



# **Fighting Future Fires: Wildfire Sensors for Early Fire Detection**

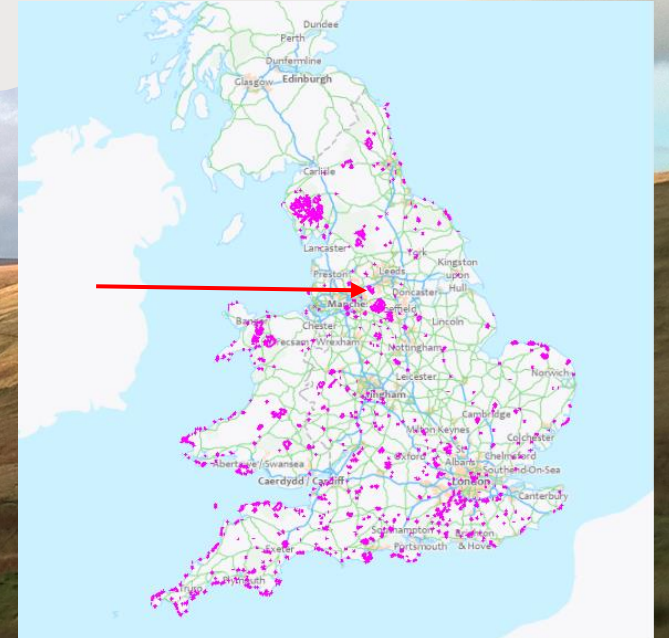
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**[tia.crouch@nationaltrust.org.uk](mailto:tia.crouch@nationaltrust.org.uk)**



# Marsden Moor



# Marsden Moor



# Wildfires on Marsden Moor



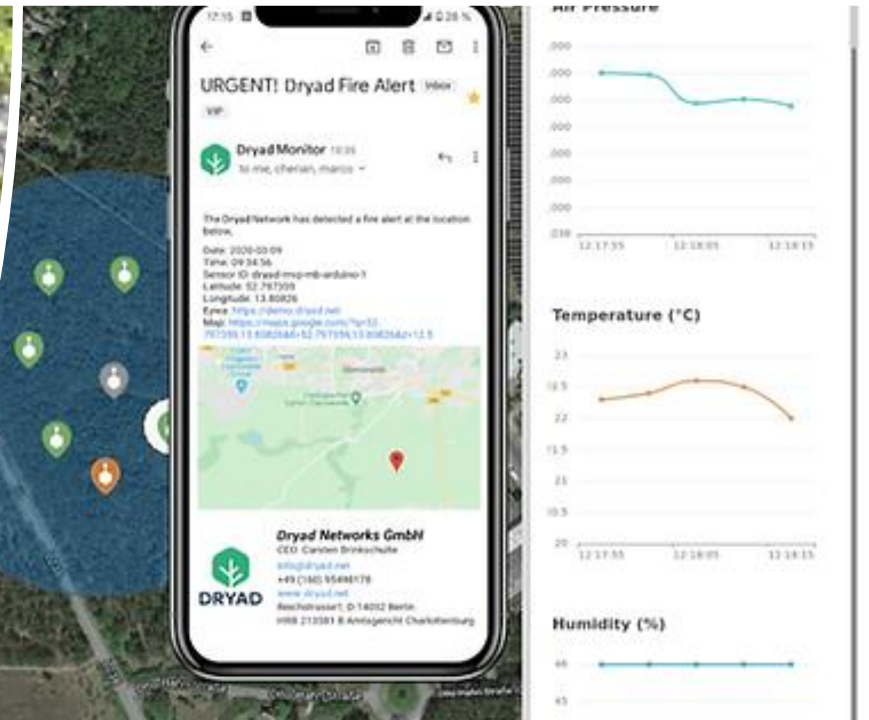
# Wildfire risk reduction

- Peatland restoration
- Vegetation cutting / flailing
- Appropriate livestock grazing
- Visitor behaviour

