

SPaTS 1-869 Old Tyres Evidence Collection

FINAL REPORT

Department for Transport

2 June 2020

Quality information

Prepared by



Scott Millard
Senior Consultant

Checked by



Dr. Aida Kaddoussi
Principal Consultant

Approved by



John Hix
Regional Director

Revision History

Revision	Revision date	Name	Position
Draft version 0.1	03/09/2019	Scott Millard	Senior Consultant
Draft Report	06/09/2019	John Hix	Regional Director
Final Report	09/10/2019	Prof. Geoff Clarke	Regional Director
Final Report_02062020	02/06/2020	Dr. Aida Kaddoussi	Principal Consultant

Prepared for:

Department for Transport

Prepared by:

Scott Millard
Senior Consultant
T: 020 3043 9410
E: scott.millard@aecom.com

AECOM Limited
Sunley House
4 Bedford Park, Surrey
Croydon CR0 2AP
United Kingdom

T: +44 20 3043 9200
aecom.com

Prepared in association with:

ARUP

© 2019 AECOM Limited. All Rights Reserved.

This document has been prepared by AECOM Limited ("AECOM") for sole use of our client (the "Client") in accordance with generally accepted consultancy principles, the budget for fees and the terms of reference agreed between AECOM and the Client. Any information provided by third parties and referred to herein has not been checked or verified by AECOM, unless otherwise expressly stated in the document. No third party may rely upon this document without the prior and express written agreement of AECOM.

Table of Contents

1	Executive Summary	6
1.1	Introduction	6
1.2	Methodology	6
1.3	Key Findings	6
1.4	Recommendations	7
2	Introduction	8
2.1	Background.....	8
2.2	Old tyres consultation	8
2.3	Aim of the project.....	8
3	Methodology.....	9
3.1	Stakeholder consultation.....	9
3.2	Set-up and deploy roadside surveys.....	9
3.3	Database management.....	9
3.4	Scoping exercise for taxis and PHVs	10
3.5	Number of commercial tyres analysis	10
4	Stakeholder engagement	11
4.1	British Tyre Manufacturers' Association (BTMA)	11
4.2	Continental.....	11
5	Roadside surveys – taxis and private hire vehicles.....	13
5.1	Survey setup.....	13
5.2	Overview of results for roadside survey	15
5.3	Qualitative commentary from drivers	16
5.4	Anecdotal evidence of taxi and PHV tyres	17
6	Taxi and private hire vehicle scoping.....	19
6.1	Local authority licensing offices	19
6.2	Taxi and private hire vehicle associations	21
7	Online survey	23
7.1	First life tyre – tyre life expectations.....	23
7.2	Re-treaded tyre – tyre life expectations	24
7.3	First life tyres – current age	25
7.4	Re-treaded tyres – current age	27
7.5	Tyre practices.....	29
8	Estimated commercial tyre population	31
8.1	Data	31
8.2	Assumptions	31
8.3	Total tyres by vehicle configuration	33
9	Summary of findings and conclusion.....	35
9.1	Findings	35
9.2	Recommendations	35
	Appendix A Online survey questions	37
	A1. Questions on SnapSurvey	37
	Appendix B Road side surveys.....	40
	B1. Data collection form	40
	B2. Locations of roadside surveys	41

Figures

Figure 1: Effective methodology to seek out key tyre evidence to advise future policy and legislation	9
Figure 2: Continental data - count of tyres by year of manufacture	11
Figure 3: Continental data - proportion of tyres by year of manufacture.....	11

Figure 4: Effective geographical spread of on-the-ground surveys to record taxis and PHVs tyre age data	13
Figure 5: Taxi and PHV tyres – age distribution of tyres (count).....	16
Figure 6: Taxi and PHV tyres – age distribution of tyres by axle position (count)	16
Figure 7: Relationship between mileage against estimated tyre life	17
Figure 8: Proportion of driver mileage category against the estimated tyre life	18
Figure 9: Count of life expectancy for first life tyres (years) on HGV rigid & tractor unit by axle type	23
Figure 10: Count of life expectancy for first life tyres (years) on heavy trailer unit by axle type.....	23
Figure 11: Count of life expectancy for first life tyres (years) on minibuses by axle type	23
Figure 12: Proportion of respondents using re-treaded tyres	24
Figure 13: Count of life expectancy for re-treaded tyres (years) on HGV rigid & tractor unit by axle type.....	24
Figure 14: Count of life expectancy for re-treaded tyres (years) on heavy trailer unit by axle type	24
Figure 15: Do you know the current age of your first life tyres?.....	25
Figure 16: Count of first life tyres by age of the tyre for HGV rigid & tractor unit	26
Figure 17: Count of first life tyres by age of the tyre for heavy trailer	26
Figure 18: Count of first life tyres by age of the tyre for minibuses.....	26
Figure 19: Count of first life tyres by age of the tyre for all vehicles	27
Figure 20: Do you know the current age of your re-treaded tyres?	28
Figure 21: Count of re-treaded tyres by age of the tyre for HGV rigid & tractor unit.....	28
Figure 22: Count of re-treaded tyres by age of the tyre for heavy trailer	28
Figure 23: Count of re-treaded tyres by age of the tyre for all vehicles	29
Figure 24: Typically, are all the tyres on the vehicle the same age (approx.)?	29
Figure 25: If you have tyres 10 years old or greater on a steering axle, which statement is typically true?.....	29
Figure 26: Does your tyre strategy/policy/contract limit the tyres based on their age?.....	30
Figure 27: Count of tyre age limits set by tyre strategy/policy/contract.....	30
Figure 28: Comparison of tyre configuration and resulting GVW total based on an 18 tonne two axle rigid	32
Figure 29: Count and percentage of total tyres by vehicle type (minimum and maximum tyre assumption)	34
Figure 30: Summary of key findings across the project.....	36

Tables

Table 1: Stakeholder engagement.....	11
Table 2: List of sites surveyed for taxi and PHV tyres.....	14
Table 3: Local authorities contacted	19
Table 4: Summary of key findings from local authorities.....	21
Table 5: Total number of tyres based on vehicle configuration and assumed number of tyres per configuration	33

Images

Image 1: Example tyre date stamp on the side wall of a tyre	14
Image 2: Example of illegible tyre date stamp with half the date stamp worn away	15

1 Executive Summary

1.1 Introduction

To help keep road users safe, the Department for Transport (DfT) has been seeking evidence and views on proposals to introduce legislation to ban tyres aged 10 years and above on heavy goods vehicles (HGVs), buses, coaches, heavy trailers, and minibuses, including tyres that have been re-treaded 10 or more years ago. The DfT are also seeking evidence on whether to introduce a similar maximum age for tyres fitted to taxis and private hire vehicles (PHVs).

The primary objective of this project was to collect information to enhance the evidence base for the age of taxi and PHV tyres, in addition to obtaining data from a sample of commercial vehicle operators. The project team also established a series of assumptions to enable the DfT to gain an understanding of the total number of tyres currently in use on commercial vehicles in Great Britain (GB).

The project sought to build on the research already conducted by the Transport Research Laboratory into how ageing affects the strength and safety of tyres and provide additional data to enhance knowledge on the subject. Findings from this project, along with results from the consultation on a potential ban of all tyres over the age of 10 years, will help inform the policy change.

1.2 Methodology

As part of this study, several techniques were used to gather a variety of information to help inform the DfT's consultation on banning old tyres. These included:

- Manual surveys completed at a variety of taxi ranks and holding areas across England. This included recording tyre ages as well as qualitative conversations with taxi and PHV drivers. This was to help achieve an understanding of the age of tyres fitted on taxis and PHVs.
- A taxi and PHV scoping exercise involving qualitative conversations with bodies such as taxi and PHV licensing authorities and associations. This was to help understand if the licensing requirements covered tyre standards and specifications, in particular tyre age.
- Stakeholder engagement with tyre manufacturers and tyre manufacturing and distribution associations. This was to better understand what heavy vehicle tyre data was available and the practicalities of accessing it.
- An online survey for commercial vehicle operators (heavy goods vehicles and bus and coach operators) including questions about tyre ages and management. This was aimed to help the DfT to understand the life expectancy of tyres, if operators' tyres reached 10 years old or older and if their tyre practices were influenced by tyre age.

The data collected throughout the project was combined and assimilated into a database to enable analysis and interpretation.

1.3 Key Findings

- Data received from the tyre manufacturer Continental on tyre ages for fleet vehicles showed that the most common year of manufacture for tyres fitted to a sample of HGVs was 2018. The dataset comprised a sample size of 8,563 tyres.
- 606 taxis and PHVs were surveyed across 12 sites equating to 2,424 tyre recordings. This data gave an age distribution of re-treaded and first life tyres fitted to those vehicles. In total 21 tyres were 10 years or older representing one per cent of the total tyres surveyed. 835 tyres were recorded as unknown (no visible date stamps) or illegible (worn date stamps) representing 34 per cent of the total tyres surveyed. It is important to note that only the outer sidewall of the tyre was observed as the inner sidewall is inaccessible to check from the roadside and would require access under the vehicle to read the marking. The most common year of manufacture observed within the sampled vehicles was 2018 with the average year being 2017. This suggests that most taxi and PHV tyres in the sample are between one to two years in age.
- Findings from the taxi and PHV scoping exercise showed that most local authorities that responded (10 local authorities) do not limit tyres based on age, except for one local authority which limited the age of tyres on a vehicle to 15 years.
- The online survey responses received from 78 commercial fleet operators suggest that tyres fitted to the front axle lasted for less time than when fitted to other axles on the vehicle. Despite operators tending not to limit tyres based on their age (72 per cent), 97 per cent of respondents did not use tyres that were 10 years old or older. This is consistent with the tyre life expectations and the current age of tyres fitted to the respondents' fleets. Some respondents reported that they used re-treaded tyres on the steering axle. Even if there are no specific requirements in the UK Construction and Use Regulations in relation to the fitment of re-treaded tyres, it is tyre industry best practice in the UK and Ireland that re-treaded tyres should

not be fitted to front steer axles. Consultation with Bridgestone suggested that, with developments in tyre testing technology and environmental pressures faced by fleet operators, it would be possible to use re-treaded tyres on the steering axle.

1.4 Recommendations

The key findings have resulted in some important conclusions for consideration. These include, but are not limited to:

- Develop an education programme to help all drivers understand the issues relating to old tyres.
- It is recognised throughout the study that a large proportion of the surveyed taxis and PHVs did not feature a visible tyre date stamp. This is most likely to be the result of the date stamp being on the inside edge of the tyre rather than the tyre being in any way non-compliant with Regulations. It would be beneficial to have a larger sample size of taxis and PHVs to investigate tyre date markings in more detail to understand if there is an issue with the visibility of markings and how this can be addressed.
- It may be sensible to work with tyre manufacturers and fleet operators to understand whether the current tyre date marking system is fit for purpose against their individual requirements. There may be alternative solutions that could make the reading of tyre ages easier and the marking less prone to wear/damage. Furthermore, there may be merit in date-stamping the first time the tyres are fitted to the vehicle, in addition to when they were manufactured. This can establish an understanding of whether a tyre was in a period of storage before it is utilised on the vehicle. The scenario could be that a tyre is stored for two years before it hits the road, therefore losing two years of its potentially 10-year operational life cycle. The condition in which the tyre is stored throughout its non-operational period will also need to be considered. The complexity with this is that the tyre standards are set internationally and changes in the marking system would need to be agreed by the UNECE (United Nations Economic Commission for Europe).
- It became clear from speaking to licensing authorities that there are regional differences in the number of physical inspections carried out on taxis and PHVs each year. It may be appropriate that this is standardised. This could be done by providing a guidance for licensing authorities on the number of checks that should be done on taxis and PHVs and what the checks should include.

2 Introduction

2.1 Background

In recent years the safety of older tyres on heavy vehicles has become a matter of increasing concern. In 2013, the Department for Transport (DfT) and the Driver and Vehicle Standards Agency (DVSA) has published roadworthiness guidance to advise bus operators against fitting tyres over 10 years old to the front axles of their vehicles. This came following a failure of a 19-year-old tyre, fitted to the steered axle of a large coach, leading to the loss of three lives. The accident investigator concluded that the tyre failure was as a direct result of its age.

Currently, there is no law governing the maximum age at which tyres may be used on the roads. Because the roadworthiness of a tyre depends on many factors, including the condition in which they are stored, the use to which they are put, road conditions, how well they are maintained, tyre pressures and the driver's driving style, there is no consistent recommendation on the age at which a tyre should be replaced. However, some tyre manufacturers, including Continental and Michelin, recommend that tyres over 10 years old should be withdrawn from service. On 1st January 2004, ECE Regulations 108 and 109 came into effect, making it mandatory for re-treaded tyres to be subject to a tyre approval test. This ensures that re-tread manufacturers must meet a specified basic standard in terms of the tyres' suitability for re-treading prior to the process, and their performance after it. It is now illegal to sell re-treaded tyres that do not have the "e" mark.

In 2018, the DVSA updated its Guide to Maintaining Roadworthiness for tyres, to the effect that tyres of 10 years of age or older should not be used on the front axles of HGVs as well as buses and coaches.

The DfT commissioned specific research to explore the link between age and tyre integrity¹. Although the research is not statistically conclusive, it suggests that corrosion is more likely to be found in older tyres and highlights the ability of moisture to penetrate through cuts in the tread area into the structure of the tyre. The research also implies a change in the hardness of the rubber, both in the tread area and the sidewall for older tyres. This hardness can lead to cracking.

2.2 Old tyres consultation

The DfT thus planned to consult on options to ban older tyres from use on buses, coaches, HGVs, heavy trailers and minibuses to help keep road users safe. The consultation which ran from 23 June 2019 to 1 September 2019, included proposals to introduce legislation to make it illegal for these vehicles to run with a tyre aged 10 years or older. The consultation also collected views and evidence on whether and how best to introduce a tyre age ban for taxis and PHVs. As part of this consultation, the DfT commissioned this project to provide further data to enhance the evidence base on the use of older tyres for taxis and PHVs. The findings from this work will form part of the Government's response to the consultation and inform any future policy decisions.

2.3 Aim of the project

The overall aim of the work package was to collect evidence on older tyres to support the development of future policies that control the use of tyres by different vehicles, on the basis of their age. In order to achieve this, quantitative and qualitative data collection was carried out from a range of primary and secondary data sources. Data collected included:

- Age distribution of re-treaded and first life tyres, fitted to taxis and PHVs
- Age data of tyres fitted to HGVs
- Current practices for tyres on taxis and PHVs

The deliverables of this project were:

- A database including all information collected on tyre ages
- A summary report explaining and justifying the approach taken, highlighting key uncertainties within the project, and including the key summary statistics and findings

¹ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/808468/tyre-ageing-its-effect-on-material-properties-and-structural-integrity.pdf

3 Methodology

The core work packages of the project are illustrated below:

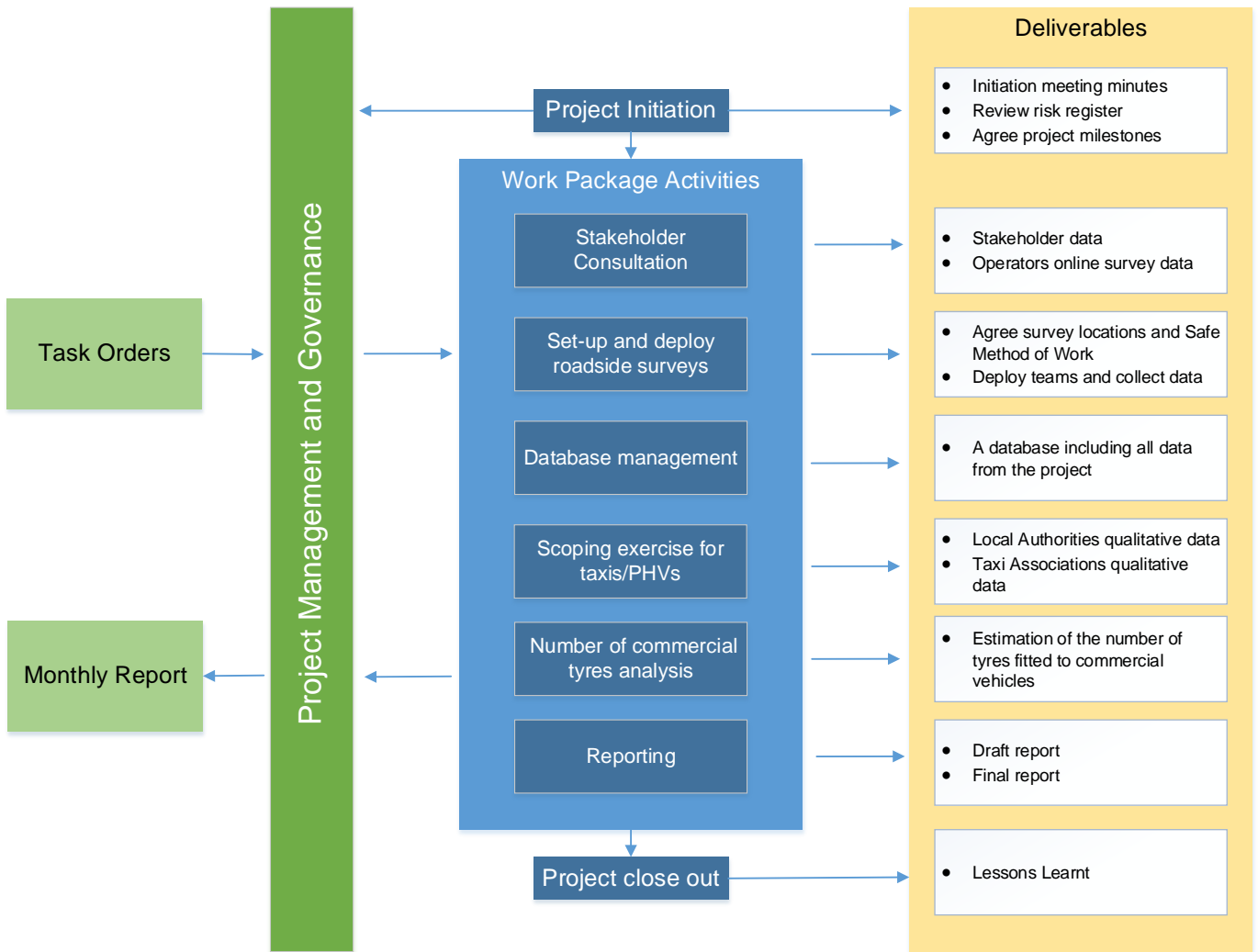


Figure 1: Effective methodology to seek out key tyre evidence to advise future policy and legislation

3.1 Stakeholder consultation

AECOM engaged with a number of tyre manufacturers and associations in order to better understand what tyre data was available and the practicalities of accessing it. AECOM engaged with the DVSA, Bridgestone, Michelin, Continental and Goodyear, alongside the British Tyre Manufacturers Association (BTMA) and National Tyre Distributors Association (NTDA). The engagement phase brought about a number of interesting comments as well as access to tyre age related data.

