**InfraHack 1.0   
Challenges & Data**

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# Disclaimer

Please review The **Code of Conduct** which we sent over as part of the Participant Info Pack - **READ IT!** This document explicitly states any data provided in this data pack is for InfraHack only and cannot be used for personal or commercial purposes, and **must be deleted after the event.**

# Introduction

Each section is labelled according to the challenge sponsor, where you will find a short summary of the challenge, a description of the data available and download links to access the data.

# Access to Data

**N.B.** you will need to request access to the datasets, **@phoebe** will be granting this access—so please notify her when your request has been made.

# Issues and points of contact

For any other issues related to the data; contact **@konrad** OR **@justas** on the InfraHack Slack channel (#infrahack on [hackpartnershackers.slack.com](http://hackpartnershackers.slack.com)).



**@konrad @justas**

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# Young Professionals Panel - NIC

## **Predicting Modal shifts**

In recent time, modal shifts have been occuring rapidly. Government isn't currently able to predict how these shifts will occur so despite the desire to invest in infrastructure to support these modal shifts, they do not have the ability. How can you build a tool with the data sets available to help forecast where infrastructure investment should occur?

[**Presentation**](https://docs.google.com/presentation/d/1VAWXOyW4guC0hN3ftY-260enjHTpki11QnWyq5vw6Q4/edit?usp=sharing)

[**Data Folder**](https://drive.google.com/drive/folders/1fa1_oBY_LFH09nmWdNhbGcB81Vkt8tuB)

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|  | | | | |
| **Format:** | **MATsim, Senozon, Java, Python** | | **Period and Frequency:** | N/A |
| **Link and Description:** | [GTFS](https://gtfs.org/) - General Transit Feed Specification  [Referencing](https://github.com/cb-cities/tflgtfs)  [OS map](https://www.openstreetmap.org) – open source – convertible to road network (with basic capacities)  [Autonomous vehicles](https://github.com/matsim-eth/av)  [MATSim (transport simulation)](https://matsim.org/)  [Senozon (visualisation software)](https://senozon.com/)  [**TfL API Login**](https://api-portal.tfl.gov.uk/admin)  Create an account to access TfL Open data  [Details on the TfL API](https://api-portal.tfl.gov.uk/docs)  TfL LTS model (origin destinations and segmentation) – use to create plans for each agent (multi stop itineraries over a day)  TfL Motion model (includes LGVs & HGVs) – use to create plans for each agent (multi stop itineraries over a day)  TfL LDTS – London synthetic population (segmented by age and income)  Census and open source ONS data register shared in my previous email for more sophisticated synthetic population (socio-demographic attributes)  TfL - Cube model for London | | | |
| **Mentor:** | Victor Frebault  Annette Jezierska | | | |

# Highways England

## **Congestion during roadworks with option for events and weather**

In areas where football matches, large concerts and festivals might take place, HE would like to be able to more dynamically avoid or re-schedule road works to minimize disruption. To achieve this, a historical analysis can be undertaken to understand how such events affect congestion and how effective past mitigations have been. This would lead to an increase in customer satisfaction (motorists) as well as generating cost savings due to more efficient deployment of road works.

[**Presentation**](https://drive.google.com/open?id=0B6jEXGzmVh4Vb2tpNTgzbkRoUE56VTlsdHM5MTlaOHZGMmJZ)

[**Data Folder**](https://drive.google.com/drive/folders/1QyHKG5Qu4tUdpWnvZdG9jVYsd_V-U1No)

