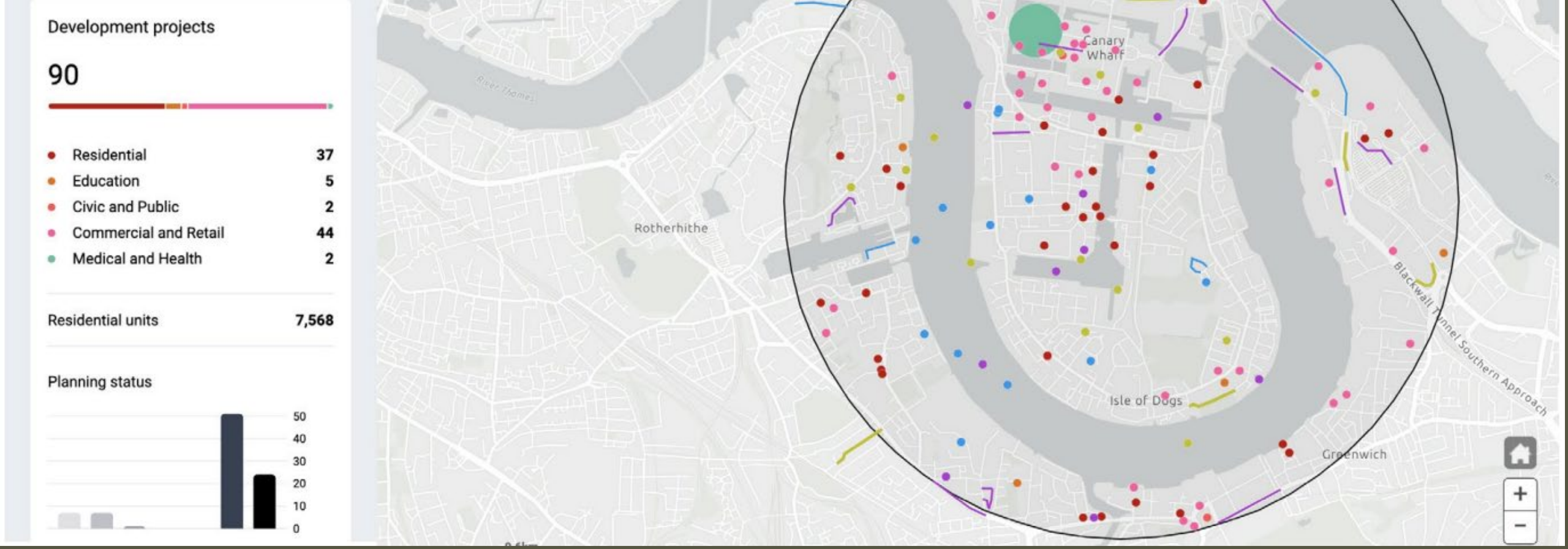


London Infrastructure Mapping Application v3

GLA Lane Rental Industry Publication

TRANSPORT FOR LONDON

Executive Summary

This project focuses on London's need for improved coordination around infrastructure delivery to minimise disruption. The sector called upon the Greater London Authority (GLA) to create a tool that would provide insight and increase certainty regarding London's future growth, development, and infrastructure investment trajectory, as well as support opportunities for infrastructure providers to deliver infrastructure in a 'joined up,' less disruptive way.

Lane Rental Scheme funding allowed the tool to develop from a prototype to launch Version 2.0 on 1 August 2017. Given the tool's strong potential to support a reduction in levels of disruption caused by the construction of projects, Lane Rental granted additional funding to deliver IMA Version 3 and Version 4, covering the period up to October 2020. The updated tool offers new functionality which has transformed it into a smart tool – rather than simply visualising the data it now tells users what they want to know. The GLA has also focussed on improving data quality and has generated significant data-related processes in the sector.

