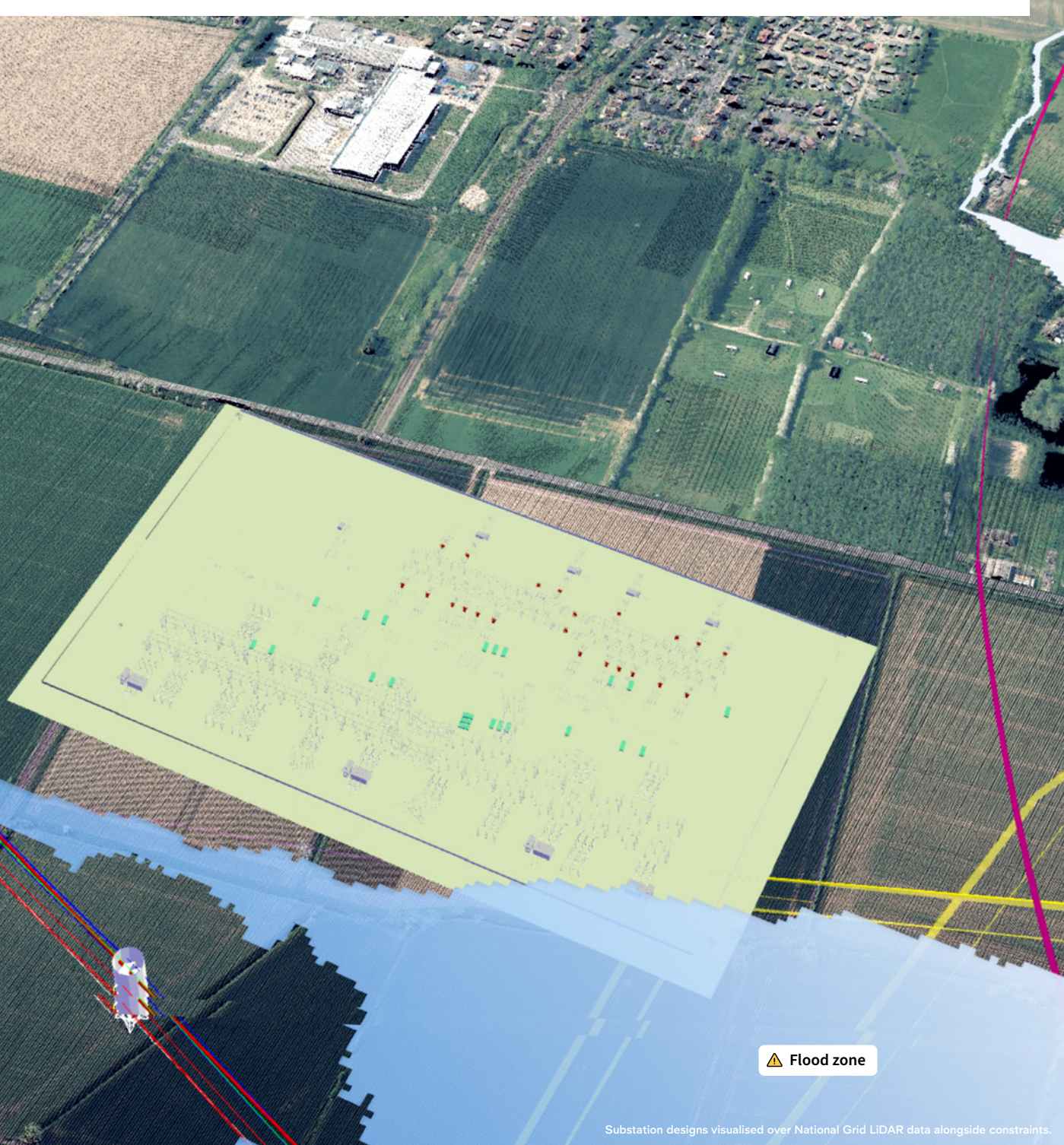


National Grid rules out inaccessible options earlier during siting study

Connections teams leverage Sensat's visualisation platform to support virtual siting studies and option selection for substation upgrades.



Substation designs visualised over National Grid LiDAR data alongside constraints.

Introduction

National Grid Energy Transmission need to conduct a siting study for a new UK-based substation in Navenby, Lincolnshire. The project team faces tight delivery deadlines and has a large study area to assess for siting and optioneering.

In search of enhanced efficiency, teams are exploring new methods to understand how the proposed designs would affect the surrounding area to arrive at the best option faster. Looking for an innovative solution, the Transmission Owner partnered with Sensat.

Industry

Energy

Location

Navenby, Lincolnshire, UK

Front-end loading Sensat's web-based platform with important data, the Transmission Owner has visualised an interactive 2D and 3D environment of the study area, its immediate real-world surroundings and constraints. Using this, teams collaboratively assess designs in context from their desktops.

We went from five options down to two clear frontrunners in a single meeting using the contextual data made available by Sensat. We could identify the hazards and constraints very quickly.