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| **Congestion during big events** | | | | |
| **Format:** | **Multiple** | | **Period and Frequency:** | N/A |
| **Link and Description:** | **Abbreviations**  RCCs = Regional Control Centres  HATMS = Highways Agency Traffic Management System  MIDAS = Motorway Incident Detection and Automatic Signalling  [**TRIS**](http://tris.highwaysengland.co.uk/) - historic traffic data in CSV  [User guide](http://data.highwaysengland.co.uk/ha-journey-times/TRIS+-+User+Guide+r3.pdf)  [Visual display of traffic detection markers](http://webtris.highwaysengland.co.uk/)  Login details:  mildagircyte  HIr2k2NP7mu  [**Site data tools website**](https://sitedatatools.co.uk/) **[SUPER IMPORTANT]**  To generate reports on:  RCC  MIDAS Traffic counting data in CSV format  **Halogen**  [User guide](https://www.gov.uk/guidance/how-to-use-the-highways-agencys-logging-environment-halogen#halogen-data)  **Roadside fault display data**  [User guide](https://www.rccstatus.org.uk/rfd/downloads/Halogen_Roadside_Fault_Display_User_Guide.pdf)  **MIDAS**  Traffic counting data by monitoring traffic flow and speed  Alert operational logs  Historic event data (excel)  historic weather data  historic M&R records  HERE SDKs & APIs - Sign up for free immediately [here](https://developer.here.com/)  [User guide](https://developer.here.com/documentation/maps/topics/overview.html) on HERE Maps API  [**Live Traffic Feed**](https://data.gov.uk/dataset/041e93f9-bf4e-48ec-b779-6bda9588ef55/live-traffic-information-from-highways-england-previously-highways-agency)  Lists all traffic information (planned and unplanned) for all roads in the Highways England road network ([a detailed map can be found here](https://www.gov.uk/government/publications/roads-managed-by-the-highways-agency)).  The metadata for the files is also available on the page in JSON format.  [**Planned roadworks**](https://data.gov.uk/dataset/highways_agency_planned_roadworks)  Lists planned roadworks up to 15 days in advance for all roads in the Highways England road network  There is a lot of data – updated each minute – for all the motorways and major A-roads in England.  http://www.trafficengland.com/services-info  http://www.highways.gov.uk/traffic-information  http://www.datex2.eu/datex-node  Software toolkits are published for the DATEX II XML web service on GitHub:  https://github.com/ntisservices  There are services available as open data:  https://data.gov.uk/dataset/live-traffic-information-from-the-highways-agency-road-network  http://www.highways.gov.uk/mobile-services/  The MobileAPI (more internal to NTIS), is a cut-down version of our DATEXII feed, thus I’d advise the best way forward would be to connect via the DATEXII toolkit (https://github.com/SaturnEclipseUK), this has a JSON near real-time interface.  Most of the data is sourced from NTIS so although the formats and delivery mechanisms vary the content should be similar. There may be higher latency with derived services. | | | |
| **Mentor:** | Chris Barnes  Amer Essa | | | |

# National Grid

## **Prediction of EV charging points**

As we move to EVs, we’re going to need a network of ultra-rapid chargers to help us do long journeys (eg replacing the fuel stations on motorways). It can take years to get the right energy infrastructure in place (usually due to land consents etc). This means it’s important for us to start thinking about this now. One of the big challenges with charging is that there isn’t one part of the industry that “owns” en route charging – hence it’s important that the many industry parties collaborate.

Another challenge is agreeing on what scenarios for EV uptake the UK should plan for. e.g. will it be 15% of new cars by 2025 or 30%? Will these people do long miles or not? What routes will they need charging on etc. Despite active collaboration from NG, there is still no industry consensus and many people are using very simple models!

The final objective is to inform the strategic road network to 2040. How can we identify the demand for rapid charging on motorways? How can we identify how the solution could be made better by amalgamating different data sets – who has these, how could they be released etc.

[**Presentation**](https://drive.google.com/open?id=0B6jEXGzmVh4VUnYtc1hCdnRmV21fMUpONkw4LUNmQ3ZPR0tv)

[**Data Folder**](https://drive.google.com/drive/folders/1pUErm_c4tZWw29Qa-548MypO6Yx2KsZu)

