorded continuously and is collected manually twice a year between Dec-Feb and Jun-Aug	Traffic flow. No user class split.
Non-permanent counts	2 sites throughout city (see Figure 3-1)	Data collected twice a year between Mar-May and Sept-Nov for a 1 week period each time	Traffic flow. No user class split.
Manual classified Counts	Sites throughout city (see Figure 3-1)	MCCs at inner (city centre) typically in May, and outer ring (ring road) typically in October each year [areas where live Blackcat counters are placed]	October 2022, Planned for October 23.
P&R	5 P&R Sites (see Figure 3-1)	As Live (Blackcat) traffic counters	As Live (Blackcat) traffic counters.

3.5 The counter locations are shown in Figure 3-1. Sites marked with a dark ring indicate availability of recent data (i.e. January 2023). Those not ringed have not been found to have very recent data, but to have some over periods during the last year.

Figure 3-1: Current traffic counter sites in and around Oxford city



National Highways A34 data

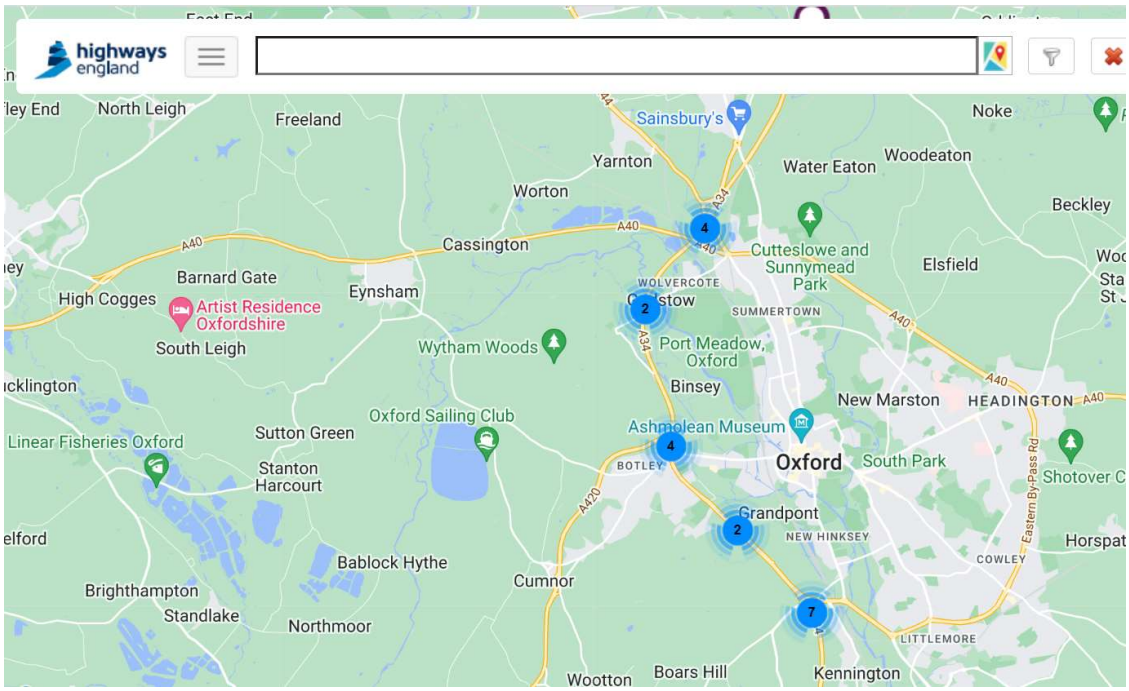
3.6 There are five National Highways (NH) count sites in the A34, shown in Figure 3-2.

3.7 OCC/Steer met with NH (8 February) and follow-up action was agreed on the data that NH count sites provide and how this can be employed to support the M&E Plan.

3.8 Through discussions with Alchera, we understand that NH data is also held by Alchera (under separate contractual arrangement with NH). The preferred and most efficient option would be for Alchera to host both OCC and NH data, and for M&E delivery organisation[1] to be granted access to NH site data via Alchera Data-Hub. This would be subject to agreement with NH.

[1] This document sets out the M&E Plan. The delivery of the plan would be separately procured by OCC.

Figure 3-2 National Highways A34 traffic counter sites (via WebTRIS)



Summary of proposed monitoring approach

Approach to data collation

3.9 Table 3-3 outlines a proposed approach to monitoring traffic count data.

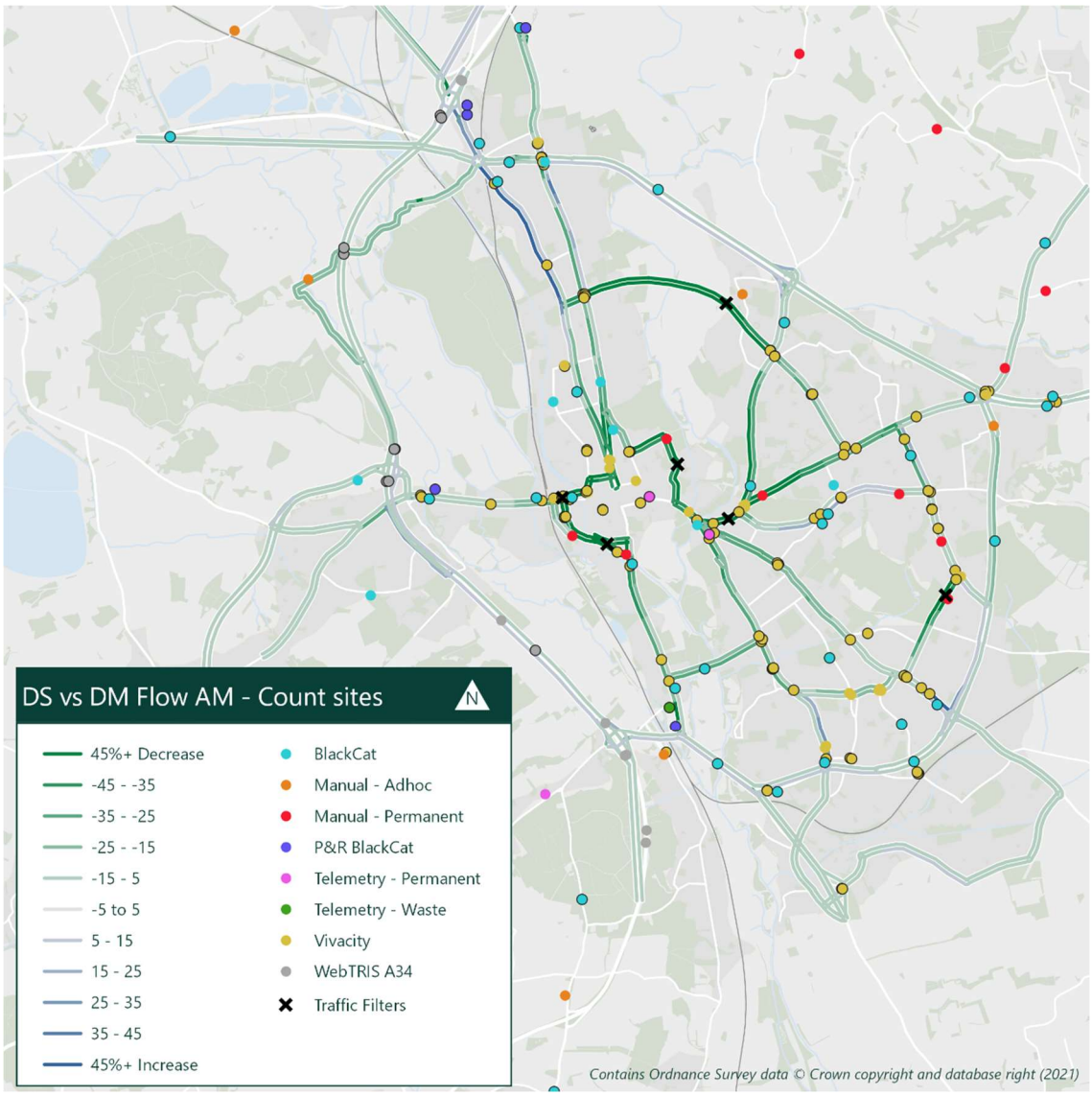
Table 3-3: Proposed monitoring of traffic count data

Key question	Proposed approach
What to monitor?	• 'Live' data used for ongoing monitoring / dashboard reporting based on Black Cat and VivaCity. – Efficient and meaningful (limit 'lag' between observed data and identification of any issues with the traffic filter scheme in terms of traffic impacts) • Other counts – supplement analysis within M&E reporting (i.e. towards end of ETRO). – More periodic and generally less reliable (harder to audit on ongoing basis). • For the M&E reporting use of wider count data e.g. 'comparator' areas/roads across Oxfordshire can be used to assess 'underlying' changes in traffic.
How to monitor and collate?	• Propose to access via Alchera 'Alpha' Data Hub which consolidates 'live' data from both ATCs (e.g. BlackCat) and VivaCity cameras. • It should also be straightforward for traffic filter ANPR data to also be fed 'live' into Alchera.
When to monitor?	*Suggest that 'live' monitoring data reported as follows:* • Weekly in initial phases of ETRO [first 10 to 12 weeks] to inform OCC. • Monthly 'dashboard' reporting thereafter. Other counts – used to inform M&E reporting (i.e. periodic rather than monthly 'dashboard').
Who should monitor?	• M&E delivery organisation via Alchera

Key question	Proposed approach
	• M&E delivery organisation to develop 'dashboard' – Map – all count sites (indexed to an agreed baseline) – Aggregation/averaging of flows by key geography [as per the traffic filter predicted impacts – central/ inner, outer, A34] – Summary of flow change by vehicle type

3.10 Figure 3-3 shows the location of current traffic count sites and the modelled link flow change between the Do Minimum (no scheme) and Do Something (with traffic filters) during the AM peak hour. This shows the comprehensive coverage that would be provided by the monitoring of BlackCat and VivaCity sites.

Figure 3-3 Current traffic count sites and modelled TF (DS vs DM) AM flow change (%)



Cycle and pedestrian Data

3.11 The Black Cat, VivaCity and traffic filter ANPR sites will all be able to monitor cycle and (in many cases) pedestrian flows. This will provide comprehensive data to support analysis of changes in pedestrian and cycle demand at part of the M&E Plan.

Approach to data quality control / monitoring

3.12 The M&E Plan and reporting relies on the quality and coverage of data.

3.13 There are issues inherent in the collection of ATC data in real time and in the public environment, whereby equipment failure (cameras, count loops) can mean that data from specific sites can be lost over a period of time. To support the overall M&E Plan, OCC should seek to maximise the usability of data, through identifying and rectifying issues as they arise.

Proposed/suggested approach

3.14 From discussion with Alchera, they are already working alongside OCC in identifying, from 'live tracking', where there are gaps or anomalies in OCC ATC or iHUB / VivaCity data.

3.15 We consider that an approach whereby Alchera can set up warning 'flags' to identify data gaps as they occur is a more responsive and efficient way of identifying issues compared to an alternative whereby Steer (or OCC) would identify issues through regular 'download' of data, as this would increase lag between problem identification and solving.