Matthew Doherty, Connections Engineer at National Grid

Challenges faced by National Grid Connection teams:



1. I want to get more value from the data that we already possess.



2. I need to rule out inaccessible options earlier so I can focus our time on the viable options.



3. It's a challenge turning technical problems into a common language for non-technical stakeholders to understand.

Challenge 1

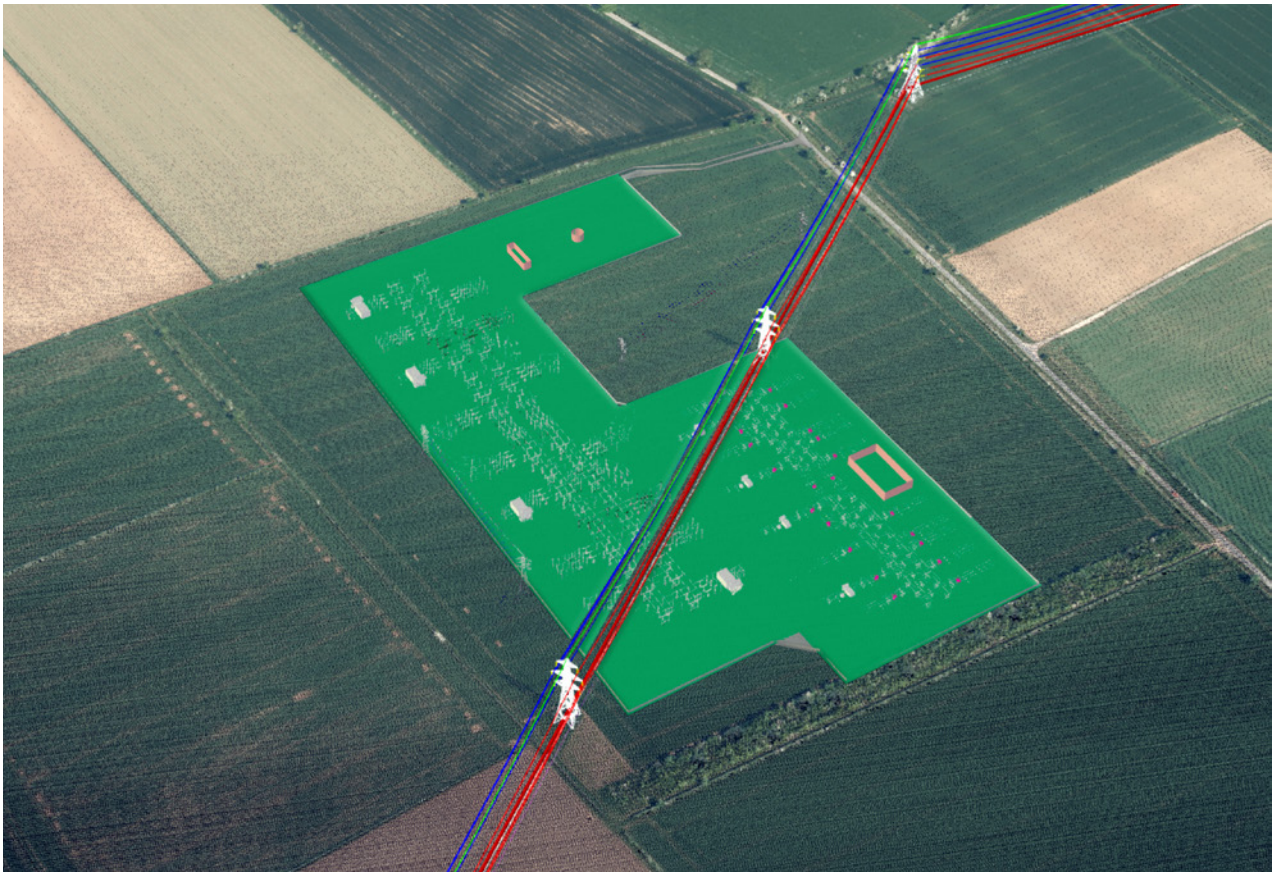


I want to get more value from the data that we already possess

National Grid has vast amounts of information available to support their projects. However, this information is

- Stored in different platforms which require specific licensing.
- Held in various formats, including PDFs and on paper maps.
- Managed by other teams.

On top of that, the team possesses excellent LiDAR data but struggles to access and view it. In response, the Connection teams sought a solution to open access to their information earlier to meet their deadlines.



Above Substation design and routing option visualised over National Grid LiDAR data set.

Solution

Easily understand how site constraints affect your options

The forward-thinking Transmission Owner is front-end loading Sensat's platform with important information to unlock the value of previously hard-to-access information. This includes constraint data, designs, and the reality LiDAR data.



In an options selection meeting the team

Eliminated 3 options in 25 minutes

which would normally take 2.5 hours

Sensat's single platform enables teams to visualise and access all of their helpful 2D and 3D data in the context of reality. By visualising these data sets together, teams can bridge understandings of previously disparate data sets earlier on in the process. Instead of overhauling existing software, users from different teams can complement their systems thanks to Sensat's extensive file type acceptance.

Using Sensat, National Grid is getting more value and usage from the data sets that they already have.