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| **Prediction of EV charging points** | | | | |
| **Format:** | **CSV & API & SDK** | | **Period and Frequency:** | Minute-by-minute |
| **Link and Description:** | HERE SDKs & APIs - Sign up for free immediately [here](https://developer.here.com/)  [User guide](https://developer.here.com/documentation/maps/topics/overview.html) on HERE Maps API  More info on what’s available:  [XYZ - Web map creation using geospatial data](https://developer.here.com/products/xyz)  [Routing & Navigation - Navigation and routing for:](https://developer.here.com/products/routing-and-navigation)   1. Real-time and historical traffic in XML and JSON 2. Car & pedestrian routing 3. Traffic Enabled Routing 4. Intermodal Routing 5. Customisable routing   [Customisable maps including indoor maps using PNG of JS tiles](https://developer.here.com/products/maps)  **Abbreviations**  RCCs = Regional Control Centres  HATMS = Highways Agency Traffic Management System  MIDAS = Motorway Incident Detection and Automatic Signalling  [**TRIS**](http://tris.highwaysengland.co.uk/) - historic traffic data in CSV  [User guide](http://data.highwaysengland.co.uk/ha-journey-times/TRIS+-+User+Guide+r3.pdf)  [Visual display of traffic detection markers](http://webtris.highwaysengland.co.uk/)  Login details:  mildagircyte  HIr2k2NP7mu  [**Site data tools website**](https://sitedatatools.co.uk/) **[SUPER IMPORTANT]**  To generate reports on:  RCC  MIDAS Traffic counting data in CSV format  **Halogen**  [User guide](https://www.gov.uk/guidance/how-to-use-the-highways-agencys-logging-environment-halogen#halogen-data)  **Roadside fault display data**  [User guide](https://www.rccstatus.org.uk/rfd/downloads/Halogen_Roadside_Fault_Display_User_Guide.pdf)  **MIDAS**  Traffic counting data by monitoring traffic flow and speed  Alert operational logs | | | |
| **Mentor:** | Laura Rainey  Ricky Moseley | | | |

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# National Infrastructure Commission

## **Alleviating long distance journey anxiety with more EV charging points**

With global warming being such an issue, there are government subsidies across the board for more eco-friendly transport options including electric vehicles. EV uptake tend to be much higher in urban areas due to the lack of charging points in more rural areas. Due to a lack of data, the government doesn't currently know where to invest in installing charging points for EVs. How can we predict where to install these EV charging points to encourage more long distance travel?

[**Presentation**](https://drive.google.com/open?id=0B6jEXGzmVh4VUlM2ZFM0R05URW1vWFNyUEVpMzR6cFVQWmRz)

[**Data Folder**](https://drive.google.com/drive/folders/1RlaCaZIJ9yw-Df6naIQToZwz8yP0OVsQ)

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| **Alleviating long distance journey anxiety with more EV charging points** | | | | |
| **Format:** | **Multiple** | | **Period and Frequency:** | N/A |
| **Link and Description:** | Try to get data on battery charging capacities on current EVs  HERE SDKs & APIs - Sign up for free immediately [here](https://developer.here.com/)  [User guide](https://developer.here.com/documentation/maps/topics/overview.html) on HERE Maps API  More info on what’s available:  [XYZ - Web map creation using geospatial data](https://developer.here.com/products/xyz)  [Routing & Navigation - Navigation and routing for:](https://developer.here.com/products/routing-and-navigation)   1. Real-time and historical traffic in XML and JSON 2. Car & pedestrian routing 3. Traffic Enabled Routing 4. Intermodal Routing 5. Customisable routing   [Customisable maps including indoor maps using PNG of JS tiles](https://developer.here.com/products/maps)  **Abbreviations**  RCCs = Regional Control Centres  HATMS = Highways Agency Traffic Management System  MIDAS = Motorway Incident Detection and Automatic Signalling  [**TRIS**](http://tris.highwaysengland.co.uk/) - historic traffic data in CSV  [User guide](http://data.highwaysengland.co.uk/ha-journey-times/TRIS+-+User+Guide+r3.pdf)  [Visual display of traffic detection markers](http://webtris.highwaysengland.co.uk/)  Login details:  mildagircyte  HIr2k2NP7mu  [**Site data tools website**](https://sitedatatools.co.uk/) **[SUPER IMPORTANT]**  To generate reports on:  RCC  MIDAS Traffic counting data in CSV format  **Halogen**  [User guide](https://www.gov.uk/guidance/how-to-use-the-highways-agencys-logging-environment-halogen#halogen-data)  **Roadside fault display data**  [User guide](https://www.rccstatus.org.uk/rfd/downloads/Halogen_Roadside_Fault_Display_User_Guide.pdf)  **MIDAS**  Traffic counting data by monitoring traffic flow and speed  Alert operational logs | | | |
| **Mentor:** | Sarah Rae | | | |