Identifying 'event data' that could impact on observed counts

3.16 There are a number of temporary factors, other than traffic filters, that have the potential to affect traffic flows. As part of the M&E, there is a need to have a record of events/incidents, so that the impact of any temporary factors can be identified and understood.

3.17 The Alchera Alpha Data-Hub includes record of 'events' (e.g. roadworks, accidents), which we will use to interrogate and explain potential anomalies in data and that such data can be 'screened' or explained in the monitoring.

Evidence gaps

3.18 The overall coverage is comprehensive and considered suitable to support the M&E Plan. The only potential 'gap' relates to potential traffic impacts on local residential or secondary roads that could witness an increase in traffic due to the re-routing effects on traffic filters (in some instances also affected by LTNs).

3.19 These are routes where the transport modelling provides some, but limited, insight into the potential increases in these routes. A combination of resident concerns, impacts suggested by traffic modelling and professional judgement will point towards residential/secondary roads that are not covered by existing count sites that we may evaluate as part of the M&E process.

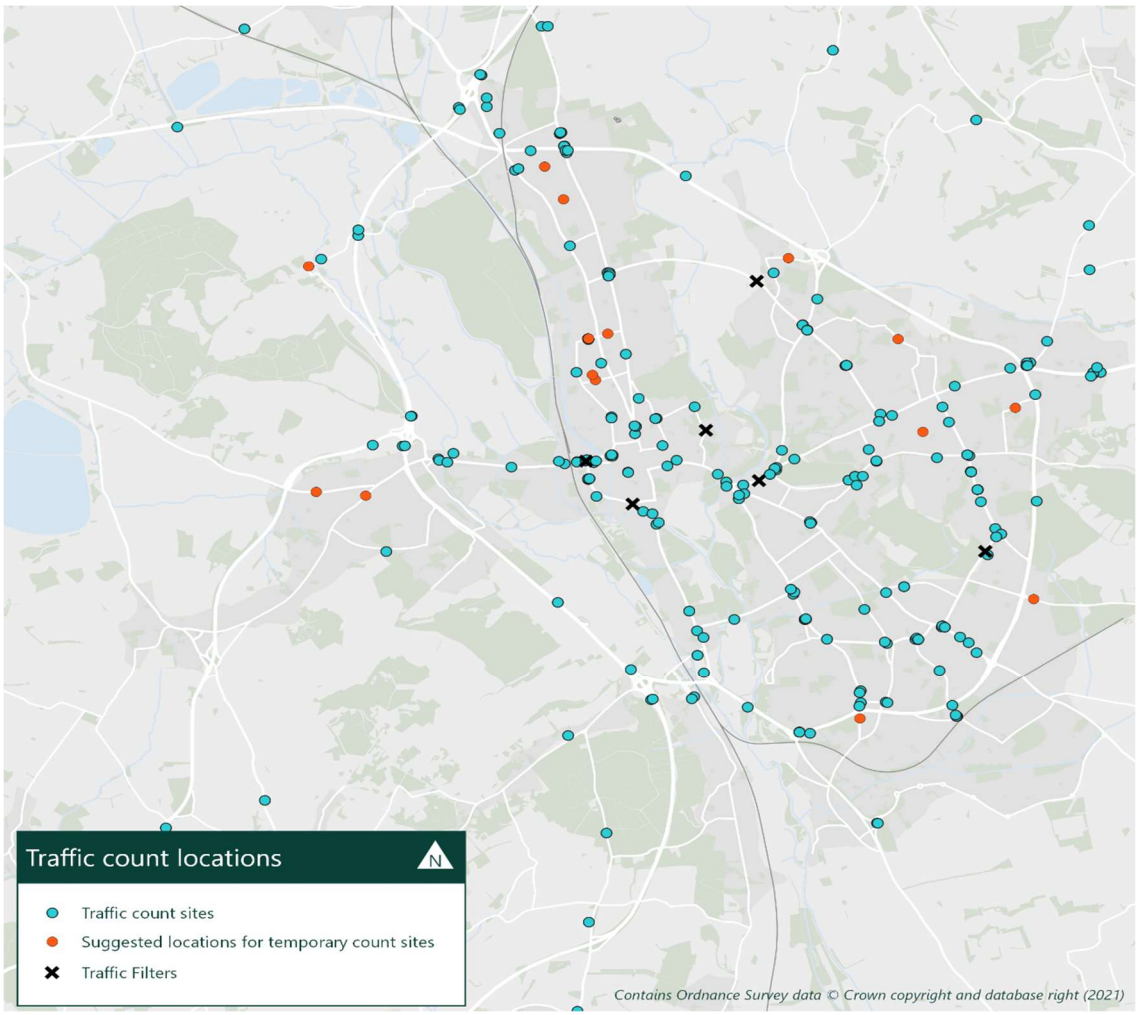
3.20 A list of potential locations for consideration are summarised in Table 3-4 and shown in Figure 3-4. These sites are gaps in current data collection, and some align with road links where modelling suggested potential traffic displacement may occur and/or areas of concern raised in the public consultation. We suggest an allowance for around 15 additional temporary count sites should be included within the M&E Plan and budget.

Table 3-4 Local and secondary Roads

Area	Location number/description
North Oxford	1. Davenant Road
North Oxford	2. Squitchey Lane (in case we do see longer queuing northbound with cars using Squitchey Lane to avoid)
North Oxford	3. Wytham (suggest use existing "Non-permanent" counter site)

North Oxford	4. St Margaret Road (possibly on both sections, linked to where model is predicted increases, so on link between Kingston Road and Woodstock Road, and also the link between Woodstock Road and Banbury Road)
Jericho[2]	5. St Bernard's Road
Jericho	6. Plantation Road
Headington Area	7. Lime Walk
Headington	8. Quarry Hollow/Beaumont Road (or location of "Non-permanent" counter site if different)
Headington	9. Dunstan Road
Old Marston	10. Elsfield Road (suggest use existing "Non-permanent" counter site)
Horspath	11. Horspath Road (near Eastern Bypass)
Littlemore	12. Oxford Road (near Littlemore Roundabout)
Botley Area	13. Cumnor Hill
Botley Area	14. Eynsham Road (already a "Permanent" counter site so could use this)

Figure 3-4: Current traffic count sites and proposed additional temporary sites



[2] Note, these is already a Blackcat live counter on Kingston Road just south of Leckford Rd.

3.21 In terms of the timing, we suggest these only need to be implemented in a period of weeks or months before (i.e. there is no requirement for implementation before the traffic filter implementation date is confirmed) the trial and during the trial. The timing of the surveys should be based, insofar as practicable, on neutral weeks that support comparable before and after assessment.

4 Bus Journey Times and Demand

Introduction

4.1 Improving bus journey time and journey time reliability are key objectives of the traffic filter scheme. The traffic filter proposals also included proposed Bus Service Plan of bus service enhancements to be implemented alongside traffic filters.

Evaluation themes and questions

Table 4-1: Evaluation themes and questions

Themes	Questions
What impact have traffic filters had on road-user journey times?	**Impact on road-user journey times?** • By area / key location; • Specific routes / route segments roads; and • By time period.
What impact have traffic filters had on bus journey times?	**Impact on bus journey times?** • By area / key location; • By routes; and • By time period.
What impact have traffic filters had on bus service provision?	**Impact on bus services and frequencies?** • Routes (as per BSP?); and • Service levels.

Monitoring data and evidence

CitySwift data

4.2 The two dominant bus operators (Oxford Bus Company and Stagecoach) and OCC have commissioned CitySwift to collate and report observed bus data, covering all routes across the SmartZone area.

4.3 The CitySwift Data provides historical (back to 2019) and ongoing data, covering:

- Bus journey times by route and by section;
- Bus reliability metrics;
- Bus boardings;
- Bus dwell times; and
- Total bus kilometres operated.

4.4 Data can be disaggregated by:

- Time period;
- Routes;
- Operator; and
- Section (or geographical area).

Summary of proposed monitoring approach

4.5 The approach to monitoring data and key metrics is summarised below.

Table 4-2: CitySwift dashboard reporting

Monitoring data	Metrics/**d**isaggregation	Notes
Journey times	Geographical disaggregation (aligned with expected impacts) • City centre / inner • Oxford City • SmartZone Area Time period • AM Peak • PM Peak • Inter-peak • All-day average	• Exclude dwell time (normalise for demand) • Weighted average • Express as average 'speed'
Journey time reliability	% services within X minutes of arrival time	Confirm metric with CS.
Bus demand	Indexed demand (boardings) based on: *Area-Based Geography* • City centre / inner area • Oxford City • SmartZone Area *Specific locations* • P&R by site • Oxford Rail Station	Suggest indexation based on pre-Covid 2019 baseline.
Bus mileage	Index of total bus mileage operated (service mileage)	Suggest indexation based on pre-Covid 2019 baseline.

4.6 For the traffic filter dashboard it will be imperative that data is meaningful and representative, but also that no commercially sensitive information is disclosed. We therefore propose that:

- No operator specific data is reported.
- Potentially sensitive information (e.g. demand) is expressed as an index.

4.7 The proposed dashboard metrics will need to be agreed with Operators and OCC.

Contextual information

4.8 It will also be important to understand any relevant information that may affect bus performance in a specific month or period.

Bus service levels and frequency

Ongoing changes

4.9 Bus routes, services and frequencies are periodically reviewed by operators (for commercial services) and OCC (for supported services).

4.10 Any changes to proposed bus services by operators need to be notified to OCC one month before any change is implemented.

4.11 As part of the M&E of traffic filters, ongoing changes in bus services will need to be reported.

Changes related to traffic filter proposals

4.12 There are specific changes to the bus network, set out in the November Cabinet report, which are planned to be enabled by and complementary to the traffic filter proposals.

4.13 There will need to be specific monitoring of the development and delivery of services that are included within the Bus Service Plan.

Evidence gaps/options

4.14 There are no gaps anticipated, based on the detailed observed bus data that underpins the CitySwift data.

Note on Rail data for M&E
There are no rail service changes associated with the traffic filter scheme. There is expected to be a small increase in rail demand as a result of the traffic filters. This was estimated at around 900 trips per weekday which equates to around 250,000 per annum. The scale of this change would represent a 5% increase compared to the annual Oxford Station demand of over 5m trips in the full year to March 2022 (ORR Station usage stats), which was down from 8.7m in the year to 2020 (pre-pandemic). ORR count data is published annually. However, there is a reporting 'lag' (the data for the year to March 2022 was published in November 2022) and the data is based on the year to March data, which may not align with the 'before and after' traffic filter periods required for the evaluation. We propose to assess rail-based demand on an ongoing basis through examination of: • Bus boardings at/around Oxford Rail Station, and more general bus demand data, based on CitySwift data. This will show trend in bus-rail interchange trips. • Looking at cycle and walking demand flows on routes between the station and city centre. • Using evidence from resident surveys (see section 9). There is an option of deploying pedestrian counters (e.g. Springboard) at the station to obtain rail station usage. This would provide for better ongoing rail data and changes before and after traffic filter implementation. However, attribution of change to traffic filters could be difficult given the relatively modest predicted change in overall usage, and the other factors that will affect overall station rail demand. These sources together will help build a picture of trends in rail demand.