3.2 Set-up and deploy roadside surveys

AECOM's project team completed the bespoke roadside survey for a number of locations across the UK to achieve an understanding of the age of tyres fitted on taxis and PHVs. Specific Health and Safety risk assessment forms were developed, and surveyors were required to read and sign to indicate that they understood and adhered to the Health and Safety requirements.

3.3 Database management

As part of the project requirements, the data collected throughout the surveys, stakeholder engagement and estimation of commercial tyre population was combined and assimilated into a database to enable analysis and interpretation of the data. Before this process was executed, the vehicle and tyre data went through a rigorous process of cleansing, review and quality control to ensure sufficient data quality was achieved. This ensured that anomalies and duplicates in the database were removed.

The database itself consisted of all the information collected throughout the surveying process to maximise the analytical opportunities. This included:

- Vehicle registration age
- Vehicle type
- Tyre age
- Tyre type
- Tyre position on the vehicle
- Additional commentary

3.4 Scoping exercise for taxis and PHVs

Telephone interviews were completed with a number of local authority licensing offices and taxi and PHV associations to understand the licensing requirements that drivers face including the number of times a year the vehicles were inspected/tested. This was to understand how licensing rules vary between different authorities and if any consideration is taken regarding the age of the tyre.

3.5 Number of commercial tyres analysis

AECOM completed an estimation on the number of commercial tyres currently fitted to commercial vehicles. This included HGVs, heavy trailers, buses, coaches, minibuses, taxis and PHVs. This estimation excluded vans. This was to understand what level of impact changes to legislation may cause on the total number of tyres currently on the road.

4 Stakeholder engagement

AECOM engaged with various stakeholders to obtain data from a sample of vehicles as detailed in the original work package scope. The aim was to better understand the age distribution of re-treaded and first life tyres fitted to HGVs, heavy trailers, buses, minibuses and coaches. The project team contacted, via e-mail and telephone, nine stakeholders shown in Table 1.

Table 1: Stakeholder engagement

British Tyre Manufacturers Association (BTMA)	Bridgestone
Driver and Vehicle Standards Agency (DVSA)	Michelin
National Tyre Distributors Association (NTDA)	Goodyear
WheelRight	Dunlop
Continental	

Of the stakeholders that were contacted, BTMA provided qualitative data and Continental provided quantitative data regarding tyre ages.

4.1 British Tyre Manufacturers’ Association (BTMA)

The BTMA estimated that around half of the HGVs in the UK are covered by tyre management contracts and that this is generally more apparent for fleets comprising of more than 20 vehicles. This is due in part to them having larger, lengthier contracts with their customers which allow them to forecast where they will be in three to five years’ time, which is the typical length of a tyre contract.

Smaller fleets do not tend to have this luxury and are reluctant to commit to a tyre contract for this length of time. This is because they don’t have the ability to forecast their revenue, fleet size or tyre usage over the medium to long term and so opt to purchase tyres as and when needed.

Having a tyre management contract does not necessarily equate to good tyre management however, and the BTMA are aware of larger operators with contracts exhibiting poor tyre management practices. This is due to various reasons such as the type of work, location, resource and poor overall vehicle maintenance.

4.2 Continental

AECOM approached Continental to obtain data on tyres from a sample of vehicles. As a result, Continental provided the AECOM team with just over 8,500 lines of data from their fleet management systems related to fleet checks conducted on their managed fleet contracts.

The data provided to AECOM consists of the vehicle type, the configuration, tyre position, tyre size and date code. This data can provide the DfT with some useful information such as identifying the typical age of the tyre by position. Some initial analysis on tyre age and profile can be found in Figure 2 and Figure 3.

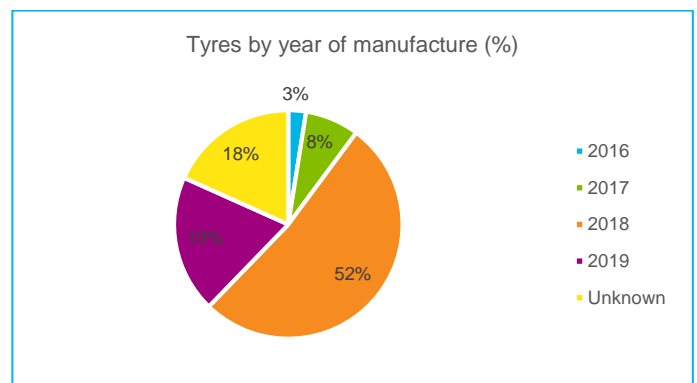
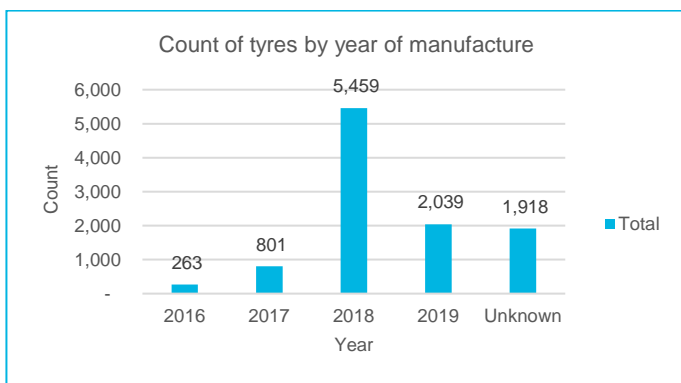


Figure 2: Continental data - count of tyres by year of manufacture

Figure 3: Continental data - proportion of tyres by year of manufacture

More effective analysis could be made around the age of tyres by vehicle position. As it stands, this is currently in code format. AECOM has tried to get in contact with Continental to establish what each of the tyre position represents however due to resource

limitations they were unable to clarify the codes within the timeframe of the project. It is recommended that the DfT pursue this further to maximise the usability of this data to inform policy decisions going forward.

As the data currently stands, there are no tyres which are greater than three years old within the sample dataset, with 52 per cent of the tyres being two years old.

5 Roadside surveys – taxis and private hire vehicles

5.1 Survey setup

Roadside surveys were conducted at 12 sites. Maps and location details of where the roadside surveys were conducted are available in Appendix B.2. The site numbers correspond with those in the taxis and PHVs database. Summary maps of the sites surveyed are shown in Figure 4.

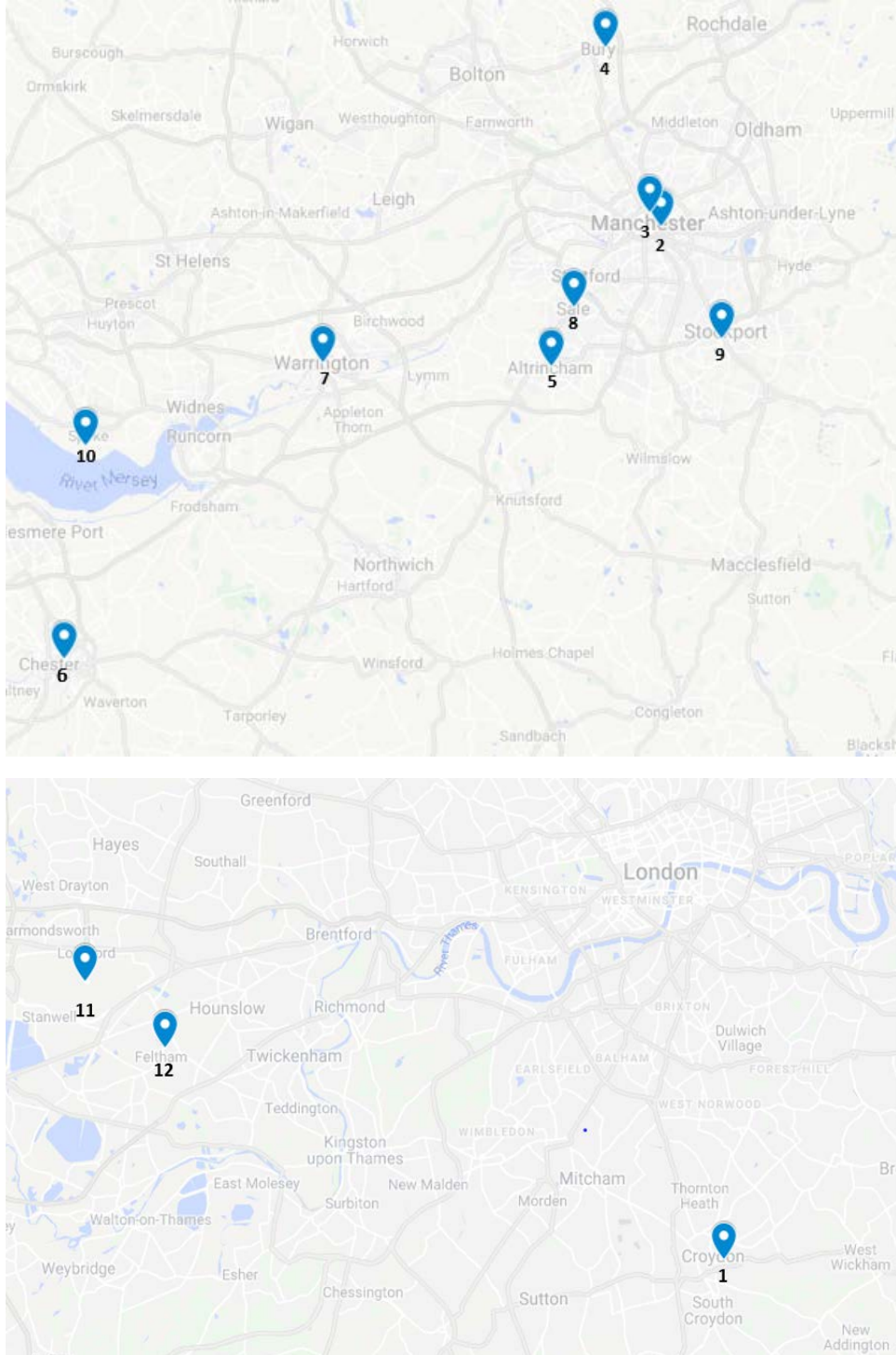


Figure 4: Effective geographical spread of on-the-ground surveys to record taxis and PHVs tyre age data

Table 2: List of sites surveyed for taxi and PHV tyres

1: East Croydon Station	7: Warrington
2: Manchester Piccadilly Station	8: Sale
3: Manchester Victoria Station	9: Stockport
4: The Rock, Bury	10: Liverpool Airport
5: Altrincham	11: Heathrow Airport
6: Chester	12: Feltham Station

For each vehicle, specific information was recorded where this was possible. Recorded information included the vehicle registration number, the week and year of manufacturing for each tyre, whether the tyre is a first life or re-treaded tyre and the position of the tyre on the vehicle. Observations were also made around the site location and, where possible, qualitative data was captured from drivers who were willing to speak to the surveyors.

The tyre date stamp consists of four digits of which the first two digits illustrate the week it was made (01 to 52) and the last two digits are for the year (e.g.19). So, if a marking states 0119, it means the tyre was manufactured in the first week of 2019. Examples of the date stamp can be seen in Image 1. For re-treaded tyres it follows the same format as first life tyres with the week number and year, however this is overwritten with the date stamp of the re-tread each time the tyre is re-treaded. For example, if the original date stamp was 0907 and then it was re-treaded in the 40th week of 2010, the original date stamp would be replaced with 4010.

**Image 1: Example tyre date stamp on the side wall of a tyre**

Where the tyre age was unknown it was either recorded as unknown (U) or illegible (I). Only the outer sidewall of the tyre was observed as the inner sidewall was inaccessible to check from the roadside and would require access under the vehicle to read the date stamp. Unknown tyre ages typically featured on non-European tyres such as the Chinese brands, although the date marking may be on the inner sidewall of these tyres. Illegible tyre ages are where the tyre had typically been in contact with the kerb and the tyre date stamp marking had been scrubbed off the sidewall. An example of this can be seen in Image 2.



Image 2: Example of illegible tyre date stamp with half the date stamp worn away

As part of the surveying, teams worked in pairs with one individual surveying while another observed any vehicle approaching in the vicinity. For some of the surveying locations with restricted access, for example Heathrow airport, the surveyors were escorted between different surveying sites for personal safety and to avoid potential conflict. Risk assessments were completed for all surveyed locations detailing potential general risks and those specific to each individual site. These were signed for each location by each team member that would be working there. This also included emergency contact details as well as nearby medical facilities in case these were required. It was also important to only survey at the nearside of the kerb when it was unsafe on the offside due to moving traffic.

5.2 Overview of results for roadside survey

The 12 locations comprised mainly of town and city centres, airports and railway stations and were chosen so the taxis and PHVs tyre ages could be recorded in a safe and efficient manner. The most surveyed locations were Heathrow and Liverpool airports. This was a result of the large holding areas for taxis and separately PHVs which meant a large number of tyres could be surveyed in a short space of time. These locations also had the taxis and PHVs stationary for an extended period meaning there was more time for the tyre ages to be surveyed while the vehicles were in the holding areas.

In total, 606 vehicles were surveyed equating to a recording of 2,424 tyres overall. Of these, 1,589 tyres had a visible date stamp on the outer facing sidewall of the tyre. The remaining 835 tyres could not be determined for their age. Of the tyres that could not be read, 29 (three per cent) were illegible as the date had been scrubbed off and 806 tyres (97 per cent) were unknown as not presenting a visible date stamp on the outer facing sidewall of the tyre. Where the brand of tyre has been recorded in the database, this links to the tyre age as unknown. In the sample of tyres surveyed, the date stamp was not visible on a range of brands such as Continental, Goodyear and Dunlop, but also on a large proportion of non-European tyres. This is most likely because the date stamp was on the inner sidewall of the tyre. The oldest recorded tyre was a re-treaded tyre from 2001 with the most recent being 2019. Of all the tyres with known dates of manufacture, only 21 tyres were 10 years or older. The distribution of the tyres by age and axle type can be found in Figures 5 and 6.

Of the vehicles, 483 (approximately 80 per cent) were taxis, 123 (approximately 20 per cent) were PHVs. PHVs were predominantly found at the airport survey locations, mainly because they had their own dedicated waiting zone in these locations. Taxis were found in all surveyed locations.

Of all the tyres recorded, 2,241 (92 per cent) were first life tyres, 173 (seven per cent) re-treaded tyres and 10 (less than one per cent) were unknown. This is clear evidence that taxis and PHVs use first life tyres rather than re-treaded tyres.

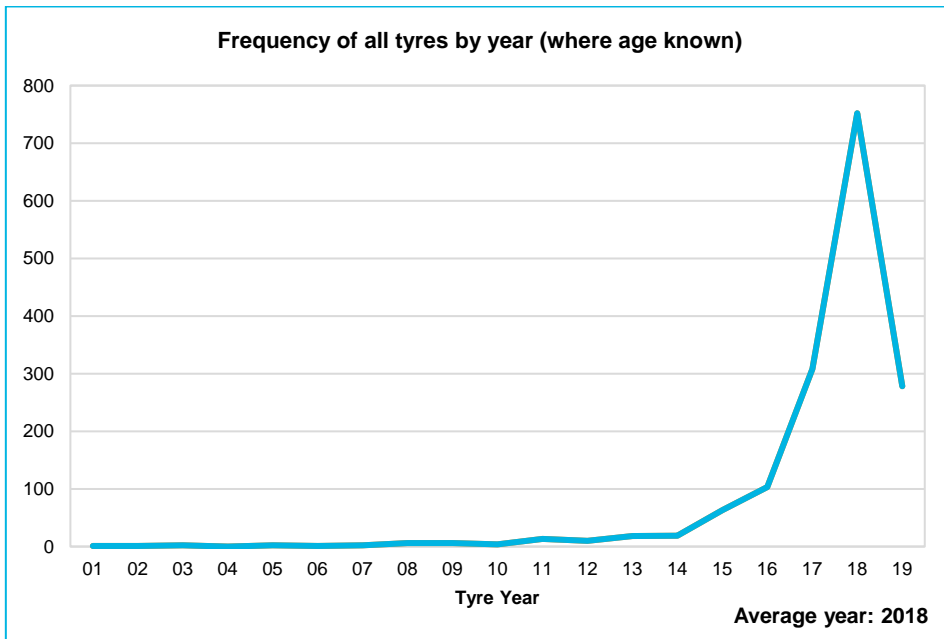


Figure 5: Taxi and PHV tyres – age distribution of tyres (count)

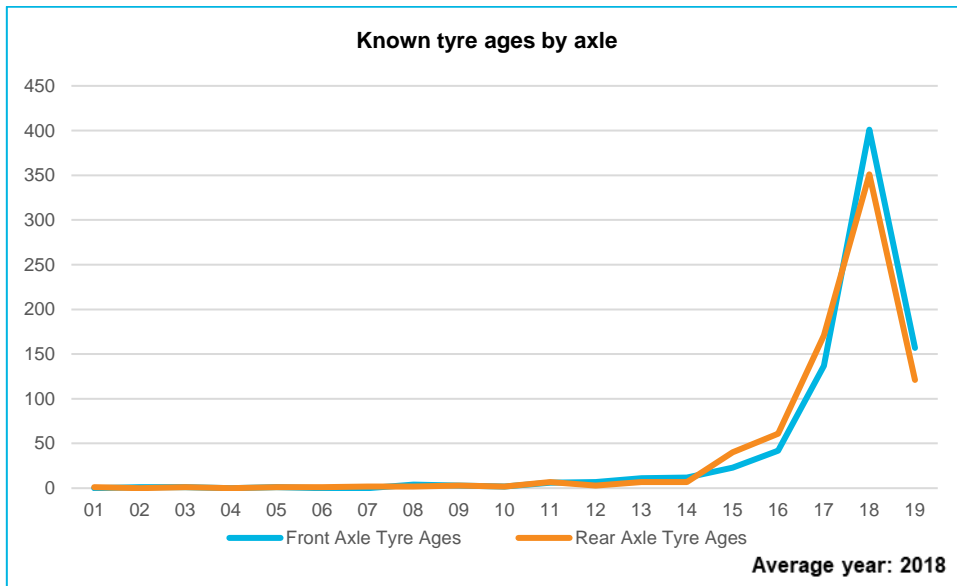


Figure 6: Taxi and PHV tyres – age distribution of tyres by axle position (count)

5.3 Qualitative commentary from drivers

As part of the survey process, conversations were undertaken with drivers to gain additional insight into their tyre management and practices. Most of the drivers spoken to said that they do not tend to rotate their tyres or their spare. Some remarked that this practice was less widespread now compared to previous years and that drivers in general were not rotating as much nowadays. In general, drivers said that front tyres and back tyres are usually replaced separately (but both front tyres and both back tyres at the same time) which is also reflected in the similar age of tyres for both front and both back tyres in the records for some vehicles.