This complete project view informs decision-making during siting studies, highlighting constraints that wouldn't be visible during a site walk. Teams more efficiently conduct siting studies from their desktop to analyse the viability of designs on the area. ■

Below Comparison of options overlaid as layers for assessment against the real-world backdrop.

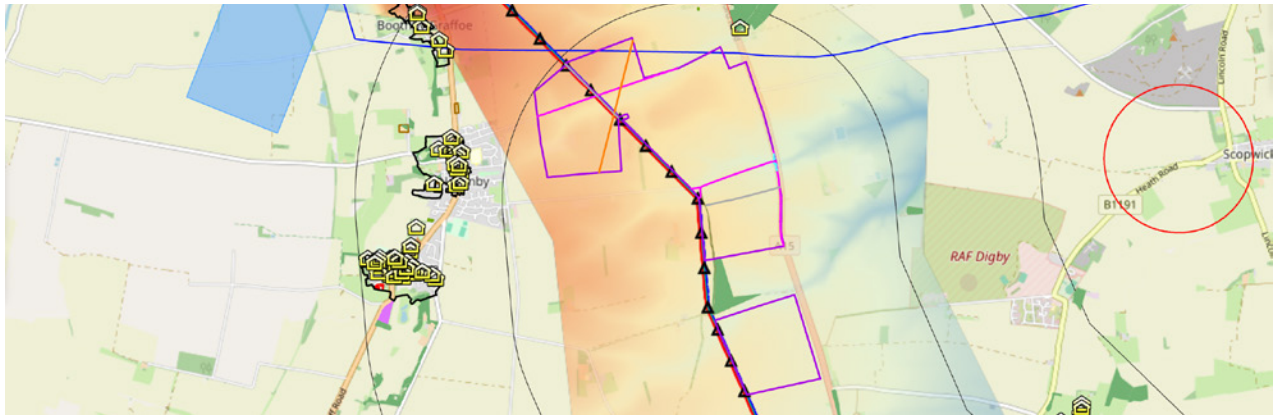


Challenge 2



I want to rule out inaccessible options earlier to focus our time on the viable options

The initial phases of planning for transmission projects involve a thorough and time-consuming process to narrow down potential locations and options. The Connections team want to expedite the elimination of undesirable options and allocate more time and resources towards developing and proposing the preferred options.



Above Backdrop of digital surface model showcasing elevation overlaid with underground utilities and source protection zones.

Solution

Evaluating plans in real-world context

National Grid is assessing the expansive Navenby site directly from their desktops. Using Sensat's height, volume, and measurement tools, the team can quickly evaluate option constraints to streamline the identification of suitable options. Use cases include:

- **Measuring how topology affects the site:** During meetings, teams use Sensat's measurement tools to assess different site's topologies. In one instance teams noticed a 7.5-meter slope would involve four times the necessary earthworks, resulting in an £18 million cost difference between other options. Because this was spotted from their desktop using Sensat, teams could discount this site early.
- **Spot constraints to speed up siting studies:** Using the project visualisation, it instantly became clear that a design's tolerance encroached on a railway line. The visual prompt for decision-making meant teams quickly eliminated the area that may have not been discovered until later.
- **Speeding-up optioneering:** During an options selection meeting the team eliminated 3 options in 25 minutes by visualising their important 2D and 3D data sets in one platform. This could easily have taken 2.5 hours of discussion using traditional methods.

The team

**identified
£18m
earthworks
difference**

between the preferred options early on in planning.

By identifying viable options early, teams can allocate more time to iterate on their remaining options to be the best that they can be. ■

Challenge 3



Turning technical problems into a common language for non-technical stakeholders to understand is difficult

Communicating technical information to non-technical stakeholders can be a challenge. Previously, communicating information has relied on lengthy back-and-forth meetings to convey constraints.

During the early-stage public consultation process on this project, the local planning authority (LPA) questioned the proposed substation's placement, perceiving it as a biased decision.

Solution

Engage with the local planning authority and make them project allies

The National Grid team are engaging with the LPA using Sensat and the constraint information to explain the rationale behind the proposed route. Teams use Sensat as a backdrop for discussion to showcase the extensive considerations being taken into account during planning.

In Sensat, the Connections team have multiple information sets, including social and environmental constraints. Using the platform as a base map for explanation, they can demonstrate why other substation sites are less favourable. Thanks to this transparent approach from the Connections team, the LPA has quickly become a project ally knowing that the team are thoroughly investigating the area and options.



Sensat exposed significant differentiating factors between options that we didn't even know about before we came in the room.

Matthew Doherty, Connections Engineer t National Grid



Conclusion

National Grid, one of Europe's largest Transmission Owners together with Sensat is streamlining the early stage planning process using a 3D site visualisation of the project area. By front-end loading their important data from an early stage, teams can spot significant differentiating factors from much earlier in the process.

Traditionally electricity transmission projects can take anywhere from five to nine years to plan, permit and build. However, using innovative practices, Sensat is helping National Grid to move forward with their proposals with more certainty and efficiency. ■