ConnectMore User Requirements & Specification

June 2020
EA Technology
Version 2.0
Document Issue Control

Version History

<table>
<thead>
<tr>
<th>Version</th>
<th>Date</th>
<th>Comment</th>
<th>Author</th>
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<tr>
<td>1.0</td>
<td>31/03/2020</td>
<td></td>
<td>EA Technology</td>
</tr>
<tr>
<td>2.0</td>
<td>15/06/2020</td>
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Final Approval (SP Energy Networks)

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## Final Approval (EA Technology)

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<tr>
<td>1.0</td>
<td>27/03/2020</td>
<td>Director (EA Technology), Product Owner (ConnectMore)</td>
<td>DaveA Roberts, Adrian Vinsome</td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>20/05/2020</td>
<td>Project Manager</td>
<td>Elaine Meskhi</td>
<td></td>
</tr>
<tr>
<td>2.0</td>
<td>15/06/2020</td>
<td>Director (EA Technology)</td>
<td>DaveA Roberts</td>
<td></td>
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This document describes:

• the stakeholder engagement carried out to gather input for ConnectMore tool user requirements definition,

• how the data gathered has been processed to determine the key user requirements and the high-level functional specifications.

The project proposal states that the scope of this tool covers:

• Users who are looking at installing multiple chargers.
• Connection queries related to charging points that will be used by ‘public’ (i.e. not fleet and not domestic charging).
• The incorporation of flexible solutions and a transport model (with the help of project partners SGS and PTV).

The *Data Transfer and Processing Plan* document sits alongside this document to provide a base specification for the ConnectMore tool.
Overview
Stakeholder Workshop 1
  • Methodology: User Profile Identification
  • Overview of Outputs: Persona
Stakeholder Workshop 2
  • Methodology: User Interface Preferences
  • Overview of Outputs: User Interface Preferences
Specification development
  • Methodology: From User Requirement to Specification
  • Outputs: ConnectMore Specification
Next Steps
  • UI design: Wireframes
  • Heatmaps
Appendices
  • User Personas
  • Workshop Materials (including survey results)
  • Workshop Outputs
  • Requirements Matrix
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Overview

• An intrinsic pillar of the Charge project is that it should be stakeholder led

• Development of the ConnectMore software tool follows the ‘Agile’ methodology, the first stage of which is a ‘discovery’ phase to inform specification development

• The specification of the ConnectMore tool is driven by the requirements of the anticipated future users captured through stakeholder engagement

• Two stakeholder workshops have been held to help identify and define:
  • the user groups, archetypes and personas likely to use the tool,
  • the user interface requirements.
Agile software development is based on an incremental, iterative approach. Instead of in-depth planning at the beginning of the project (as in the traditional Waterfall method), Agile methodologies are defined by evolving requirements over time and encourage constant feedback from the end users.

<table>
<thead>
<tr>
<th></th>
<th>Agile</th>
<th>Waterfall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sequential</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Flexible</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Accommodates change</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Defined requirements</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Deliver quality products</td>
<td>✔</td>
<td>✔</td>
</tr>
<tr>
<td>Continually evolving</td>
<td>✔</td>
<td></td>
</tr>
<tr>
<td>Rigid process</td>
<td></td>
<td>✔</td>
</tr>
</tbody>
</table>

The Agile method has been chosen due to the complex nature of this project – cross-disciplinary and with multiple strands of development.

• The discovery phase aims to gain a detailed understanding of stakeholders and the end customer in order to produce a better performing product.

• The first step is identifying the user groups which are typically job roles.

• An archetype shows the common characteristics of a given user group (or a job).

• The persona is a specific individual, one instance of the user group created by personifying the archetype.
User Profile Workshop
Methodology: User Profile Workshop

• The first stakeholder workshop was held in Chester, in July 2019.
• It was attended by a cross-section of stakeholders including:
  • Local Authority transport and strategic planners from across the SP-Manweb licence area (Merseyside, Cheshire, North Wales and Shropshire),
  • Chargepoint installers,
  • Community organisations,
  • Consultancies,
  • All project partners (logos top right of this page) were also represented.

• Professional event moderators, Explain Market Research, ensured conversations remained focused and covered all necessary topics. The views of all participants were gathered and discussions were accurately recorded.
  • Participants were provided with background information about the Charge project, its aims and principal deliverables.
  • Round table discussions were used to help identify user personas which are expected to use the ConnectMore tool and then identify working practices and pain points that the tool could address for the identified personas.
• The professional event moderators provided transcripts of the workshop discussions and a summary of the findings.
Overview of User Profile
Workshop Outputs

Example persona (the workshops produced 12 personas representing 12 key user groups likely to benefit from the tool):

**Laura Khan – Motorway service stations**

<table>
<thead>
<tr>
<th>Goals &amp; needs</th>
<th>Pain points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laura needs...</td>
<td>Laura’s current pain points are...</td>
</tr>
<tr>
<td>• A tool that will clearly identify capacity for connection</td>
<td>• Understanding the implications of different scenarios and factors</td>
</tr>
<tr>
<td>• The ability to forecast EV uptake to understand impact on future demand at motorway services</td>
<td>• Complex language and information</td>
</tr>
<tr>
<td>• A tool that can outline the options and impact for number and type of charge points</td>
<td>• Understand how the process works as a whole</td>
</tr>
<tr>
<td>• A tool that can help her understand the ‘bigger picture’ of EVs and chargers, including smart solutions</td>
<td>Use scenario</td>
</tr>
<tr>
<td>Outputs that can be exported and printed</td>
<td>Laura would usually be...</td>
</tr>
</tbody>
</table>

- **Profile**
  - Laura is a 35 year old female, who works in planning for the motorway service station
  - Laura has a degree in Planning and experience in strategic infrastructure planning
  - Laura has a general awareness of EV and understands that charging points are needed in service stations

- **Motivation**
  - Laura would like...
  - To be able to look at different scenarios within one interaction
  - To have an understanding of the costs relating to these different scenarios

This is because as a motorway service station planner, Laura needs to be able to look at scenarios and costs to inform business decisions

**Key quotes about ConnectMore**

- “I need the knowledge to build a business case”
- “I’m not an electrician”
- “What are my options here?”
Methodology: User Interface Workshop

- The second stakeholder workshop was held in Chester, in December 2019.
- Many attendees had attended the previous workshop held in July 2019, the groups attending including:
  - Local Authority transport and strategic planners,
  - Charge point installers,
  - Community organisations,
  - Consultancies,
  - All project partners (logos top right of this page) were represented.

- As for the July workshop, it was managed by professional event moderators, Explain Market Research.
  - Delegates were provided with an update on project progress and a recap of the previous workshop.
  - Attendees reviewed the user personas created in the previous workshop and were asked which one they most closely identified with themselves.
  - Discussions were held to identify what the represented personas would want or need from the ConnectMore tool, and following a demonstration of different interface examples the interface preferences of each persona was also captured.
User Interface Workshop
Delegates were provided with demonstrations of software interface examples developed by EA Technology and PTV Group.
Delegates were presented with a starting selection of potential ConnectMore user groups.

The first exercise was to determine if this list was complete or if further user groups should be added.
Overview of User Profile Workshop Outputs

- Participants were separated onto four tables so that each workshop table comprised of delegates from a variety of professional backgrounds.
- Each group then worked with the templates provided to develop the personas.
Delegates were asked to self-assign themselves to one of the user personas developed at the previous workshop.

Through this process seven personas were represented.
Delegates expanded the definitions of the persona that they identified with on template activity sheets.

These were subsequently supplemented and expanded using transcripts of the workshop activities.

The resultant seven definitions corresponding to the represented personas are included in the appendices (an example of which is shown on the next page).
### Example requirements by persona

#### Dan Sprake – Car park owner

**Goals and Needs**

- A tool that is simple, with a user-friendly interface.
- A tool that can provide detailed information on available charging options.
- A tool that educates users on the connection process—clear eligibility criteria and costs.
- A tool with imagery and videos to help users understand the process.
- A tool that generates a quick response.

**Pain points**

- Difficult user interface.
- Local authority targets and quotes on cost per EVCharger.
- The use of jargon.
- Knowing where to find tool.

#### Inputs and Outputs

**What inputs are needed?**

- Postcode
- How many chargers
- Type of charger needed

**How could they be entered?**

- Keyboard
- Drop down menu

**What outputs are necessary?**

- Is it possible?
- Cost and benefits (carbon and financial)

**How could these be displayed?**

- Forecast risk metric updated regularly
- What to do next? £6 contractors would pay for leads, handover to contractors

#### User Story

**Card**

*As a car park owner*

I want/need to know if I can fit EV chargers and how much it will cost. So that I will know if it’s worth fitting them.

**Conversation**

Keep it simple

**Confirmation**

Can I see how many people have them installed (from previous users of the system to prove tool)?