With new functionality and huge increases in the volume and quality of data, the IMA has evolved from a prototype to an essential part of the GLA's Infrastructure Coordination Service, providing the data needed to identify collaborative streetworks opportunities and support planning for growth.

Introduction

The Infrastructure Mapping Application (IMA) was developed in response to the Mayor's London Infrastructure Group in 2015 and their appetite for a digital tool to share, view and plan future infrastructure and development in London, and is the only central register of infrastructure investment data in London. It is an interactive map-based (GIS) application, designed to present complex data in a user-friendly way. Spatial data is the focus of the tool and drives the user experience, with simple filters and menu options to adjust the data presented.

A huge part of the IMA's value is facilitating data exchange across the infrastructure sector. Its unique benefit is that it draws together utilities' and transport providers' forward plans, along with development data, capacity information, and context layers, to provide insight into London's growth, development, and infrastructure trajectory. These sources of data are otherwise available only in silos, and while integrating them into a single tool has required—and will continue to require—significant resources, doing so yields compelling benefits both to infrastructure providers and the public.

The IMA operates at city level and is publicly accessible. It's had an average of 15,500 annual page views since 2017; with almost 20,000 in the past year. The IMA also has a private site, accessible to 21 Non-Disclosure Agreement (NDA) signatories, comprising 9 local authorities and all London's major energy, transport and water distributors. It is a central data hub and decision-making tool for the Infrastructure Coordination Service, both in terms of supporting infrastructure providers in planning for growth in London, as well as identifying opportunities for collaborative streetworks progressed by the GLA Streetworks service and their Steering Group (comprising major utilities and TfL).

The Project

At the beginning of the grant period, the IMA allowed users to explore data, but did not provide sufficient tools for analysing it. Users requested improved functionality to increase the IMA's usefulness in operations and strategic decision-making. The funding provided by Lane Rental has supported development to transform the IMA from a prototype to a smart tool which supports its two use-cases of coordination to identify opportunities for joint streetworks and planning for growth. It now has both the functionality and data to meet the demands of the recently established Infrastructure Coordination Service (ICS).

The focus of the project was:

- Transforming the IMA from a visualisation tool into a 'smart' tool that flags up opportunities for coordinated delivery, among other insights
- Improving the quality, reliability, and usability of data, including a significant initiative around the sourcing of planning data
- Ensuring technical systems are robust to support the ongoing expansion of the tool

Outcomes

The Mayor launched key features developed during Infrastructure Mapping Application (IMA) Version 3 at the Mayor's Infrastructure Group meeting in mid-February 2020. There were accompanying press announcementsI and it was well received. Version 4 was completed in November 2020 and its new functionality supported the most recent round of GLA Streetworks' shortlisting exercise to find and progress potential collaborative schemes across London. The IMA has met all three objectives set in its viable product definition, and in some cases exceeded these.

Collaboration Tool

A key development has been the addition of the Collaboration Tool, which uses data on speculative and planned infrastructure across London to find overlaps between different providers planning works in the same location and timeframe. This allows users to find opportunities for collaboration in delivery and encourage infrastructure providers - who may not have otherwise collaborated - to streamline their streetworks. The benefits include reduced costs for providers and a significant reduction in streetworks days, meaning less road network disruption, noise and access issues.

The IMA's collaboration wizard allows a user to enter search parameters for collaboration settings, specifying distance, time and works promoters. The IMA then sorts through all the planned and speculative investment data that meets those parameters and generates a longlist of potential collaboration opportunities.