Regarding re-treaded tyres, some drivers said that they would be discouraged from getting re-treaded tyres as they consider them to be too much of a risk. When pressed why they thought this, the response linked back to not knowing where the tyre had been during previous lives and the amount of wear the tyre had experienced. Drivers seem to be sceptical as to how safe re-treaded tyres are to use. This could suggest a lack of knowledge in the quality standards set out for re-treaded tyres. This could also suggest that drivers assume that re-treaded are similar to second hand tyres, e.g. part worn tyres.

Most drivers were not aware how to check the ages of their tyres but those keen to converse were interested in how the ages could be measured. In general, the drivers spoken to said they changed their tyres approximately every six months. Some said they did it more frequently (approximately every four months) but overall the rate of tyre change was quite frequent. Drivers spoken to who

were apathetic about tyre ages were either in rented vehicles or vehicles where the maintenance was managed by another person, demonstrating that those in their own vehicles were more interested in the age of their tyres. Although some drivers were interested in the reason for the surveys being conducted, most were apathetic about the purpose. Regarding non-European tyres, most drivers (when told) were surprised that their tyres were non-European (mostly Chinese) but did not appear concerned as long as they were within regulations.

5.4 Anecdotal evidence of taxi and PHV tyres

By discussing with taxi and PHV drivers while tyre surveys were taking place, it was possible to gain anecdotal evidence on tyre life versus the distance taxis and PHVs were covering (or usage of the vehicle, as a proxy for distance).

Based on those discussions with drivers it was possible to split them in to four broad usage categories:

- Low mileage usage – drivers working around three to four hours a day, and, on average, about 12,000 miles a year. These drivers suggested they would replace tyres once every two years.
- Medium mileage usage – drivers typically working an eight hour shift each day, driving on average about 25,000 miles a year. These drivers suggested they would typically replace tyres once a year.
- High mileage usage – drivers working either very long shifts or working six or seven days a week, with vehicle mileage of around 50,000 miles. These drivers suggested they would typically replace tyres every six to seven months.
- Very high mileage usage – instances where a vehicle was double shifted – i.e. used by one driver and then handed over to another for the next shift on the same day. This means that their vehicles were in almost continuous usage. These vehicles were doing annual mileages of around 60,000, and drivers suggested that they would replace tyres every three or four months.

Figure 7 shows the relationship arising between mileage and how frequently drivers replace their tyres – namely, that higher usage requires more frequent tyre replacement.

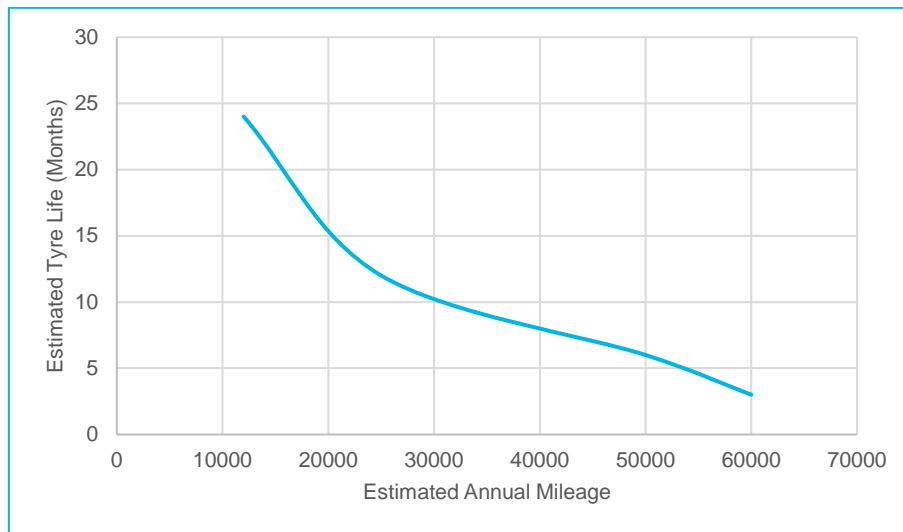


Figure 7: Relationship between mileage against estimated tyre life

From the discussions with drivers it was estimated that approximately 10 per cent of drivers fell into the low usage category, 20 per cent into the medium usage category, 50 per cent into the high usage category and 20 per cent into the very high usage category. Using these proportions, it becomes possible to map a distribution of the proportions of drivers against how frequently they would typically expect to replace tyres. This is shown in the Figure 8:

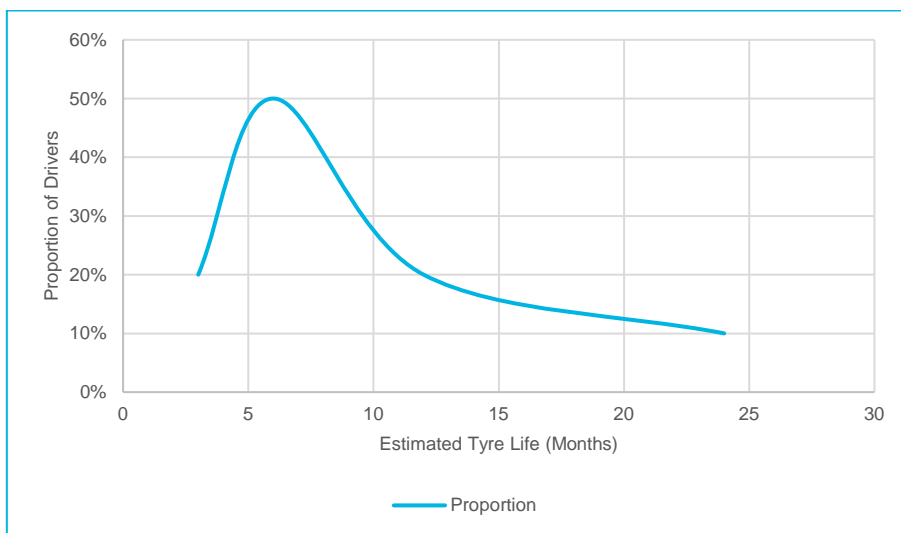


Figure 8: Proportion of driver mileage category against the estimated tyre life

This is a clear bell-shaped relationship, with the majority of drivers replacing tyres after around six to eight months. This is reflective of the majority of drivers fitting in to the high or very high usage categories.

It should be noted that mileage is not the only factor influencing tyre life. Tyres fitted to drive axles would be expected to have a shorter life than those on a non-drive axle, particularly in a front wheel drive vehicle where the front axle is not only the steer axle, but also provides the traction effort (as well as braking effort). Drivers may consider extending the life of the tyres by rotating their tyres. The method of this is dependent on which axle is the drive axle.

6 Taxi and private hire vehicle scoping

6.1 Local authority licensing offices

As part of the taxi and PHV scoping, AECOM has engaged with several local authorities to understand the current practices on tyres and licensing requirements faced by vehicle owners. Since the existing requirements and regulations for tyre roadworthiness, MOT testing and licensing for taxis and PHVs may vary between licensing authorities, it is important to establish the differences in the assessment procedures of vehicles and whether the age of the tyre is taken into consideration. Initially, the project team tried to contact via e-mail and telephone 27 local authorities, shown in Table 3.

Table 3: Local authorities contacted

Birmingham	Lincoln
Brighton	Norwich
Cambridge	Nottingham
Canterbury	Oxford
Chelmsford	Peterborough
Chesterfield	Plymouth
Crawley	Portsmouth
Derbyshire Dales	Reading
Exeter	South Lakeland
Fylde	Stafford
Guildford	Stoke-on-Trent
Harrogate	Swansea
Hartlepool	York
Lancaster	Transport for London

Conducting data collection in August was affected by the holiday period and not being able to reach the right person from each local authority. From the original list, the team was able to establish contact with 10 local authorities: Transport for London, Chelmsford, Crawley, Fylde, Lancaster, Lincoln, Norwich, Plymouth, South Lakeland and Stafford. The collected feedback is described below for each of the local authorities.

The conversations had with local authorities around regulations and licensing requirements align to those set out in the policy and licensing documents issued out by the local authority.

6.1.1 Transport for London

The current licensing requirements in London demand that taxis and PHVs undertake two MOT's and one licensing inspection annually. Regarding tyres, TfL's testing manual states that the tread depth's minimum legal requirement is 1.6 mm across 75 per cent of tyre breadth over the complete circumference. The outer edge can be devoid of tread pattern. The examiner is required to check that the tread pattern is visible above the wear bar indicator across the centre three quarters of the tyre around the entire circumference. They also check that the tyre is not cut, split or bulging, and also that there is no uneven tyre wear and that no ply or cord is visible. A further check is also requested on taxis and PHVs that the tyres meet the correct manufacturer size, speed and weight specifications. Regarding data, TfL stated that specific data on tyres is not collected, with the exception of failure rates at the licensing inspection, which are quite low as the vehicle is required to have a current MOT no older than 14 days when it presents for licensing. Additionally, any illegal or badly worn tyre will be remarked upon during the MOT inspection.

6.1.2 Chelmsford

Under Chelmsford's current regulations, all vehicles are inspected every six months along with the yearly vehicle MOT. The tyres are checked for the tread depth, condition and wheels; however, the age of the tyre is not considered. The type of tyre used is regulated by the licensing authority and vehicle owners are allowed to fit part worn and re-treaded tyres to their vehicles. This local authority has enforcement officers which do spot checks, including checking the tyres.

6.1.3 Crawley

Crawley's licensing authority ban the use of part worn tyres; however, it does not take into account the tyre age, but is considering it due to DVSA's alerts on age of tyres. Drivers are exempt from the normal MOT because they receive a certificate of compliance, done once yearly if the vehicle is under four years old, and twice yearly if the vehicle is over four years old. These tests can be done at five garages nominated by the council, and are more comprehensive than the MOT, including the checking of the body work and regulatory aspects of the vehicle, such as calibration of the meter. The checking of the tyres includes the tyre type, tyre load, speed rating, tyre condition and wheel condition, the minimum tread depth being 2mm. Up to three interim inspections may be requested on the vehicle a year, triggered by complaints from customers. If the DfT sets out requirements surrounding tyre age, Crawley's local authority would follow suit as part of best practice requirements.

6.1.4 Fylde

The local authority of Fylde determined that the legal minimum requirements are checked at MOT, which does not include tyre age, nor does the licensing conditions. If advisory on tyres is issued, an inspector will contact the driver subsequently to verify the advisory has been acted upon.

6.1.5 Lancaster

In Lancaster, the only requirements needed are taxi and PHV tests, where vehicles are checked in line with MOT standards.

6.1.6 Lincoln

Lincoln's local authority conducts MOT testing twice a year, random night-time inspections, and inspections of the licence plate (i.e. that it's visible). These checks are done to the MOT standards, such as minimum tread depth, tyre pressure and other requirements; not including tyre age. These licensing conditions will be reviewed in October 2019.

6.1.7 Norwich

The current licensing regulations under Norwich City Council require vehicles to have one mechanical test annually, along with their yearly MOT. If the vehicle is less than three years old, only the mechanical test would be needed; while if the vehicle is 10 or more years old, then a mechanical test is required every six months. After 15 years, the vehicle is no longer allowed to be licensed. No additional guidance is provided to the driver surrounding best practice on tyres; however, they are given a green book which consists of the Hackney Carriage by-laws.

6.1.8 Plymouth

In Plymouth, vehicles are required to have one yearly MOT alongside a vehicle compliance test. If the vehicle is over five years old, then two yearly MOTs and a vehicle compliance test are required. The vehicle compliance tests are done by council approved garages. The tyres are all checked in accordance to the MOT, including the tread (1.6mm limit), size and condition of the tyre. The age of the tyre is not checked as it is not a requirement. Plymouth's licensing authority does not set any restrictions surrounding the tyre type, and therefore it is possible to use part-worn and re-treaded tyres. Additionally, enforcement officers do spot checks on vehicles along with the police, where all aspects of the car, including the condition of the tyre, are checked. Best practice guidance is provided to the driver on how best to look after the tyres, from checking the tread and condition, to doing daily walk around checks as part of licensing requirements, and as a result, every driver is expected to inspect their own tyres.

6.1.9 South Lakeland

South Lakeland's local authority follows the conditions of the MOT. An additional report must be filled out by the garage doing the MOT, the only question related to tyres being: "Does the vehicle have a spare tyre and is it inflated to the right pressure/has right tread depth?".

6.1.10 Stafford

In Stafford, the tyre age is not considered. Every new and renewal vehicle is fully inspected before the plates are issued, and regular checks of the vehicles are also undertaken when out inspecting the ranks. Additionally, tyre checks are part of the compliance inspection when the MOT takes place. The Taxi Licensing Policy states that, before undertaking any journey, the driver should ensure that the vehicle is roadworthy and includes ensuring that the tyres are not worn below the legal limit.

Overall, most of the interviewed local authorities have stated that, currently, only the MOT standards and vehicle inspections are enforced, without considering the age of the tyre.

6.1.11 Summary of findings

Table 4: Summary of key findings from local authorities

Local Authority	Number of MOTs yearly	Number of licensing/compliance inspections yearly	Age limit on vehicle	Tyre requirements	Age of tyre requirements
Transport for London	2 yearly	1 yearly	-	Tread depth Tyre condition Size Speed rating Weight	No age restriction
Chelmsford	1 yearly	2 yearly – every six months	-	Tread depth Tyres condition Wheels condition	No age restriction
Crawley	Exempt from normal MOT	1 if vehicle under 4 years old 2 if vehicle over 4 years old	-	Type Load Speed rating Condition Wheels condition Tread depth	No age restriction
Fylde	1 yearly	-	-	In line with MOT standards	No age restriction
Lancaster	1 yearly	-	-	In line with MOT standards	No age restriction
Lincoln	2 yearly	Random night-time inspections	-	In line with MOT standards	No age restriction
Norwich	1 yearly	Mechanical test every 6 months if vehicle over 10 years old	15 years	In line with MOT standards	No age restriction
Plymouth	1 if vehicle under 5 years old 2 if vehicle over 5 years old	1 if vehicle over 5 years old	-	In line with MOT standards	No age restriction
South Lakeland	1 yearly	-	-	In line with MOT standards Spare tyre check	No age restriction
Stafford	1 yearly	Regular ranks checks	-	In line with MOT standards	No age restriction

6.2 Taxi and private hire vehicle associations

6.2.1 National Private Hire & Taxi Association

This body informed AECOM that there were around 284 different licensing firms, all with their own requirements. Councils often required different tread depth requirements, and these were different to MOT standards. This leads to problems when the conditions imposed by councils are more stringent than those imposed by the MOT standards. This is particularly apparent when drivers use the MOT as a 'test' to see what is wrong with their vehicles.

It was also suggested that with all the existing regulations, having another regulation around tyre ages would not really be to their advantage. They noted that many drivers find it difficult to make a living in the existing climate and thus are 'living by the law' so currently do not do anything additional that they are not required to do e.g. check age of tyres. If the tyres are legal then for many drivers that is all that is important. That is why a lot of drivers don't know or are apathetic about tyre age and wouldn't know how to tell the age of their tyres.

It was noted that some members used to have an initial test before they have a council test, but this is not common anymore due to a reduced profit margin for the drivers. Additionally, the contact for this body had not heard of the consultation on old tyres and seemed surprised that the initial consultation, which closed on 1 September, had closed without them knowing anything about it.

6.2.2 Licensed Private Hire Car Association

This association noted that they do not get very much information or feedback from members without asking them directly. They said that due to the prevalence of a number of consultations on different aspects of the industry it is difficult to keep up with them all, and thus they found it unsurprising that they weren't aware of the DfT consultation on old tyres.

They said that they have a quarterly magazine and e-alert that references important industry updates and changes. However, they said that this is more geared around providing relevant information as opposed to specifically giving their members advice. As part of this, they noted that tyre age isn't a current law and, as a result, they do not really reference this a lot in their communications.

6.2.3 National Taxi Association (NTA)

The majority of NTA members face the MOT standard in terms of the tread depth, although some go to 2mm or 2.5mm, and the edge of the tyres are sometimes included in this depth due to the wear they experience as a result of the turning circle. Most taxi tyres do not achieve 10 years of age, with the tyres lasting around six months at approximately 10 to 20 thousand miles. There is often a lot of variance between the members as it depends on how hard the driver works and the condition of the road, such as speed bumps and kerbs. Some local authorities may request three tests in a year alongside the normal MOT. As an example, Carlisle, requires one inspection for vehicles up to three years old; two tests for up to six years old; and three tests for vehicles over six years. NTA does not provide guidance to members, as they must follow the regulatory guidance set out by the local authority.

7 Online survey

As part of the stakeholder engagement phase, AECOM completed an online survey to fleet operators to allow the DfT to establish an understanding of the following:

- Tyre life expectancy by tyre type and vehicle type
- Age of tyres fitted to fleets by tyre type and vehicle type
- Consistency of tyre ages on the vehicle
- If tyres 10 years or older are used
- If tyre strategy/policy/contract limited the tyre age

This survey was created using SnapSurveys and was distributed to over 5,000 fleet operators. This provided a unique opportunity for the DfT to understand the tyre age expectations of operators, if their tyres reach 10 years old or older and if their tyre practices are influenced by tyre age.