Can it...
• Each person was also asked to review the transport and electricity network mapping software demonstrated, reflecting on positives, negatives, and possible improvements to the interface.
• Reflecting on the ConnectMore tool each group considered:
  • key points to avoid
  • what could cause confusion
  • what should be included from the perspective of their persona.
• The 12 activity sheets, again supplemented with transcripts of the group’s discussions, are included in the supporting documentation.
### Overview of User Interface Workshop Outputs

**Example Output**

#### Network mapping

<table>
<thead>
<tr>
<th>Positives</th>
<th>Negatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Lots of detail</td>
<td>- Have to keep digging – want an indication earlier on</td>
</tr>
<tr>
<td>- Understand where can be developed for planning</td>
<td>- Does it take into account future developments already planned</td>
</tr>
<tr>
<td>- Almost too much detail</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Improvements</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Quicker being able to interpret the data (narrowing it down to what is relevant to you)</td>
</tr>
<tr>
<td>- Quicker visual of feasibility</td>
</tr>
<tr>
<td>- An app for a “quick look” at options</td>
</tr>
<tr>
<td>- Option for “quick response” or detailed response</td>
</tr>
<tr>
<td>- Note: better for small users</td>
</tr>
</tbody>
</table>

#### Transport mapping

<table>
<thead>
<tr>
<th>Positives</th>
<th>Negatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Compare different sites</td>
<td>- Less relevant to persona – go where client site dictates</td>
</tr>
<tr>
<td>- More relevant for brownfield sites</td>
<td>- Does it let you see enough detail?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Improvements</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Look at impact of developing new sites on EV flow</td>
</tr>
<tr>
<td>- Sensitivity studies for the future</td>
</tr>
<tr>
<td>- Does it include lorries and buses?</td>
</tr>
<tr>
<td>- Are vehicle to grid (v2g) taken into account?</td>
</tr>
<tr>
<td>- Can you see how closely post ‘future’ scenarios</td>
</tr>
<tr>
<td>- Ability to plot indicated sites</td>
</tr>
<tr>
<td>- Indication of time spent at locations during travel</td>
</tr>
</tbody>
</table>

#### Key Points

**What should be avoided?**

- Too much information – more than a lot of users need
- People will lose trust if it is not accurate/doesn’t work

**What could cause confusion?**

- Need a level of technical expertise to work
- Concern over accuracy of predictions – does it include all load types?
- Long term future is very important for this audience

**What works well?**

- Need right balance of data detail
- Zooming/scrolling
- User friendly, interactive
- Good to be able to draw a plot and then view lots of different scenarios at a click (trends over
User Requirements to Specification
In order to determine the full set of requirements:

1. All workshop material including transcripts was reviewed itemised.

2. The itemised list was turned into a matrix showing a unique requirement in each row (99 items) against each of the user groups requesting the requirement in columns (see next page for extract).

3. The number of occurrences of each requirement was counted to inform the priority level.

4. The MoSCoW prioritisation of each requirement was determined by considering a number of factors, in addition to the ‘number of occurrences’ the partners’ expertise and experience and the project/product scope.

An extract of the matrix is shown on the next page and the full matrix and full list of Functional and Non-Functional Requirements is available in Appendix C.

The ‘Must’ requirements were verified by the Stakeholders via an email exchange (see appendix for materials) as the in-person workshop scheduled for 11th March 2020 was cancelled due to the COVID-19 outbreak.
<table>
<thead>
<tr>
<th>Feature</th>
<th>User Groups</th>
<th>Count</th>
<th>Priority</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goals / Needs</td>
<td>Cost estimator</td>
<td>3</td>
<td>M</td>
<td>A key feature of the tool</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Pain Points</td>
<td>3rd party delays</td>
<td>1</td>
<td>W</td>
<td>Outside project scope and control</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Inputs</td>
<td>Batch file of sites</td>
<td>1</td>
<td>C</td>
<td>Limited use case for this feature and potential other ways to achieve same outcome</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Data entry</td>
<td>Drop down menu</td>
<td>3</td>
<td>S</td>
<td>Reduce user/data entry errors but refer to UI design best practice</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Outputs</td>
<td>Yes/no, is it possible</td>
<td>2</td>
<td>C</td>
<td>Not necessarily helpful without extra information which the tool is intending to provide</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Display</td>
<td>GIS layers</td>
<td>1</td>
<td>M</td>
<td>A key feature of the tool</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>
From the previous matrix and collected workshop outputs the ‘Must’ requirements for the user interface, user inputs and user outputs are shown across the next three pages:

### User Interface

- Web-based frontend for ease of deployment and accessibility
  - Ability to input parameters via forms or graphical controls
- Network capacity view
- Electricity network/cost of connection view
- EV demand/transport model view
- Outputs shown visually with traffic light colouring (Red/Amber/Green)
- User accounts with login to save cost quotes
- Downloading results – export to PDF
- Tested on a range of web browsers and platforms
- Guidance/links to information about service alterations, queue management policy

The specific controls for data entry (e.g. drop-down menu or radio buttons etc.) will be further explored in user testing.
Overview of Outputs: User Requirements - Inputs

User Inputs

- Login credentials (links to SP Energy Networks CRM* system)
  - Ability to specify default parameters/user preferences
- Location (fixed or broad area)
- Number of charge points
- Types of charge points (7kW/22kW/50kW) – drop-down list with hover-over help
- Electrical capacity required
- Budget range for connection
- Number of EVs expected (or user could input number of cars expected)
- Dwell time of cars (Transport Model inputs)

• One way we can help users with data inputs include with hints like, ‘a 7kW charger will add approximately 30 miles worth of charge to a mid-sized EV every hour’.

*CRM = Customer Relationship Management
### Outputs to User

- Electricity network capacity/EV charging demand heatmaps
- Connection cost estimates
- Charge points possible (count and type – 7kW/22kW/50kW)
  - Additional requirements for smart charging e.g. cost and equipment
- Reports contain maps and supporting data, e.g. limitations and assumptions used by the tool
- Contacts for information for next steps

- Transport model
- Flexibility options
  - Additional requirements for flexibility options
- Different levels of report – initial scope, full business case
In addition to the functional requirements (what the tool will do) described above there are also non-functional requirements (describing how the system works). These are determined by considering user feedback, stakeholder needs and various standards or best practice. The Non-Functional Requirements (NFRs) are grouped by category and the ‘must’ requirements (non-exhaustive) are shown over the next pages.

<table>
<thead>
<tr>
<th>NFR ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Usability</td>
<td></td>
</tr>
<tr>
<td>NFR 1.1</td>
<td>Simple and easy-to-use interface, toolbox format.</td>
</tr>
<tr>
<td>NFR 1.2</td>
<td>Ability to pass parameters in a user-friendly manner, i.e. via GUI/forms.</td>
</tr>
<tr>
<td>NFR 1.3</td>
<td>Non-technical language throughout user interface or link to glossary of terms.</td>
</tr>
<tr>
<td>NFR 1.4</td>
<td>Ability to specify default parameters.</td>
</tr>
<tr>
<td>NFR 1.5</td>
<td>Available to use from a range of web browsers and platforms (e.g. Microsoft Edge, Google Chrome, Safari).</td>
</tr>
<tr>
<td>NFR 1.6</td>
<td>Provide functionality to minimise data entry e.g. default values.</td>
</tr>
<tr>
<td>2. Data</td>
<td></td>
</tr>
<tr>
<td>NFR 2.1</td>
<td>Interface with SPEN CRM software to save quotes to user logins.</td>
</tr>
<tr>
<td>NFR 2.2</td>
<td>Adhere to industry requirements for confidentiality and data protection and meet the GDPR (General Data Protection Regulations).</td>
</tr>
<tr>
<td>NFR 2.3</td>
<td>All electrical network asset data will be held in CIM (Common Information Model) format.</td>
</tr>
</tbody>
</table>
## Non-functional requirements (2)