## **Measuring energy efficiency**

The NIC puts together an annual report on best practice to encourage energy efficiency. Thousands of measures have been installed over the last years however it is not clear whether these measures have had an actual impact on energy efficiency. This is quite tricky as there are multiple factors However, one way of doing this is possibly via energy consumption data. How can we measure and visualise the impact the implemented measures have on energy efficiency? (the findings might be based on Northern UK data and then extrapolated to the rest of the country - TBC)

[**Presentation**](https://drive.google.com/open?id=0B6jEXGzmVh4VUlM2ZFM0R05URW1vWFNyUEVpMzR6cFVQWmRz)

[**Data Folder**](https://drive.google.com/drive/folders/1RlaCaZIJ9yw-Df6naIQToZwz8yP0OVsQ)

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| **Format:** | **Multiple** | | **Period and Frequency:** | N/A |
| **Link and Description:** | https://www.gov.uk/government/collections/sub-national-electricity-consumption-data  [Elexon BMU data – historic only and breaks things down into 14 UK areas (distribution operator areas)](https://www.elexon.co.uk/operations-settlement/balancing-mechanism-units/)  [FES – regional distribution data sheet – granular projections but only goes on “peak” data](http://fes.nationalgrid.com/fes-document/)  [Truckload of energy data for UK](https://www.gov.uk/government/statistics/energy-consumption-in-the-uk)  [London consumption by borough](https://data.london.gov.uk/dataset/electricity-consumption-borough)  Weather data for scotland  [BEIS energy data tools](http://njs.analysisoncbas.co.uk/energy/data)  APIs  [Energy performance of buildings for households and businesses](https://epc.opendatacommunities.org/)   * Including details on factors that affect the efficiency calculation * [Guidance on using this API](https://epc.opendatacommunities.org/docs/guidance) * API key: bb1d5dae2806b18baa843f757cfdeb2d612e6545 * [hello@hackpartners.com](mailto:hello@hackpartners.com):bb1d5dae2806b18baa843f757cfdeb2d612e6545 * [Login link](https://epc.opendatacommunities.org/login-with-token?token=a808eb7910c8fb67a17680302510d6fa150921c8&email=hello%40hackpartners.com) * You can also download the data locally via the login link   [Free postcode lookup API and geocoder for the UK](https://postcodes.io/)  XLS  National Energy Efficiency Data-Framework   * Gas & Electricity consumption for 2005 to 2016 based on Local Authority or overall, by   + Floor area   + Bedrooms   + Property type   + Property age   + Tenure   + Household income   + Number of adults   + Country and region   + Output area classification   + Rural urban classification   + Fuel poverty quintile   + Multiple deprivation * Current data on the impact of measures * [More excel tables with more granular data on consumption and measures](https://www.gov.uk/government/statistics/national-energy-efficiency-data-framework-need-report-summary-of-analysis-2018)   CSV  [Electricity consumption for domestic use by postcode for years](https://www.gov.uk/government/collections/sub-national-electricity-consumption-data):   * [2017](https://www.gov.uk/government/statistics/postcode-level-electricity-statistics-2017-experimental) * [2016](https://www.gov.uk/government/statistics/postcode-level-electricity-statistics-2016-experimental) * [2015](https://www.gov.uk/government/statistics/postcode-level-electricity-estimates-2015-experimental) * [2013](https://www.gov.uk/government/statistics/postcode-level-electricity-estimates-2013-experimental)   [Gas consumption for domestic use by postcode for years](https://www.gov.uk/government/collections/sub-national-gas-consumption-data):   * [2017](https://www.gov.uk/government/statistics/postcode-level-gas-statistics-2017-experimental) * [2016](https://www.gov.uk/government/statistics/postcode-level-gas-statistics-2016-experimental) * [2015](https://www.gov.uk/government/statistics/postcode-level-gas-estimates-2015-experimental) * [2013](https://www.gov.uk/government/statistics/postcode-level-gas-estimates-2013-experimental)   [More potential data for the energy sector](https://www.gov.uk/government/organisations/department-for-business-energy-and-industrial-%20strategy/about/statistics) | | | |
| **Mentor:** | Sarah Rae | | | |