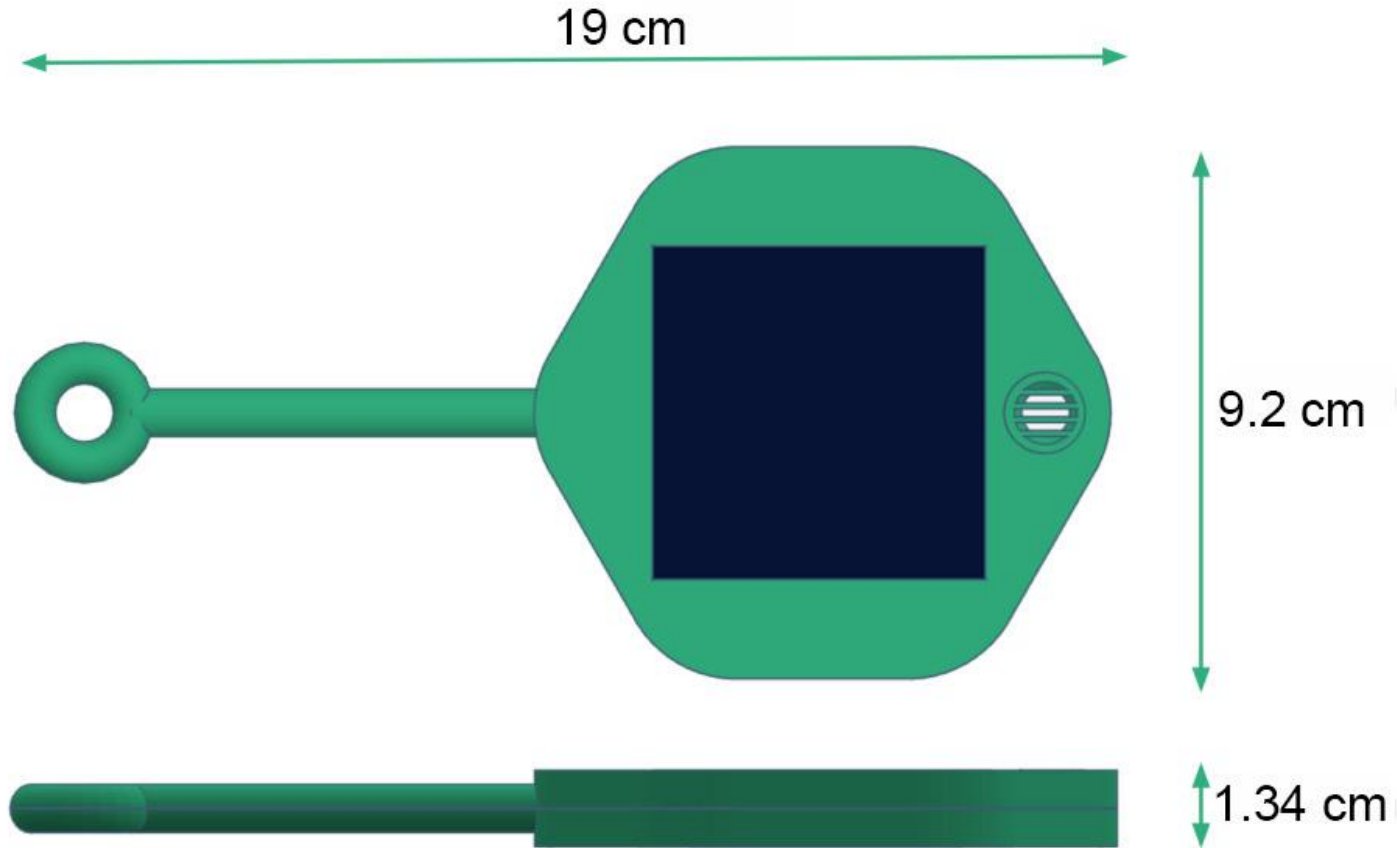


# Wildfire Sensor Project

- Wildfire Sensors
- Mesh Gateway
- Border Gateway
- Cloud Platform