<table>
<thead>
<tr>
<th>NFR ID</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3. Performance</strong></td>
<td></td>
</tr>
<tr>
<td>NFR 3.1</td>
<td>Less than 1 second response time for general navigation in the tool. Including screen navigation and menu operations but excluding any data operations or transactions.</td>
</tr>
<tr>
<td>NFR 3.2</td>
<td>A response time for data operations or transactions of less than 10 seconds under anticipated IT loading conditions.</td>
</tr>
<tr>
<td>NFR 3.3</td>
<td>Scalable online and storage capability for quotes.</td>
</tr>
<tr>
<td>NFR 3.4</td>
<td>The tool is expected to be available 24/7 (99.5% availability).</td>
</tr>
<tr>
<td>NFR 3.5</td>
<td>There will be a separate test and production environments.</td>
</tr>
<tr>
<td><strong>4. Testing</strong></td>
<td></td>
</tr>
<tr>
<td>NFR 4.1</td>
<td>Support the ability to test all areas of functionality including: data load, transaction processing, reporting, stress testing, communications/failover.</td>
</tr>
<tr>
<td>NFR 4.2</td>
<td>Ability to operate system in a test mode prior to production and also during states of system upgrade or change.</td>
</tr>
<tr>
<td>NFR ID</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>-------------</td>
</tr>
<tr>
<td>5. Error Handling</td>
<td></td>
</tr>
<tr>
<td>NFR 5.1</td>
<td>The tool must be able to recover from failure in a graceful manner, presenting error messages to users in clear, non-technical language.</td>
</tr>
<tr>
<td>6. Security</td>
<td></td>
</tr>
<tr>
<td>NFR 6.1</td>
<td>Data encryption in place (at rest and in transit).</td>
</tr>
<tr>
<td>NFR 6.2</td>
<td>Security applied to APIs, data import/export, file transfer activities.</td>
</tr>
<tr>
<td>NFR 6.3</td>
<td>A facility, hosted in the EU, compliant with ISO 27001.</td>
</tr>
<tr>
<td>7. Backup</td>
<td></td>
</tr>
<tr>
<td>NFR 7.1</td>
<td>System should be Disaster Tolerant (backup system within the EU).</td>
</tr>
<tr>
<td>NFR 7.2</td>
<td>Data should be backed up when the state of the underlying data changes. In the first instance it is estimated that data will be uploaded annually.</td>
</tr>
<tr>
<td>NFR 7.3</td>
<td>The ConnectMore tool backup arrangements will be consistent with the enterprise wide Systems Backup Policy across the Iberdrola Group (2020).</td>
</tr>
<tr>
<td>NFR 7.4</td>
<td>Capability to trace the inputs corresponding to a given set of outputs.</td>
</tr>
</tbody>
</table>
User Interface and User Experience Specification Development
• This Use Case diagram shows the various ways the different users may interact with the ConnectMore tool.
• This section of the report goes into further detail about what features the user may see in the tool and how they may navigate between different parts of the tool.
• The next page shows an annotated user journey example.
Example: A Car Park Owner

1. User is interested in exploring heatmaps around multiple car parks.

2. User identifies that one of my car parks is in an area with plenty of network capacity, where the number of EVs is forecasted to grow rapidly. They want to get an idea of how much it will cost to install some EV chargers.

3. Upon submitting a connection request, the user receives an instant quote.

4. User navigates to the quote manager, to see how this quote compares to their previous quotes. From here, they may close the application, or explore or review other options.
To progress the design (and development) of the tool EA Technology keep and update a set of wireframes for the tool.

A wireframe is a graphical skeleton that shows the layout, content and key concepts of a tool/website’s User Interface (UI).

Wireframes facilitate discussions about the functionality and reduce assumptions or errors in the tool build stage. The wireframes will be workshopped with a range of stakeholders.

‘Mobile first’ design means layouts are created for smallest screen first to help prioritise use of space and then scaled up to laptops.

In creating the wireframes examples of decisions that will be made include:

- The number of pages to click/navigate through.
- The appropriate number and type of controls on each view

Some examples of the wireframes are provided on the following pages.
User Journey Flow Diagram

Start Menu

Connection Cost Estimator
Quote Manager
FAQ
Tool Info

Log In

Network/transport heatmap viewer (baseline and forecast information)
Heatmaps (load-responsive network)
Input spatial information
Get quote

Connections input form
Verify details
Quote manager
Individual quote viewer

Category of screen
Individual screens

ConnectMore information
FAQ list

Multi-layer Heatmap
Start Menu

Welcome to ConnectMore

How would you like to use the tool today?

- Transport/Heatmaps Section Link
- Connection Cost Estimator Section Link
- Retrieve a previous quote
- Find out about the tool
- FAQ/HELP

A series of buttons to route users to the relevant part of the tool depending on what they want to do (get information from the transport mode, look at network capacity, make a connection application, retrieve a previous quote, understand how the tool works or access the help pages).

Heatmaps page

search box for user to type postcode or street name to navigate the map. The map will also be panable and zoomable with touch interface.

scenario selector—within scenario we are proposing two different views are needed for user to determine charger size and type:
- charge point capacity - total demand
- type of demand - dwell time distribution

Legend to show scale and colour scheme for selected layer (will update with selected layer).

H. refers the SP Energy Networks website header.

EV charging demand
Electricity network capacity
Electricity network connectivity

Collapsible checklist (so as to get better view of map)
Icons by each layer to give an idea of what each layer is? (see google maps on phone)
“Street” view always on
Users select as many layers as desired
Perhaps SPEN would prefer for the network (connectivity diagram) view to only be visible to those logged in?

help - tutorial guide how to use it
The following pages focus on the transport elements of ConnectMore – what users of this part of the tool will require, the data available, how this could be visualised and combined with network headroom information.

Early work by PTV on the specification of the transport model has allowed more detailed design to be included for the Transport parts of ConnectMore.

EA Technology have also completed a focus group with potential users of the tool. While other aspects of ConnectMore are available (in part) in existing tools the display of EV demand data is new – hence why additional feedback has been obtained.

The first focus group was focused on local authorities and transport authorities. Further consultation will be completed in the future with other users (e.g. charging network operators, car park owners etc.)
• The data available from the transport model has been established by PTV (e.g. in the Model Specification Report)
• There are multiple user groups for ConnectMore who may have different needs. The processing and visualisation in ConnectMore needs to be designed to satisfy these needs.
• In order to achieve the above the following need to be established:
  a) what users want to achieve with the tool (page 40)
  b) the data available (page 41)
Needs of Users of ConnectMore - Transport Elements

- The table shows a summary of the key user groups interested in the transport model element of ConnectMore.
- In addition to the Discovery workshops held in 2019 and described at the start of this report the transport aspects of ConnectMore have been reviewed at an additional focus group workshop held online on 19th June 2020.

<table>
<thead>
<tr>
<th>User</th>
<th>Using the transport part of the tool to understand:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local authority planners</td>
<td>Where will there be demand for public EV charging infrastructure?</td>
</tr>
<tr>
<td>Charging network operator</td>
<td>When will this demand occur?</td>
</tr>
<tr>
<td>Local councillor</td>
<td>What type of chargers will be needed (7kW, 22kW or 50kW)?</td>
</tr>
<tr>
<td>Development surveyor</td>
<td>Should EV charging infrastructure be included in a development?</td>
</tr>
<tr>
<td></td>
<td>Is there sufficient demand to justify it?</td>
</tr>
<tr>
<td></td>
<td>What type of infrastructure?</td>
</tr>
<tr>
<td>Business owner – e.g. leisure destinations</td>
<td>Is there demand for EV charging at their business/car park location(s)?</td>
</tr>
<tr>
<td></td>
<td>What type of chargers would be needed?</td>
</tr>
<tr>
<td>Car Park owners</td>
<td></td>
</tr>
</tbody>
</table>
• Data will be available for each metric, for each LSOA, in each scenario and model year.
• Data could be displayed ‘raw’ or combined to create additional (new) information.
• A summary of the key data types and figures available is shown in the table below. Further details about data processing are provided in the ‘Data Transfer and Processing’ report.

<table>
<thead>
<tr>
<th>Data type</th>
<th>Figures available</th>
</tr>
</thead>
<tbody>
<tr>
<td>How much energy is required for charging (kWh)</td>
<td>Disaggregated into public charging, private charging at activity (e.g. work), private charging at home. Available for each hour of a typical weekday</td>
</tr>
<tr>
<td>Number of vehicles arriving</td>
<td>Split into all private cars and EVs. Available for each hour of a typical weekday</td>
</tr>
<tr>
<td>Number of EVs arriving and charging</td>
<td>Available for each hour of a typical weekday</td>
</tr>
<tr>
<td>Dwell time of vehicles charging</td>
<td>Shown as a distribution (e.g. % who dwell for 0 – 1 hours, 1 – 3 hours etc.). Available for each hour of a typical weekday</td>
</tr>
<tr>
<td>Energy (kWh) transferred for each charging EV</td>
<td>Shown as a distribution (e.g. % of charge events taking 0 – 5 kWh, 5 – 15 kWh etc.). Available for each hour of a typical weekday</td>
</tr>
</tbody>
</table>
Taking the information from the previous two pages the tool visuals will allow the user to:

- see multiple LSOA areas (shown by the light grey boundaries).
- easily compare and contrast LSOAs by the colour coding of the LSOAs.
- gain a quantitative view of each LSOA based on a legend which relates each shade to a numerical value range.
- Visually compare different locations over a wide area or zoom in to view a smaller area.
- save a copy of the view.

These heat map views can be used to show the quantities below, with the user selecting the view they want to see:

- Daily total kWh for public EV charging
- Daily total kWh for private at home EV charging
- Daily total kWh for private at activity charging
- Proportion of trips completed in an EV
- Number of EVs expected in LSOA
- Average dwell time (hours)
- Average energy taken per charging session (kWh)

Figure: Example Heat Map View
• To inform a connection request the user is likely to be seeking information about the expected demand for charging infrastructure in a specific location (or a shortlist of potential locations).

• Stakeholder engagement has also indicated that users are interested in using the tool to support them in making decisions about the type of charging infrastructure which should be installed (charging rate).

• A heat map would continue to be used but with additional functionality when the user has zoomed in (see figure). This functionality would allow the user to:
  • tap/click on an LSOA to view a call-out displaying numerical values,
  • add the LSOA to a comparison. This comparison would enable users to compare multiple locations and to inform the business case for a connection application.