# BEIS

## **Energy efficiency measures due to new technology**

Measuring energy efficiency isn’t an exact science but there isn’t much aggregated data on what measures/technology have been taken up resulting in better efficiency. Key questions to answer would be:

* Can we measure and understand the adoption of new energy technology by consumers? What incentives could be made to increase take up?
* Does the UK landscape of energy efficiency installers and businesses in the supply chain affect consumer adoption?
* What drives consumer energy usage? Can we change consumer behaviour to be more energy efficient?

[**Presentation**](https://drive.google.com/open?id=0B6jEXGzmVh4VQ3NQci1mNmZoQWRnVW12RHp4WXNnQkZmWWs4)

[**Data Folder**](https://drive.google.com/drive/u/0/folders/1xsY6lXtnxXJ1g1tl2X_7qtAzJJ-uwxGA)

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| **Format:** | **API, XLS, CSV** | | **Period and Frequency:** | N/A |
| **Link and Description:** | [BEIS energy data tools](http://njs.analysisoncbas.co.uk/energy/data)  APIs  [Energy performance of buildings for households and businesses](https://epc.opendatacommunities.org/)   * Including details on factors that affect the efficiency calculation * [Guidance on using this API](https://epc.opendatacommunities.org/docs/guidance) * API key: bb1d5dae2806b18baa843f757cfdeb2d612e6545 * [hello@hackpartners.com](mailto:hello@hackpartners.com):bb1d5dae2806b18baa843f757cfdeb2d612e6545 * [Login link](https://epc.opendatacommunities.org/login-with-token?token=a808eb7910c8fb67a17680302510d6fa150921c8&email=hello%40hackpartners.com) * You can also download the data locally via the login link   [Free postcode lookup API and geocoder for the UK](https://postcodes.io/)  XLS  National Energy Efficiency Data-Framework   * Gas & Electricity consumption for 2005 to 2016 based on Local Authority or overall, by   + Floor area   + Bedrooms   + Property type   + Property age   + Tenure   + Household income   + Number of adults   + Country and region   + Output area classification   + Rural urban classification   + Fuel poverty quintile   + Multiple deprivation * Current data on the impact of measures * [More excel tables with more granular data on consumption and measures](https://www.gov.uk/government/statistics/national-energy-efficiency-data-framework-need-report-summary-of-analysis-2018)   CSV  [Electricity consumption for domestic use by postcode for years](https://www.gov.uk/government/collections/sub-national-electricity-consumption-data):   * [2017](https://www.gov.uk/government/statistics/postcode-level-electricity-statistics-2017-experimental) * [2016](https://www.gov.uk/government/statistics/postcode-level-electricity-statistics-2016-experimental) * [2015](https://www.gov.uk/government/statistics/postcode-level-electricity-estimates-2015-experimental) * [2013](https://www.gov.uk/government/statistics/postcode-level-electricity-estimates-2013-experimental)   [Gas consumption for domestic use by postcode for years](https://www.gov.uk/government/collections/sub-national-gas-consumption-data):   * [2017](https://www.gov.uk/government/statistics/postcode-level-gas-statistics-2017-experimental) * [2016](https://www.gov.uk/government/statistics/postcode-level-gas-statistics-2016-experimental) * [2015](https://www.gov.uk/government/statistics/postcode-level-gas-estimates-2015-experimental) * [2013](https://www.gov.uk/government/statistics/postcode-level-gas-estimates-2013-experimental)   [More potential data for the energy sector](https://www.gov.uk/government/organisations/department-for-business-energy-and-industrial-%20strategy/about/statistics) | | | |
| **Mentor:** | Chris Rosslowe  Ivan Srbulov | | | |

## **Identifying efficiency savings for commercial spaces**

Analyse non-domestic energy market to identify efficiency savings. For example, can we use infrared satellite image information to identify heat loss from commercial buildings?

