October 1, 2023

DELIVERING A BREATH OF FRESH AIR

Reducing the impact of deliveries on the environment while reducing exposure to poor air quality

Department for Environment Food & Rural Affairs

CROSS RIVER PARTNERSHIP

Contents

Introduction

At Cross River Partnership, we thought about how to help active commuters such as cyclists and walkers avoid high pollution areas. This led to the Clean Air Route Finder[1] (CARF), a digital tool we created in 2017 through our Clean Air Better Business (CABB) project, which was supported by the Mayor of London.

We developed the tool with Imperial College London's Environmental Research Group (formerly with King's College London). They were also tasked with studying the levels of black carbon and pollution levels on selected routes in central London, focusing on busy paths and 'Clean Air Walking Routes' that were quieter and less polluted.

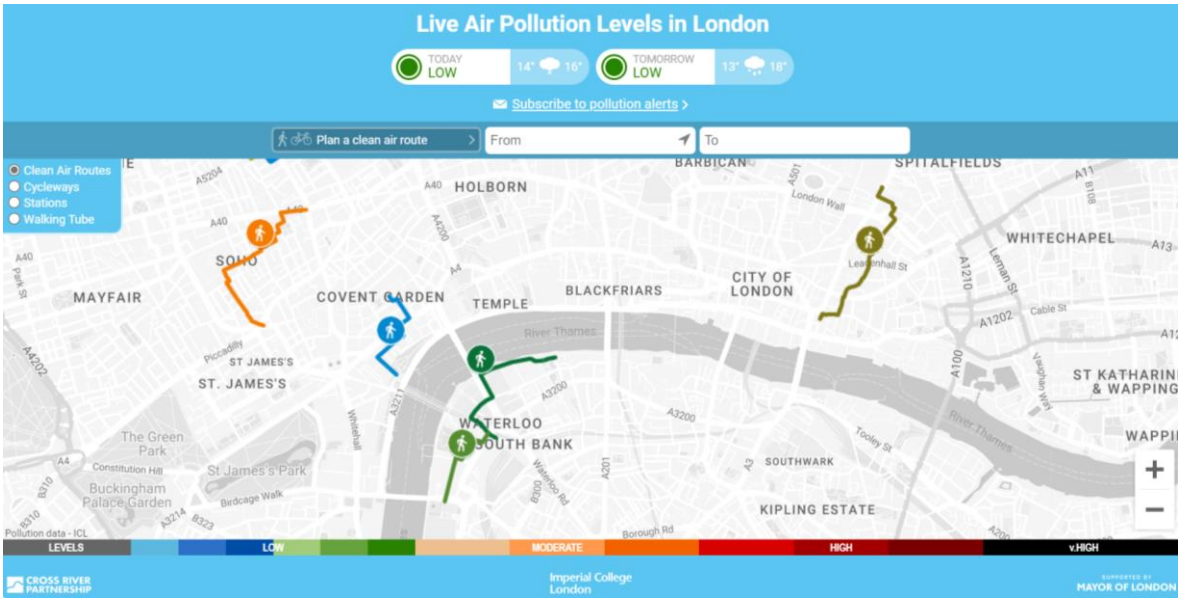
Since its inception in 2017, CRP has improved the CARF tool to further our mission of promoting clean air throughout London.

One of our latest initiatives is the Clean Air Logistics for London (CALL) programme, funded through the Department for Environment, Food & Rural Affairs' (Defra) Air Quality Grant scheme.

Under this initiative, we collaborated with global logistics company, UPS, to implement a pilot walking freight scheme in Fitzrovia, London. Other initiatives included parcel locker schemes to stimulate active commuting and entail low-emission deliveries. These trials demonstrate how fewer diesel delivery vans making last-mile deliveries lowers local air pollution.

London, one of the busiest cities in the world, continues to tackle poor air quality. Outdoor workers (such as couriers on foot or bike), along with the general public, need to exercise care when outside, especially when pollution is high. One way to do so is by taking low-pollution routes when possible.

CARF can play an important role in helping the public protect themselves from poor air quality.



Screenshot of Clean Air Route Finder showing monitored routes in Central London

[1] https://cleanairroutes.london

Background

Research shows that pollutants with the strongest impacts on health are particulate matter (PM), nitrogen dioxide (NO_2), and polycyclic aromatic hydrocarbons (PAHs), which mainly come from incomplete combustion of fossil fuels in vehicles.