The survey was sent out to operators on the 30/08/2019 for 11 days and was closed on the 09/09/2019. In total the survey received 78 responses.

The online survey questions can be found in Appendix A.

7.1 First life tyre – tyre life expectations

The survey asked respondents what they thought was the life expectancy for tyres fitted to front and other axles. This was based on several vehicle types within their fleet. Of all responses received, no data was submitted for buses or coaches.

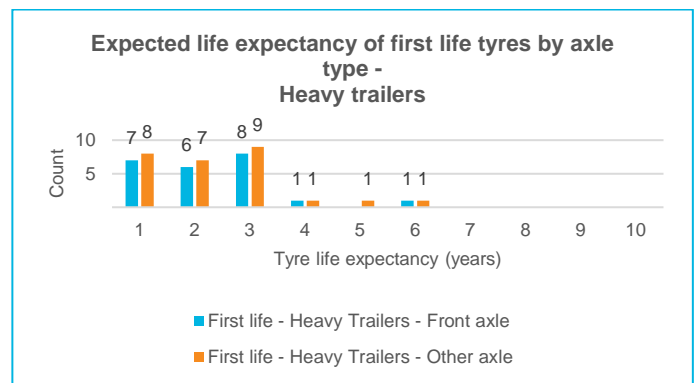
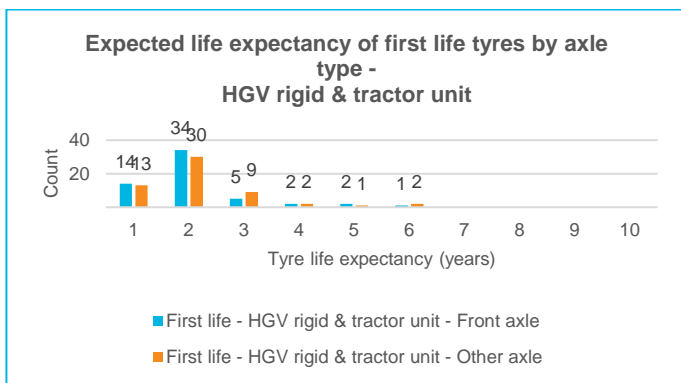


Figure 9: Count of life expectancy for first life tyres (years) on HGV rigid & tractor unit by axle type

Figure 10: Count of life expectancy for first life tyres (years) on heavy trailer unit by axle type

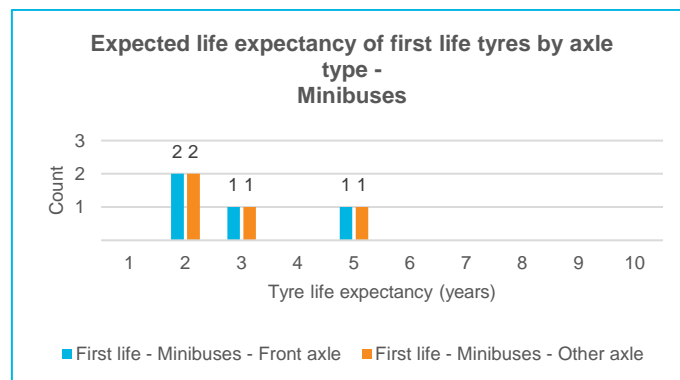


Figure 11: Count of life expectancy for first life tyres (years) on minibuses by axle type

For HGV rigid & tractor unit vehicles, respondents reported a tyre age expectancy range from one to six years with the majority stating that tyres last around one to three years. 84 per cent of responses stated that the first life tyres on the front axle would last between one to two years. For other axles this dropped to 57 per cent with tyres tending to last longer (around three years).

For heavy trailers the life expectancy ranged typically from one to three years of which 34 per cent of respondents said that front axle first life tyres last three years and 33 per cent of respondents saying other axles last three years.

Typically, respondents stated that minibus tyres have a life expectancy of two to five years for all axles. The sample size is quite small so it may be difficult to take away meaningful conclusions from this.

7.2 Re-treaded tyre – tyre life expectations

For re-treaded tyres, 27 per cent (21 respondents) stated that they used re-treaded tyres with the remainder 73 per cent using first life tyres only. No data for re-treaded tyres was submitted for buses, coaches or minibuses.

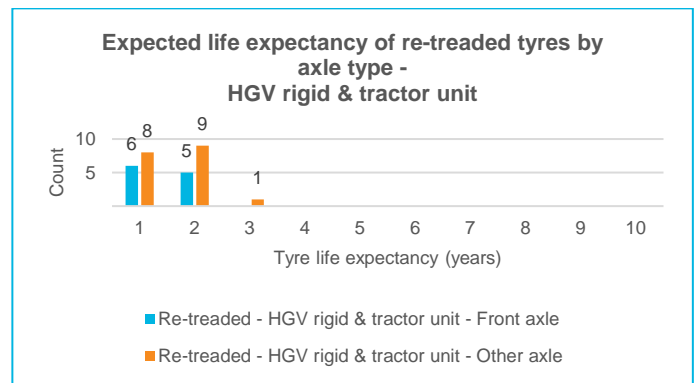
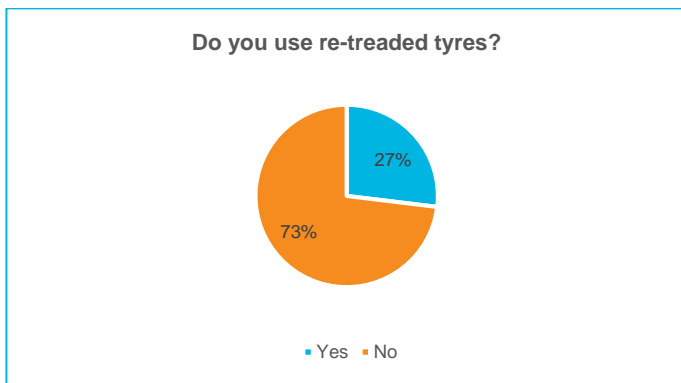


Figure 12: Proportion of respondents using re-treaded tyres

Figure 13: Count of life expectancy for re-treaded tyres (years) on HGV rigid & tractor unit by axle type

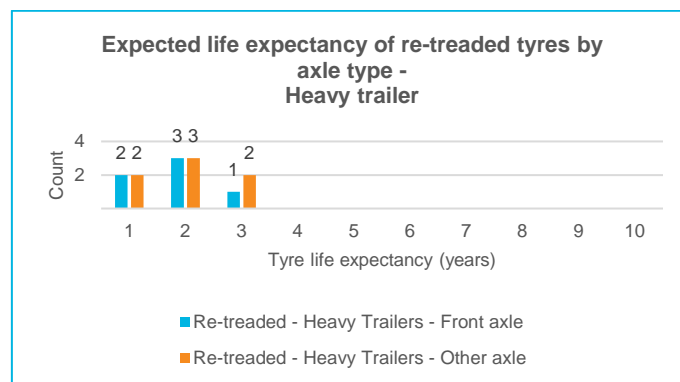


Figure 14: Count of life expectancy for re-treaded tyres (years) on heavy trailer unit by axle type

For HGV rigid & tractor unit vehicles, 54 per cent stated that the re-treaded tyres on the front axle are more likely to last for one year. Compared with first life tyres they don't last as long. This is perhaps because of the wear on the carcass that could potentially be in its 2nd, 3rd or 4th life. These numbers are highly dependent on a number of factors including the type of operations the tyre is working with and how well looked after they are by the driver. For other axles more respondents stated that tyres last for two years. This is typically expected for axles away from the front axle.

Some respondents reported that they use re-treaded tyres on the front axle of HGV rigid & tractor units. This was unexpected given the recommendations from the Guide to tyre management on heavy vehicles which states that it would strongly recommend only to use new tyres and re-grooved tyres on the steering axles, thus translating that it would not recommend using re-treaded tyres on steering axles. The responses suggest that this recommendation is not consistently followed. Tyre market research on the availability of re-treaded tyres for the steering axle identified that there are re-treaded tyres available. Tructyre² offers a re-treaded

² <https://www.tructyre.co.uk/re-trak.asp>

tyre (RE-TRAK MULTI-U WM3) to fleet operators which can be used in any position (including the steering axle) for vehicles operating in stop start urban environments.

Of the 11 respondents who use re-treaded tyres on the front axle, three were from the construction sector, three from the manufacturing sector, two from the wholesale and retail trade sector, one from the transportation and storage sector and two were unknown. These industries would suggest these vehicles could predominantly work in the urban environment where the use of re-treaded tyres on steer axle is more probable.

AECOM took the opportunity to speak with the technical manager at Bridgestone to discuss this matter further. Engagement with Bridgestone revealed that with the technology available for testing tyres it would be possible to confidently fit re-treaded tyres to the steering axle. At Bridgestone the re-treaded tyres go through extensive testing including a non-destructive testing procedure to check the structure of the tyre including highlighting any bonding concerns that maybe present in the structure of the tyre. These tests provide the necessary confidence that the tyre is fully compliant and as safe as possible. Bridgestone then went on to say that fleet operators are under pressure to reduce their impact on the environment and so using re-treaded tyres can help. It also has an operational benefit as re-treaded tyres are typically lighter in weight in comparison to first life tyres. This results in improved fuel efficiency, aiding their environmental reductions. From a tyre manufacturer point of view, they are looking to protect the image of re-treaded tyres. Some operators will be put off buying re-treaded tyres if there are restrictions on certain axle positions. By enabling re-treaded tyres to be fitted across all the axles on the vehicle, operators are more likely to have them fitted, thus aiding the environmental reduction. Given the technological advancements in the testing and manufacturing of re-treaded tyres, this suggests a need for a review of the guidance on the use of re-treaded tyres on the steering axle.

For heavy trailers the re-treaded life expectancy ranges from two to three years. There is consistency in age expectancy between the front and other axle.

7.3 First life tyres – current age

Respondents were then asked if they knew the current age of tyres fitted to their fleets. Of the 78 total responses, 58 stated that they knew the current age of their tyres. However, of these, five responses were discounted for this section of the survey due to misunderstanding the question. Due to the low number of tyres that they had provided, it would suggest they thought the question meant vehicles rather than count of tyres. The excluded respondents did not meet the minimum of having four tyres.

No data for current age of first life tyres was submitted for buses and coaches.

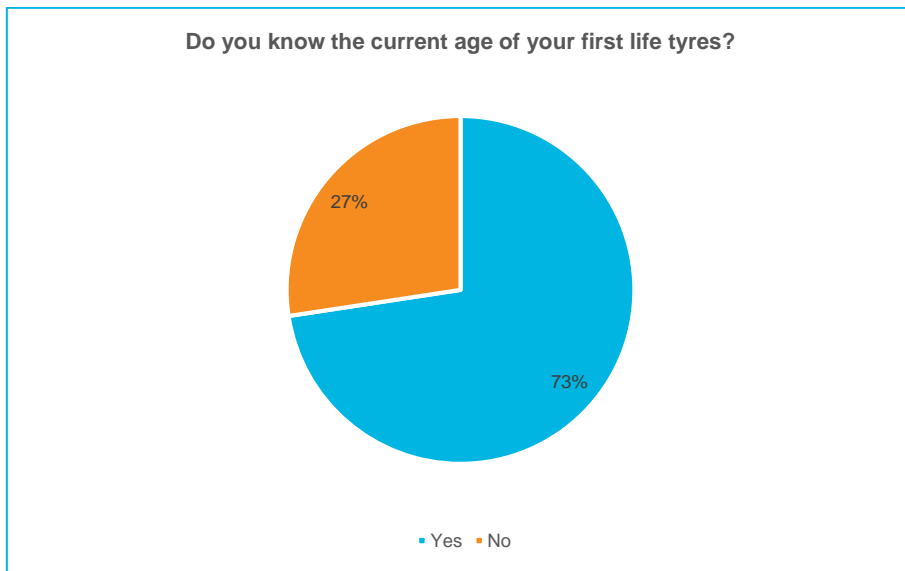


Figure 15: Do you know the current age of your first life tyres?

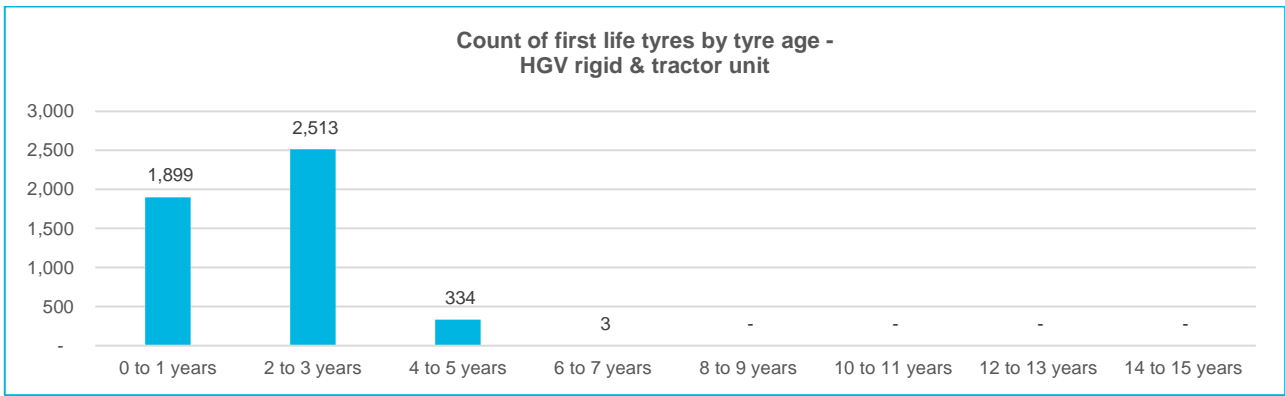


Figure 16: Count of first life tyres by age of the tyre for HGV rigid & tractor unit

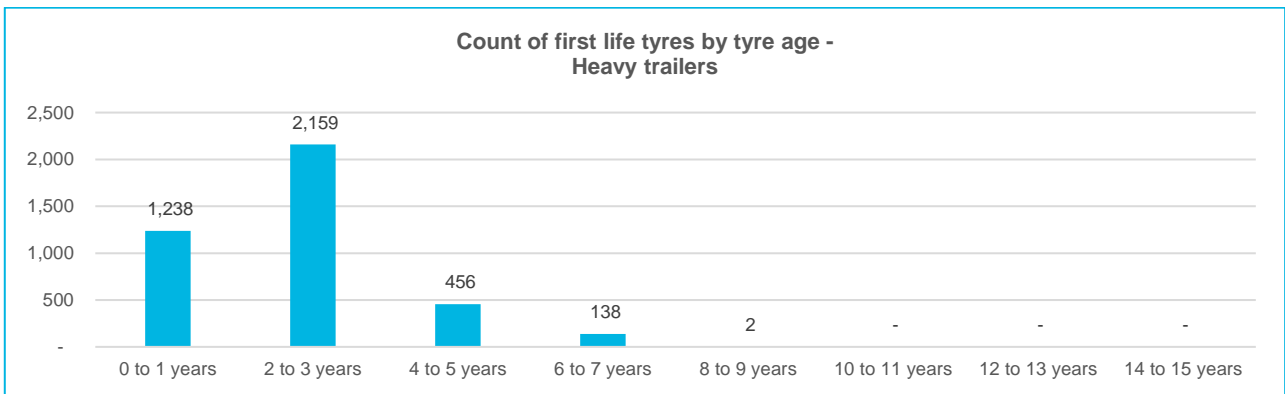


Figure 17: Count of first life tyres by age of the tyre for heavy trailer

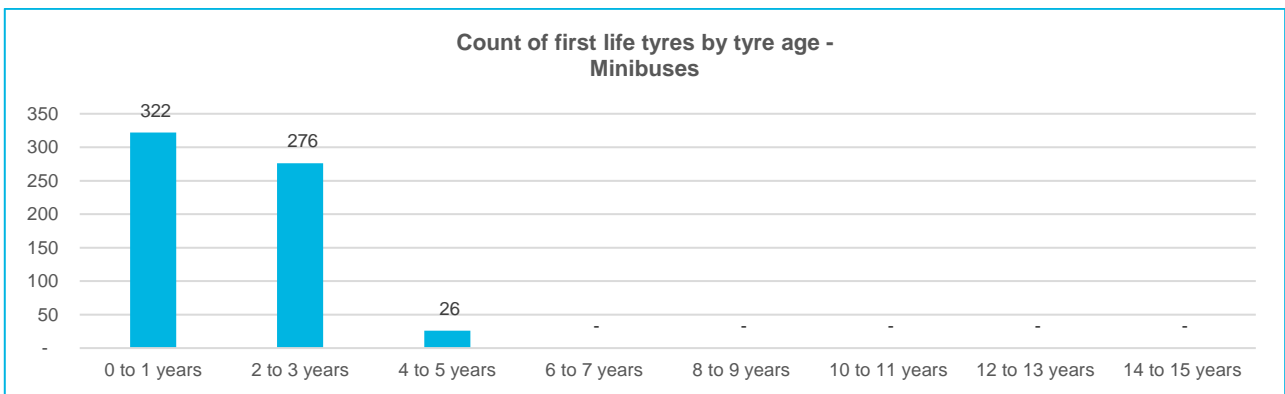


Figure 18: Count of first life tyres by age of the tyre for minibuses

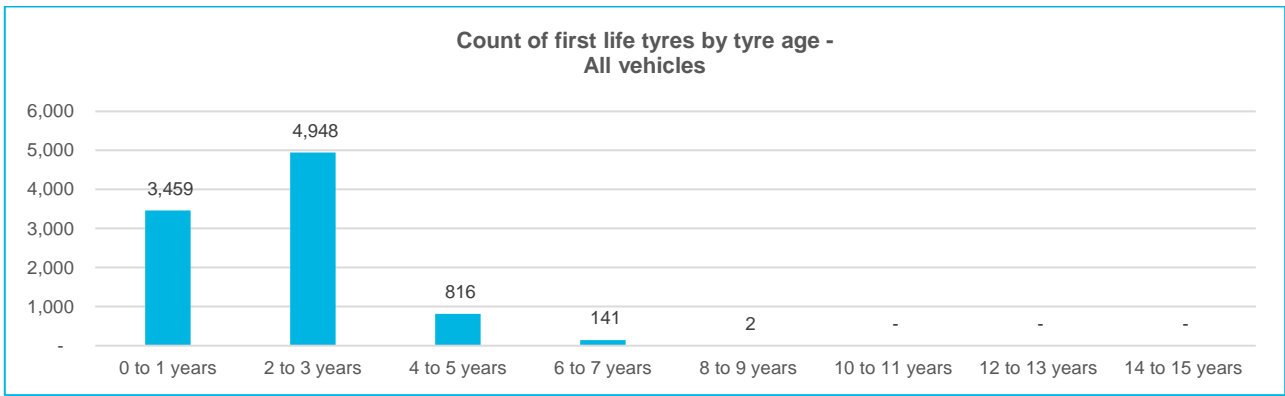


Figure 19: Count of first life tyres by age of the tyre for all vehicles

In total, respondents provided a total of 9,366 first life tyre ages across HGV rigid & tractor units (4,749), heavy trailers (3,993) and minibuses (624). This represents a percentage split of 51:42:7. Across all the vehicles 53 per cent of tyres were aged at two to three years old and only less than one per cent were aged nearest to 10 years at eight to nine years.