Figure: Example Close Up LSOA View for Transport Model
Charging demand can be described and evaluated by answering three questions:

1. **Where?**
   - Heat maps allow comparison of multiple LSOA areas
   - Users know the location(s) which they want to review charging demand in
   - Tool needs user-friendly ways for the user to navigate to locations (e.g. postcode, town name or address search)

2. **When?**
   - When (time of day) is important for assessment of additional loading compared to network capacity (and offering smart charging connections)
   - Transport model will predict each metric for each hour of the day at the LSOA level. User may have better estimates for demand at their site.
   - Also predicts all metrics across a long-term time horizon (2020 – 2050)

3. **How fast?**
   - Charging rate is essential for the connection application process and comparing the need for charging infrastructure with available network capacity
   - Transport model does not predict which type of chargers are required
   - Distribution for dwell time (hours) and energy required (kWh) can be used to estimate distribution for what proportion of charging events require different charging rates.

The transport part of ConnectMore should help the user answer these three questions (as in the table below) which in turn helps provide the information needed to make a connection request.
• The transport model does not predict which type of chargers (charging speed) are required.
• ConnectMore will include three types of charger: 7, 22 and 50kW.

• The distribution for dwell time (hours) and energy required (kWh) can be used to calculate the charging speed required.
• For example:
  1. A charge event with an energy requirement of 9kWh, and a dwell time of 3 hours could charge at 3kW and meet the requirement – a 7kW charger is sufficient in this case
  2. A charge event with an energy requirement of 40kWh, and a dwell time of 1 hour would need to charge at 40kW to meet the requirement – for this example a 50kW charger would be needed

• The distribution for each LSOA will be used to show what proportion of charge events are satisfied by which type of charger
  • In an LSOA where the majority of charge events require little energy, or dwell times are long (e.g. a residential area without off-street parking) 7kW chargers may satisfy the majority of charging requirements
  • Another LSOA where energy demands tend to higher, or dwell times shorter would need higher power chargers to satisfy the users needs.
Visualisation of Charging Speed Results

- The diagrams show an example of how the data from the previous slide could be visualised.
- Users could move between the three available charging speeds, with the shading indicating what proportion of charging sessions could be satisfied with each charging speed.

- LSOA 1 – 22kW or 50kW charging would be necessary to satisfy more than 50% of the charging sessions requirements for energy in the time available.
- LSOA 2 – 7kW is likely to be sufficient.
How to make data available?

- Three data views that could be presented by ConnectMore are shown here. Each would display slightly different data at different levels of granularity.

**Download pdf summary**
Can include multiple metrics and different quantities (e.g. all future years, or all scenarios) but needs to not be overwhelming. Potentially user configurable to select:
- Metric(s) to include
- Year(s)
- Scenario(s)
- Data time period

**View in ConnectMore – i.e. through heat map**
View can probably only show one number at a time, so need to allow user to select:
- Metric to view
- Year
- Scenario

**Download data table**
Most granular option – suitable for more detailed individual analysis. Potentially user configurable to select:
- Metric(s) to include
- Year(s)
- Scenario(s)
- More granular data for time periods – e.g. including the hourly totals

The focus group held with local authority/transport authority users of ConnectMore indicated that heat maps and data tables were their preferred means to access data.

*subject to commercial model*
The figure on the right shows an early representation of the overlay of the transport energy demand and the electricity network capacity ‘layer’ views.

The purple shading on each LSOA represents the energy demand for private cars travelling into each area. The location of primary substation groups are shown by a 1km diameter circle around the location. The shading of these circles show the available headroom.

In this example the graph indicates that there is greater available capacity to connect in Crewe and Knutsford than Sandbach for example.

The user of the ConnectMore will be able to pan across the region and zoom in and out of specific locations.

ConnectMore will show a much more detailed representation of network capacity – showing the LV network.

Figure: Heatmap of transport demand and electricity network capacity overlay.
Start Menu

Welcome to ConnectMore

How would you like to use the tool today?

- Transport/Heatmaps Service Link
- Connection Cost Estimator Station Link
- Retrieve a previous quote
- Find out about the tool
- FAQ link

A series of buttons to guide users to the relevant part of the tool depending on what they want to do (get information from the transport modes, look at network capacity, make a connection application, retrieve a previous quote, understand how the tool works or access the help pages).

Login page

H - refers the SP Energy Network's website header

Disclaimer for tool use - accuracy of results, how realistic are the tools? How realistic are the costs? (for tool use/data output)?

Login to SPEN CRM
Find out from SPEN what else is stored on Login when else would a user log in

Interface with SPEN CRM tool

Login
- Email:
- Password:
- Log in
- Forgot password?

Sign Up
- Name:
- Email:
- Password:
- Re-type password
- I agree to the Terms of Use
- Learn more
Connection Cost Estimator – Input form

1. Address for connection

2. Number of connections & sites
   - Charger type: Number
     - 7kW
     - 22kW
     - 50kW

3. Is additional capacity required?
   - Yes
   - No

Q1. Checks that the postcode in question is within SPEN’s licence area (and not EDRC) – display message containing info about what to do if postcode outside of SPEN’s area.

Q3. Checks that the needs cannot be met by service allocation – guide user through checks.

Connection Cost Estimator - Results page

View different options for connection (for those where flexible connections offered). Or for users with multiple locations.

Quote Ref: Q1234
Quote estimate: £ XX,XXX

Based on:
- 7kW: 1 charger
- 22kW: 1 charger
- 50kW: 2 chargers

Flexible: Yes

Next steps: web link

Full quote includes summary information & all options?
Where the network capacity is limited users would benefit with being presented with *smart charging connection* options which should reduce either their cost to connect or time to connect.

The acceptability of a smart charging connection will be influenced by the management of charging would adversely affect the end customers (the people charging) this in turn is dependent on a number of factors, such as:

- EV battery size,
- SOC of the EV battery,
- the distance (energy) required for the EV driver to get to their next destination with a charging point.

The information from the transport model is intended to assist users in assessing whether a smart charging connection is suitable in their area.
Incorporation of Smart Charging Connection in the Costing Estimation

- The data from SGS (information on schemes A to G can be found in the SGS deliverable) is processed to define a logic tree structure for the tool to use and to filter viable solutions for each connection request based on location and related network constraints and network apparatus (e.g. local/central controller).

- In order to assess whether a smart charging connection is able to meet the needs of the chargepoint while maintaining the network within thresholds the tool will take an estimated demand profile for the proposed site (without smart charging) and the network state from the DEBUT load flow results and calculate whether there is likely to be enough flexibility in the system to offer the client the requested capacity.

- In reality, the network demand around the connected charge point would be monitored in real time and, should this be approaching limits, the chargepoint hub would be asked to reduce its load. The algorithm used across connected charge points will be up to the chargepoint operator.

**Figure: Logic tree to filter viable solutions for given connection request**
Next Steps
Next Steps

- Agile development means cross-functional teams deliver multiple iterations of a product with new versions being delivered frequently.
- This work is organised into a ‘backlog’ that is prioritised based on business or customer value.
- The goal of each time-bounded iteration (or ‘sprint’) is to produce working code or a product increment which can be reviewed by stakeholders.

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</thead>
<tbody>
<tr>
<td>Milestone</td>
<td></td>
<td></td>
<td></td>
<td>LV Capacity Assessment</td>
<td></td>
<td></td>
<td>HV Capacity Assessment</td>
<td></td>
<td></td>
<td>Transport Model Integration</td>
</tr>
<tr>
<td>Sprint plan (subject to change)</td>
<td>Sprint 1</td>
<td>Sprint 2</td>
<td>Sprint 3</td>
<td>Sprint 4</td>
<td>Sprint 5</td>
<td>Sprint 6</td>
<td>Sprint 7</td>
<td>Sprint 8</td>
<td>Sprint 9</td>
<td>Sprint 10</td>
</tr>
</tbody>
</table>

*Figure: ConnectMore tool sprint timeline*
The ConnectMore deliverable milestones as they stand for the Charge project are shown on the timeline. ‘Staging release’ on the timeline refers to a Minimum Viable Product (MVP) which has sufficient features to deliver value to the users. The final, complete set of features is only designed and developed after considering feedback from the product's initial users.