5 Road Congestion and Journey Time Data

Introduction

5.1 A key objective of traffic filters is to reduce traffic levels and congestion in the central and inner parts of the city. The traffic filter proposal will result in some car trips having to re-route to make the equivalent journey that they currently make. The traffic filter evidence prepared to support the November Cabinet Paper included an assessment of areas and roads (e.g. the A34) that are expected to experience an increase in traffic.

5.2 The changes to traffic flows are an important metric in being able to measure the traffic reduction and traffic displacement as a result of traffic filters.

5.3 A related issue is the degree to which changes in traffic levels contribute positively to desired objectives (to reduce congestion and improve journey times within the inner areas), while also having acceptable congestion and journey time impacts across the wider network.

Evaluation themes and questions

Table 5-1: Evaluation themes and questions

Themes	Questions
What impact have traffic filters had on road-user journey times?	**Impact on road-user journey times?** • By area / key location; • Specific routes / route sections; and • By time period.

Monitoring data and evidence

Data sources (INRIX)

5.4 Discussions are ongoing relating to INRIX.

5.5 Oxfordshire County Council has access to INRIX data which has been purchased by iHUB and is imported into the Alchera 'Alpha' data platform.

5.6 INRIX data is based on GPS telematics data / satellite navigation data from vehicles, which 'tracks' vehicles and can therefore record the journey time taken between key points and on specific links. The INRIX data aggregates data such that the overall 'average' journey times can be collated for all roads on the network.

5.7 The INRIX data:

- Covers all road links in Oxfordshire, including the A34.
- Has been purchased (to date) for four months of the year.

- Accounts for around 4-6% of total trips. However, the trip data is significantly skewed towards the commercial vehicle fleet.

Summary of proposed monitoring approach

Approach to data collation

5.8 The main potential uses of the INRIX data to support the M&E are:

- The link speed data, which is available by time period and direction;
- The potential to 'aggregate' links to obtain observable journey times across route sections and their intermediate timing points – for example the A34 and key radials into the city centre; and
- The 'skew' towards commercial vehicles would not affect average speeds, which would be governed by the prevailing traffic conditions reflecting all vehicle types.

5.9 The data can be compared for 'before and after' the ETRO for selected routes (those likely to be affected by changes in flow from traffic filters, and therefore resulting congestion and speeds) and can also be compared to 'control' areas (where flows do not change).

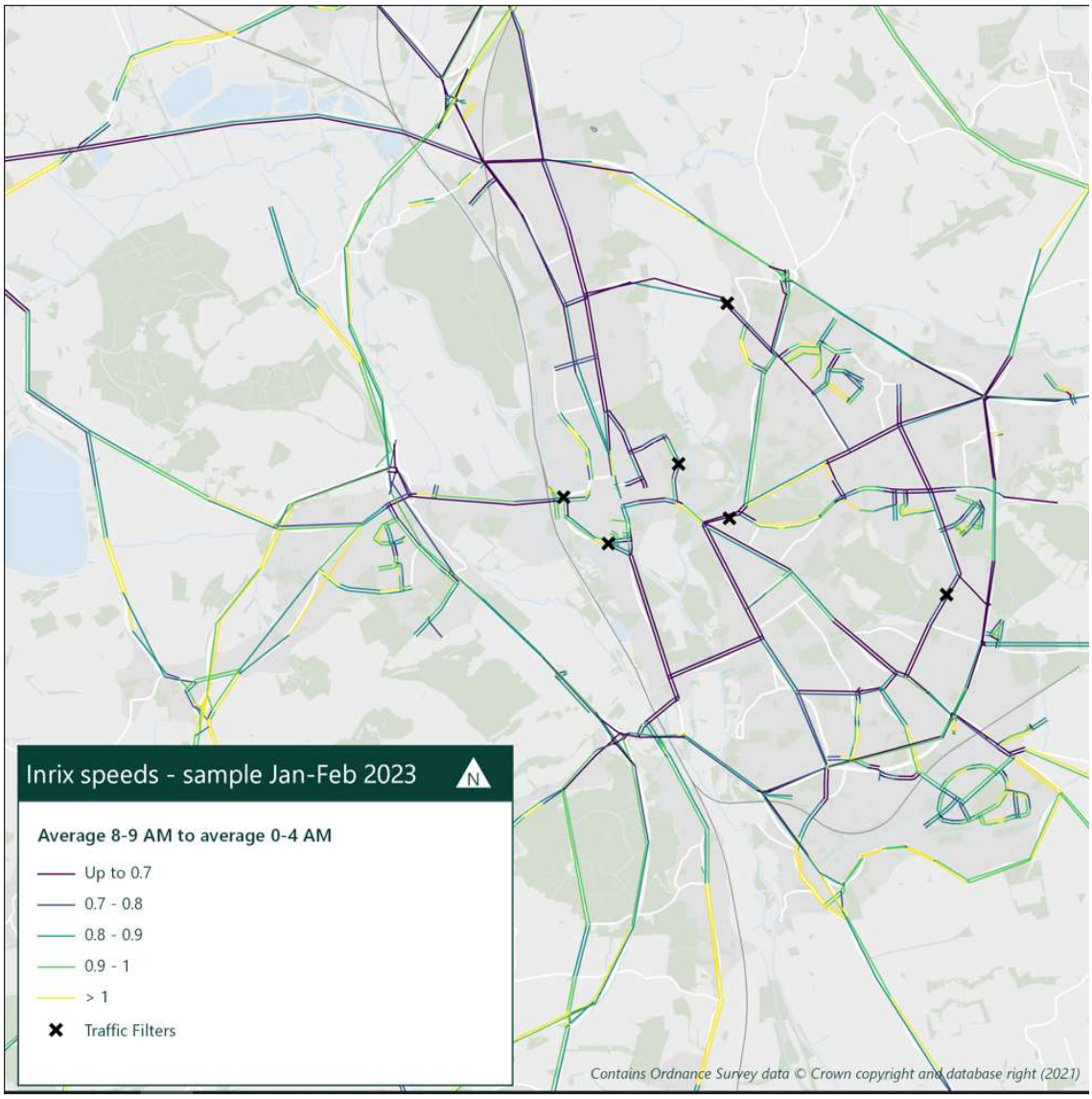
5.10 The functionality that INRIX has to consider routings (the INRIX 'PATH' function) is of less use as the skew towards commercial vehicles – which are exempt from filters – make this less meaningful and representative of the wider potential re-routing effects of the scheme.

5.11 Should the traffic filters result in 'unintended' impacts (such as a large increase in commercial vehicles through the traffic filters and within the city – which would be picked up in traffic count data), there would be the ability to interrogate 'before and after' PATH data to assess routing effects. However, such effects are expected to be secondary compared to the main effect of restricting car trips without a permit/exemption.

5.12 Figure 5-1 illustrates the INRIX data coverage. The map shows peak (0800-0900) speeds indexed against those of night-time 'free flow' speeds. The map shows both the comprehensive network coverage of INRIX data, and the ability to compare differences in journey speeds between given specified scenarios (in this case between time periods, but for M&E this would compare pre-and post-ETRO speeds).

5.13 Where the ratio of peak to free-flow speeds is below 1 (blue and green lines on the map), this indicates lower speeds at peak time periods, which is likely to be an indicator of the more congested roads.

Figure 5-1 INRIX-based journey speeds (ratio of Peak:'free-flow' speeds)



Approach to data quality control/monitoring

INRIX data

5.14 We propose piloting/testing the data through a 'dry-run' assessment during 2023. Our working assumption is that speed data, especially if averaged over a full month should provide reliable observed speeds. Data could be based on observations that exclude outliers (e.g. average excluding fastest/slowest X%) or be based on a 'percentile' measure e.g. 50th or 85th percentile. This could be assessed through piloting.

5.15 The main impacts on speed data are more likely to relate to other factors that may affect speeds e.g. traffic incidents, road closures. An understanding of these will be required to support interpretation of the data.

Other journey time data

5.16 We propose specifying some journey time routes/segments which correspond to bus routes, for which journey times will be monitored.

5.17 We would expect there to be a correlation between the *relative* INRIX speeds and bus speeds over common sections that do not include bus lanes (for different time periods, before and after etc.) and that in absolute terms INRIX speeds (commercial vehicles) should be faster than bus, due to bus dwell times at stops.

Evidence gaps

5.18 At this stage, we consider that INRIX data will provide the required data on highway journey times, which is a direct measure of highway network performance (journey times are directly affected by prevailing congestion levels).

5.19 The key potential gap relates to the temporal coverage of INRIX data, which is currently purchased by iHUB for four months of the year.

5.20 It may be that these months align well with the timing of the ETRO and its excepted impacts on traffic levels.

5.21 However, it would be prudent to make provision for the purchase of additional data should this be required. The need for additional data should be confirmed at the point when the ETRO start date is finalised, such that the suitable 'comparator' months can be identified. Historical data (e.g. for equivalent months in 2022) can be purchased at this point.

6 Air Quality Monitoring

Evaluation theme and questions

6.1 There are two key considerations for air quality monitoring, these are:

- The extent to which the forecast improvements/changes in air quality that relate to 'expected' changes in traffic levels have materialised; and
- Whether the changes in traffic levels contribute to a worsening in air quality in areas that exceed legal air quality threshold levels or could lead to an exceedance of threshold levels. There are two AQMAs within the area affected by traffic filters – Oxford City & Botley.

Estimated impacts based on traffic flows

Predicted impacts

6.2 The predicted air quality impacts were set out in the Oxford Traffic Filters Scheme Air Quality Modelling Report[3].

6.3 The assessment of the impact of traffic filters was underpinned by a modelling approach which directly related the change in traffic flow with and without the scheme to the predicted change in air quality.

6.4 As such, the changes in traffic flows through the ongoing monitoring are the most suitable proxy measure for the likely change in air quality *as a result of traffic filters*.

6.5 Air quality monitoring data, which is reported less frequently, should then provide evidence of how and where changes in traffic levels have observable and measurable effects on air quality.

Monitoring data and evidence - air quality monitoring data

OCC emissions monitoring and reporting

6.6 Oxford City Council prepares an annual air quality report[4], which is based on three automatic (continuous) monitoring sites and 87 non-automatic sites (as of 2020). Recently a further 37 diffusion tubes (non-automatic) have been added.

6.7 There are also air quality sites within the Botley AQMA that are of relevance to the scheme, given its proximity to the A34.