An average of 1 in 18 deaths are linked to PM2.5 each year. (Taskforce for Lung Health, 2023)

Among these, fine particulate matter poses the gravest health risks. It is a mix of sulphate, nitrates, ammonia, sodium chloride, black carbon, and more. These come from combustion engines, industrial activities, and even tyres, brakes and road surfaces.

Kings College London produced a 2015 report which highlighted that nitrogen dioxide and PM2.5 particulates cause premature deaths of thousands in London, with road transport being the main source. Freight- and delivery-related trips make up a third of road transport in London.

The COVID-19 pandemic and subsequent lockdowns led to growth of e-commerce has increased road deliveries, leading to a rise in air pollution in London. Next day deliveries remain popular. Though customers may not immediately consider their impact, deliveries from online shopping contribute to air pollution in London.

Prioritising convenience and speed has led to a logistics system laden with inefficiencies. Delivery vans are often going out at a fraction of capacity (de Prez, 2019) making the deliveries to across the city. Deliveries to home addresses are often attempted several times because no one is home to receive the packages.

London's Ultra-Low Emission Zone (ULEZ) is now citywide, so couriers with non-compliant vehicles pay extra fees which are eventually passed on to consumers.

Furthermore, over the past twenty years, London has seen a shift towards pedestrian, cycling and bus travel, resulting in a decrease in road network capacity for private motorised vehicles. This reduces parking spaces for delivery drivers, causing fines and traffic disruptions.

Sustainable last-mile deliveries

Last mile delivery, the final leg in logistics, faces various challenges such as high demand from online shopping, city traffic, delivery costs, and consumer expectations.

Online shopping has increased the number of package deliveries and pressurized logistics firms to offer quicker delivery services.

Urban traffic congestion is an added challenge for delivery services leading to delays, higher fuel consumption, and more carbon emissions.

To tackle these challenges, logistics companies are exploring alternatives:

- Zero- or low-emission vehicles
- E-cargo bikes and bicycles
- Drones
- Autonomous vehicles
- Smart lockers and pickup points
- Mini hubs and consolidation centres
- Collaborative delivery networks
- Route optimisation and predictive analytics
- Walking freight (also known as on-foot portering)

In cities with heavy traffic like London, biking or walking are effective approaches. Bicycle and pedestrian deliveries are eco-friendly alternatives that reduce pollution and ease traffic. Integrating bicycles and pedestrians into delivery can create an eco-friendlier and more efficient network, also promoting well-being and fitness for couriers.

Area	*Change in van kilometres between 2021 and 2025 (%)*	*Change in van kilometres between 2021 and 2030(%)*
Central London	**3 to 9**	***6 to 17***
Inner London	**1 to 2**	***2 to 4***
Outer London	**0 to 1**	***1 to 2***
Greater London	**1 to 2**	***1 to 4***

TfL developed a demand model to calculate how cycle freight could potentially replace vans in London. (Transport for London, 2023)

Logistics companies like Gnewt Cargo (now Menzies Distribution), Amazon, and UPS have explored walking freight in crowded London streets, sometimes partnering with academic institutions and supporting organisations like the University of Westminster and CRP, respectively. despite limitations of weight and size. These continued trials and initiatives indicate that walking freight remains a desirable solution for covering short distances despite the weight and size limitations.

Walking Freight in London – A retrospective from 2012 – 2023

2012:
DHL and CitySprint briefly utilise joggers and rollerbladers during London Olympics for lightweight, time-critical deliveries.

2018:
Gnewt Cargo tests walking freight over two days – one day in Southwark, and one in the City of London. Partnering with academia, this TfL demonstrator shows a reduction of up to

- 65% in kerbside parking time
- 71% in driving time
- 30% in driving distance.

which implies a significant reduction in vehicle emissions.

2021:
Urb-it announces its partnership with UK food retailer, Co-op, to expand its rapid delivery service in London. Beginning with 10 stores, the convenience retailer will leverage Urb-it's walking delivery model for hyperlocal deliveries across London.

2022-2023:

As part of our Defra-funded Clean Air Villages 4 programme, CRP publishes a report on the feasibility of walking freight in London.

This is followed by a walking freight trial during CALL to address problems caused by traffic and air pollution. Collaborating with The Fitzrovia Partnership, Camden Council, UPS and Heals Furniture, it is the first walking freight trial to take place on public land.

Addressing couriers' exposure

Climate change worsens air pollution, increasing allergens and deadly pollutants. Extended warm seasons trigger longer pollen seasons, causing more allergic reactions and asthma and reducing productivity. Also, hot temperatures enhance ozone, a potent air pollutant and greenhouse gas.