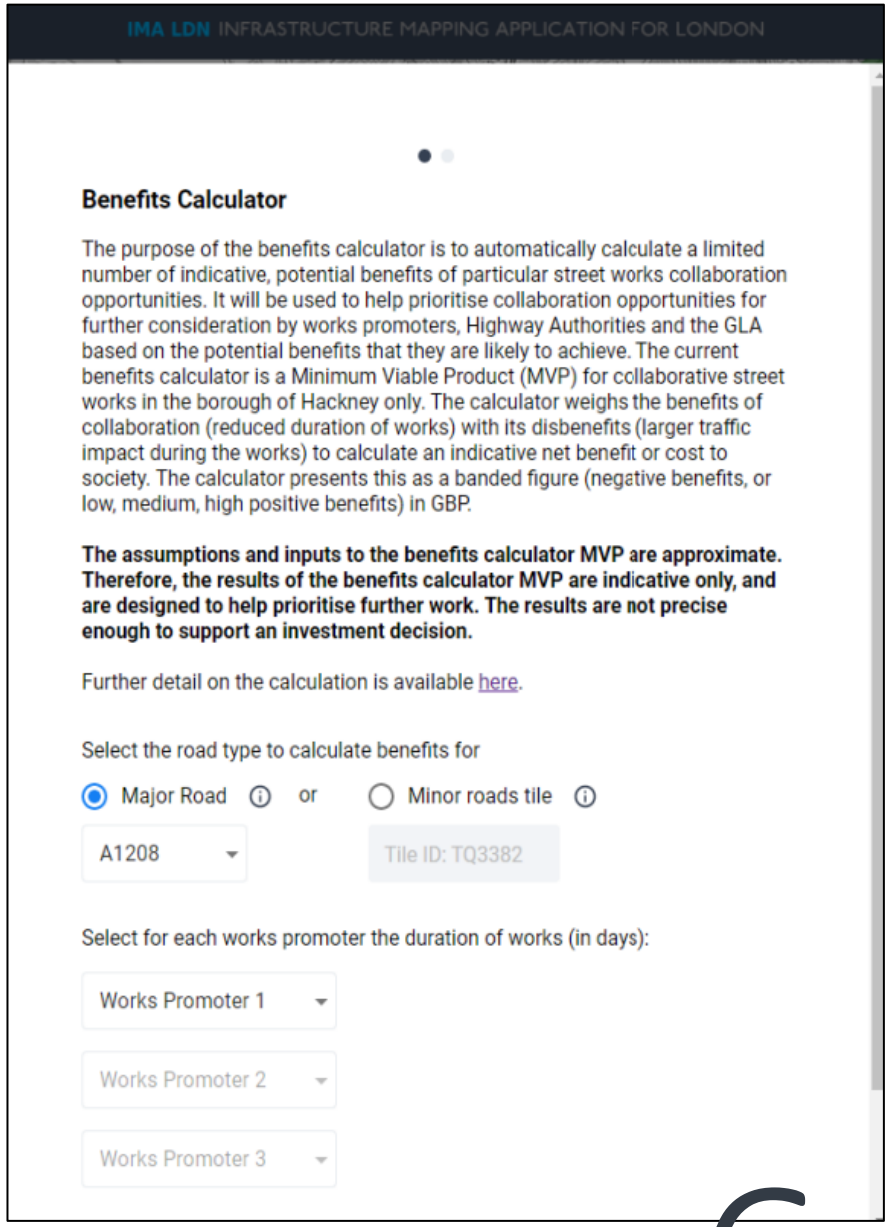
The latest round of development has improved the shortlisting process by adding spatial and borough filters to the initial wizard, has amended the CSV download to make shortlisting and cross-referencing projects easier, and has added a new 'alignment' metric which identifies how many metres of overlap there are in opportunities.

IMA data facilitating collaborative streetworks

Use of the IMA to identify prospective joint streetworks opportunities is now becoming common practice - the tool generates lists of opportunities reviewed on a regular basis by the GLA's Infrastructure Coordination Steering Group. The Streetworks team (part of the GLA's Infrastructure Coordination Service) now conduct shortlisting exercises using new data in the IMA quarterly. Thanks to the widening range of data displayed in the IMA from our growing stakeholder network, the ICS is now able to consider more complex collaborations with greater potential to reinstate London's streets better than we find them. This is a result of the GLA's proactive engagement with data providers to share more future investment data, much of which is created specifically for the IMA. Currently six collaborative schemes have been delivered by the ICS or are in the final stage of planning, of which five were identified through the IMA. Nine more are at various stages of consideration/early planning, eight of which were identified using data in the IMA.