[3] https://www.oxfordshire.gov.uk/sites/default/files/file/roads-and-transport-connecting-oxfordshire/Oxford_Traffic_Filters_Scheme_Air_Quality_report.pdf

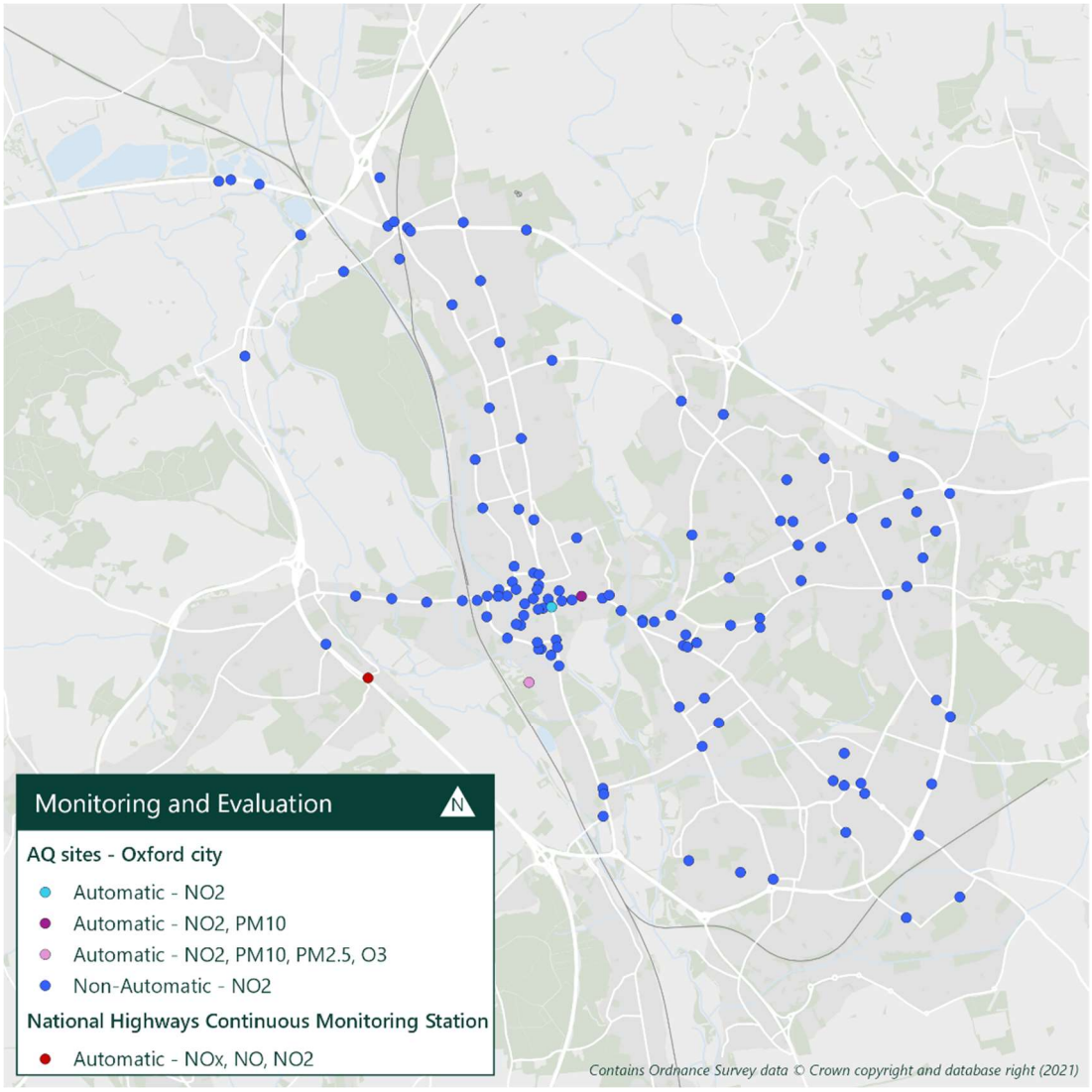
[4] https://www.oxford.gov.uk/downloads/file/8003/air_quality_annual_status_report_2021

National Highways continuous monitoring station on A34

6.8 A continuous monitoring station (CMS) was established on the A34 near Botley[5] in Feb/Mar 2021 and records oxides of nitrogen (NOx), nitric oxide (NO) and nitrogen dioxide (NO2) concentrations.

6.9 The air quality data is available on request via the NH central air quality inbox at National Highways[6], and the request can be specified to correspond to the dates required to support the air quality monitoring. These are shown in Figure 6-1[7].

Figure 6-1 Current automatic (PM, NO2) and diffusion tube (NO2) sites in and around Oxford city



6.10 The monitoring is used to measure levels of the following pollutants:

[5] Site ID is 49 A34 _N_SB, Botley and is located at the grid reference location - 449405, 205400

[6] airquality@nationalhighways.co.uk

[7] The M&E Delivery Organisation should review AQ sites with OCC as part of the plan delivery. There are additional sites that are added periodically, and we are aware that there may be additional School Streets AQ monitoring sites.

- Nitrogen Dioxide (NO2). Combustion processes emit a mixture of nitrogen oxides – NO and NO2 - collectively termed NOX.
- Particulate Matter (PM10 and PM2.5). Airborne particulate matter varies widely in its physical and chemical composition, source and particle size. The terms PM10 and PM2.5 are used to describe particles with an effective size less than 10 and 2.5µm respectively.

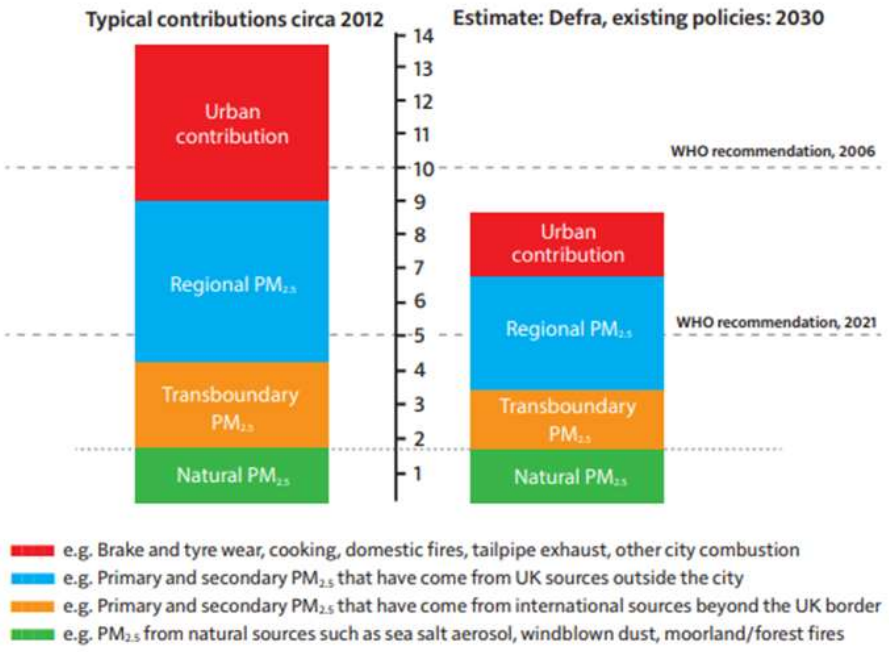
Summary of proposed monitoring approach

Recommendation to monitor NOx Only

6.11 While the OCC air quality regime monitors both NOx and PMs, we recommend that only NOx is monitored as part of the traffic filter M&E Plan.

6.12 The primary reason for this is that traffic-borne emissions represent a small fraction of observed PM emissions, based on that fact that:

- Only a fraction (just less than one third) of what is measured being directly attributed to local sources[8]. The biggest contribution of what is measured in terms of PM2.5 in an urban monitoring station comes from non-local sources (regional, transboundary and natural).
- Of PM emissions within the urban area, traffic only represents 10% of those emissions.



Left: the period circa 2012 (based on materials in reference 3). Right: contributing sources that might be anticipated in 2030 based on the author's evaluation of impacts arising from likely emissions reduction by 2030. Y-axis is atmospheric concentration in units of µg/m³.
Source: AQEG (2015)[3] and ApSimon et al. (2022)[4]

Figure 3: A qualitative representation of the different contributing sources to $PM_{2.5}$ that might be experienced in a typical urban centre (England)

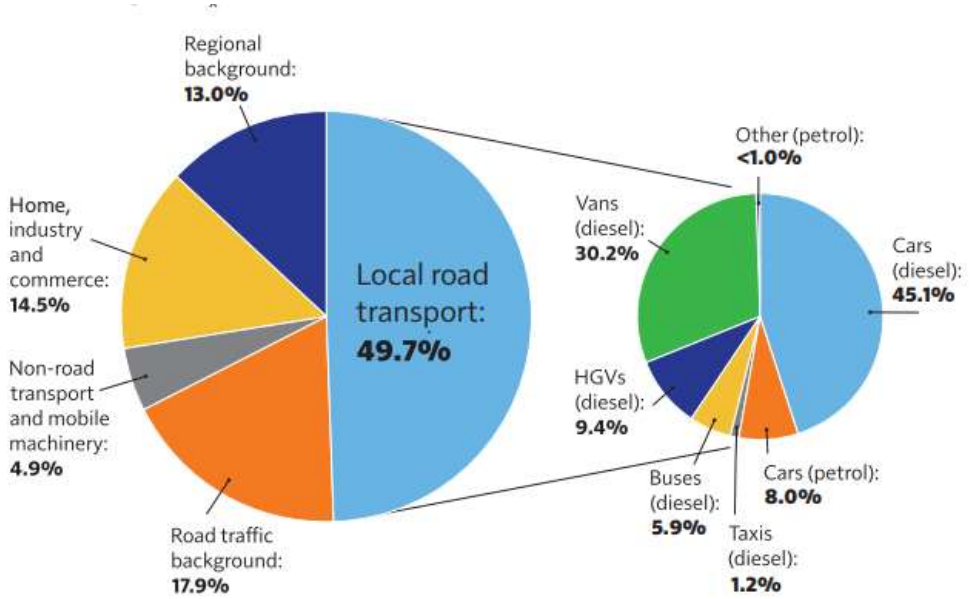
[8] Chief Medical Officer's Annual Report 2022 (publishing.service.gov.uk)

Source: Taken from [Chief Medical Officer's Annual Report 2022 (publishing.service.gov.uk)]

6.13 As such, traffic flows typically represent only around 3% of PM emissions. Even a large percentage change in flows from traffic filters would therefore have an imperceptible impact on PM emissions at monitoring sites.

6.14 We therefore propose that NOx emissions are the focus of air quality monitoring for the traffic filter M&E Plan. For NOx emissions, in contrast to PMs, local road transport accounts for half of total emissions, as illustrated by Figure 6-2.

Figure 6-2 Roadside NOx emissions by source[9]



Note: NO_x is the sum of nitrogen dioxide (NO_2) and nitric oxide (NO).
Source: Defra (2021)[8]

How and when to report?

6.15 As part of the air quality monitoring and reporting there is extensive checking and validation of air quality data to ensure its robustness, and to ensure that variations due to climate/weather patterns are 'normalised' and that 'measurement' variation is also taken into account.