Rising temperatures aggravate pollution, with 2022 being one of the six warmest years on record. Outdoor workers, such as parcel delivery drivers, are especially exposed to poor air quality and heat. For instance, multi-drop couriers in central London walk about 8 km (5 miles) a day while their vehicle is parked at the kerbside, taking up more than 60% of their time worked. This makes them especially vulnerable to air pollution.

In 2020, the British Safety Council (BSC) released a report derived from the data captured by their mobile app, Can*air*y. The app utilises London's air quality data as a safeguarding tool, helping outdoor workers manage their exposure to air pollution. The analysis revealed that outdoor workers were subjected to air pollution levels up to 60% higher than the threshold set by the World Health Organisation's (WHO) guidelines. The report advocated for organisations and employers of outdoor workers to protect their workforce.

Hourly Average Exposures

Pollution	Testers	Employees	WHO annual guideline µg/m³*
NO2	31.5	43.5	40
PM2.5	12.6	13.8	10
PM10	23.3	25.9	20
Ozone	48.2	43.2	-

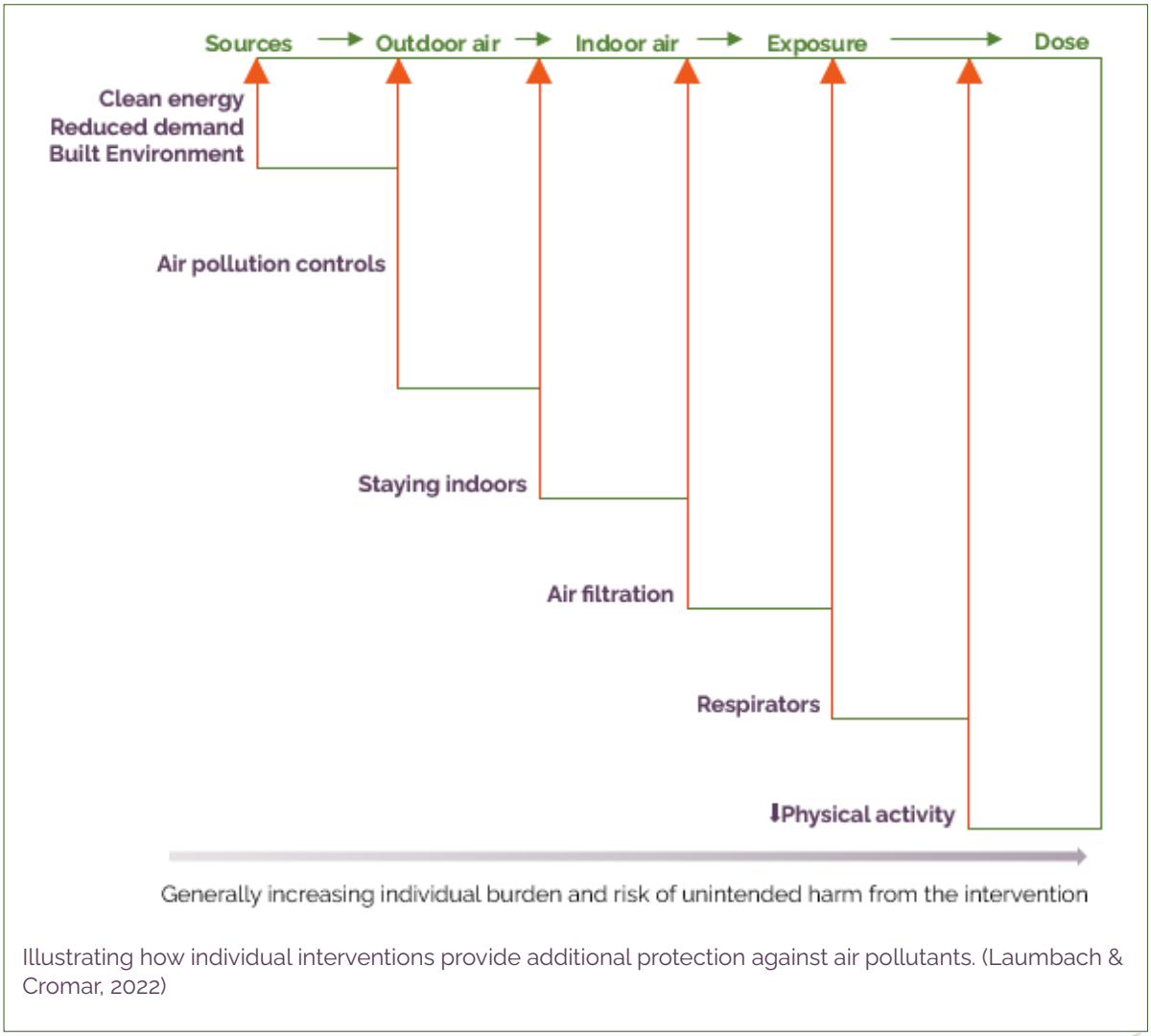
Maximum Exposures (averaged)