[**Presentation**](https://drive.google.com/open?id=0B6jEXGzmVh4VQ3NQci1mNmZoQWRnVW12RHp4WXNnQkZmWWs4)

[**Data Folder**](https://drive.google.com/drive/u/0/folders/1xsY6lXtnxXJ1g1tl2X_7qtAzJJ-uwxGA)

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| **Format:** |  | | **Period and Frequency:** | N/A |
| **Link and Description:** | [Energy performance of buildings for households and businesses](https://epc.opendatacommunities.org/)   * [Guidance on using this API](https://epc.opendatacommunities.org/docs/guidance) * API key: bb1d5dae2806b18baa843f757cfdeb2d612e6545 * [hello@hackpartners.com](mailto:hello@hackpartners.com):bb1d5dae2806b18baa843f757cfdeb2d612e6545 * [Login link](https://epc.opendatacommunities.org/login-with-token?token=a808eb7910c8fb67a17680302510d6fa150921c8&email=hello%40hackpartners.com) * You can also download the data locally via the login link or from the data folder | | | |
| **Mentor:** | Chris Rosslowe  Ivan Srbulov | | | |

# CGI

## **Efficient energy infrastructure locations**

Identify optimal locations for generating technologies (e.g. wind farms and solar energy sites) using geographical and weather data; this would improve forecasts of generation and degradation.

**Presentation**

**Challenge Folder**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Efficient energy infrastructure locations** | | | | |
| **Format:** | **[i.e. .JSON]** | | **Period and Frequency:** | N/A |
| **Link and Description:** | Below is a list of open data sources for UK energy.  [Oil & Gas authority data on wells and seismic lines](https://ndr.ogauthority.co.uk/dp/controller/PLEASE_LOGIN_PAGE)   * Requires creation of login * [User guide](https://ndr.ogauthority.co.uk/dp/pages/NDRDocuments/NDR_User_Guides/NDR_Public_Users_Help_Guide.pdf)   [Ofgem energy pricing data](https://www.ofgem.gov.uk/data-portal/overview)    [UK electricity national grid demand and output](http://gridwatch.co.uk/)  [UK renewable energy data](https://ukdataexplorer.com/renewables/)  [UK energy data based on demand, market imbalance, prices and fuel type](https://www.bmreports.com/bmrs/?q=eds/main)   * [User guide](https://www.elexon.co.uk/documents/training-guidance/bsc-guidance-notes/bmrs-api-and-data-push-user-guide-2/)   [Energy supply data by source](https://www.iea.org/statistics/?country=WORLD&amp;year=2016&amp;category=Energy%20supply&amp;indicato%20r=TPESbySource&amp;mode=chart&amp;dataTable=BALANCES)    [UK electricity supply data](https://www.carbonbrief.org/mapped-how-the-uk-generates-its-electricity)  [UK wind energy supply data](https://winderful.diascreative.net/)  More energy grid data:  http://energynumbers.info/gbgrid  https://www.energydashboard.co.uk/live  http://www.ukenergywatch.org/  http://intelligence.energybrokers.co.uk/  https://www.oecd-nea.org/ndd/nuclear-energy-data/2017/  http://njs.analysisoncbas.co.uk/energy/data  Satellite data:  https://earthexplorer.usgs.gov/ | | | |
| **Mentor:** | Doug Sykes | | | |

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# Network Rail & TfL

## **Real-time information on lift and escalator status**

DLR stations are unmanned which could result in a delay on fault reports for lifts and escalators which lead to unsatisfactory customer journeys. How can we develop a tool based on the sensor information which would not only inform staff at the control centre when faults have occurred as well as the potential fixes based on the different fault codes but also send a notification or update the TfL app to let passengers know that the relevant station has a faulty lift/escalator?

Network Rail, having collected significant schematic and condition data on their lifts and escalators, are looking for ways to employ this data to improve the customer experience around accessibility, to increase the efficiency of their maintenance efforts, and to predict outages to ensure high passenger flow through stations.