The MVP will include:

- EV chargepoint connection budget estimator for MANWEB license area (including capacity assessment for meshed networks). Output will include options for smart charging connection.
- EV charging demand heatmap interface (PTV model information).
- Electricity network capacity heatmap interface.
• Appendix A: Stakeholder Workshop 1: User Profiles - materials and outputs
• Appendix B: Stakeholder Workshop 2: User Interface - materials and outputs
• Appendix C: Requirements Matrix [live document]
• Appendix D: Requirements Verification Workshop
Appendix A – User Profiles


• Appendix A2. Explain Market Research’s outputs from the workshop - https://eatl.sharepoint.com/:p:/s/ChargeProject/EZpCE1DBOS1Bvad116TrfPIB5RFkB3wEC8EWOVSHPsuw?e=pYgQ6c
  ➢ Appendix A2i. The 12 persona profiles determined at this workshop are reproduced on the following pages.
Chris James – Electrician & installer

Profile
• Chris is a 40 year old male, who is an electrical contractor with 20 years of experience
• Chris has worked his way up as an Apprentice to complete his degree
• Chris is married with children and is looking forward to his retirement
• Chris spends his time between the office and site visits
• He’s always connected to the internet and utilises digital tools a lot within his role
• Chris has an interest in EV charging but limited experience in this area at the moment

Goals & needs
Chris needs...
• A tool with a simple and clear interface across devices
• A tool that provides an instant yes/no indication for his customer
• A tool that provides accurate indicative costs
• A tool that allows him to input and search based on precise technical details, such as postcode and MPAN

Motivation
Chris would like...
• A tool that is customer driven and can support him to provide better customer service
• A tool that is up to date with reliable information that can be given directly to his customer
This is because as an electrician and installer, Chris needs to be able to work efficiently to provide better customer service

Pain points
Chris’ current pain points are...
• Not having access to accurate and up to date information for his customer
• Barriers to him providing speedy customer service

Use scenario
Chris would usually be...
• Using the tool to generate an output based on a client request
• Either on site with the client using his smartphone, or at the office using his laptop
• Always connected to the internet

Key quotes about ConnectMore
“I would use ConnectMore as a daily use tool”
“This better not be complicated”
“If it’s not accurate it’ll affect my bottom line”
Profile
• Dan is a 60 year old male, who is the owner of a multi-storey car park
• Dan doesn’t have a strong academic or educational background and has worked his way up through the company
• Dan is married with children
• Dan does not have any experience of EV charging

Goals & needs
Dan needs...
• A tool that is simple, with a toolbox format
• A tool that can provide budget estimations
• A tool that will educate on the connections process – with a clear guide and checklist
• A tool with images and videos to help understanding
• A tool that generates a quick response

Motivation
Dan would like...
• To understand the different types of chargers and connection points available
• To understand what demand this would have on the car park
• To be able to connect directly with developers to take this forward

This is because as a car park owner, Dan needs to install charge points, but first needs to understand demand and the types of charges needed

Pain points
Dan’s current pain points are...
• Local authority targets and quotas on the percentage of charge points needed
• The use of jargon
• Knowing where to find this tool

Use scenario
Dan would usually be...
• Using the tool as a one off for a specific project
• In the office on desktop computer

Key quotes about ConnectMore
“1 just want someone to tell me the answer”
Laura Khan – Motorway service stations

Goals & needs
Laura needs...
• A tool that will clearly identify capacity for connection
• The ability to forecast EV uptake to understand impact on future demand at motorway services
• A tool that can outline the options and impact for number and type of charge points
• A tool that can help her understand the ‘bigger picture’ of EVs and chargers, including smart solutions
• Outputs that can be exported and printed

Motivation
Laura would like...
• To be able to look at different scenarios within one interaction
• To have an understanding of the costs relating to these different scenarios
This is because as a motorway service station planner, Laura needs to be able to look at scenarios and costs to inform business decisions

Pain points
Laura’s current pain points are...
• Understanding the implications of different scenarios and factors
• Complex language and information
• Understand how the process works as a whole

Use scenario
Laura would usually be...
• Trying out different scenarios to understand how many charge points may be needed and what type
• Assessing from the office desktop computer

Key quotes about ConnectMore
“I need the knowledge to build a business case”
“I'm not an electrician”
“What are my options here?”
**Profile**

- Chris is a 58 year old female, who is an active member of her village community group.
- Chris is married with older children.
- Chris is degree educated with a professional background in accounting.
- Chris currently works part time and volunteers in the local community in her spare time.
- She is eco-conscious and has an aspiration for her village to be carbon-neutral.
- Chris enjoys the outdoors and walks with her dog.
- Chris has an amateur interest in EV charging and connections; her son has an EV and she has taken responsibility for researching EVs on behalf of a rural community group.
- She is comfortable using the internet for shopping and information finding.

**Goals & needs**

Chris needs...

- A tool with a simple interface with non-technical language – ‘non-professional’ option to simplify.
- To be able to get an answer with limited data.
- To be able to access clear and up to date data for her rural area.
- A tutorial guide and videos.
- To be able to understand what capacity and options are available in her area.
- To be able to access outputs that are downloadable/available offline.

**Motivation**

Chris would like...

- To drive her village towards its carbon-neutral goal.
- To be able to understand the options available in the rural area; charge point options, costs, charge time.
- To be able to gather information to support grant applications.

This is because as a community group representative, Chris needs to understand what might work for the rural area, and have the right evidence to apply for community grants to take this forward.

**Pain points**

Chris’ current pain points are...

- Feeling she doesn’t know where to start.
- Getting explanations in layman’s terms.
- Finding recommendations how to proceed.
- Being charged to access this information.

**Use scenario**

Chris would usually be...

- Finding the tool via a Google search for ‘Can I have a charge point?’
- Accessing at home from her laptop or tablet.
- Connect to home broadband.

**Key quotes about ConnectMore**

- “Can I have a charge point?”
- “How can I find out more about community charging schemes?”
- “I want it to be quick and easy to use”
- “I didn’t realise it was all going to be so complicated!”
Cybil Knight – Hotel owner

Profile

• Cybil is a 54 year old female, who owns and runs a hotel with her husband in rural Wales
• The hotel also has spa and gym facilities
• Cybil left education at the age of 18 and has worked in the hospitality industry since
• Cybil has very little spare time, but enjoys relaxing with a gin when she can
• Cybil is comfortable with IT day to day; designing promotion materials, completing hotel admin and advertising on social media

Goals & needs

Cybil needs...

• Clear guidance to allow her to approach an installer with a basic understanding of the options available
• Non-technical language and a glossary of terms
• Outputs shown visually with traffic light colouring
• An explanation of options and associated costs, with relevant caveats and warnings
• The ability to view options based on a budget
• To understand if EVs would benefit the hotel and if she would need to charge for the service
• To contact information for any additional queries
• An autosave function

Motivation

Cybil would like...

• To attract more visitors to the hotel and remain competitive
• To understand what is feasible for the hotel
• To understand the ballpark cost to take this forward

This is because as a hotel owner, Cybil wants to attract customers and meet their changing needs, but needs to be sure her investments will pay off

Pain points

Cybil’s current pain points are...

• Locating the tool online
• Not having technical knowledge and feeling overwhelmed by too much information
• Not having experience with this type of tool before and lacking confidence as a result
• Having the time to input data required
• Having to pay to access the tool

Use scenario

Cybil would usually be...

• Accessing the tool on her tablet computer with broadband connection
• Using the tool for one specific project
• Looking to understand basic options and costs

Key quotes about ConnectMore

“Will it be too complicated for me?”

“Will I get more people visiting the hotel if I install a charger?”

“Is it what my installer needs? Will it help us speak the same language?”
Dave Ward – Housing association – Sustainability officer

Profile
- Dave is a 45 year old male, who holds the position of Sustainability Officer for a large housing association.
- Dave is degree educated and has spent most of his career working for the housing association.
- He’s worked in sustainability related roles for the last seven years.
- Dave is divorced and enjoys cycling in his spare time.
- Dave also works part time as a DJ.
- He has non-technical knowledge of EVs and Connections.

Goals & needs
Dave needs...
- To be able to produce key deliverables from the tool; summary reports with maps and support data.
- Plenty of evidence to support recommendations for location options, such as network availability, costs and timescales.
- To be able to export digitally and print outputs.
- To be able to save his report or quote.

Motivation
Dave would like...
- To be able to see long-term forecasts for capacity and need across locations.
- To improve current developments based upon customer demand.
- To plan for future developments.
- To meet housing sector standards and requirements.
- To understand the options and costs quickly.
- To support the move for internal fleet of maintenance vans to go electric.

This is because as a Sustainability Officer, Dave wants to ensure future planning supports customer needs, and he must be able to evidence this to his superiors.

Pain points
Dave’s current pain points are...
- Understanding if connections would work across brownfield and greenfield sites.
- Accessing up to date information at all times that works with a rolling budget.
- Accessing maps with high level of detail needed.
- Inputting future developments into tool to understand impact; new sites, number of houses, predicted load, new roads etc.

Use scenario
Dave would usually be...
- In the office on his desktop, with the latest version of Windows.
- Accessing the tool regularly for different scenario testing.
- Downloading and printing outputs for use on-site.

Key quotes about ConnectMore

“IT needs to make my job easier”

“It needs to be up-to-date”

“It would be an asset to our business”
Anna Castillo – Leisure place owner

Profile

• Anna is a 45 year old female who is the owner of a leisure place
• She has an entrepreneurial background and a BMA
• She has worked in a number of organisations across different sectors, with a focus on maximising profit
• Anna does not have any technical background or experience
• She is married with young children, and is looking to build up a nest egg for the future
• With a young family Anna is particularly focused on health and wellbeing, and enjoys travelling and experiencing culture with her family
• She’s ambitious and looking to maximise her role, which means she is open to change and flexible in her business approach

Goals & needs

Anna needs...