Pollution	Testers	Employees	WHO annual guideline µg/m³*
NO2	46.41	65.60	40
PM2.5	14.02	15.73	10
PM10	23.27	31.68	20
Ozone	50.10	46.57	-

Average outdoor workers' exposure captured between March and September 2019 (British Safety Council, 2020)

* WHO air quality guidelines are set according to health evidence and establish pollution levels designed to protect most of the population.

It is important to balance increasing walking freight and cycle deliveries, as well as encouraging active travel in general, with taking sensible precautions when spending time outdoors. Personal interventions can help reduce exposure when source controls are not enough.



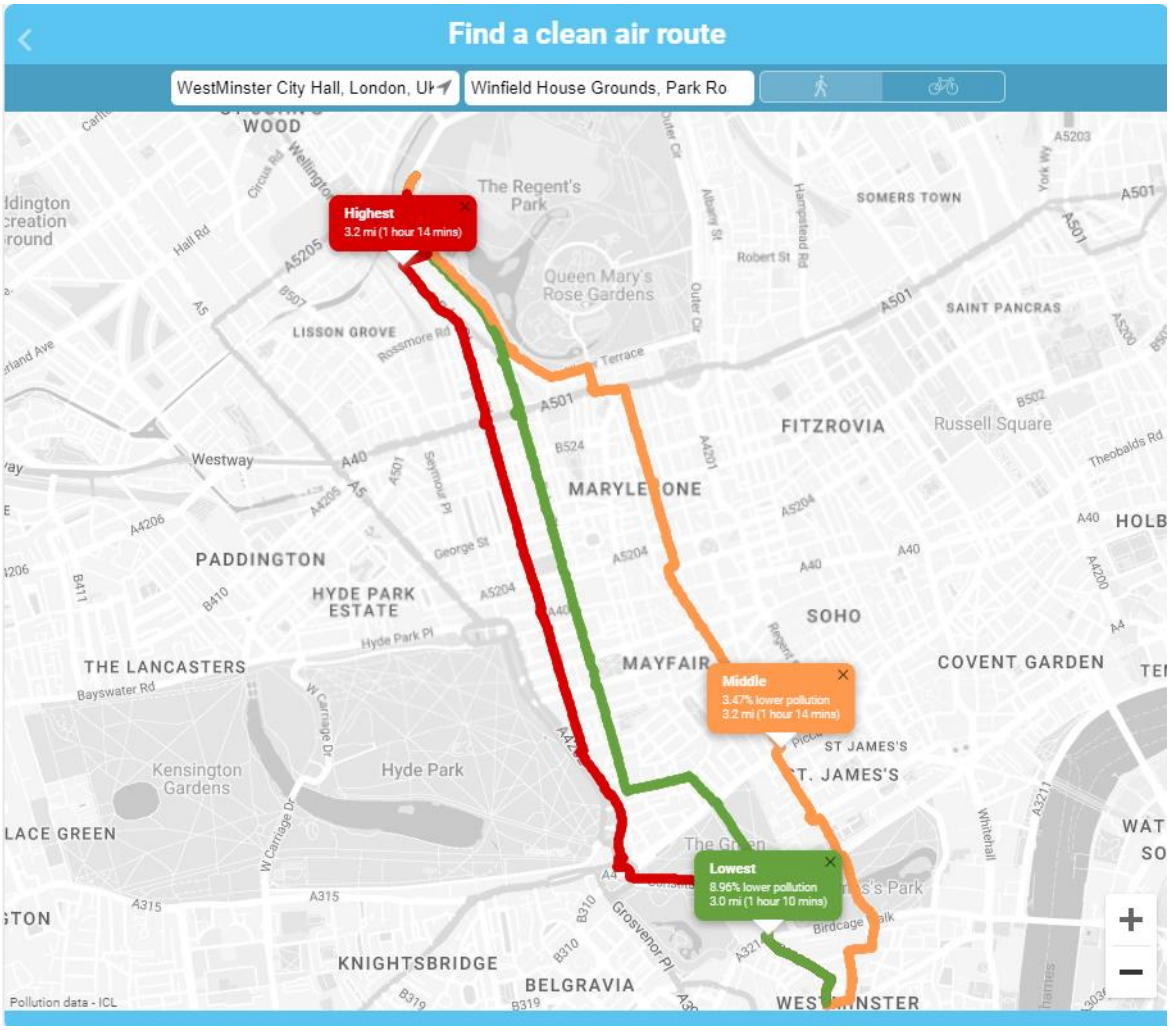
Illustrating how individual interventions provide additional protection against air pollutants. (Laumbach & Cromar, 2022)