Mutual stations are: Lewisham, Stratford International, Stratford, West Ham, Limehouse, Greenwich & Tower Hill

**Presentation:**

[Network Rail](https://drive.google.com/open?id=0B6jEXGzmVh4VUm9mN1F0NEZ1eVRQVHJPRVlSQ3FZUG5pSHd3)

[**Data Folder**](https://drive.google.com/drive/folders/1TRXLfeWPWOnnWC6sfkcND_rkSUFVMfyu)

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| **Real-time information on lift and escalator status** | | | | |
| **Format:** | **CSV** | | **Period and Frequency:** | N/A |
| **Link and Description:** | **TfL/DLR**  SCADA - Fault data from DLR lifts  Metro - Maintenance data inputted by humans after the SCADA alerts occur  Blueprints of station/station maps  **Network Rail**  Faults data from Thames Valley Controls.  CCTV data | | | |
| **Mentor:** | **Network Rail**  Russell Sweeting-White  Andy Jannaway  **DLR/TfL (remote only)**  Raj Parmar | | | |

# Northumbrian Water Group

## **Asset Depth based on network of pipes**

NWL has a network of at least 30km of water mains and sewer pipes. Some of these assets were buried hundreds of years ago with records on how wide the assets are but not how deep they are buried. This unfortunately results in accidental damages, extra costs and delays to work completion. How can we establish or infer how deep these assets are buried and help NWL better plan maintenance works as a result?

[**Presentation**](https://drive.google.com/open?id=0B6jEXGzmVh4VR0lJRVVSUmZmTzQ1R3d1a2YxazVRWnF5VGlj)

[**Data Folder**](https://drive.google.com/drive/folders/13RGmoJkAJwrSfgQa4TZyiJOjE9LtS5ew)

|  |  |  |  |  |
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| **Asset Depth based on network of pipes** | | | | |
| **Format:** | **Shape** | | **Period and Frequency:** | N/A |
| **Link and Description:** | Use iModel hub to view. Logins can be found here.  Chamber depth for half the manholes  Factors that determine how deep a main or sewer is laid  Average gradients based on minimum gradients of sewers to reverse calculate estimated depth  LIDAR data for surface level  Pipe diameter  Pipe material type to determine different depths based on properties  Position or immediate environment of pipe i.e. pavement, verge, road or agricultural land will determine how deep it is buried  Age of pipe  Other underground obstacles i.e. existing services from other utilities"  [Ordnance Survey Mastermap data](#_1blsmz4lmxqg) (look for grid reference NZ for those related to NWG data set locations)   * Highways Network (Roads) - GML 3.2 + FVDS * Highways Network (Paths) - GML 3.2 + FVDS * Highways Network (Roads, routing and Asset Management Information) - GML 3.2 + FVDS OS MasterMap Highways Network provides all the highways data you need, in one place. It’s a new, common and authoritative view of the whole road network in Great Britain, ideal for routing and public sector data-sharing. * Sites - GML 3.2 * Topography Building Heights - CSV * Topography - GML 2.1.2 **large file 45 GB** OS MasterMap Topography Layer is the most detailed and accurate view of Great Britain's landscape – from roads to fields, to buildings and trees, fences, paths and more. * Imagery - JPEG  When you need the visual feel for a location, the aerial photography of OS MasterMap Imagery Layer gives you the real-world view. * Water - GML 3.2 This is the only detailed, heighted water network of Great Britain showing the flow and precise course of rivers, streams, lakes and canals. It supports flood risk management and is ideal for data sharing. * Terrain 5 - GML Contours & Esri Shape Contours **large file 16.2 GB**   **If you feel other Ordnance Survey data sets can help, contact @phoebe or** [**phoebe@hackpartners.com**](mailto:phoebe@hackpartners.com) **or +447964941182 to ask for more data.** | | | |
| **Mentor:** | Clive Surmann-Wells | | | |

# Mott Macdonald

## **Digital mapping of design data with construction data to find optimal construction cost**

MM captures a lot of design data but struggles to connect it with construction data. If this were done systematically, MM would be able to understand where optimization of supplies and construction can take place on large infrastructure projects. This could significantly reduce time and cost of infrastructure works due to greater economies of scale & greater understanding of construction bottlenecks. How can we build a tool to visualise or predict the optimisation of supplies and construction?