• A yes or no answer as to whether she can connect and charge EVs on her premises
• Information that’s represented visually and clearly
• No technical jargon

Motivation

Anna would like...

• A tool that provides easy to understand outputs for the non-technical
• Outputs that are visual and to the point
• Outputs that give a cost indication for connections
• A tool that provides guidance on suppliers and operations to take connections forward

This is because as a leisure place owner, Anna needs to maximise profit whilst investing in new technology to meet evolving customer needs

Pain points

Anna’s current pain points are...

• Not having the time to fill in a lengthy form
• Understanding technical jargon
• Determining the costs vs benefit to her business
• Understanding the overall process and next steps

Use scenario

Anna would usually be...

• Doing an initial sense check/test run on her smartphone while out and about
• Using the tool in full in the office on her company laptop
• Wireless internet – limited signal

Key quotes about ConnectMore

“This is more complicated than I thought”

“I can’t believe how many options there are”
Brian Roberts – Parish/town council

Profile

• Brian is a 65 year old male, who has been Chairman of the Council since his early retirement
• Starting his career as an apprentice, Brian worked his way up to Senior Manager prior to retirement
• Brian is married with two older children who are at university, he still supports them financially
• Brian has technical experience built up across his career; however he isn’t up to date with new technology
• Brian has a passion for serving his community, and keeps himself busy with community service and public events
• He keeps up on current affairs through the local printed newspaper
• Brian is also passionate about the environment, with an interest in climate change and renewables

Goals & needs

Brian needs...
• Outputs that include high level cost and risk implications
• A tool that helps him understand the risk and benefits of EV connections in his locality

Motivation

Brian would like...
• A tool that provides an initial yes/no indication of capacity in the local area
• A tool that also provides wider information on the EV initiative and wider impact
• A tool that presents outputs visually and in a printable format

This is because as a Council chairman, Brian must listen to the interests of his community and be able to evidence to council members any risks or benefits

Pain points

Brian’s current pain points are...
• Not having the knowledge to fill out complex forms or understand technical jargon
• Waiting for the council clerk to report on the system outputs
• Being wary of the ‘myths’ relating to EVs and charge points
• Convincing other council members of the benefit of EVs in the community

Use scenario

Brian would usually be...
• Working from home on his smartphone to do an initial assessment
• Sending the link through to his clerk to use in the office via desktop
• Connected to private Wi-Fi

Key quotes about ConnectMore

“We need one of those, they’ve got one, we want one”

“Let’s get the clerk to do this”
Richy Rich – Charging Network Operator

Profile
- Richy is a 42 year old male, who is in a short-term role as charging network operator
- Richy is divorced without children
- Richy has a Masters in Business and Marketing and refers to himself as a ‘professional entrepreneur’
- Richy is a forward thinker and often changes his job to follow new technologies and innovation
- Making money is Richy’s primary motivator, so he can enjoy regular holidays to the Maldives
- Richy spends his weekends socialising at parties
- Richy is also a sports car enthusiast and has recently purchased the new Tesla model

Goals & needs
Richy needs...
- Information that is focused and clear
- Accurate cost indications
- To be able to search multiple locations at one time
- Answers in less than five minutes

Motivation
Richy would like...
- A tool that provides instant answers to support client proposals and ensure return on investments
- A tool that can support him bringing his product to market
- A tool that can help him identify key areas of footfall for future projects

This is because as a charging network operator, Richy needs to be able to see quickly what options are available to ensure return on investment

Pain points
Richy’s current pain points are...
- Not having information to hand ‘in the moment’ during client meetings
- Reading through detailed and technical information to determine return on investment
- Basing client proposals on information that is misleading or not kept up to date
- Paying more to get accurate and up to date information

Use scenario
Richy would usually be...
- In the office on his Mac costing up a proposal for a client, or on his iPhone in a face to face client meeting
- Accessing the system quickly to get an immediate response
- Always connected to the internet

Key quotes about ConnectMore

“I managed to cost that site in less than five minutes”

“I need clear information for my business case”
Profile

- John is a 42 year old male, who is the Transport and Spatial Planning Manager for the Local Authority.
- John has a degree in Geography.
- He has worked for his current Local Authority for 10 years, previously holding a similar position in another Local Authority for 10 years.
- John works full time, but has flexible working – with two days on the road/working from home, and three days based in the office.
- John is a family man with two children and a dog.
- He drives a diesel car.
- John enjoys dog walking, football and Formula One.
- John has some knowledge of the principles of EVs, but not in relation to the technical aspects.

Goals & needs

John needs...
- To be able to view the best locations and capacity in the area.
- The option to export information directly from the tool that can be placed straight into his planning applications.

Motivation

John would like...
- To access information to support internal planning applications for specific projects and locations.
- A tool that has similar functionality to other systems he's familiar with, such as traffic models.
- The functionality to change the map view and overlay external maps.
This is because as a Transport and Spatial Planning Manager, John needs the tool to support his internal planning applications, to ensure projects are based in the best locations with the right capacity.

Pain points

John’s current pain points are...
- Having to pay to access the tool.
- Knowing that the tool has the most up to date information.
- The compatibility of the tool with existing systems.

Use scenario

John would usually be...
- Using his work laptop with Windows 8.
- Using Chrome or Internet Explorer.
- Connected to home or office internet.
- Hooked up to the Local Authority system at all times – with restricted access remotely.
- Submitting an application to be able to download any software or plug-ins.

Key quotes about ConnectMore

- “Is there a cost?”
- “How does it link to my software?”
- “My computer’s a bit old, will it still work?”
Sian Evans – Development Surveyor

Profile
- Sian is a 35 year old female, who is a Development Surveyor in a medium-sized organisation for a commercial housing provider
- Sian has been in her current role for five years
- She has been chartered for two years and is looking to move into a managerial role
- Sian is often out on-site, but also works from the office, with one day working from home
- In her free time, Sian enjoys running, Zumba and cycling

Goals & needs
Sian needs...
- Evidence for the feasibility of new schemes
- An indication of related costs
- A tool that can support her in producing feasibility reports – with costs and risk assessments
- The ability to work offline and download documents

Motivation
Sian would like...
- To access information that will support her planning applications
- To be able to carry out a cost benefit analysis based on the information
- To understand if a lower voltage connection will reduce costs
This is because as a Development Surveyor, Sian needs the whole picture to gauge what type of EV chargers would be best for the site based on current plans and infrastructure, without large cost implications

Use scenario
Sian would usually be...
- Using the tool for more than one project
- Working to a Local Authority directive
- Accessing the tool on-site in different locations
- Using work devices such as Android smart phone, laptop with Windows 8 or iPad tablet computer
- Devices will be around three years behind latest model

Pain points
Sian’s current pain points are...
- The costs of connections across projects
- Outputs that state ‘no demand’ as this isn’t helpful
- Limited internet connection or signal from remote sites

Key quotes about ConnectMore
- "Is it available in Welsh?"
- "Why does it cost so much?"
- "I need data for my feasibility study"
Paul Jones – Regional Transport Manager

Profile

• Paul is a 47 year old male, who is a Regional Transport Manager
• Paul started as an apprentice and has worked his way up through six to seven different roles – with around five to six years in each role
• He has gained all his experience ‘on the job’ with mainly operational practice
• Paul is now less ‘tech savvy’ as he manages a team who complete the technical work on his behalf
• Paul is office based, with network meetings once a week in different regions
• Paul is single and in his spare time enjoys trips to the pub and rambling
• He is also interested in model railways, music and real ale

Goals & needs

Paul needs...

• A tool that is simple to use
• A tool that provides outputs for costs and viability, to understand level of risk
• Imagery to input directly into planning applications
• To see demand scenarios and forecasting for what is currently available and what would be required in the future
• The functionality for GIS overlay
• The option to export and print out outputs – both high level and detailed information

Motivation

Paul would like...

• A tool that will enable his team to access detailed information, but with a one page summary output for him to review
• A tool that can provide the information needs to support planning applications

This is because as a Regional Transport Manager, Paul needs to review the community benefits of EVs, whilst ensuring future proofing and the meeting of government standards

Pain points

Paul’s current pain points are...

• Being constrained to locations adjacent to transport infrastructure, such as stations and railway lines
• The cost of connections and charge points

Use scenario

Paul would usually be...

• Accessing the tool from his office on his laptop, with good internet access
• Using Windows 8

Key quotes about ConnectMore

“Who in my team can use this?”

“My locations are fixed, the network has to come to me”
Appendix B – Stakeholder workshop materials

• Appendix B1. The presentation shown at the workshop
  https://eatl.sharepoint.com/:b:/s/ChargeProject/ERrETH-HbAFOq0mMjeH7tZYBtKXyaTeeI7ksU2_C8GnhIA?e=mSA77L

• Appendix B2. Explain Market Research’s output summary
  https://eatl.sharepoint.com/:p:/s/ChargeProject/EXFNRyowM9dIp97niCiCm9EBijoG0F05d36iO4rX4pgi7w?e=JWOpab
  ➢ Appendix B2i. The extended persona profiles are reproduced in this document.
  ➢ Appendix B2ii. The user interface workshops are reproduced in this document.
**Dan Sprake – Car park owner**

### Goals and Needs

Dan needs...