One such intervention is by changing how much, when and where we are active outside. Changing our outdoor activities to locations and times at which air pollutant levels are lower will reduce our exposure to air pollution.

Adjusting our outdoor activities to avoid high pollution times and places can lessen our exposure to air pollution. Suggestions may include reducing physical exertion during peak pollution times and choosing indoor activities or locations away from pollution sources. However, people are encouraged to engage in outdoor physical activities when air quality is good. Options like walking or cycling on routes away from heavy traffic can also reduce exposure to pollutants, which usually drop to normal levels about 400m from main roads.

The Clean Air Route Finder (CARF)

This is where CARF could be useful. It works by using Google Maps to find up to three alternative routes and calculates the modelled dose of NO2, PM10 and PM2.5 using monitoring data taken from the London Air Quality Network which is run by the Environmental Research Group at Imperial College London. Given that models use live data, the routes generated can vary depending on factors such as weather, temperature, traffic, etc.



A screenshot of the Clean Air Route Finder showing the following walking route options between Westminster City Hall and The Regent's Park at approximately 17:30 on 16 October 2023:

1. The highest exposure in red shows a walking distance of 3.2 miles over 74 min;
2. The middle exposure in amber shows a walking distance of 3.2 miles also over 74 minutes, but with a reduction of 3.47% in air pollution; and
3. The lowest exposure in green shows a walking distance of 3 miles over 70 minutes, with a reduction of 8.96% in air pollution.

The use of CARF is currently limited for couriers as they normally have the most efficient routes for quick deliveries pre-mapped for them. However, individuals can incorporate the tool into their everyday activities, not just leisurely walks. For instance, when going to collect their parcel from a locker or click and collect point, they have the option of mapping a low-pollution route.

For those couriers who may not have the option to use CARF, one option is to use respirators or face masks on high pollution days. Respirators and masks offer varying protection levels against inhaled pollutants. These masks can range from certified work safety respirators to surgical or improvised masks.

At CRP, we will continue exploring ways to make the tool useful to couriers by keeping current with the logistics sector, having conversations with courier companies, hosting workshops, and more.

Conclusion

Navigating busy London streets while reducing vehicle emissions is a challenge faced by all delivery companies. Increasing deliveries by active travel, i.e.,, walking and cycling is gaining traction in the city. However, the broader issue of issue of environmental health, particularly air pollution remains an issue for people, especially outdoor workers who spend more time outside than the average individual.

There are various steps we can take to reduce our exposure to poor air including staying indoors. When staying inside is not an option, the Clean Air Route Finder can be used to identify low pollutions routes between any two given points within Greater London. While this may not be useful for those couriers who are assigned the most expeditious routes for their deliveries for the day, CARF can be used by independent couriers as well as individuals to reduce the amount of pollutants they inhale while going about their outside activities.

In summary:

- Freight traffic contributes a significant amount of air pollutants that adversely impact Londoners;
- Delivery companies are exploring greener, smarter innovations including cycling and walking freight;
- Outdoor workers, including couriers, are exposed to higher levels of air pollutants;
- CRP's Clean Air Route Finder is a tool that could help independent couriers find lower pollution routes to their destinations.

Finally, proper planning and prioritising health can make the process of deliveries more sustainable, safe and efficient for everyone involved. At CRP, we will continue to explore how CARF could become more useful to couriers.

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CROSS RIVER PARTNERSHIP

Cross River Partnership (CRP) is a partnership delivering environmental, economic and community-focused projects. We support public, private and voluntary organisations to address creatively challenges around Air Quality, Transport, Placemaking and Wellbeing.

Our vision is to address sustainability challenges collaboratively in London and beyond.

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