7.3.1 HGV rigid & tractor unit

The tyre age ranged from zero to seven years old. Of the total number of tyres, 40 per cent were aged zero to one years old and 53 per cent were aged two to three years old. The oldest tyres were reported at seven years old consisting of three tyres. This would suggest that few tyres reach this age considering the wear they are likely to experience.

7.3.2 Heavy trailer

The tyre age ranged from zero to nine years old with 54 per cent of tyres aged at two to three years. There is a greater spread of tyres in the older categories with four per cent of tyres aged six to nine years. This would suggest that tyres last longer on trailers in comparison to the tractor units as they are likely to experience more stress with drive and front steer axles. Also, many trailers do less mileage than tractor units each year and hence the tyres last longer.

7.3.3 Minibuses

The tyre age ranged from zero to five years with the majority of tyres for minibuses aged at zero to three years old (96 per cent). The data set is quite small in comparison to the other vehicle types.

Across all the vehicles, 53 per cent of tyres were aged at two to three years old and less than one per cent were aged near t years at eight to nine years.

7.4 Re-treaded tyres – current age

For re-treaded tyres, two of the respondents replied saying they knew the age of their tyres however the data again suggested they had recorded vehicles rather than the number of tyres. These formed part of the five respondents which responded incorrectly for the first life tyres, as aforementioned. Out of the remaining 19 respondents, 47 per cent knew the current age of their re-treaded tyres.

No data for current age of re-treaded tyres was submitted for buses, coaches and minibuses.

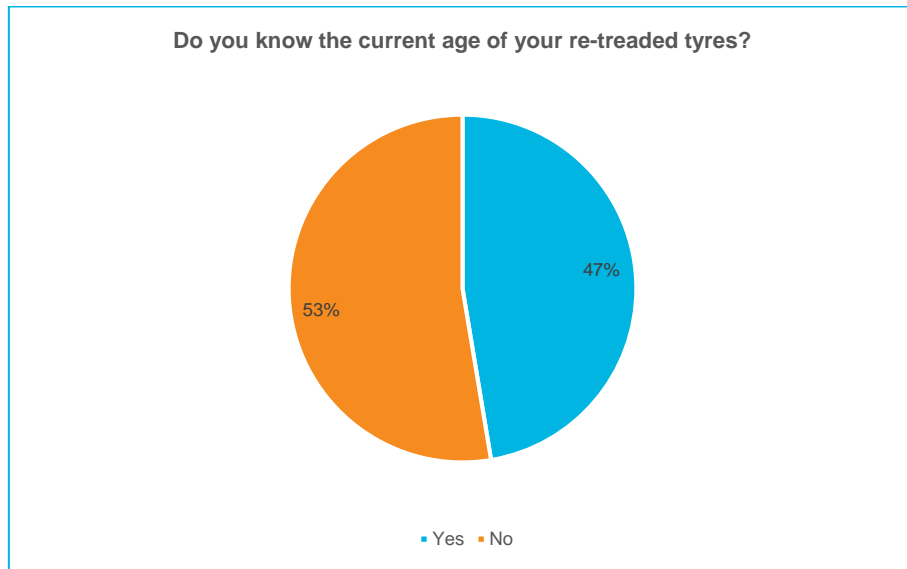


Figure 20: Do you know the current age of your re-treaded tyres?

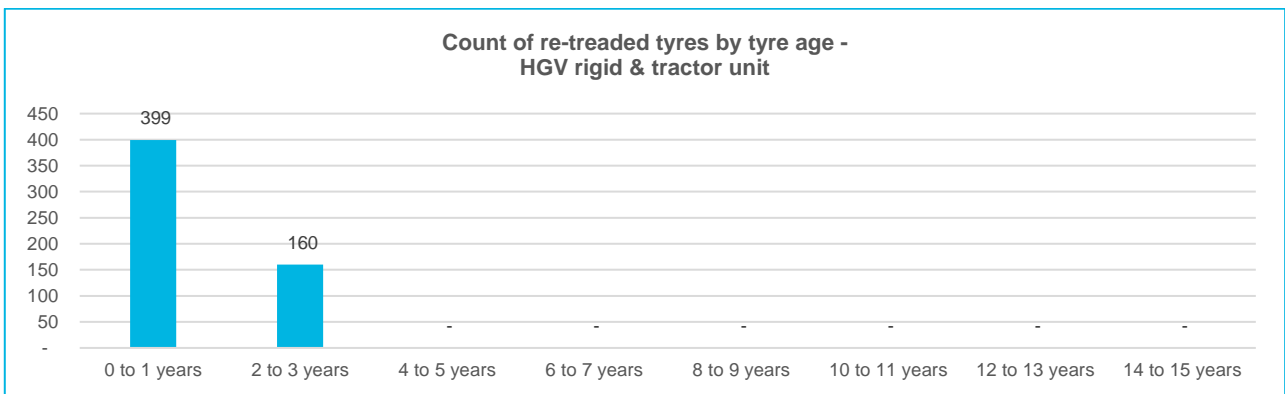


Figure 21: Count of re-treaded tyres by age of the tyre for HGV rigid & tractor unit

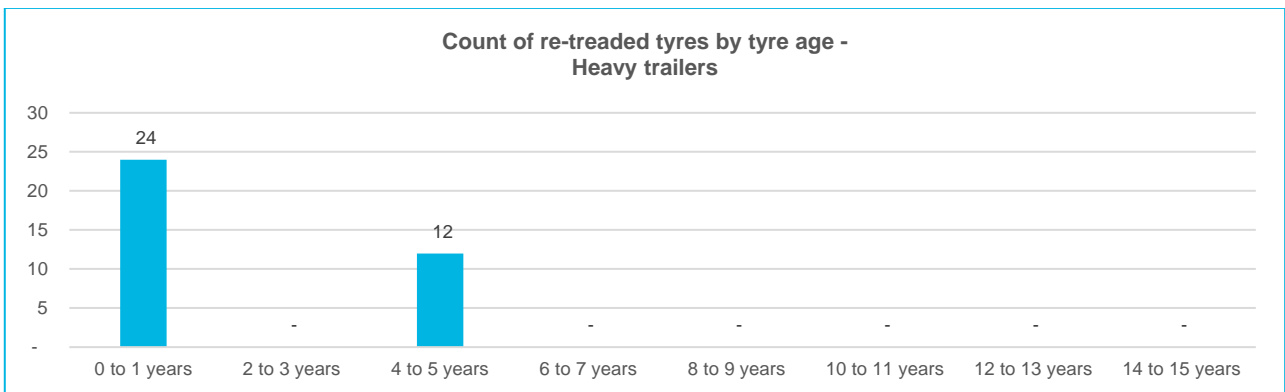


Figure 22: Count of re-treaded tyres by age of the tyre for heavy trailer

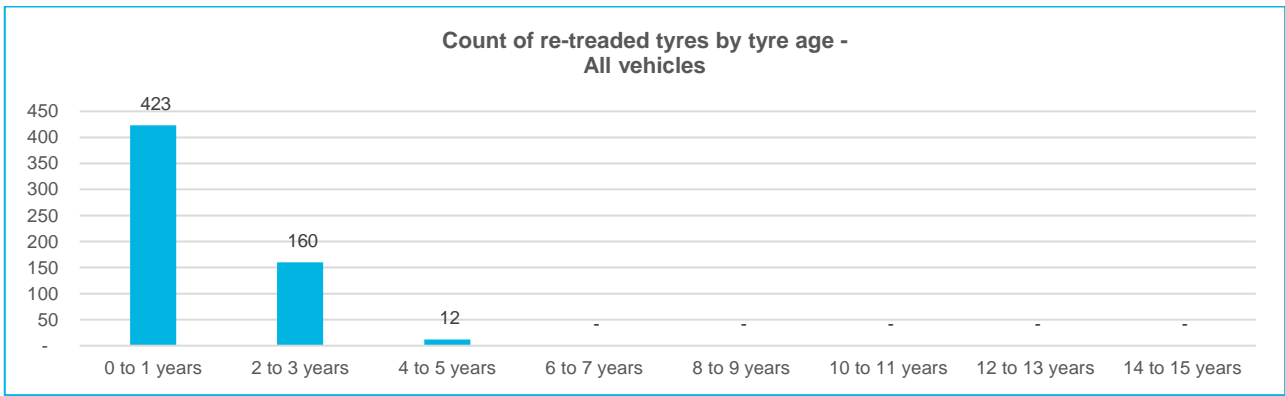


Figure 23: Count of re-treaded tyres by age of the tyre for all vehicles

In total respondents provided a total of 595 re-treaded tyre ages across HGV rigid & tractor units (559) and heavy trailers (36). This represents a percentage split of 94:6. Across all the vehicles 71 per cent of tyres were aged at zero to one years old and only two per cent were aged at four to five years. It is noteworthy that none were approaching 10 years old.

7.4.1 HGV rigid & tractor unit

The re-treaded tyre age ranged from zero to three years with 399 re-treaded tyres reported as zero to one year in age (71 per cent). It would appear from the data that it is uncommon to have tyres aged older than three years. This could be due to the fact that tyre casings may have multiple lives and therefore do not last as long in each individual life.

7.4.2 Heavy trailer

The re-treaded tyre age ranged from zero to five years with 423 re-treaded tyres reported as zero to one year in age (71 per cent).

7.5 Tyre practices

To understand more how operators use their tyres and the tyre practices they have, respondents were asked about tyre ages, what they do with tyres 10 years or older and if their tyre strategy limited the tyre by age.

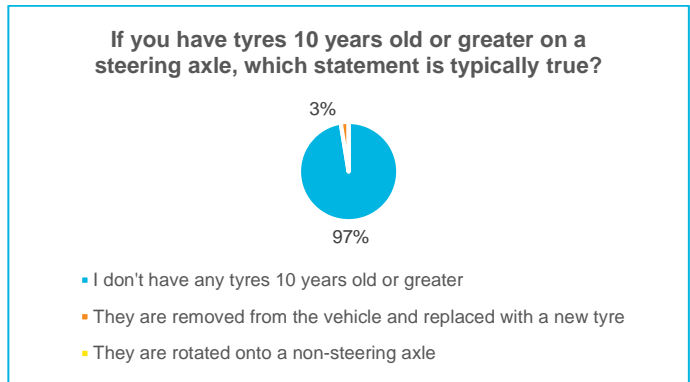
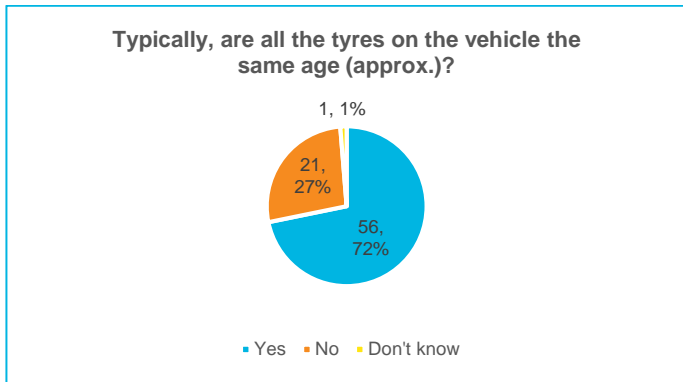


Figure 24: Typically, are all the tyres on the vehicle the same age (approx.)?

Figure 25: If you have tyres 10 years old or greater on a steering axle, which statement is typically true?

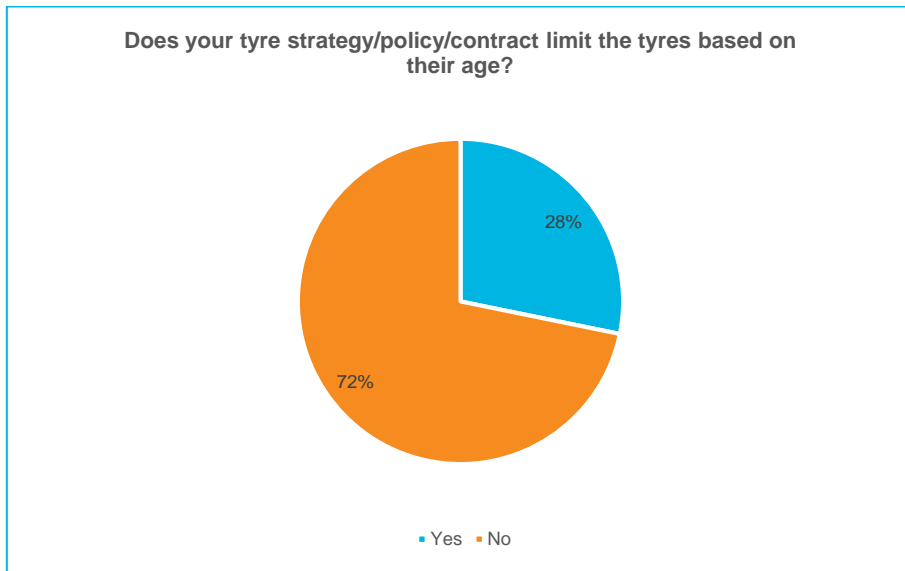


Figure 26: Does your tyre strategy/policy/contract limit the tyres based on their age?

Respondents were asked if the age of their tyres on the vehicle were consistent and 72 per cent of respondents replied yes that the ages of tyres were similar on the vehicle. This suggests that tyres are changed across the axle or in some cases all the tyres are replaced at the same time.

Respondents were then asked about their practices for using tyres over 10 years old. This is in respect of the road worthiness guidance which advises tyres that are 10 years or older to be removed from the steering axle. 97 per cent of respondents do not use tyres that are 10 years old or older. This is consistent with the tyre life expectations and the current age of tyres fitted to respondents' fleets. The remaining three per cent said that the tyre is removed from the vehicle and replaced with a new tyre. No responses rotated the tyre onto a non-steering axle. The responses seem to suggest that the use of tyres aged 10 years or older is uncommon. This is likely to be linked to the amount of wear that is experienced.

To conclude, the respondents were then asked if their tyre strategy/policy/contract limited their tyres based on their age. 28 per cent of respondents confirmed that their tyres were limited to an age. The limit ranged from one to nine years. 33 per cent of respondents said the tyre policy limited the age of tyres to five years. One respondent also limited their tyre to 350,000 km of travel and another limited the tyre to two years on the steer axle and three years on the drive and trailer axles.

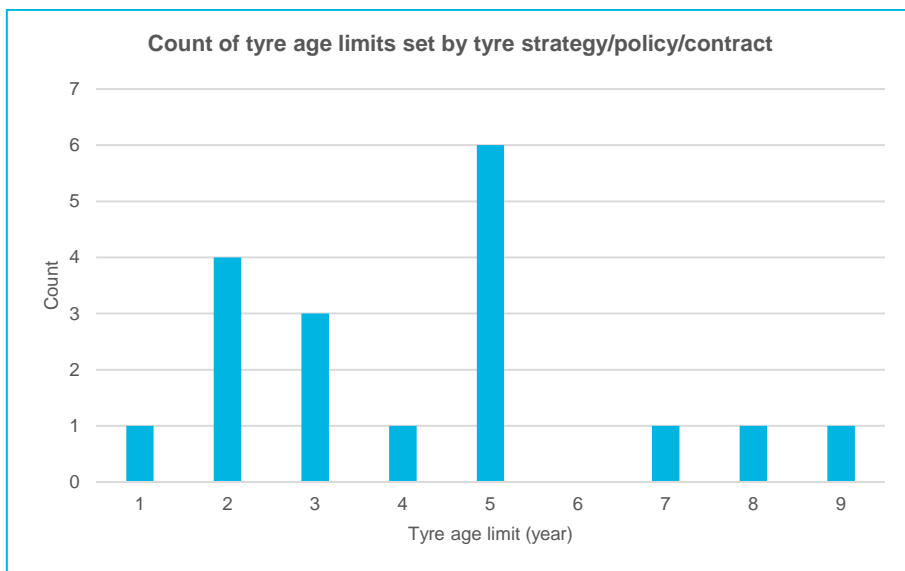


Figure 27: Count of tyre age limits set by tyre strategy/policy/contract

8 Estimated commercial tyre population

Through discussion with the DfT, it was established that the number of tyres used by commercial vehicles could be of great value to the consultation and the impact modelling assessment. Initially this was thought to be obtained via the online survey. AECOM expressed concern over this and the possibility of confusing the respondents, who were already required to answer several specific questions on their fleet tyres. Instead, AECOM established a series of assumptions to enable the DfT to gain an understanding on the number of tyres in use.

8.1 Data

In order to provide the DfT with the best possible indicator of the number of tyres in use, several data sources have been utilised. The time period of these data sources vary with updates completed throughout the year. To ensure consistency between the data sources, AECOM has utilised comparable data from the same time period to ensure an accurate estimation of the tyre population. The data has been sourced from 2018 as indicated in the below summary:

- HGVs³

The HGV data has been sourced via the DfT statistics using table VEH0524 for 2018. This provides the number of HGVs over 3.5 tonnes by axle configuration for rigid and artic vehicles throughout the Great Britain (GB).

- Trailers⁴

The trailer data has been sourced via the DVSA statistics on the annual tests for lorries, buses and trailers for 2017/2018 (GB).

- Buses⁵

The bus data has been sourced via the DfT statistics using table BUS0601 for 2017/18 (GB). This provides the number of public service buses operating throughout GB.