[**Presentation**](https://drive.google.com/open?id=0B6jEXGzmVh4VODhMOEpXT3dLMjFWU0VfUW9TSEM2SjJNUDFz)

[**Data Folder**](https://drive.google.com/drive/u/0/folders/1G705BcGIilRyBjtBSvoyaDoDwXO2JnEw)

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| **Format:** | **.xlsx** | | **Period and Frequency:** | N/A |
| **Link and Description:** | **Design Asset data**  Unique number associated to each element. Same number can be used from one model to the other  Unique code given to each asset  Actual asset name  Element description  Cost breakdown structure code of the element. Used to link to cost database and estimate its price  Work breakdown structure code of the element. Used to link to the construction programme and understand when it will be built  Material used for structural elements  Cross section used for structural elements (mainly beams and piles)  Prestress ratio for beam elements  Extra volume allowance at the end of steel beam elements (in % of modelled beam)  Extra volume allowance at the end of steel bracing elements (in % of modelled bracing)  Prestress ratio for slab deck elements  Quantity of polypropylene fibres for slab elements  Quantity of steel fibres for slab elements  Extra volume allowance at the end of stiffener elements (in % of modelled stiffener)  Quantity of polypropylene fibres for tunnel linings elements  Quantity of steel fibres for tunnel linings elements  Quantity of polypropylene fibres for wall elements  Quantity of steel fibres for wall elements  Thickness of slab elements  Height of wall elements  Width of wall elements  Cross section area of the element  Length of the path along which the element profile is extruded  Net side area of slab elements  Net top area of slab elements  Net bottom area of slab elements  Modeled cross section area for structural elements  Path length for structural elements (see Path\_Length)  Net center area of wall elements  Net left area of wall elements  Net right area of wall elements  Path length for wall elements (see Path\_Length)  Net volume of the element  Reinforcement ratio of the element  Grade Mix used for the element material  Asset Location  Images of elements  Financial data | | | |
| **Snapshot:** | Asset Data Description:  Asset Data:    Asset Location Data:    3D visual representation of elements: | | | |
| **Mentor:** | Michael Gaunt  Tanguy Matta  Mert Yesugey | | | |

# OS Data sets

## **Multiple Challenges**

The OS data sets are useful for multiple challenges.

[**Data Folder**](https://drive.google.com/drive/folders/16uTS_BAKDDOTNHEG89qqwUbe9PRL5Luj)

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|  | | | | |
| **Format:** | **Multiple** | | **Period and Frequency:** | N/A |
| **Link and Description:** | To pick out the area you would like covered, compare against this [full sized map](https://www.ordnancesurvey.co.uk/docs/maps/national-grid-map.pdf).  Ordnance Survey Mastermap data   * Highways Network (Roads) - GML 3.2 + FVDS * Highways Network (Paths) - GML 3.2 + FVDS * Highways Network (Roads, routing and Asset Management Information) - GML 3.2 + FVDS OS MasterMap Highways Network provides all the highways data you need, in one place. It’s a new, common and authoritative view of the whole road network in Great Britain, ideal for routing and public sector data-sharing. * Sites - GML 3.2 * Topography Building Heights - CSV * Topography - GML 2.1.2 **large file 45 GB** OS MasterMap Topography Layer is the most detailed and accurate view of Great Britain's landscape – from roads to fields, to buildings and trees, fences, paths and more. * Imagery - JPEG  When you need the visual feel for a location, the aerial photography of OS MasterMap Imagery Layer gives you the real-world view. * Water - GML 3.2 This is the only detailed, heighted water network of Great Britain showing the flow and precise course of rivers, streams, lakes and canals. It supports flood risk management and is ideal for data sharing. * Terrain 5 - GML Contours & Esri Shape Contours **large file 16.2 GB** | | | |