6.16 For this reason, air quality reporting for the purposes of monitoring and evaluation is only robust over a longer monitoring period due to effects of seasonality and measurement variability. Data are 'validated' and reported annually, typically for a calendar year. Air quality measurements are not valid for the purposes of comparison over shorter periods, e.g. month to month or quarter to quarter.

6.17 The traffic filter scheme may not be implemented towards the start or end of a calendar year. Depending on the timing of implementation, it would be possible to re-specify the definition of the 12-month periods for which air quality comparison was undertaken, so that air quality for a year of 'pre-ETRO data' can be compared with a year of 'after' ETRO data. This would not affect the cost of the collection of monitoring data but would require additional work to 'validate' the air quality measurements for the 12-month periods selected.

[9] [Chief Medical Officer's Annual Report 2022 (publishing.service.gov.uk)]

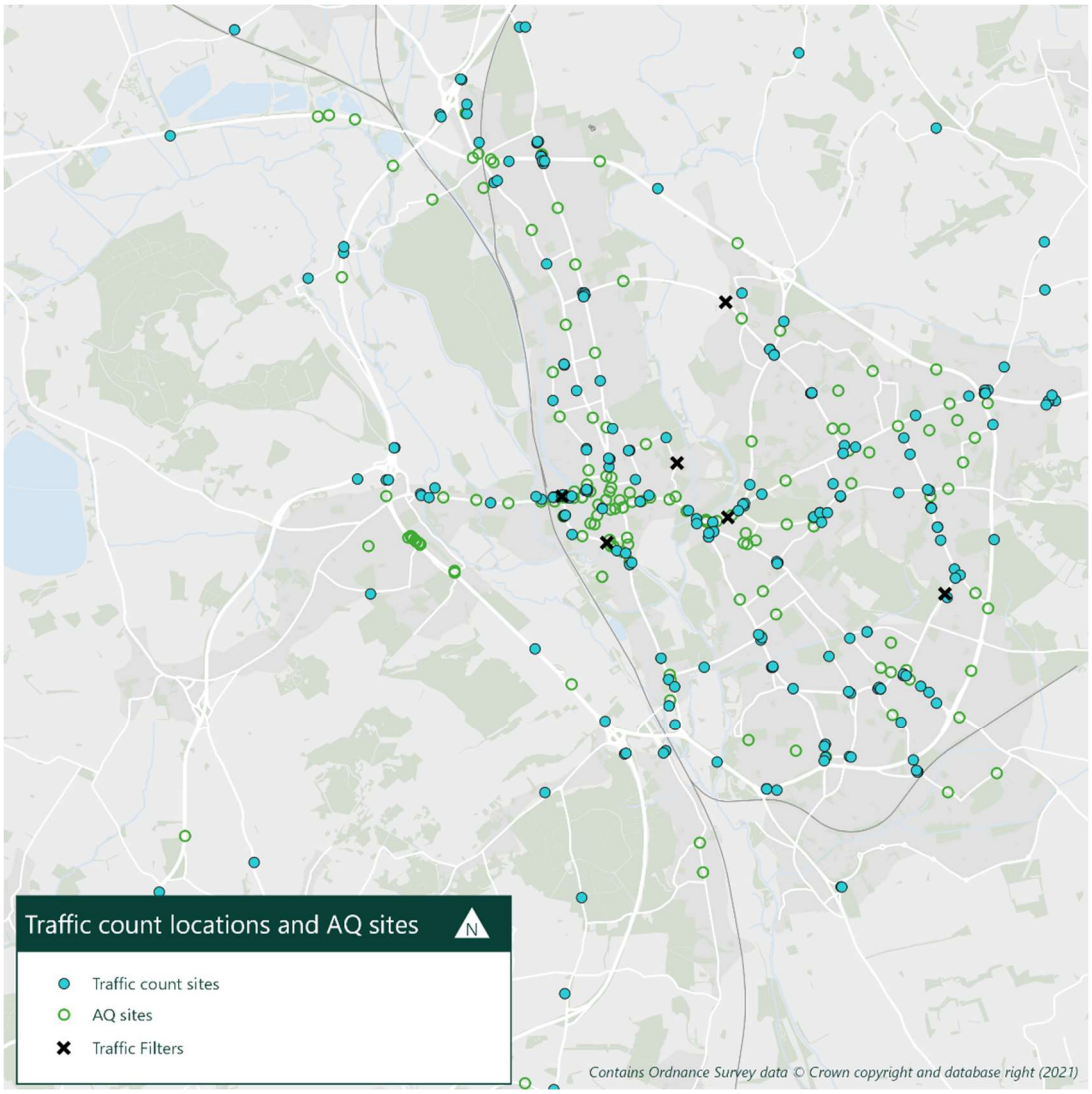
6.18 However, the *attributable* change to air quality from the traffic filter scheme would be directly correlated with the change in traffic levels at the roadside. While bespoke air quality assessment would help corroborate this relationship (i.e. between traffic and NOx), the relationship is well established, and we do not consider bespoke traffic filter air quality assessment to be necessary to support the overall M&E Plan, i.e. we do not recommend that annual air quality data should be 're-validated' and reported for bespoke defined years (non-calendar) either side of traffic filter implementation.

6.19 The change in traffic can therefore be taken to be a direct proxy measure for the likely change in air quality emissions.

Air quality monitoring sites mapped to traffic count sites

6.20 Figure 6-3 shows the traffic count sites overlaid on the air quality sites, and shows that there is very comprehensive coverage of, and good correspondence between, count sites and air quality sites.

Figure 6-3 Air Quality Monitoring Sites mapped to Traffic Count Locations



Evidence gaps/options

6.21 The coverage of air quality monitoring sites is extensive and provides for monitoring of air quality for areas where:

- Air quality levels are poor both in comparative terms (those areas of the city with worse pollution) and absolute terms i.e. where NOx levels are close to the Government limit of 40 µg/m3;
- A high proportion of people are 'exposed' to poor air quality; and
- There are expected changes in traffic flow (decrease or increase) as a result of traffic filters.

6.22 The only potential 'gap' identified is the potential need for an air quality sensor on A34, in the Botley AQMA area. National Highways already has a continuous monitor on A34 near Botley (see Figure 6-3). This location is south of a proposed site previously identified by Ricardo, on behalf of OCC, as part of a review of air quality sites in 2022. The location of the site proposed by Ricardo is shown in Figure 6-4.

6.23 The options for an additional sensor at this location would be for either a 'Reference' class sensor at a high cost, or 'near-reference' option at a significantly lower cost. Given the proximity to the National Highways counter, we recommend the 'near-reference' option is provisionally budgeted within the M&E Plan.

Figure 6-4 Potential location of additional air quality sensor

7 Collisions and Monitoring

Introduction

7.1 The traffic filters were predicted to result in a reduction in the overall number of collisions and casualties, based on the predicted change in traffic levels. The largest forecast reduction is in the city centre and key radials, where most pedestrian and cycle accidents occur and where traffic filters are forecast to result in the largest reduction in traffic.

7.2 The key question for the evaluation is the extent to which the forecast reduction in collisions have materialised. The measure of this is through the change in traffic levels as a result of traffic filters. Collisions data then provide evidence as to whether observed changes in traffic levels have translated into a reduction in collisions.

Evaluation themes and questions

Table 7-1: Evaluation themes and questions

Themes	Questions
What impact have traffic filters had on traffic collisions and casualties?	**Impact on collisions and casualties?** By area (based on the expected % changes in accidents at 3 spatial levels): • City centre / inner area • Oxford City • Ring-Road By collision type: • Cyclists • Pedestrian • Motorised

Monitoring data and evidence - collisions monitoring data

Description of data

7.3 Thames Valley Police (TVP) accident data, covering all reported accidents, with details provided on:

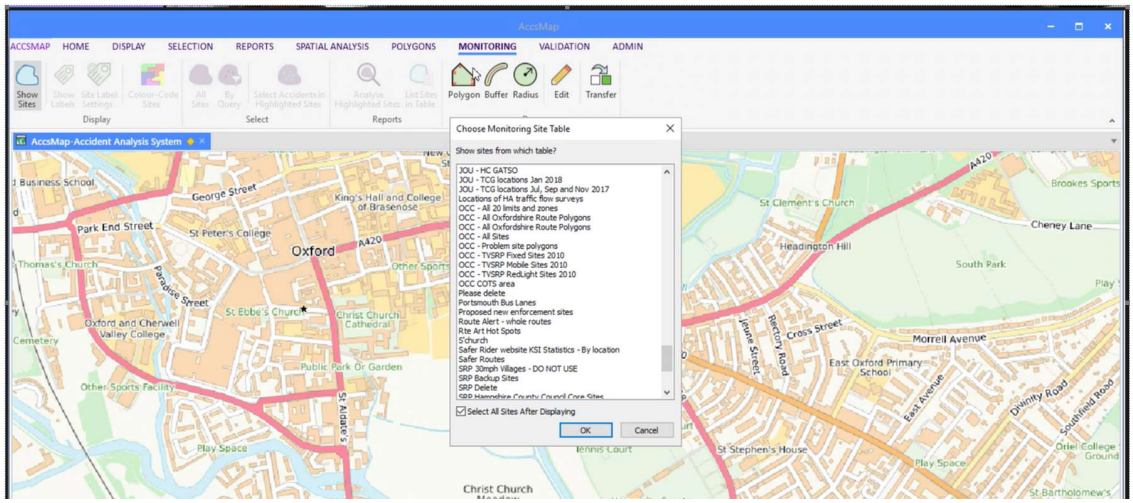
- Collision date;
- Collision location;
- Collision type – motorised, pedestrian or cyclist;
- Number of casualties; and
- Severity of casualties: slight, serious or fatal.

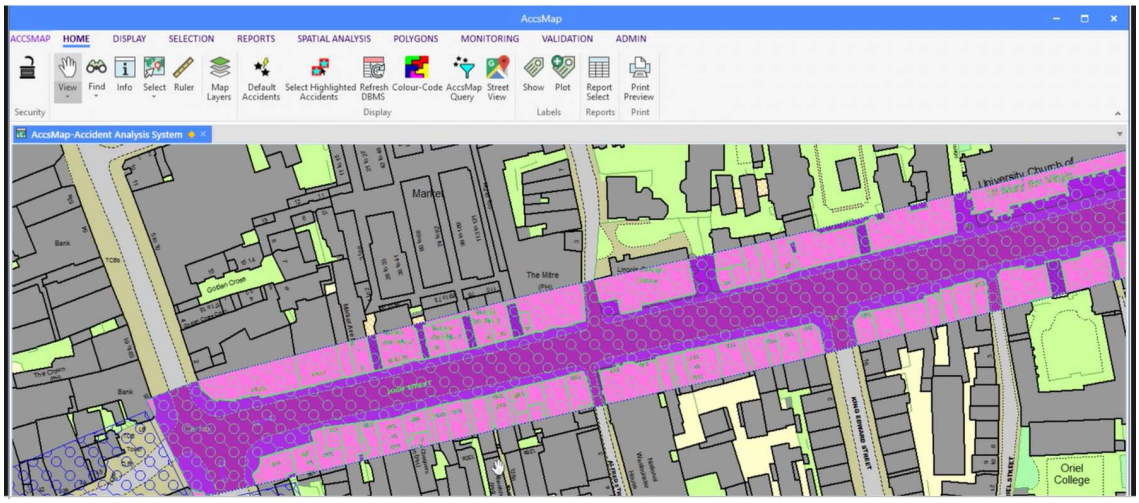
Reporting of collision data

7.4 There is a 'lag' of around six weeks between a collision taking place and its reporting within the OCC accident database.