Benefits Tool

A recent new development to the Collaboration Tool is the integration of a Minimum Viable Product (MVP) Benefits Calculator in Hackney. The purpose of the benefits calculator is to calculate automatically, and to a rough level of approximation, some of the benefits of streetworks collaboration opportunities. It is expected to be used to help prioritise collaboration opportunities for further consideration by local authorities, works promoters, and the GLA based on the potential benefits that they are likely to achieve. Users input the number of works promoters and the streetworks duration for the specific collaboration opportunity they are interested in. The IMA then runs its algorithm, which uses a simple road network model with changing traffic speeds and some road users switching to alternative road sections, to identify the estimated days of disruption saved. This is combined with estimated daily traffic impacts to provide a monetised estimate of road user time savings generated by collaboration. These indicative benefits can be used as an initial sift of collaboration opportunities.



Explorer Tool

The IMA also enables better planning for growth in London. It combines over 200 data layers including London's Development Database (every residential planning permission in London), asset condition data, and contextual data layers on policy, environment, and growth projections to produce models and analysis used by providers and local authorities to plan their investment.

New analytical developments include the Probability of Development filter which predicts the likelihood of developments being completed by a given date (currently at 80% accuracy when tested on historic data); a dormant sites filter; and area summarisation functionality

Improved data

Fragmentation of ownership within London's infrastructure sector makes data sharing challenging, with many different private and public stakeholders. This is complicated by policy and regulation priorities, lack of resources for infrastructure data maintenance and sharing, speculative data being viewed as sensitive, competition law, varied (and siloed) data taxonomies and formats. The success of the IMA depends, more than anything, on the quality and reliability of its data. The IMA has made huge strides in this regard, increasing both the quality and quantity of data underpinning the tool.

The GLA developed a Non-Disclosure Agreement (NDA) to resolve data sharing concerns, which allows organisations to confidently and confidentially share sensitive data on the IMA's private site. 11 organisations signed the NDA when first developed in 2018, and over the past two years 9 local authorities have also signed up.

Improved data continued

The GLA has convened data providers and encouraged them to share best practice with each other - at a senior level, amongst technical teams, and amongst planning and operational teams too. Through this, providers encourage each other to raise the average standard of data and to share more with the IMA. Our efforts have been met with corresponding increases in data provision. The data underpinning the IMA has seen a huge uptake over the past 2 years. In 2019 the IMA team processed 27 future investment datasets (~5k features – points, lines or polygons); in 2020 the team processed 74 datasets (~25k features).

In addition to increasing the future investment data, the IMA has continued to grow contextual data available. The IMA has over 100 context layers, including some Section 58 data pulled together from DfT's New filter to remove planning permissions that have been defined as dormant to support planning for growth Street Manager, Thames Connect and boroughs' own data. The IMA now has over 60,000 data points in 200 layers, and this number is continually increasing. The volume of data has grown so substantially that we have had to enhance the IMA's architecture to cope. We will continue to push for the benefits of increased infrastructure data sharing through engagement, capability development, publicity and culture change.

Back-end sustainability

A new bespoke IMA API has been developed which supports some of the new functionality (bookmarking/dataset filtering) but, importantly, significantly increases the data capacity and performance of the application. The API also opens up future development opportunities and improves the resilience of the technical platform.

During the grant period the GLA has accelerated work to build automated connections between the IMA and other data providers and have made success with three data providers:

- For the first time data is being consumed via published web service from DfT's Street Manager tool directly into the IMA.
- Work has resumed to build an automated connection between the IMA and Thames Water's Thames Connect and several context layers from Thames Connect are now being consumed into the IMA without the need for manual data transfer.
- The IMA has consumed data from TfL Playbook for nearly 2 years. Over the last grant period, TfL has made progress building a two-way connection between the IMA and TfL's Playbook, so that Playbook could consume IMA data and vice versa.