- A tool that is simple, with a toolbox format
- A tool that can provide budget estimations
- A tool that will educate on the connections process – with a clear guide and checklist
- A tool with images and videos to help understanding
- A tool that generates a quick response

### Pain points

Dan’s current pain points are...

- Local authority targets and quotas on the percentage of charge points needed
- The use of jargon
- Knowing where to find this tool

### Inputs and Outputs

**What inputs are needed?**

- Postcode
- How many chargers
- Type of charge needed

**How could they be entered?**

- Keyboard
- Drop down menu

**What outputs are necessary?**

- Is it possible?
- Cost and benefits (carbon and financial)

**How could these be displayed?**

- Forecast risk metric updated regularly
- What to do next? £6 contractors would pay for leads, handover to contractors

### User Story

**Card**

As a car park owner

I want/need to know if I can fit EV chargers and how much it will cost

So that I will know if it’s worth fitting them

**Conversation**

Keep it simple

**Confirmation**

Can I see how many people have them installed (from previous users of the system to prove tool)

Can it...
Goals and Needs
Sian needs...
• Evidence for the feasibility of new schemes
• An indication of related costs
• A tool that can support her in producing feasibility reports – with costs and risk assessments
• The ability to work offline and download documents

Pain points
Sian’s current pain points are...
• The costs of connections across projects
• Outputs that state ‘no demand’ as this isn’t helpful
• Limited internet connection or signal from remote sites

Inputs and Outputs
What inputs are needed?
— Number of housing units
— Assessment of number of vehicles on site
— Total energy load
— Extra costs for EV charge, location, type of property (exec/social etc)

How could they be entered?
— Populate simple tabular information
— Grid reference of polygon on map software
— Touch screen entry to map software
— Radar button with correct wording

What outputs are necessary?
— Cost of connection
— Regular updates of costs estimates
— What type of charging is needed
— Timescale and complexity
— Radar button
— Size of electric sub needed

How could these be displayed?
— Cost per unit/per acre

User Story
Card
As a Development Surveyor
I want/need cost information and barriers to connection that is updated over time
So that calculate development appraisal profiles for sites and projects

Conversation
Scope for sensitivity analysis between various sites

Confirmation
Can I clear costs and timescales for new site provision
Can it provide comparison data between sites and price change over time, provide cost changes if local battery storage or other technologies are installed, enable me to sign up for connection approval process?
John Smith - Local Authority – Transport and spatial planning

Goals and Needs

John needs:

• To be able to view the best locations and capacity in the area – localised scenario planning
• The option to export information directly from the tool that can be placed straight into his planning applications
• Land ownership data
• Demand capacity

Pain points

John’s current pain points are:

• Having to pay to access the tool
• Knowing that the tool has the most up to date information
• The compatibility of the tool with existing systems
• Understanding non-charging energy demand
• Programme coordination

Inputs and Outputs

What inputs are needed?

— Other GIS lawyers – household info (address), upload a ‘layer’ for key scenarios
— Batch files multiple sites
— Needs existing connection registrations already built in (MPAN)

How could they be entered?

— UPRN – google style, polygon and specific area (set road)
— Tick on/off on infrastructure/capacity options
— EV registration by postcode
— 5,10,15 year forecast on demand
— What infrastructure is needed to support

What outputs are necessary?

— Report which SLA are attracting most interest (requests, queries)
— Individual site specific and wider polygon
— Outline assumptions on charging behaviour
— DVLA info

How could these be displayed?

— Report – tick SLA of interest (last 12 month queries)
— Spatial map info
— Recommendations on levels/volumes
— Additional request for SPEN reporting
— Understand alternatives – tool to ‘flag’ options e.g. if no grid capacity, exportable as layer to add into other GIS

User Story

Card

As a local authority
I want/need to forecast demand
So that I can set the correct level of investment, for strategy

Conversation

Future proofing, in advance and down the line, what types of chargers are appropriate at different levels/volumes

Confirmation

Can I input batch files for multiple sites
Can it be readily incepted by other colleagues, accessible
Goals and Needs
Chris needs:
• A tool with a simple interface with non-technical language – ‘non-professional’ option to simplify
• To be able to get an answer with limited data
• To be able to access clear and up to date data for her rural area
• A tutorial guide and videos
• To be able to understand what capacity and options are available in her area
• To be able to access outputs that are downloadable/ available offline

Pain points
Chris’ current pain points are:
• Feeling she doesn’t know where to start
• Getting explanations in layman’s terms
• Finding recommendations how to proceed
• Being charged to access this information

Inputs and Outputs
What inputs are needed?
— Budget range available
— Postcode and/or specific address
— Charge point type

How could they be entered?
— Pinpoint on a map, charge point type
— Drop down options
— Non-jargon ‘help’ options

What outputs are necessary?
— Visibility of existing chargers
— Available network capacity

How could these be displayed?
— Visibility – mapped (link to zap map?)
— Network capacity (heatmap)

User Story
Card
As a village community member
I want/need to install EV charging points
So that visitors and residents without off-street parking can charge their cars

Conversation
Link to zap map

Confirmation
Can I understand if and where I can install EV chargers at appropriate cost
Can it give me up to date and accurate information
If too costly/not feasible at current time, need a way to register for future alerts if circumstances change, chat facility of help, charge perimeters automated to find a more feasible site
Goals and Needs
Chris needs...
• A tool with a simple and clear interface across devices
• A tool that provides an instant yes/no indication for his customer
• A tool that provides accurate indicative costs
• A tool that allows him to input and search based on precise technical details, such as postcode and MPAN

Pain points
Chris’ current pain points are...
• Not having access to accurate and up to date information for his customer
• Barriers to him providing speedy customer service

Inputs and Outputs
What inputs are needed?
— Numbers of charge points needed
— Maximum rating of units
— Existing sight capacity
— New capacity needed

How could they be entered?
— Address
— MPAN

What outputs are necessary?
— Cost for upgrade of service
— Budgetary quotation

How could these be displayed?

User Story
Card
As a Installer
I want/need a budget quote
So that I can quote accurately to the customer

Conversation
Need transparency of capacity, can I have more capacity for only small additional cost to futureproof the site?

Confirmation
Can I firmly quote from the information provided
Can it
Richy Rich – Charging network operator

Goals and Needs
Richy needs...
• Information that is focused and clear
• Accurate cost indications
• To be able to search multiple locations at one time
• Answers in less than five minutes

Pain points
Richy’s current pain points are...
• Not having information to hand ‘in the moment’ during client meetings
• Reading through detailed and technical information to determine return on investment
• Basing client proposals on information that is misleading or not kept up to date
• Paying more to get accurate and up to date information

Inputs and Outputs
What inputs are needed?
— 1 charger and x options for location (multiple chargers and locations)
— Potential flexibility, other local flexibility
— Guest usage (create account after you have done some work), seasonality
— When will charge and for how long
— Other transport plan impact

How could they be entered?
— Plot on a map
— Drop down menu
— Overview (zoom in and out)
— Detailed information per charge

What outputs are necessary?
— Cost (breakdown) for chargers in each region
— Options for flexibility

How could these be displayed?
— Layers
— Interact with council planning portal
— Record wish list and generation storage
— If it’s too expensive record capacity

User Story
Card
As a Charging network operator
I want/need to be able to plan for a specific charge point, look at region and see where usage and cost are low and then drill seamlessly to the specify charge point and add additional information and go out
So that I can see the cost of insulation and predicted use. User registration is painless. I can save and come back later to populate, using rough locations for each one

Confirmation
Can I save work, refresh data fast, record wish list, seamlessly go to high quality to low quality detail, I can view/test a single charge point for cost and demand with options to adjust and save.