7.5 OCC hold the data in a ACCMAP Collisions software programme. This allows for 'query-based' reporting and outputs based on user-defined specification, such as by geography and time periods. Examples are shown in Figure 7-1 below.

Figure 7-1 ACCMAP examples





Summary of proposed monitoring approach

What to measure

7.6 We propose using ACCMAP, set of query-based traffic filter monitoring data based on:

- Specify geography corresponding to 'expected' impacts
  - Within the City
  - On the ring road
  - 'Other'
- Summary for key links to be confirmed, but likely to include:
  - A34 (for reporting to NH)
  - Key radials – where collisions are highest and where traffic filters are expected to have the largest benefit
- Also extract county-wide stats as a comparator 'control' group

  - To assess, for example, whether decline in City collisions is reflected county-wide, in which case impacts may be less directly attributable to traffic filters.

When to report

7.7 The relatively small number of collisions in any given 'quarter' (there were a total of around 200 collisions city-wide in the last two years), means that meaningful collisions data in the context of traffic filter M&E would be better assessed by comparing, for example, a full year's worth of before vs after data. The six-week 'lag' in collisions reporting means that 'quarterly' dashboard reporting of accident data (for a period corresponding to traffic flows) would not be sensible.

7.8 We therefore propose to compare accident statistics within the traffic filter evaluation, for the corresponding annual periods 'before' and 'after' ETRO data.

7.9 The ongoing change in traffic levels can be taken as a direct proxy measure for the likely (or expected, based on the direct theoretical linkage) change in collisions.

Evidence gaps/options

- None

Implications for costs and procurement

- Data collection and collation
  - Within OCC current budget
- M&E bespoke analysis
  - M&E Delivery Organisation to be granted access to ACCMAP [OCC to facilitate]
  - 'Workshop' with OCC to introduce ACCMAP
  - M&E Delivery Organisation to specific query and reporting outputs

8 Economic and Business Impacts

Evaluation themes and questions

8.1 What effect have the traffic filters had on the local economy?

8.2 Are any changes to the scheme design and/or supporting measures required to mitigate any negative economic effects?

8.3 How have businesses been affected by the traffic filters? Specifically, what have been the impacts on recruitment and retention of staff, footfall and spend in the city centre and district centres?

Options for understanding economic and business impacts

8.4 The following options have been considered:

- Pedestrian interview surveys in Oxford city centre and district centres;
- Shop vacancy rates;
- Footfall data;
- Spend data; and
- Business surveys.

Pedestrian interview surveys

Description

8.5 Oxfordshire County Council completed an interview survey of pedestrians in Oxford city centre and the Jericho area of the city, to understand how people travel, how often, the purposes of those trips and how much they spend.

8.6 The surveys were undertaken on weekdays and weekends during the week commencing 23rd May 2022 between 8am-7pm.

8.7 Surveyors intercepted people at random in the street, aiming to interview the next available person. As a check on how representative the survey was of people in the area, the profile (approximate age and gender) of people who refused to take part in the survey was also collected. The survey respondent profile was found to be closely aligned to the profile of people in the area who refused to take part in the survey, indicating the survey is broadly representative of people in Jericho and the city centre.

8.8 The survey included questions on the following topics:

- Reason for visit (journey purpose)
- Mode of travel used to travel to survey location
- Frequency of visit to the survey location (Jericho/city centre)
- Expected spend on the day of the survey
- Blue Badge holder or travelling with a Blue Badge holder

- Home residence (UK or overseas)

8.9 1,021 respondents were interviewed in the city centre, 276 were interviewed in Jericho.

8.10 The surveys provide information about modes used for access to the city and district centres that is not available elsewhere and the ability to link spend to modes used for access. As such, they provide key results that would not be provided through resident surveys and spend data alone.

Proposed approach

- Repeat for Jericho and City Centre 9-12 months after implementation of the traffic filters.
- Also undertake in Headington, Cowley Rd, Summertown, Cowley.
- Add questions relating to the filters trial:
  - Awareness of the traffic filters?
  - Changes made in how travel?
  - Changes made in use of city centre/district centres?

Frequency of data collection

- Bespoke/once

Format of data outputs/reporting

- As per 2022.
- Reporting of key changes since 2022. [Report would be factual, interpretation of changes would be in M&E Plan – as explanations for differences need wider context / data]

Gaps/coverage

- None

Shop vacancy rates

Vacancy data

8.11 The City Council report on shop vacancy rates in the city centre. The data is reported quarterly. The data can be combined (across quarters) to provide an average 'before' and 'after' vacancy rate.

8.12 However, shop vacancies have multiple potential causes (rates increases, general trading conditions linked to the wider economy, shop specific commercial factors, owner/ lessee non-commercial decisions) most of which are likely to be more material than any likely impact of traffic filters, especially in the city centre where only a small percentage (around 10%) of city centre 'footfall' accesses by car.

Proposed approach

8.13 We propose that shop vacancy rate information (already collected by the City) is collated and reported as part of the wider M&E. This is mainly to pre-empt potential criticism that not to report this would be 'hiding' relevant data.

8.14 However, while vacancy rates are a good indicator of the overall health of city centre retail (on the context of the wider economy), the myriad causes of vacancies mean they will not be a meaningful proxy measure for the impact of the traffic filters. Appropriate caveats would accompany M&E reporting.

8.15 Due to the limitations of the data (in the context of understanding traffic filer impacts) we would not propose to extend existing vacancy surveys undertaken by the city e.g. to other centres or more frequently.

City Centre footfall data

Footfall data

8.16 Oxford City Council has purchased footfall data which also collects dwell times using mobile phone data. This enhances the data available on footfall - the previous camera-based system gave footfall only and would also count the same individual more than once per day if they passed the camera multiple times, which would not be the case for mobile based data.

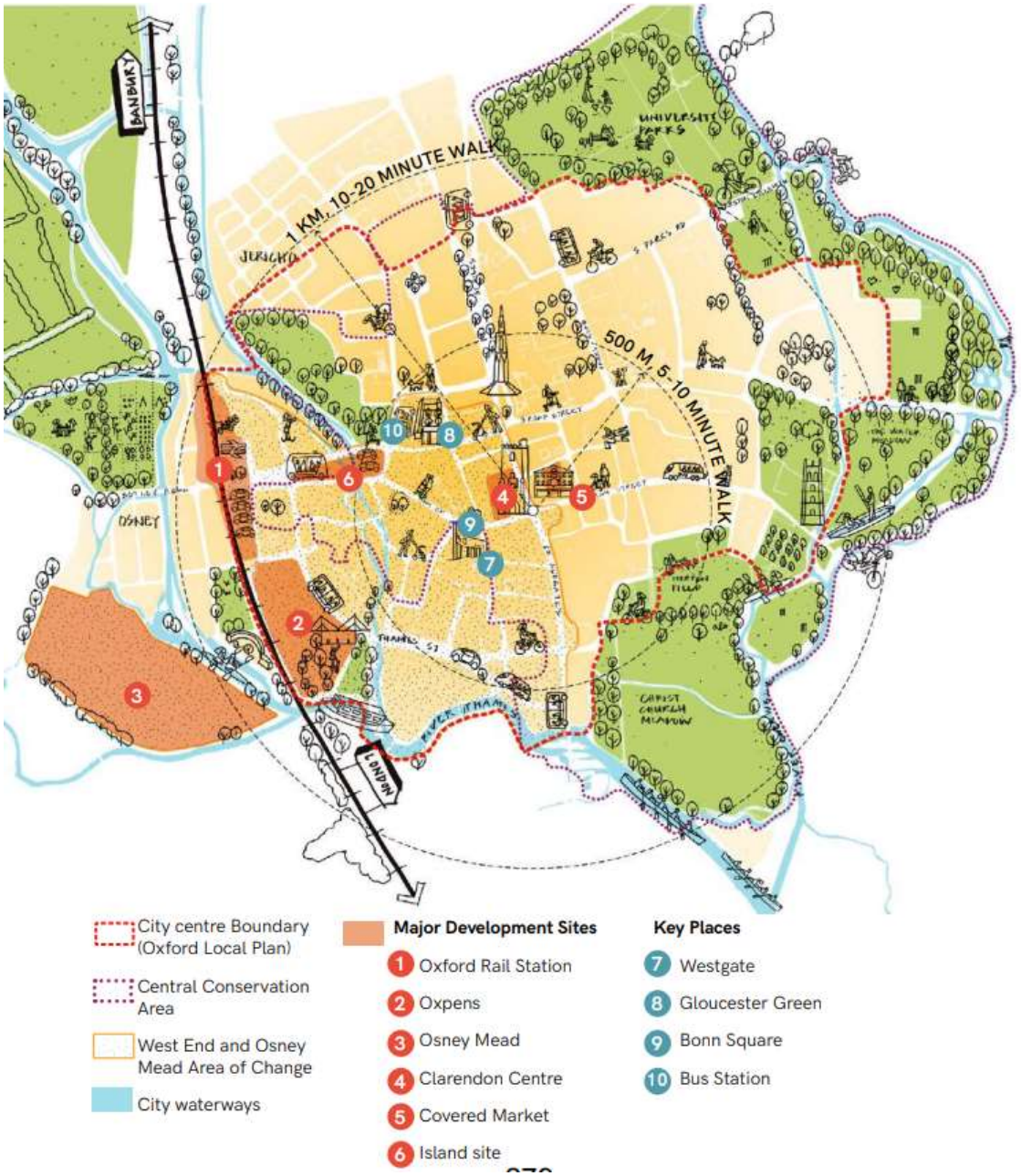
8.17 From March/April 2022 the City Council is obtaining data from huq (**https://huq.io**) for the city centre only (the area for which data is collected corresponds with the City Centre Action Plan area, shown in Figure 8-1). The data is derived from mobile phone data for approximately 2% of the population. The City Council has purchased the **Community Vision** product which provides:

- footfall monitoring including:
    (a) ability to access data from prior years (2-3 years retrospective data)
    (b) analysis by socio-economic group
    (c) access to benchmark locations across the UK
- footfall density mapping (visualisation of footfall activity)
- catchment area mapping, showing home origins of city centre users/visitors

8.18 The product is offered in modules. To add a single location (e.g. a district centre in Oxford) for footfall only is £1,000 per annum with additional features (e.g. density mapping, catchment mapping) at an additional £1,000 each per annum, per location.

8.19 It is recommended that County procures footfall data for each of the six district centres and engages with huq for a competitive quote. An option to explore would be a joint procurement with the City Council to expand the city centre data collection area (as purchased by City) to the whole of Oxford within the ring road.