- Coaches⁶

The coach data has been sourced via the DfT statistics using table VEH0601 for 2018 (GB). The coach data has been disaggregated from the bus and coach total using the data from the bus statistics BUS0601.

- Minibuses⁷

The minibus data has been sourced via the DfT statistics using table VEH0601 for 2018 (GB).

- Taxis and PHVs⁸

The taxi and PHV data for GB has been an amalgamation of two data sources. One from the DfT statistics using table TAXI0102 for 2018 to represent England and Wales. Scotland has been represented using statistics from the Scottish Government (licensed taxi and PHV data⁹). This provides the total number of licensed taxis and PHVs within GB.

AECOM has provided the DfT with the foundations of the tyre assumption method, giving the opportunity to update the vehicle analysis as and when new data becomes available.

8.2 Assumptions

The majority of the assumptions are illustrated within the table below, however AECOM has provided some added clarity to the following vehicle types.

- HGVs

The number of tyres per vehicle axle configuration has been presented as a minimum and maximum value to account for the variance in the operational needs of the vehicle. The configuration of the axles will determine the Gross Vehicle Weight (GVW) of the vehicle, along with the configuration of the tyres including the use of super single or dual tyres. Dual tyres are required in some cases to spread out the load of the vehicle in order to achieve its GVW. For example, an 18 tonne two axle rigid vehicle will feature a dual tyre axle on the rear. The reason for this is that the front axle is typically plated to run at 6.5 tonnes gross and the rear axle 11.5 tonnes gross making 18 tonnes gross vehicle weight in total. Many tyres are designed to carry a load of around four tonnes

³ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/794500/veh0524.ods

⁴ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/814215/dvsa-com-01-summary-of-annual-tests-for-lorries-buses-and-trailers.csv/preview

⁵ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/774608/bus0601.ods

⁶ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/794505/veh0601.ods

⁷ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/794505/veh0601.ods

⁸ https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/833574/taxi0102.ods

⁹ Table 1.4 (p42) - <https://www.transport.gov.scot/media/44207/sct01193326941.pdf>

and hence if the lorry only had four tyres it could only run at 16 tonnes MGW instead of 18 tonnes. This is shown in Figure 28. The dual tyre also ensures the vehicle does not exceed the permitted weight limit placed onto the road surface. These assumptions are based on using Construction & Use Regulations 1986 and Road Vehicles (Authorised Weights Regulations) 1998 and interpreted for this study using AECOM freight industry expertise. These assumptions have been demonstrated in the database sent to the DfT prior to the reporting.

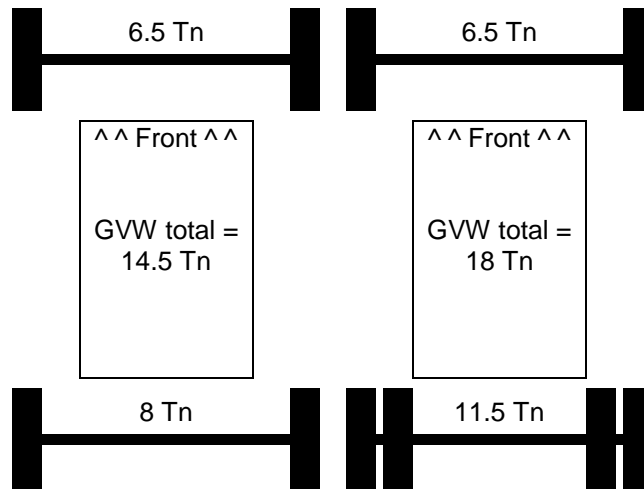


Figure 28: Comparison of tyre configuration and resulting GVW total based on an 18 tonne two axle rigid

- Trailers

The trailer data from the DVSA includes the number of trailers tested in total between 2017/2018. These tests include the retests for trailers which did not pass first time. To account for these and remove double counting, the total number of retests have been subtracted from the total number of tests completed to leave the total number of trailers for GB.

The trailer axle configurations have been based on the proportional split of the trailers axle configurations in the HGV data (VEH0524). The sum of two, three and four or more axle trailers have been established to then proportion out the trailer data from the DVSA.

- Bus and Coach

The coach data has been disaggregated from the bus and coach data (VEH0601) by deducting the total number of buses from the data using the public service vehicle stock data on buses (BUS0601).

Some bus and coaches are configured to have three axles. To ensure this is included within the calculation, AECOM estimates that five per cent of buses and 10 per cent of coaches are configured with three axles. This assumption is indicative but was not able to be confirmed by SMMT.

8.3 Total tyres by vehicle configuration

The Table 5 provides an estimation of the number of tyres operating by vehicle type and configuration.

Table 5: Total number of tyres based on vehicle configuration and assumed number of tyres per configuration

Vehicle type	Vehicle configuration	Tyre number assumptions (min)	Tyre number assumptions (max)	Total vehicles	Percentage split	Total tyres (min)	Percentage split	Total tyres (max)	Percentage split	Data source and comments
HGVs	Rigid - 2 Axle	6	6	186,404	47%	1,118,424	40%	1,118,424	35%	~DfT VEH0524 Vehicle Licensing Statistics 2018, GB. ~Provided a min and max number of tyres to show variance between vehicle configurations and tyre configuration.
	Rigid - 3 Axle	8	10	42,977	11%	343,816	12%	429,770	13%	
	Rigid - 4 Axle	10	12	36,144	9%	361,440	13%	433,728	14%	
	Artic - 2 Axle Tractor	6	6	20,361	5%	122,166	4%	122,166	4%	
	Artic - 3 Axle Tractor	8	10	109,167	28%	873,336	31%	1,091,670	34%	
Sum of rigid and tractor unit vehicles				395,053	100%	2,819,182	100%	3,195,758	100%	
Trailers	2 axle trailer	4	8	17,540	8%	70,160	5%	140,320	5%	~DVSA annual tests for road worthiness 2017/2018, GB. ~Provided a min and max number of tyres to show variance between vehicle configurations and tyre configuration. ~Trailer axle configuration proportions based on the DfT VEH0524 trailer data.
	3 axle trailer	6	12	194,938	88%	1,169,627	89%	2,339,254	89%	
	4 or more axle trailer	8	16	8,420	4%	67,362	5%	134,723	5%	
	Sum of Trailers				220,898	100%	1,307,148	100%	2,614,297	
TOTAL				615,951		4,126,330		5,810,055		
Difference in min and max HGV and trailer tyres						28.98%				
Bus	2 axle	6	6	38,066	8%	228,395	10%	228,395	10%	~DfT VEH0601 Vehicle Licensing Statistics 2018, GB. ~Coach data disaggregated from VEH0601 using DfT BUS0601 Public Service Vehicle stock (GB) to leave remaining coach vehicles. ~Assumed 5 per cent of total buses will be configured with 3 axles.
	3 axle	8	8	2,003	0%	16,028	1%	16,028	1%	
Coach	2 axle	6	6	26,372	6%	158,235	7%	158,235	7%	~DfT BUS0601 Public Service Vehicle stock 2017/2018, GB. ~Assumed 10 per cent of total coaches will be configured with 3 axles.
	3 axle	8	8	2,930	1%	23,442	1%	23,442	1%	
Minibuses	2 axle	6	6	84,525	18%	507,150	23%	507,150	23%	~DfT VEH0601 Vehicle Licensing Statistics 2018, GB.
Taxi / PHVs	Taxi	4	4	88,432	19%	353,728	16%	353,728	16%	~DfT TAXI0102 Taxi statistics 2018, England and Wales. / Scottish Government licensed Taxi and PHV statistics 2018, Scotland. ~Amalgamation of statistics for England and Wales and statistics for Scotland to create GB statistics.
	PHV	4	4	231,124	49%	924,496	42%	924,496	42%	
Sum of passenger vehicles				473,453	100%	2,211,473	100%	2,211,473	100%	
TOTAL				1,089,404		6,337,804		8,021,528		

AECOM's project team estimates the commercial tyre population to be between 6.3 to 8 million tyres (excluding vans). Our analysis shows a significant proportion of the tyres for commercial vehicles are fitted to HGVs and HGV trailers. On average between the minimum and maximum number of tyres, HGVs and HGV trailers represent 69 per cent of the tyre population and passenger vehicles represent 31 per cent of the tyre population. It is worth bearing in mind that this data does not include vans, which shares a large proportion of the vehicle market, and is beyond the scope of the project as set out by the DfT.

The most popular HGVs are the two-axle rigid vehicle and the three-axle artic with three axle trailers which equate to 47 per cent and 28 per cent of the HGV rigid and tractor unit market respectively. In terms of the number of tyres these equate to (on average between the min and max total number of tyres) a 37 per cent and 33 per cent share of the HGV rigid & tractor unit tyre population respectively.

The most popular trailer is the three-axle trailer which represents 88 per cent of the trailer population. In terms of the number of tyres these equate to 89 per cent of the total trailer tyres.

For passenger vehicles the most popular vehicle is the PHV which has a 49 per cent share of passenger vehicle market. This equates to a 42 per cent share of the tyre population for passenger vehicles.

This process has provided the DfT with an understanding of the estimated tyre population. This can be used alongside the findings of the consultation and this report surrounding the age of tyres by vehicle type as part of the impact assessment modelling. These assumptions can assist in understanding the level of impact of potential changes to legislation on tyre ages and the number of vehicles it could affect. This could feed into estimating the level of compensation that may be required for operators.

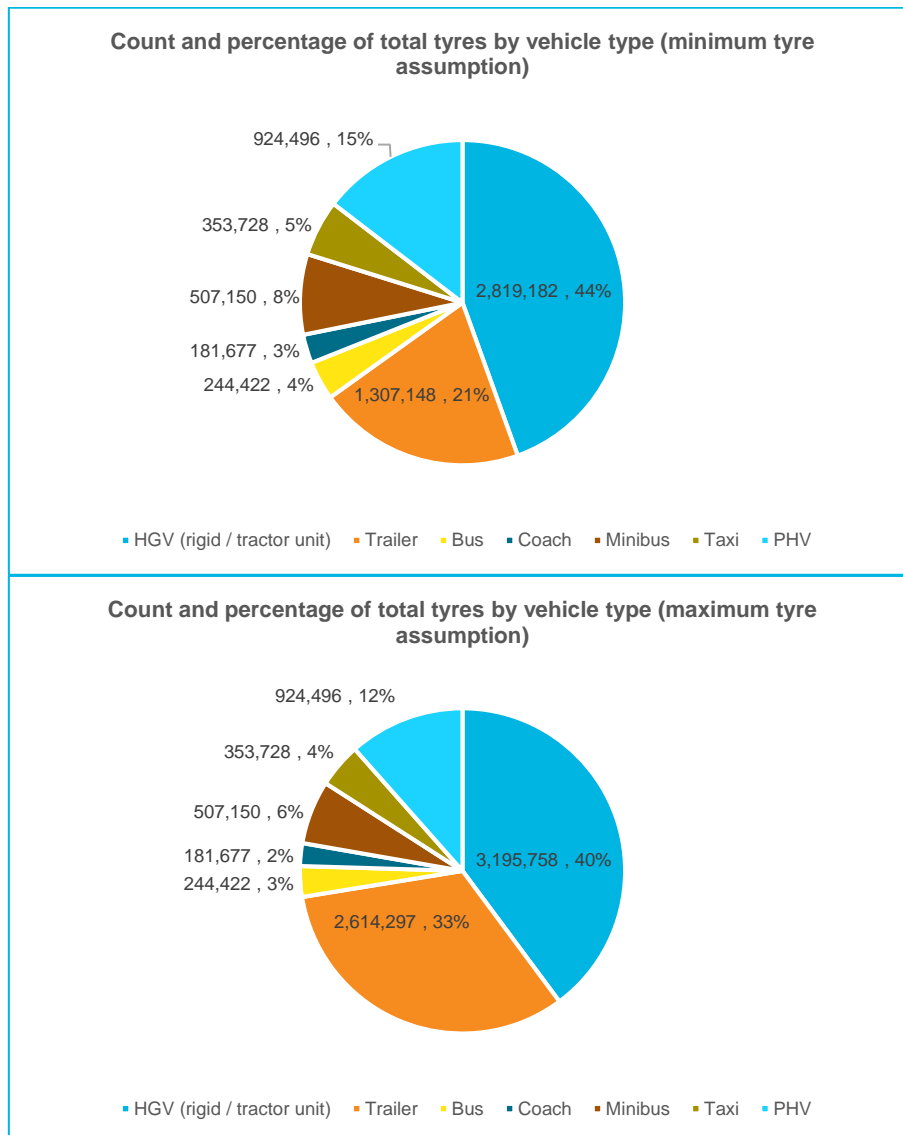


Figure 29: Count and percentage of total tyres by vehicle type (minimum and maximum tyre assumption)

9 Summary of findings and conclusion

AECOM has achieved the deliverables of this project through a tailored methodology fit to establish an understanding of the tyre ages fitted to commercial vehicles. The activities included:

- Estimating the commercial vehicle tyre population
- Establishing the availability of tyre data for fleet vehicles
- Obtaining tyre age data on taxis and PHVs
- Establishing tyre age requirements for local authority taxi and PHV licensing regulations

9.1 Findings

AECOM estimated that the commercial vehicle tyre population ranges from 6.3 to 8 million (excluding vans) depending on the assumptions applied to the statistics. 69 per cent of the total tyre population is estimated to represent the HGV and trailer market.

The roadside surveys for taxis and PHVs collected tyre age data across 12 sites resulting in a database of 606 vehicles and 2,424 tyres, detailing the tyre age distribution for the first life and re-treaded tyres fitted to the surveyed vehicles. Of the recorded tyres, 1,589 tyres (66 per cent) displayed a date stamp for the year of manufacture. 21 tyres (one per cent) were recorded with a date stamp of 10 years or older, with the oldest tyre being a re-treaded tyre dating back to 2001. The most common year of manufacture for tyres surveyed was 2018 with the average being 2017, which suggests that most tyres were between one to two years in age.

The online survey of commercial vehicle fleet operators provided a snapshot of the industry views on tyre age, having been distributed to a representative sample of fleet operators, covering different vehicle types. The findings showed that, from the 78 responses received, the typical life expectancy of a tyre was between one to three years. The online surveys also determined that tyres fitted to the front axle last for less time than when fitted to other axles on the vehicle. The key take away from the online survey is that despite operators tending not to limit tyres based on their age (72 per cent), 97 per cent of respondents do not use tyres that are 10 years old or older. This is consistent with the tyre life expectations and the current age of tyres fitted to respondents' fleets. An unexpected finding was the use of re-treaded tyres on the steering axle of HGV rigid & tractor units. Further market research and consultation with Bridgestone suggests a move away from the guidance of not using re-treaded tyres on the steering axle as a result of improvements in technology and environmental pressures. Whilst the online survey provided some useful insight on old tyres, it is potentially limited to good operators and hence may not be fully representative of the whole market. It is thought that poor performing operators may not want to share information in case of potential repercussions.

During the scoping exercise for taxis and PHVs the project team successfully engaged with 10 local authority taxi and PHVs licensing offices. It concluded that, with the exception of one local authority which limited tyre age to a maximum of 15 years, local authorities do not limit tyres based on age. Instead, most local authorities align their taxi and PHV licensing requirements with MOT standards.

To conclude, the research AECOM has performed, and the data gathered, has provided a better understanding of the characteristics of tyres fitted to vehicles, in particular age, and the current age profile of taxis and PHVs. The evidence gathered suggests that the vast majority of tyres fitted to commercial vehicles and taxis and PHVs are less than 10 years old. Better awareness of this could be made if the reading of tyre ages was made easier with an alternative marking system. It should be designed to not only show the date of manufacture but the original date of manufacture when it comes to identifying re-treaded tyre ages. Alternatively, the DfT could explore tyre data around sales and disposal as a way of establishing the possibility of extracting tyre age related date e.g. sales date.

The findings from this project will assist the DfT with decisions on whether the tyre age ban proposals should be extended to include taxis and PHVs.

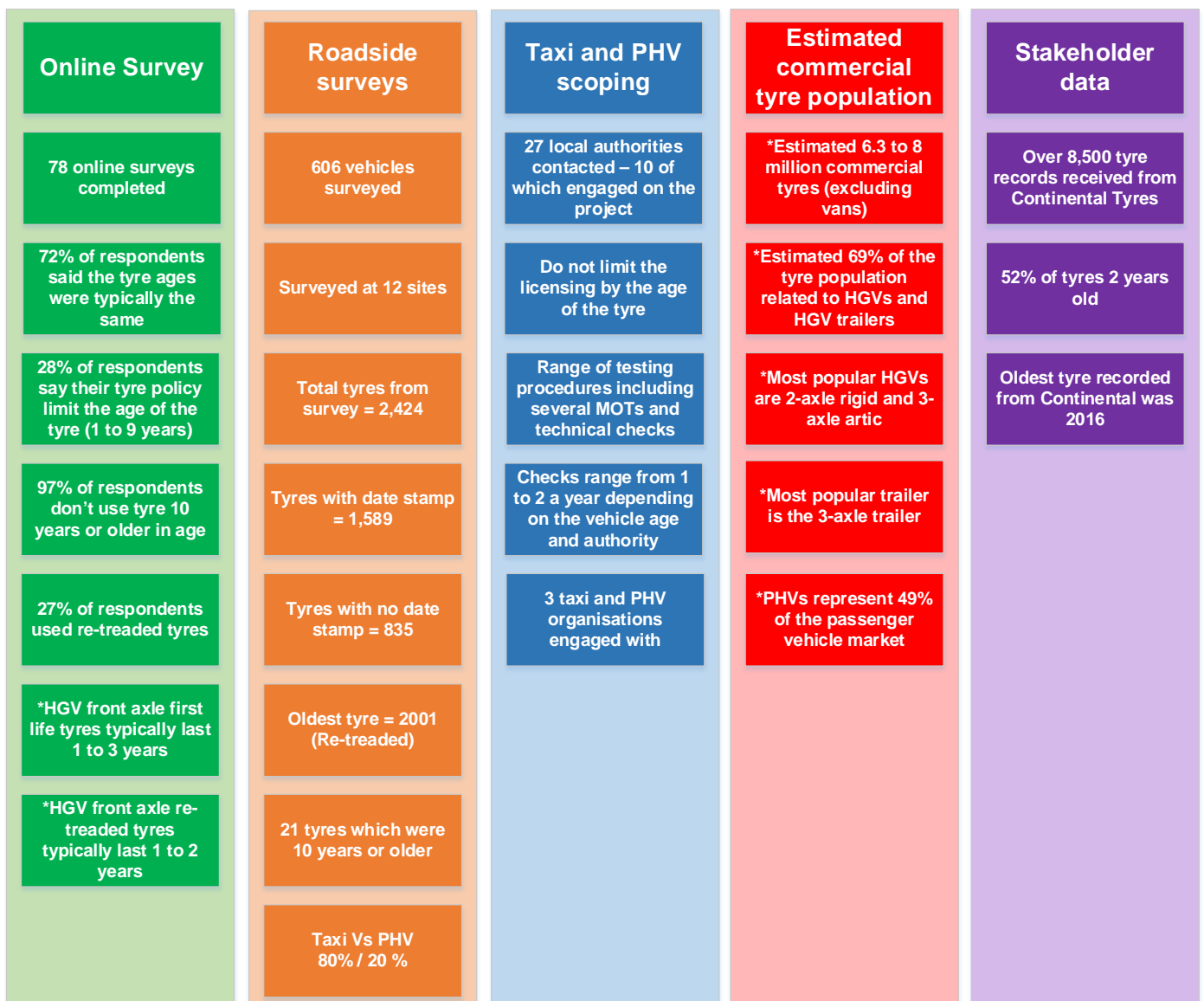
9.2 Recommendations

The detailed analysis and findings have led the project team to develop some conclusions for consideration.