Can it add data for flexibility, add data on transport constraint, demand 48, weekly, seasonal patterns. Nature of constraint, conditions for flexibility. View data at different granularity (24 hour, 48 hour, weekday, weekend, weekly, monthly)
Brian Roberts – Parish/town council

**Goals and Needs**
Brian needs...
- Outputs that include high level cost and risk implications
- A tool that helps him understand the risk and benefits of EV connections in his locality

**Pain points**
Brian’s current pain points are...
- Not having the knowledge to fill out complex forms or understand technical jargon
- Waiting for the council clerk to report on the system outputs
- Being wary of the ‘myths’ relating to EVs and charge points
- Convincing other council members of the benefit of EVs in the community

**Inputs and Outputs**

**What inputs are needed?**
- Location (fixed or now/broader)
- Number of cars/EV’s
- Dwell time
- Budget

**How could they be entered?**
- Postcode (click a map, draw a polygon or GPS)
- Fixed number for range

**What outputs are necessary?**
- Yes/no – can we connect
- Then a cost/cost breakdown of options/solutions
- Recommended type and rating/number of chargers
- Timescales for development
- Risks and benefits of EV’s, snapshot in time warnings/high interest
- Links to how to get a formal connections quote

**How could these be displayed?**
- Prioritise cheapest option but display alternatives
- Export to printable PDF (with button) with clear outputs and summaries, jargon reference section

**User Story**

**Card**
As a council chairman
I **want/need** an easy to use tool with clear outputs and little previous knowledge required
So that I can convince other councillors of the benefits of EV’s

**Conversation**
Provide useful information and links; clear readable outputs for helping business case

**Confirmation**
Can I understand the inputs/outputs and get a straightforward answer
Can it be as precise and easy to use as possible, find it in a Google search
<table>
<thead>
<tr>
<th>Network mapping</th>
<th>Transport mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positives</strong></td>
<td><strong>Positives</strong></td>
</tr>
<tr>
<td>— Lots of detail, almost too much detail</td>
<td>— Future scenario of growth of EVs</td>
</tr>
<tr>
<td>— Have to keep digging – want an indication earlier on</td>
<td>— Time spent at location – dictate the speed of a charger</td>
</tr>
<tr>
<td>— Does it take into account future developments already planned</td>
<td>— How accurate are future predications?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Negatives</strong></th>
<th><strong>Negatives</strong></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th><strong>Improvements</strong></th>
<th><strong>Improvements</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>— How accurate is the guide cost?</td>
<td>— Show ‘sensitivity’ for future scenarios</td>
</tr>
<tr>
<td>— Distance travelled</td>
<td>— Distance travelled</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Key Points</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>What should be avoided?</strong></td>
</tr>
<tr>
<td>— Too much information – immediately switch off</td>
</tr>
</tbody>
</table>

| **What could cause confusion?** |
| — Keep it simple |
| — Intuitive functionality |
| — Apps/familiar interface |

<table>
<thead>
<tr>
<th><strong>What works well?</strong></th>
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<tr>
<td>— Keep it simple</td>
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Sian Evans – Development Surveyor

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<tr>
<td>—Lots of detail</td>
<td>—Compare different sites</td>
</tr>
<tr>
<td>—Understand where can be developed for planning</td>
<td>—More relevant for brownfield sites</td>
</tr>
<tr>
<td><strong>Negatives</strong></td>
<td><strong>Negatives</strong></td>
</tr>
<tr>
<td>—Have to keep digging – want an indication earlier on</td>
<td>—Less relevant to persona – go where client site dictates</td>
</tr>
<tr>
<td>—Does it take into account future developments already planned</td>
<td>—Does it let you see enough detail?</td>
</tr>
<tr>
<td>—Almost too much detail</td>
<td></td>
</tr>
</tbody>
</table>

**Improvements**

—Quicker being able to interpret the data (narrowing it down to what is relevant to you)
—Quicker visual of feasibility
—An app for a ‘quick look’ at options
—Option for ‘quick response’ or detailed response
—Note: better for small users

—Look at impact of developing new sites on EV flow
—Sensitivity studies for the future
—Does it include lorries and busses?
—Are vehicle to grid (v2g) taken into account?
—Can you see how closely post ‘future’ scenarios
—Ability to plot indicated sites
—Indication of time spent at locations during travel

**Key Points**

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<tr>
<td>—Too much information –more than a lot of users need</td>
<td>—Need a level of technical expertise to work</td>
<td>—Need right balance of data detail</td>
</tr>
<tr>
<td>—People will lose trust if it is not accurate/doesn’t work</td>
<td>—Concern over accuracy of predictions – does it include all load types?</td>
<td>—Zooming/scrolling</td>
</tr>
<tr>
<td></td>
<td>—Long term future is very important for this audience</td>
<td>—User friendly, interactive</td>
</tr>
</tbody>
</table>

—Good to be able to draw a plot and then view lots of different scenarios at a click (trends over different periods of time).
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<tbody>
<tr>
<td>Traffic light</td>
<td>What are the prior assumptions?</td>
<td>Overlap, GIS, aggregated</td>
<td>3D not necessary</td>
</tr>
<tr>
<td>Breakdown of cost options</td>
<td></td>
<td></td>
<td>Not as easy to interpret</td>
</tr>
<tr>
<td>Influence scenario</td>
<td></td>
<td></td>
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<th></th>
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<tbody>
<tr>
<td>See detail on assumptions made in tool – see how can influence red/amber/green</td>
<td></td>
<td>Scenario forecasting – additional layer</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Output results</td>
<td></td>
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</tbody>
</table>

| Key Points                    |                                               |                                               |                                               |
| What should be avoided?       |                                               |                                               |                                               |
| Over simplifications          |                                               |                                               |                                               |
| Over complications            |                                               |                                               |                                               |

---

| What could cause confusion?   |                                               |                                               |
| Assumptions without understanding behind it |                                               |                                               |
| Understanding on street/off street options |                                               |                                               |

<p>| What works well?              |                                               |                                               |
| Pre-formatted menu – option for level of detail |                                               |                                               |
| Turning options on/off for scenarios |                                               |                                               |
| Easy costing – breakdown options |                                               |                                               |
| Domestic vs non-domestic breakdown |                                               |                                               |
| Being able to manipulate assumptions/scenarios |                                               |                                               |
| Importing data                |                                               |                                               |</p>
<table>
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<th>Chris James – Electrician &amp; installer</th>
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<td>— NPG mapping backdrop much better</td>
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<tr>
<td>— Give other options which could impact/reduce costs – change inputs easily to see difference/impact</td>
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<tr>
<td>— Need assurance of the quote in order to confirm costs to a customer (consider profit margin for installer)</td>
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<tr>
<td>— What is included and what is not?</td>
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<td>— Give other options which could impact/reduce costs – change inputs easily to see difference/impact</td>
</tr>
<tr>
<td>— Need assurance of the quote in order to confirm costs to a customer (consider profit margin for installer)</td>
</tr>
<tr>
<td><strong>Key Points</strong></td>
</tr>
<tr>
<td><strong>What should be avoided?</strong></td>
</tr>
<tr>
<td><strong>What could cause confusion?</strong></td>
</tr>
<tr>
<td></td>
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<tr>
<td>Richy Rich – Charging network operator</td>
</tr>
<tr>
<td>----------------------------------------</td>
</tr>
<tr>
<td><strong>Network mapping</strong></td>
</tr>
<tr>
<td><strong>Positives</strong></td>
</tr>
<tr>
<td>— Easy plotting</td>
</tr>
<tr>
<td>— Familiar</td>
</tr>
<tr>
<td><strong>Negatives</strong></td>
</tr>
<tr>
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</tbody>
</table>

**Key Points**

<table>
<thead>
<tr>
<th><strong>What should be avoided?</strong></th>
<th><strong>What could cause confusion?</strong></th>
<th><strong>What works well?</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>— Must have clear statement on colour use and meaning</td>
<td>— Different date ages</td>
<td>— Plotting</td>
</tr>
<tr>
<td></td>
<td>— Explanation of transport model and loadflow calculation</td>
<td>— Legend</td>
</tr>
<tr>
<td></td>
<td></td>
<td>— Information input other information by menus</td>
</tr>
</tbody>
</table>
### Network mapping

<table>
<thead>
<tr>
<th>Positives</th>
<th>Negatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy to use</td>
<td>Auto-download PDF</td>
</tr>
<tr>
<td>Simple map background</td>
<td>Easy to draw through invalid ground</td>
</tr>
<tr>
<td>Quick results</td>
<td>Aspect ratio problem on small screens on NAT</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Improvements</th>
</tr>
</thead>
<tbody>
<tr>
<td>—Option to download PDF</td>
</tr>
<tr>
<td>—Block invalid ground types e.g. houses</td>
</tr>
<tr>
<td>—Save results to login (i.e. editable and can return to)</td>
</tr>
<tr>
<td>—Must be friendly to all screen sizes including phones</td>
</tr>
</tbody>
</table>

### Transport mapping

<table>
<thead>
<tr>
<th>Positives</th>
<th>Negatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Future scenarios</td>
<td>—Too many layers</td>
</tr>
<tr>
<td>—Colour coded zonal view</td>
<td>—Lots of data and views – too many for a laymen</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Improvements</th>
</tr>
</thead>
<tbody>
<tr>
<td>—Option to view more detail if techy user – needs to be simpler for laymen</td>
</tr>
</tbody>
</table>

### Key Points

#### What should be avoided?
- Barrage of information automatically
- Complicated/slow to use, too many initial options
- Jargon
- Too many output options/scenarios

#### What could cause confusion?
- Colours – too many or colour blind confusion, want something intuitive not use of legends
- Out of date networks/data/results

#### What works well?
- Popups/hover for more info
- Simple maps, clear intuitive interface
- Saving results
- Works on many platforms
Appendix C – Requirements Matrix

• Please see accompanying spreadsheet for full list of Functional and Non-Functional Requirements
Workshop slideshow (emailed to stakeholders)