Lessons Learnt

Improving data quality is a process which requires continual support and engagement: Even with the substantial improvements in data quality and quantity that we have seen thus far, the work on data sharing requires continual support to move all partners towards the highest standards of data sharing. There are immediate improvements required – for example to standardise data refreshes and improve data flow - and we know that data requirements will continue to evolve to accommodate changing demand, use-cases and users.

Moving from a prototype to a delivery tool requires both functional changes and the establishment of processes: The IMA has made huge strides in improving both its functionality and the data underpinning the tool. It has evolved from a proof of concept to become a core component of the Infrastructure Coordination Service (ICS). The resultant increase in use has necessitated changes to the tool itself so it can accommodate huge increases in data and respond to user need, and also close working with the ICS to establish operational processes and ensure it can operate during periods of intense use.

Increasing data in the IMA increases the potential for new use cases and new users: As the data within the IMA has grown, so too has its potential to provide new analytical products and accommodate new use cases.

Trailblazing partners can have a catalytic effect on data sharing: Digitally innovative partners have shared not only data on planned and speculative works, but also data on assets with a higher risk rating (which indicates they are likely to require replacement in future). This has encouraged other partners we work with to share similar, large, future investment datasets on their asset capacity, quality, condition, and speculative work - encouraging collaboration across the sector. The IMA creates an expectation for data sharing and encourages all providers to raise the bar, as they see their data alongside others. Furthermore, we have begun to see more advanced data sharing methods cascade to other data providers – one partner's automated connection led another partner to explore this in their own business.

The importance of articulating the benefits of infrastructure data sharing:

While the IMA is critical to much of the ICS' delivery, attributing the improved outcomes that the ICS achieves to data sharing - whether reduced days of disruption or healthier streets - will continue to be challenging. The IMA also generates benefits for data providers themselves, by visualising and aggregating their data in a usable way. Articulating these benefits will be critical to catalyse data providers to invest adequately in data provision and ensure this is prioritised.

Conclusion/Recommendations

The ICS use the IMA intensively and share the output with utilities, infrastructure providers and local authorities. While we do have examples of engaged individuals within utilities making regular use of the IMA, we would like to cascade the IMA's usage into partner organisations more fully, and will continue to engage with utilities to encourage boroughs to use IMA in all quarterly statutory meetings, thus embedding its usage and ownership in boroughs. As part of this we anticipate that the service we provide will need to adapt to one building capability and facilitating providers to use the tool independently.

The IMA has met its viable product definition and more; it has grown in scope from being a digital prototype, to a digital service which has generated significant improvements to data-related processes in the sector.

- As a digital service the IMA is now an essential component of the Infrastructure Coordination Service (ICS), providing valuable data for the ICS and wider users.
- Thanks to the widening range of data displayed in the IMA from our growing stakeholder network, the ICS is now able to consider more complex collaborations with greater potential to reinstate London's streets better than we find them.
- At an infrastructure sector level, the IMA pioneers working with diverse partners to voluntarily share future investment data for common purposes, ensuring consistency across organisations at different stages of technological maturity.
- As a pioneering digital project, the IMA has shared learning across the digital, GIS and data sectors. The IMA team engage with relevant bodies, such as the National Digital twin programme and the London Office of Technology and Innovation (LOTI). We regularly advise other cities, regional and sub-regional authorities and adjacent sectors on best practice for infrastructure data sharing.

The GLA intends to continue developing and evolving the IMA to meet demand for both streetworks and planning for growth, so it can support the coordination of delivery and reduction of road network disruption across London for years to come.

TfL Lane Rental Scheme

Optimising customer journeys through the delivery of safer, innovative and sustainable roadworks

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