1. Develop an education programme to help all drivers understand the issues relating to old tyres.
2. The education needs to extend to how and where drivers can check the date of their tyres and any tyres they buy in the future.
3. It is recognised throughout the study that a large proportion of the surveyed taxis and PHVs did not feature a visible tyre date stamp. This is most likely to be the result of the date stamp being on the inner sidewall of the tyre rather than the tyre being in any way non-compliant with Regulations. It would be beneficial to have a larger sample size of taxis and PHVs to

investigate tyre date markings in more detail to understand if there is an issue with the visibility of markings and how this can be addressed.

4. It may be sensible to work with tyre manufacturers and fleet operators to understand whether the current tyre date marking system is fit for purpose against their individual requirements. There may be alternative solutions that could make the reading of tyre ages easier and the marking less prone to wear/damage. Furthermore, there may be merit in date-stamping the first time the tyres are fitted to the vehicle, in addition to when they were manufactured. This can establish an understanding of whether a tyre was in a period of storage before it is utilised on the vehicle. The scenario could be that a tyre is stored for two years before it hits the road, therefore losing two years of its potentially 10-year operational life cycle. The condition in which the tyre is stored throughout its non-operational period will also need to be considered. The complexity with this is that the tyre standards are set internationally and changes in the marking system would need to be agreed by the UNECE.
5. It became clear from speaking to licensing authorities that there are regional differences in the number of physical inspections carried out on taxis and PHVs each year. It may be appropriate that this is standardised. This could be done by providing a guidance for licensing authorities on the number of checks that should be done on taxis and PHVs and what the checks should include.
6. Introduce tyre date checking into taxi and PHV checks.



*Based on data submitted from respondents or assumptions applied to data

Figure 30: Summary of key findings across the project

Appendix A Online survey questions

A1. Questions on SnapSurvey

Intro Text

The Department for Transport (DfT) is collecting evidence to support its consultation on a proposed ban on tyres aged 10 years and older from certain vehicle types, to improve road safety for all users.

As part of this consultation, the DfT would like to engage with you to provide further data to enhance the evidence base on the use of older tyres.

This survey will only take five minutes to complete, along with a chance to win one of three £50 Marks and Spencer vouchers.

1. On your fleet, what is the typical life expectancy (in years) of first life tyres? First life tyres are any tyres which have not been re-treaded but include re-grooved tyres.

	Front axle (years)	Other axle (years)	Don't know	Vehicle not in my fleet
HGV rigid and tractor unit				
Buses				
Coaches				
Minibuses				
Heavy Trailers*				

*Heavy trailers, including semi-trailers include category O3 (over 3.5 tonnes but not exceeding 10 tonnes) and O4 (over 10 tonnes)

2. Do you know the current age of the first life tyres on your fleet?

Yes	
No	

3. Insert the number of first life tyres by vehicle type and tyre age.

	0 to 1 years	2 to 3 years	4 to 5 years	6 to 7 years	8 to 9 years	10 to 11 years	12 to 13 years	14 to 15 years	Over 15 years	Don't know	Vehicle not in my fleet
HGV rigid and tractor unit											
Buses											
Coaches											
Minibuses											
Heavy Trailers*											

*Heavy trailers, including semi-trailers include category O3 (over 3.5 tonnes but not exceeding 10 tonnes) and O4 (over 10 tonnes)

4. Does your fleet use re-treaded tyres? Re-treaded tyres are tyres which are not on their first life and have been remoulded using an existing carcass.

Yes	
No	

5. On your fleet, what is the typical life expectancy (in years, from the re-tread date to removal from the vehicle) of re-treaded tyres?

	Front axle (years)	Other axle (years)	Don't know	Vehicle not in my fleet
HGV rigid and tractor unit				
Buses				
Coaches				
Minibuses				
Heavy Trailers*				

*Heavy trailers, including semi-trailers include category O3 (over 3.5 tonnes but not exceeding 10 tonnes) and O4 (over 10 tonnes)

6. Do you know the current age of your re-treaded tyres on your fleet?

Yes	
No	

7. Insert the number of re-treaded tyres by vehicle type and tyre age

	0 to 1 years	2 to 3 years	4 to 5 years	6 to 7 years	8 to 9 years	10 to 11 years	12 to 13 years	14 to 15 years	Over 15 years	Don't know	Vehicle not in my fleet
HGV rigid and tractor unit											
Buses											
Coaches											
Minibuses											
Heavy Trailers*											

*Heavy trailers, including semi-trailers include category O3 (over 3.5 tonnes but not exceeding 10 tonnes) and O4 (over 10 tonnes)

8. Typically, are all the tyres on the vehicle of the same age (approx.)?

Yes	
No	
Don't know	

9. If you have tyres 10 years old or greater on a steering axle, which statement is typically true

They are removed from the vehicle and replaced with a new tyre	
They are rotated onto a non-steering axle	
I don't have any tyres 10 years old or greater	
Other*	

*If other, please specify

10. Does your tyre management strategy/policy/contract limit tyres based on their age?

Yes*	
No	

*What is the age limit?

11. Thank you for completing the survey. To have a chance to win one of three £50.00 Marks and Spencer vouchers, please provide us with your email address.

email	
-------	--

Appendix B Road side surveys

B1. Data collection form

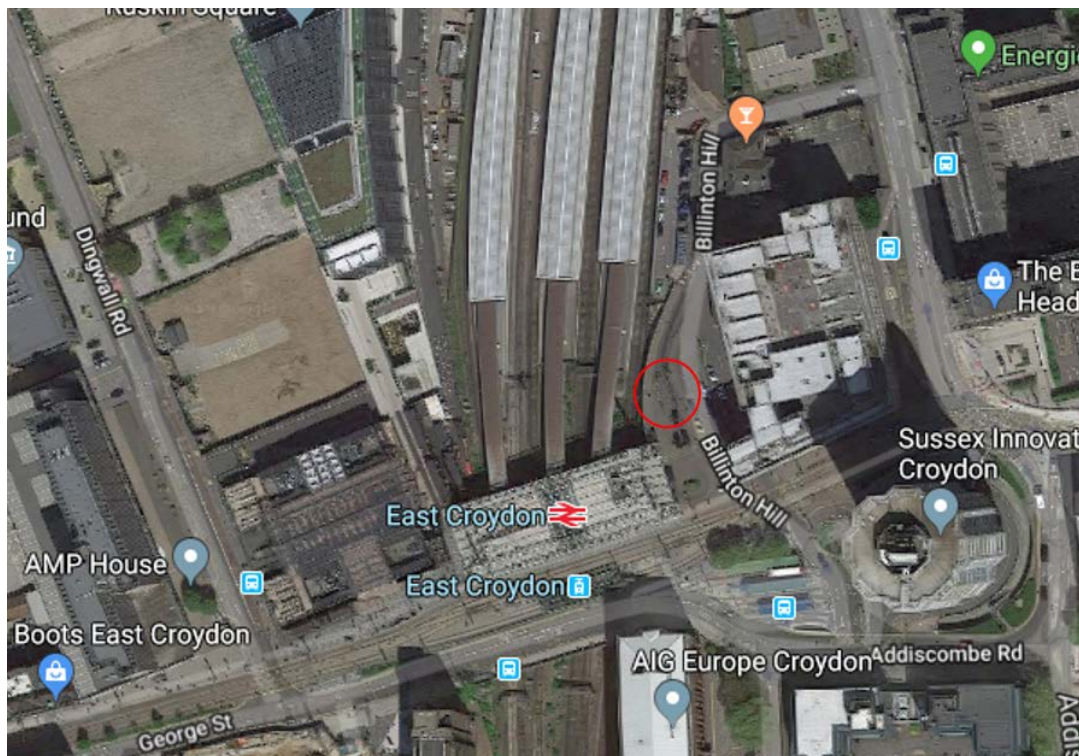
1-869 Old Tyres Data Collection - Taxis	Date	Initials	Location	Sheet Number

Reg Plate (e.g. 16)							Extra Information
Vehicle Type (✓)	Black Cab		Private Hire		Uber		
Tyre position	FNS	RNS	FOS	ROS			
Date, Illegible (I) or Unknown (U)							
Tyre Type* (F, T or G)							

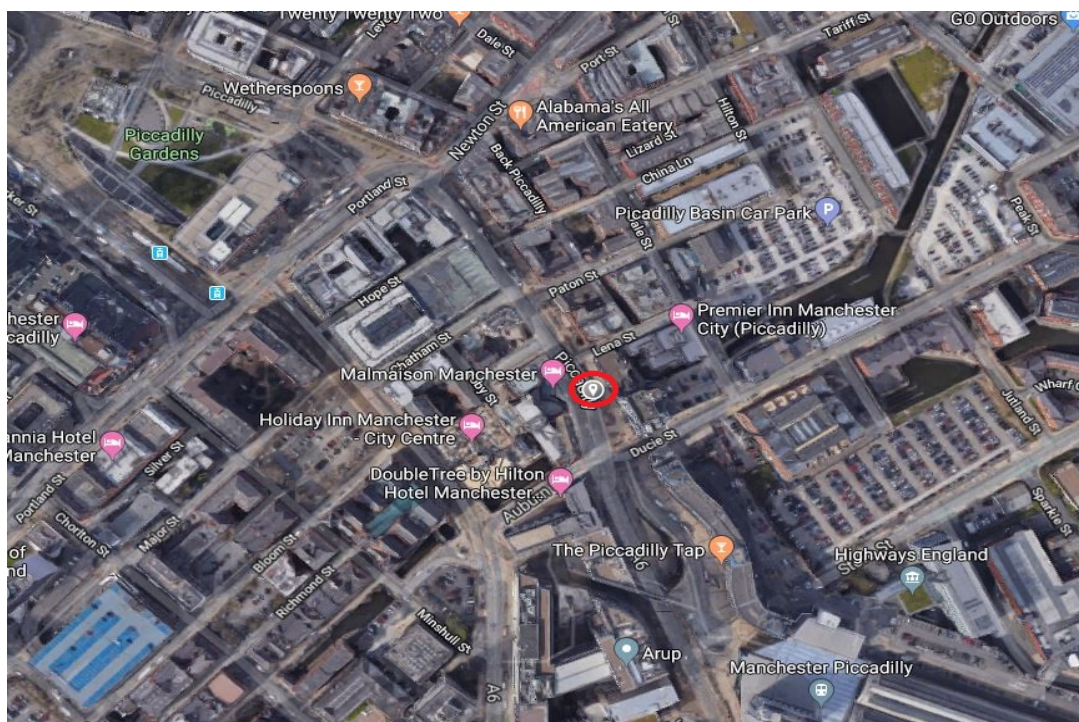
*Tyre Type: F = First-life; T= Re-Tread; G= Re-Groove

B2. Locations of roadside surveys

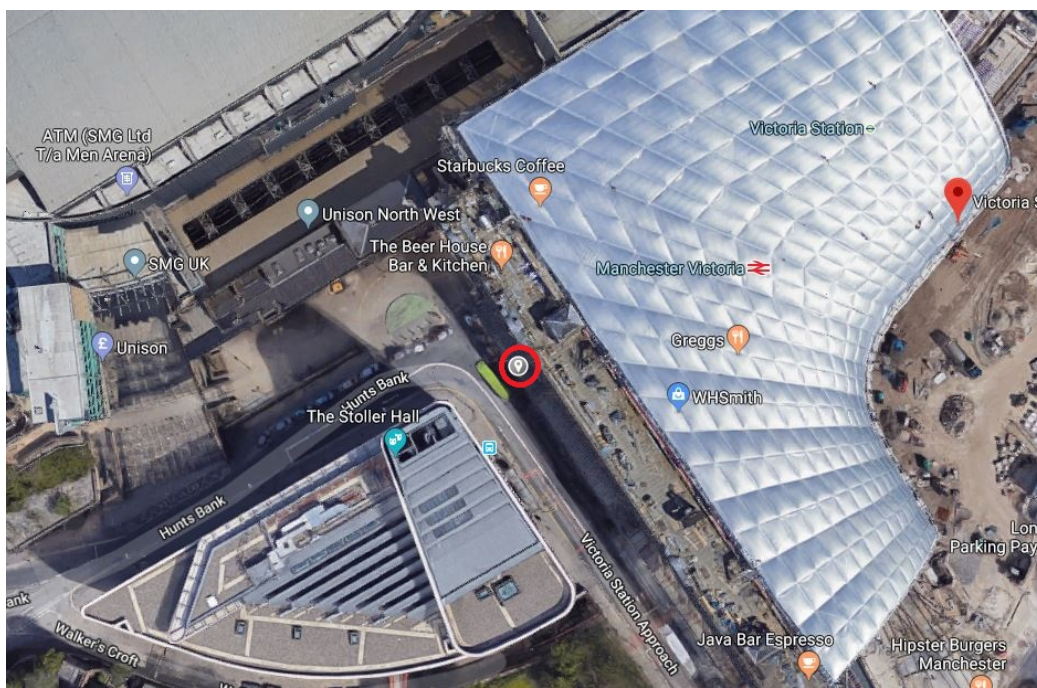
Site 1 – East Croydon Station - Survey site indicated by red circle



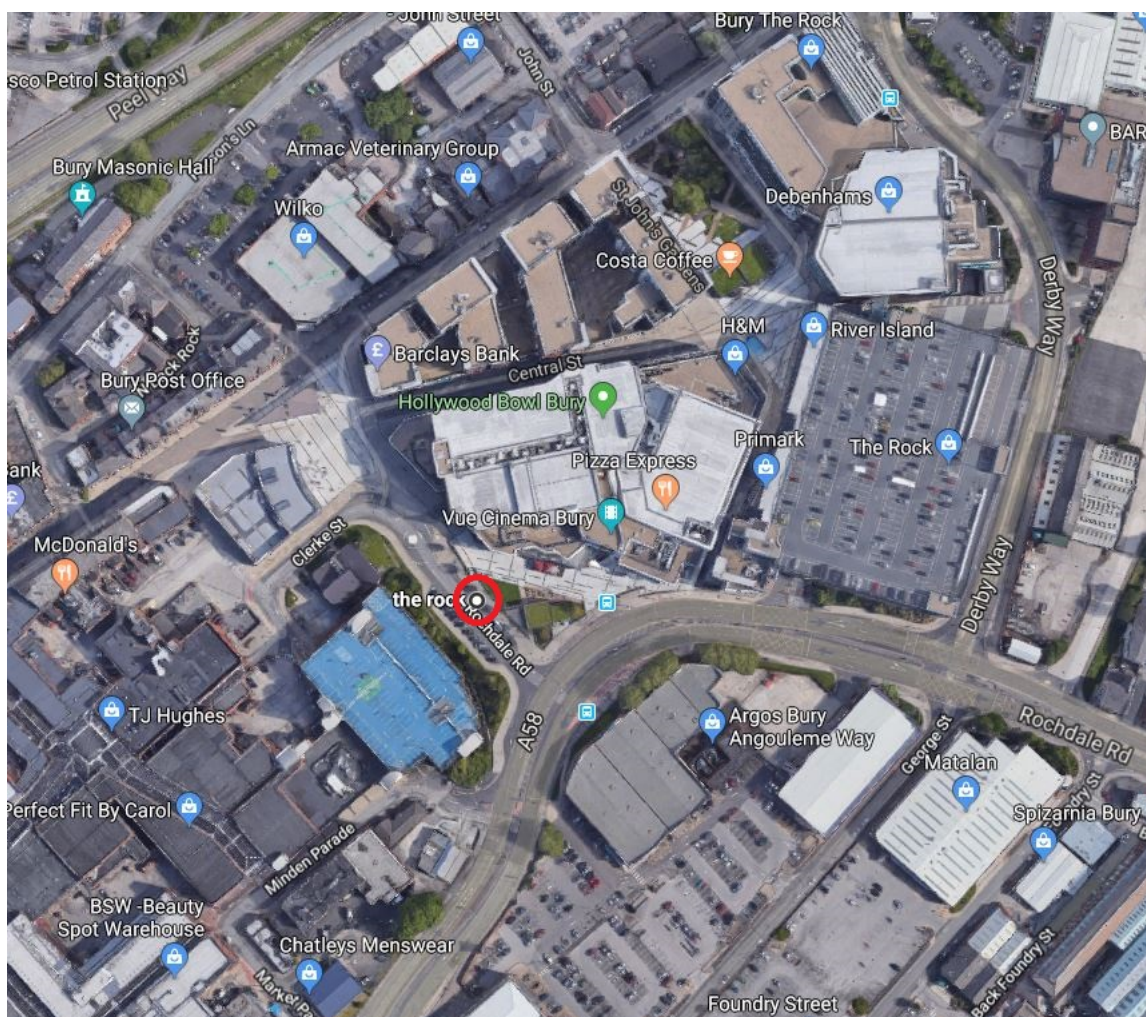
Site 2 – Manchester Piccadilly Station approach taxi rank - Survey site indicated by red circle