Figure 8-1: Area of footfall data collection - Oxford city centre (within "Oxford Local Plan" city centre boundary)



8.20 There are other sources of footfall data:

- Westgate Centre also collects footfall data using Springboard cameras and are likely to be willing to share data, though permission will need to be obtained to publish it.
- Vivacity cameras also count pedestrians but are less useful in understanding footfall in commercial areas / district centres as they are located at junctions away from the core commercial activity in district centres.

Proposed approach

- Work with City Council to expand area of footfall data collection to include the district centres assessed in the business impact assessment (Summertown, Headington, Cowley Road, Cowley and Jericho).

- Ongoing monitoring of footfall (using City Council, Westgate and Vivacity data) from April 2023 through to end of the traffic filters trial period.
- Quarterly reporting.

Spend data

8.21 Retail spend is reported by ONS at a national level but there is no Local Authority or city level breakdown of spend that is publicly available. Data on levels of spend is available for purchase from data/payment processing companies. Two options have been explored:

- Purchase directly from a payment processing company; and
- Purchase from an intermediary.

8.22 Note, an exhaustive review of options was not undertaken, alternative approaches may exist.

Option 1: Purchase directly from a payment processing company

- Mastercard are able to provide anonymised records of transactions. Mastercard accounts for about 14% of UK debit/credit card spend[10], providing a proxy for all spend.
- The Geo Insights tool gives an indication of where cardholders live. The information is provided in a .csv file that can be used to create a heat map/dashboard.
- The Greater London Authority is using Mastercard data for 550 data points – local centres across London - to monitor spend.
- The data is provided as change in spend indexed to 2018 and there is also an ability to compare against historic data.
- Reports can be delivered for any time period from weekly (monthly, quarterly, annual).
- High level data for comparator cities – is possible but outside usual package so would need a bespoke arrangement.

Option 2: Purchase from an intermediary

8.23 Data company Beauclair provided insights on spend as part of the Centre for Cities High Street Recovery Tracker11. Beauclair was approached to understand availability and costs for spend data for Oxford.

- Beauclair provides a dashboard of information about spend including:
  - Sales
  - Customers
  - Transactions
  - Average Transaction Value (£)
  - Average Revenue Per Customer (£)
- Data is based on an underlying national data set of over 3 billion debit and credit card transactions per year from a range of sources including high street banks and other financial institutions. Each transaction is geo-tagged to track its location and retail sector, e.g. food and drink, vehicles. Limited demographic information is also available on a sub-set of customers so that information is available on customer profiles. All merchant and customer data is strictly anonymised and aggregated to comply with GDPR and data protection requirements.

[10] **https://www.statista.com/statistics/1116580/payment-card-scheme-market-share-in-europe-by-country/**

[11] **https://www.centreforcities.org/blog/how-has-spending-recovered-in-our-town-and-city-centres/**

- Compares the values to the pre-selected comparison towns or cities. Sales, Customers and Transactions are normalised to the average month in 2019.
- Compares the values of the following sectors: Consumer Services, Entertainment, Fashion, Food & Drink, General Retail, Grocery, Health & Beauty, Household, Travel & Accommodation and Vehicles.
- Provides the customer origin and allows comparison by geographic location.
- Provides demographic sales contribution using a classification system called CAMEO.
- Annual costs vary according to the number of locations/comparator cities and length of subscription. The premium option would include:
  - All the variables (area sales, customers, average transaction value) for Oxford city centre.
  - Area sales data for the 6 district centres in Oxford.
  - Area sales data for two comparators e.g. Cambridge, York.
  - A dashboard for the Oxford city centre data for all of the variables (e.g. area sales, customers, average transaction value) and area sales for two comparators (e.g. Cambridge).
  - Additional 6 districts' area sales data available to download from the dashboard in a spreadsheet format.

8.24 There is also a 'spend' module available at additional cost as a supplement to the footfall data that the City Council is obtaining data from huq (**https://huq.io**).

8.25 Spend data is relatively expensive to purchase, and our research suggests that Option 2 (purchase from Intermediary) would offer better potential value that Option 1. While we consider that footfall data is an essential requirement of the M&E plan, spend data would be desirable but not essential for the M&E. We therefore suggest that the case for purchasing spend data is considered further at the M&E delivery stage.

Business surveys

8.26 Engagement with businesses/employers offers opportunity to provide insight into the perceptions of the traffic filters and their impacts.

8.27 A key challenge for engaging with any organisation is how to identify the most appropriate person to contribute to the research then finding them and securing their participation. Ideally, input would be gained from senior management who can take a strategic view informed by actual business performance data and provide a business, not personal or anecdotal, perspective. Regardless of the approach taken, it would not be feasible to obtain reliable quantitative data on business performance impacts through a business survey, but engaging with businesses would be useful in monitoring business feedback and perceptions more qualitatively.

8.28 The following options have been considered but are not recommended, due to the likely difficulty in ensuring responses are obtained from the most appropriate, senior representative in the organisation:

- Telephone survey of businesses recruited to be broadly representative of Oxford businesses, using a purchased contact database;
- An online survey, open to all businesses; and
- Online survey, distributed to a purchased contact database broadly representative of Oxford businesses.

8.29 Some businesses and employers participate in business networking activities such as:

- The Oxford Economic Growth Strategy Steering Board which meets quarterly to oversee the delivery of the city's growth strategy and other key economic development and growth-related issues relevant to the city, as well as ensuring effective engagement with local businesses and employers. The Steering Board includes representatives from businesses and business groups, universities and colleges, the Local Enterprise Partnership and the City and County Councils.
- Thames Valley Chamber of Commerce
- Federation Small Businesses
- B4Business

8.30 As businesses "opt-in" to participate in such networks, the profile of participants may not match the profile of businesses/employers in Oxford. To obtain a more representative sample of businesses, a further option is to recruit a business panel, possibly through Oxford City Council and the business networking organisations above. Engagement through a business panel could take a number of forms including discussion groups, online surveys and other, ad hoc feedback throughout the trial period.

8.31 To encourage participation and add value, a business panel may be extended to cover more than just traffic filters e.g. wider transport (including other Core Schemes) and environmental topics.

Proposed approach

8.32 Engagement with businesses/employers would provide qualitative feedback on experiences of business operations with traffic filters, an opportunity to "take the pulse" of the business community, identify and respond to key concerns. It would not, however, be a suitable mechanism for establishing reliable quantitative evidence on business performance to monitor/evaluate the traffic filters (footfall data, spend and vacancies are more reliable to monitor). As such, it is suggested that engagement with businesses forms part of the Council's stakeholder engagement strategy, not part of the M&E Plan.

Evidence gaps/options

8.33 We consider that the evidence and data summarised in the Chapter will provide for a strong evidence base to demonstrate how potential real and perceived economic impacts of traffic filters are being addressed through M&E.

8.34 We re-iterate that it will, irrespective of the quality and coverage of economic data, be hard to attribute changes in economic performance to the traffic filters due to the complex nature behavioural responses of traffic filters (varying by movement, mode, trip purpose) and the myriad drivers of economic activity.

9 User Experience and Behavioural Surveys

Introduction

9.1 While there are surveys such as the National Travel Survey that capture travel behaviour (and data can be obtained at Local Authority level), bespoke surveys would be required to understand the specific user response to the traffic filters.

Evaluation themes and questions

- Has the trial scheme reduced car travel?
- Has the trial scheme increased walking and cycling and public transport use?
- Has the trial scheme resulted in people changing behaviours in any other ways, for example, re-timing of trips or deciding to shop elsewhere?
- Has the trial scheme reduced road collisions (can ask about perception of safety)?
- Has the trial scheme improved air quality (can ask about perception of safety)?
- What are the users' experiences of the exemptions, permits and enforcement systems?
- Did the Council promote the scheme, making all content accessible, and seek to support residents through the transition period?
- How has the scheme affected access to healthcare for Protected Characteristic Groups (PCGs)?
- How has the scheme affected disabled non-Blue Badge holders who travel by taxi?
- Have there been any impacts on crime and anti-social behaviour e.g., fear of crime deterring mode shift by women?

Monitoring data and evidence

Proposed monitoring approach

- Resident surveys to understand changes in travel behaviour in Oxford and its immediate catchment.
- Service user surveys to understand experiences of using the resident permit system (and capture journey purposes).
- Surveys or interviews to capture impacts on people in PCGs.

Resident surveys

9.2 Traffic flow/Vivacity data will show changes in volumes for different modes and CitySwift analysis will show changes in bus patronage. The underlying reasons for changes in behaviour, including the extent to which traffic filters influence travel choices, will not be captured by flow data.

9.3 Resident surveys are important to understand the motivations behind the changes people make to how they travel, which groups are making changes and what modes are affected. Resident surveys may also measure experiences and perceptions of the filters.

9.4 Any resident survey should seek to obtain a survey sample that is representative of the affected population (primarily Oxford and its immediate catchment) and allows statistically significant comparison between sub-groups.

9.5 As there will be extensive collection and analysis of changes to traffic flow and pedestrian/cycle movement (as described in section 3), there is less need for resident surveys to capture details of specific trips (e.g. through a travel diary). A travel diary approach would also require completion of surveys by the same respondents before and after/during the filters trial, which increases costs significantly.

9.6 The proposed approach is that analysis of traffic/pedestrian/cycle/bus data will establish changes in usage of modes and a resident survey will explore these changes in more detail. A before and after approach is not necessarily required, though a pre-implementation survey could be valuable to collect a baseline of perceptions of travel in Oxford and expected changes to travel habits in response to the filters. On balance, that information is probably not worth the cost of administering a pre-trial survey and may be available from previous local research.

9.7 Suggested approach:

- Survey focuses on capturing changes to travel behaviour and motivations. To obtain "neutral" responses, the option of issuing a survey that is not specifically labelled as a "traffic filters" survey should be considered.
- Distribute the survey invitation widely by post to every household in a defined area. This may be the resident permit eligibility zone plus some nearby settlements where residents are likely to travel regularly to Oxford (e.g. Kidlington, Abingdon, Eynsham).
- Respondents are invited to complete a survey online with a postal option to allow access for all - could be a paper copy of the questionnaire with a QR code/access code for an online version. One option would be a single sheet with invitation and QR code and the invitation includes the option to request a paper copy (assuming most would complete the survey online).
- One response per household (single use codes).
- Weighting of results back to demographics where sample sizes are significant enough to support scaling e.g. car ownership, social grade.
- Sample size should be as large as possible – around 1,000 responses would be sufficient to enable analysis/cross-tabulation by demographic/geographic sub-groups.

9.8 Estimated costs for a survey that is representative of the Oxford and nearby settlements would be around £15,000 to £20,000 for survey design, analysis and reporting plus estimated print and post costs of £25,000 to £40,000.

9.9 Consideration was given to surveying control groups in addition to surveys in Oxford, to measure against an area where filters have not been introduced. Control groups are not deemed suitable.