Site 3 – Manchester Victoria station taxi rank - Survey site indicated by red circle



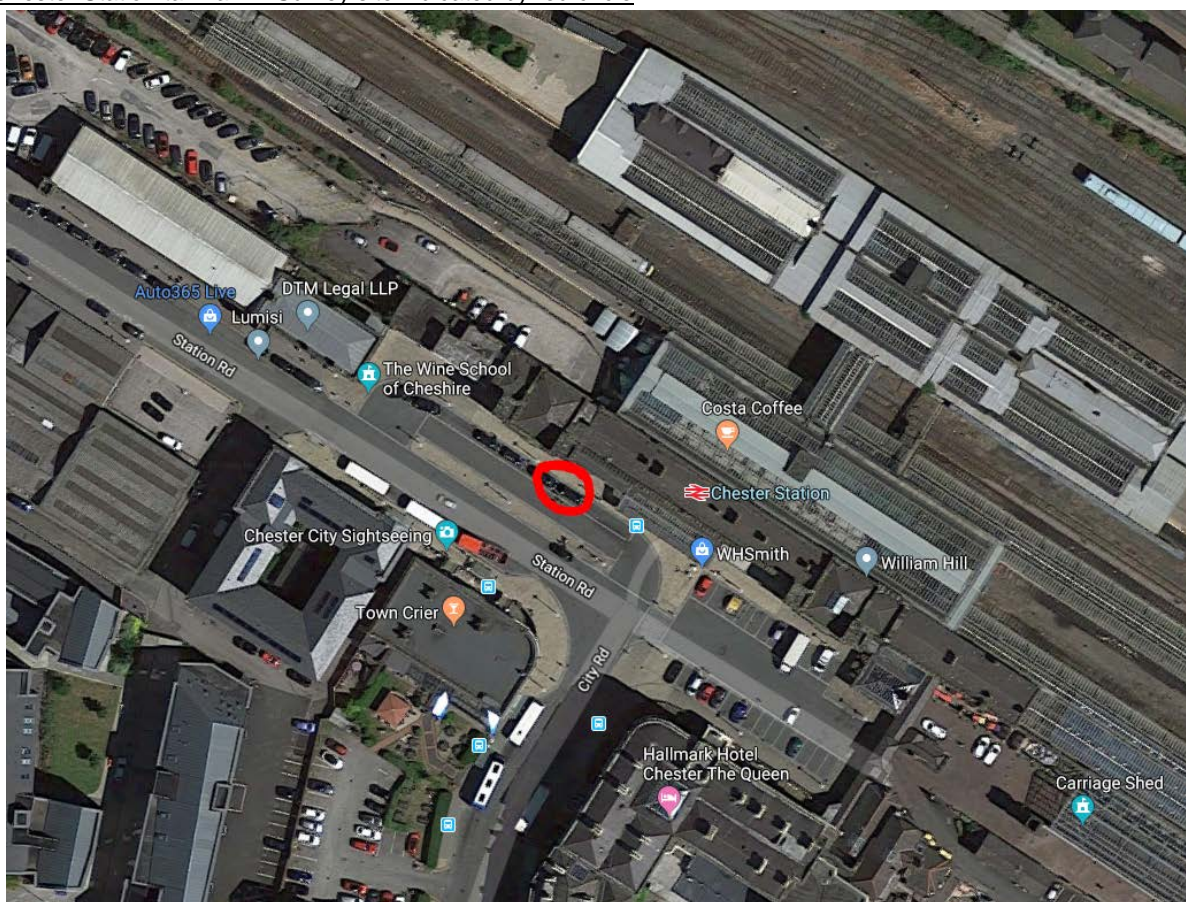
Site 4 – Bury The Rock shopping centre taxi rank - Survey site indicated by red circle



Site 5 – Altrincham taxi rank - Survey site indicated by red circle



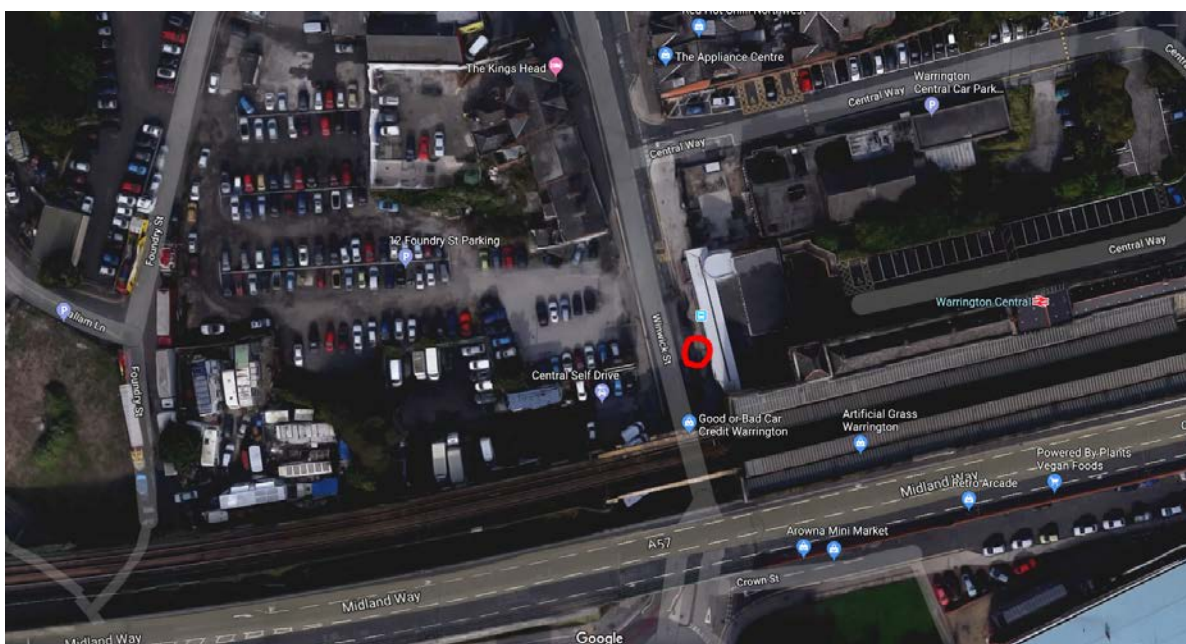
Site 6 – Chester Station taxi rank - Survey site indicated by red circle



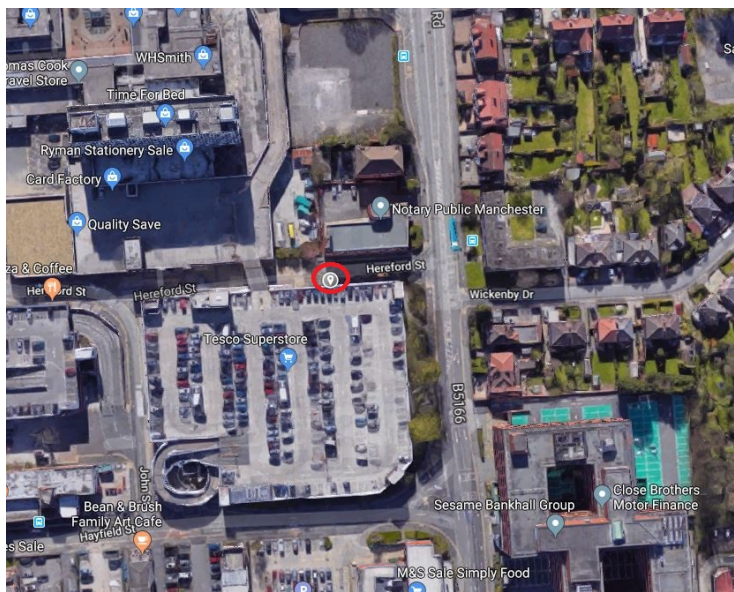
Site 7 (Location 1) – Warrington Bank Quay taxi rank - Survey site indicated by red circle



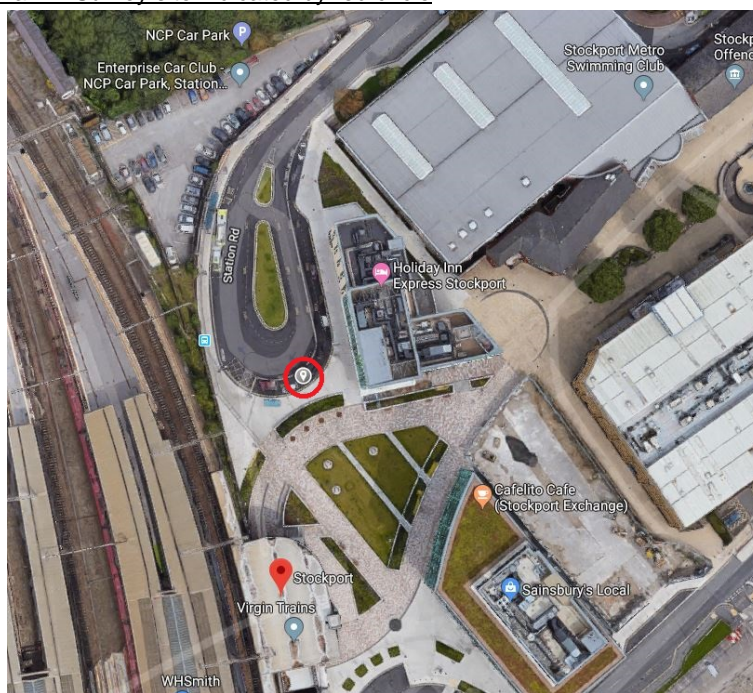
Site 7 (Location 2) – Warrington Central taxi rank - Survey site indicated by red circle



Site 8 – Sale shopping area taxi rank - Survey site indicated by red circle



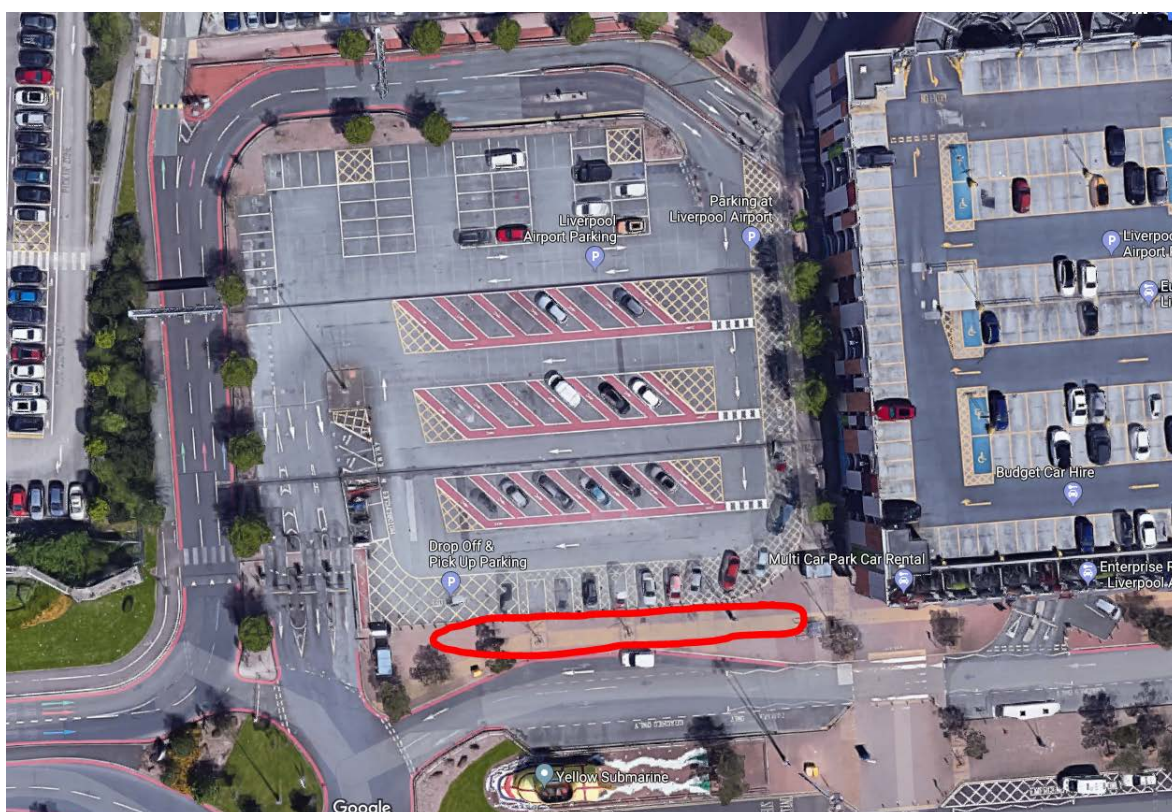
Site 9 – Stockport station taxi rank - Survey site indicated by red circle



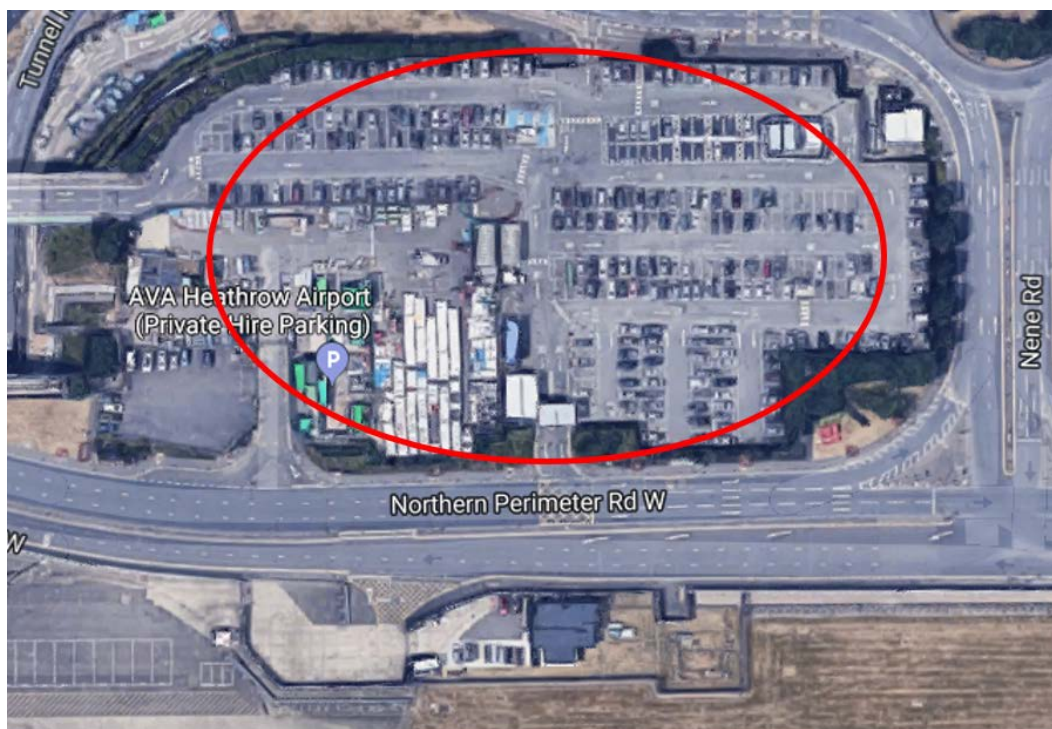
Site 10 (Location 1) – Liverpool Airport Taxi Rank - Survey site indicated by red circle



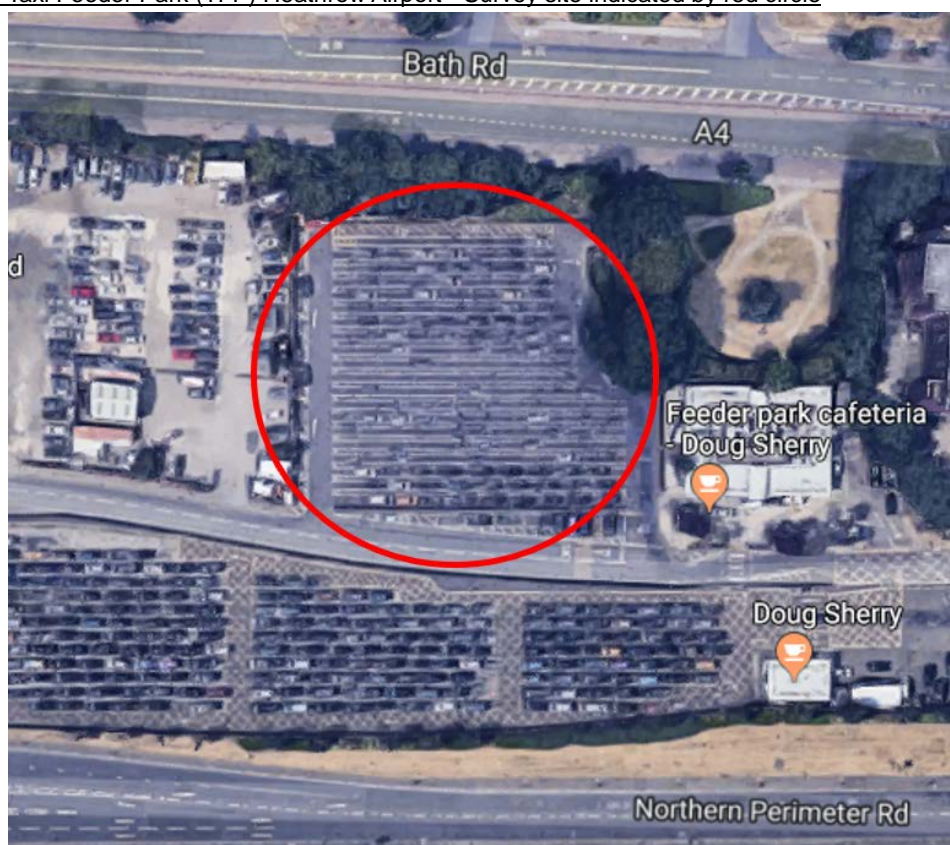
Site 10 (Location 2) – Liverpool Airport Express Pick Up and Drop Off Area - Survey site indicated by red circle



Site 11 (Location 1) – The Authorised Vehicle Area (AVA) Heathrow Airport - Survey site indicated by red circle



Site 11 (Location 2)–Taxi Feeder Park (TFP) Heathrow Airport - Survey site indicated by red circle



Site 12- Feltham Station - Survey site indicated by red circle