- Using other areas within Oxfordshire as control groups would offer limited insight – travel behaviours and the demographic profile in other Oxfordshire towns and rural areas are different and there is no urban area of a comparable size.
- Similar-sized cities elsewhere (e.g. Cambridge, York) may have more similar travel behaviour/demographics but will be subject to their own transport interventions which may affect the results, e.g. Cambridge is pursuing a congestion charge.

Service user experience

9.10 A new system will be installed to allow eligible residents to obtain permits to pass through the traffic filters. It is expected that residents will obtain virtual permits using an online portal. The evaluation should capture experiences of using this system. There is also an opportunity to include questions about behaviours (e.g. what type of trip permits are used for).

9.11 The specification for the system therefore needs to include the ability to obtain user feedback.

9.12 Tendering for the system should invite suppliers to suggest ways in which they could gather feedback, which could include:

- Push notifications - specific messages that are sent to users after performing activities that the system captures with one or two questions to respond to e.g.:
  - After registering – how was your experience of registration?
  - After making trips – what was the purpose/origin destination of your trip?
- Periodic surveys – e.g., email to invite participation in a longer perception/behavioural survey after 6-12 months.

Engagement with people in Protected Characteristic Groups (PCGs)

9.13 The Equalities Impact Assessment (EqIA) for the traffic filters included several mitigations for potential impacts on PCGs identified (exemptions for Blue Badge holders and carers for example). The following potential impacts identified in the EqIA were not fully mitigated and it was suggested in the EqIA that these were assessed and monitored as part of the trial:

- How has the scheme affected access to healthcare for PCGs?
- How has the scheme affected travel by disabled non-Blue Badge holders?

9.14 In addition to understanding more about these specific impacts, engagement with disabled people would provide a better understanding of impacts on disabled people that may not be captured in a resident survey (including any not previously identified).

9.15 It is recommended that engagement takes two forms:

- Ongoing engagement with The Oxford Inclusive Transport Focus Group to provide updates and allow participants to give feedback on impacts of the scheme. The Inclusive Focus Group includes a mix of people with lived experience of disability and participants who also represent disability groups or forums.
- Targeted engagement through one-to-one interviews or surveys with people with protected characteristics, facilitated through the disability groups represented on the forum. For example representatives of disability groups could be asked to issue a survey to their members or invite members to take part in research.

9.16 The disability groups that participate in the Inclusive Focus Group include the groups listed below. There are also representatives from other organisations who could support the engagement such as the City and County Council, bus operators and NHS Hospital Trust.

- Wheels for Wellbeing trustee
- 50+ Network
- Oxtalk
- MyVision Oxfordshire
- Unlimited Oxfordshire (and Oxfordshire Transport and Access Group (OXTRAG) to be part of Unlimited Oxfordshire from 31st January)

- Wheels for All
- Motability Operations
- KEEN

Assessing impacts on PCGs through the resident survey

9.17 The resident survey described above should also collect information about respondent characteristics including protected characteristics of age, disability, race, religion or belief, sex, pregnancy and maternity. This will enable analysis of the responses from these groups and whether their behaviours/experiences/perceptions differ. Providing this information will be optional and many respondents will choose not to provide it. This may limit the ability to make comparisons between some groups, particularly where there is a low prevalence in the survey area (e.g. of some minority ethnic groups). To understand impacts on such groups, direct engagement (e.g. follow-ups with respondents who agree to be contacted) or through representative groups may be required. The survey should therefore allow respondents to opt in to follow-up research. This may be in the form of additional surveys or interviews, which may be required to understand impacts on people with protected characteristics.

9.18 The survey should also ask respondents if they have a mobility impairment that affects how they travel and whether they have a Blue Badge for disabled car parking. This will help identify respondents who have an impairment but do not have a Blue Badge, a group that was identified by the EqIA for further monitoring (as potential impacts on this group were not fully mitigated).

9.19 Information on protected characteristics of gender reassignment, marriage and civil partnership would not need to be collected – the EqIA did not identify any potentially disproportionate impacts on these groups.

9.20 The County Council's EqIA requirements include consideration of impacts on rural communities, Armed Forces, carers and areas of deprivation. The survey will establish rurality/deprivation through collection of respondent location. It should also establish whether respondents have caring responsibilities (paid or voluntary) but there is no likely disproportionate impact on people in the Armed Forces so that would not need to be collected.

10 Summary of Gaps and Procurement/Cost Implications

Costs of continuation of 'existing' data and evidence

10.1 The majority of 'existing' data sources (including OCC traffic count data, collisions data, air quality data) are, and will be, budgeted for within OCCs overall 'core services' and there are no additional collection costs as part of the traffic filter M&E Plan.

10.2 However, there are several strands of data that are currently funded through the Oxfordshire Innovation Hub (iHUB) initiative. These include the purchase and use of VivaCity camera data, INRIX traffic data and the data aggregation and visualisation provided by Alchera. The iHUB is a 'non-core' OCC service and its ongoing funding would be through a combination of allocated project funding (e.g. LTN evaluation, traffic filters, LTCP etc.) and discretionary third-party funding (Innovate UK) for which funding applications would be made.

10.3 We have estimated that the costs of iHUB funded M&E costs to be around £150k to support the Traffic Filter M&E. This assumes that the cost of iHUB data services are spread across a range of OCC projects, and the £150k represents the proportion borne from the traffic filter M&E budget.

Costs of additional data collection and surveys

10.4 Indicative costs of bespoke data collection to support the M&E are summarised in Table 10-1.

Table 10-1: Summary of gaps and procurement/cost implication

Evaluation theme	Key gaps	Procurement/cost implication	Cost assumption/provision (M&E specific, above existing cost)
Administration of traffic filter scheme	None	• Ensure scope for 'back office' system consistent with M&E approach. – Costs assumed within traffic filter 'systems' cost. • Assumed that OCC would 'run' periodic reporting. – OCC staff time/cost allowance (within already budgeted costs?)	None (TBC)
Traffic flow data (incl. cycle)	A34 (TBC)	• Data collection/collation of ATCs – within existing OCC/ iHUB costs	• Costs of existing Black Cat assumed within

Evaluation theme	Key gaps	Procurement/cost implication	Cost assumption/provision (M&E specific, above existing cost)
		• Uncertain whether VivaCity cameras will be retained through ETRO period and beyond (as existing OCC commitment) – Provision made for traffic filters project budget. • Alchera Data-Hub proposed as most efficient platform for hosting and downloading M&E data. – Provision made for traffic filters project budget. • Checking and remediation of faulty count sites – Proposed approach based on Alchera / OCC – Provision made for traffic filters project budget.	OCC committed budgets. • iHUB procured services (VivaCity, Alchera) provision as per above.
Additional traffic count sites (local roads)	Local residential roads	• Allowance for up to 15 count sites to be monitored shortly before the traffic filter implementation and during the trial. • Cost per location for per ad hoc tube survey count (over 7 days) would be c. £120. • Assuming an average of six individual weeks were sampled across 15 sites, the total cost would be around £11k. Some sites may require more/less frequent monitoring, and we suggest an overall budget provision of £15k is prudent, with the option for a mode 'ad hoc' approach to potentially reduce this amount.	£15k provision
Bus data (journey times, demand)	None – covered by City Swift	• Data collection – within existing OCC costs • Costs of dashboard into 2025 & 2026	£15k provision

Evaluation theme	Key gaps	Procurement/cost implication	Cost assumption/provision (M&E specific, above existing cost)
		• Confirm with OCC re future provision for CitySwift costs, and assumptions on cost sharing with operators. Suggested provision of £10-£20k (current OCC contribution is £15k) but could be zero.	
Road congestion and journey time data	Temporal coverage of INRIX – only 3-4 months of data	Additional cost for INRIX data • Fur future years (beyond existing commitment) • Potential costs for additional 'months' of data • Provision made for traffic filter project budget.	Included within iHUB costs above.
Air quality monitoring	Additional 37 AQ diffusion tubes installed in 2022	Regular monitoring, maintenance and data analysis over period: • May 22 to Dec 23. £14k • Jan 24 – Dec 25. £18k	Total £32k.
Air quality monitoring	A34 sensor in Botley AQMA	Based on additional site north of National Highways site at Botley. OCC estimates: • £3k for 'near reference' sensor plus £3k p.a. • £50k plus £10k p.a. for reference sensor • Suggest prudent provision for £15k ('near reference')	• Allowance for site at £3k implementation plus £3k per annum. • Total provision of £12k.
Collisions and monitoring	None	None – within current OCC budgeting.	Nil
Economic and business impacts	Modes of access to city/district centres High street spend data Method of gaining feedback from representative sample of businesses (at senior level)	Pedestrian interview surveys in 7 centres = £10-20k City Council Footfall data. City centre within City scope/costs. Additional £1k indicative per local centre. Spend data for city centre and local centres – provisional estimate of c. £25k p.a. City/County officer time requirements to convene and moderate a business panel.	c. £50k overall (excluding officer time).
User experience	Changes in behaviour and motivations	Resident survey = £45-60k.	Budget for up to £75k.

Evaluation theme	Key gaps	Procurement/cost implication	Cost assumption/provision (M&E specific, above existing cost)
and behavioural Surveys	Impacts on PCGs	Officer time to engage and specialist support to gather feedback (£<15k).	

10.5 The cost provisions above equate to an overall estimate of between c. £190k to £220k. Costs for collation and reporting for M&E data by an external provider/consultant are dependent on the nature of the commission and requirements for ongoing reporting/co-ordination of the dashboards.

Costs of M&E analysis and reporting

10.6 Costs for collation and reporting for M&E data by an external provider/consultant are dependent on the nature of the commission and requirements for ongoing reporting/co-ordination of the dashboards. We have provided an indicative cost estimate for analysis and reporting, summarised in Table 10-2.

Table 10-2 Costs of M&E analysis and reporting

Stage	Task	Timing	Indicative costs
Pre-ETRO	Pilot/test/sample dashboard(s)	c. 6-9 month before implementation	£25-£35k
	Baseline data e.g., prepare for: 2019, 2023, 2024	c. 3-6 month before implementation	Assume within above – part of testing
During ETRO	Dashboard preparation/issue	Monthly	c. £2k per month c. £50k over 2 years (6 month 'before' and 18-month ETRO)
	Analysis of Surveys		Assumed within survey costs
Full M&E Report	Full M&E	Towards end of ETRO	£60-£80k
General support			TBC (depends on retained role on other CTS)
Total			**Up to c. £200k**

Summary of total M&E costs

10.8 The overall provisional cost estimate base on the elements above is summarised in Table 10-3.

Table 10-3 Total M&E indicative cost estimate

Category	Cost (total)
iHUB data collection/hosting (support continuation of current data)	c. £150
Bespoke Data Collection and Evidence Gaps	c. £190k to £220k
M&E Analysis and Reporting	c. £200k
Total	**c. £540k to £570k**

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Prepared by	Prepared for
Steer 14-21 Rushworth Street London SE1 0RB +44 20 7910 5000 www.steergroup.com	Oxfordshire County Council County Hall, New Road Oxford OX1 1ND
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24194201	
Author/originator	**Reviewer/approver**
TWH	TWH
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