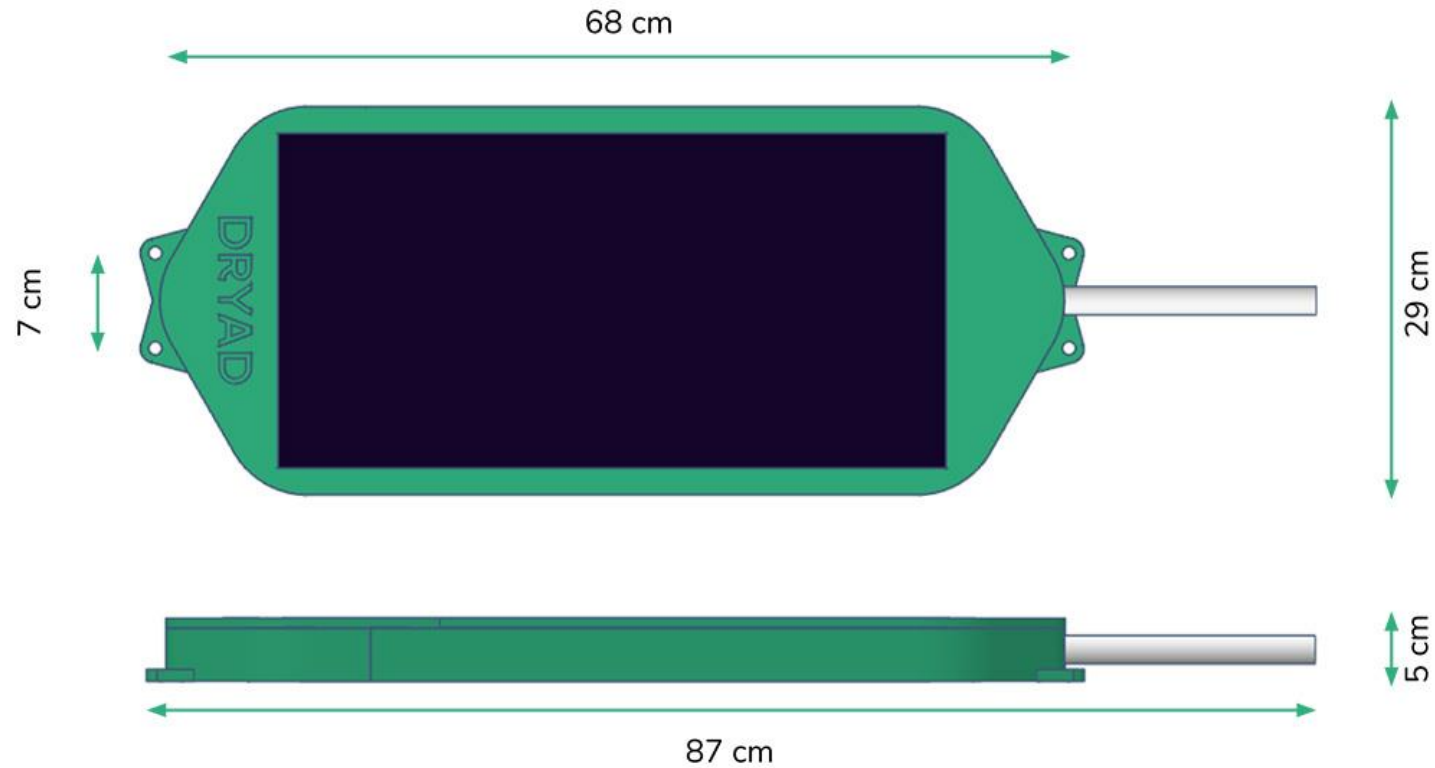


# Wildfire Sensor



- Solar powered
- Gas sensor
- Detection radius 80-100m

# Mesh Gateway



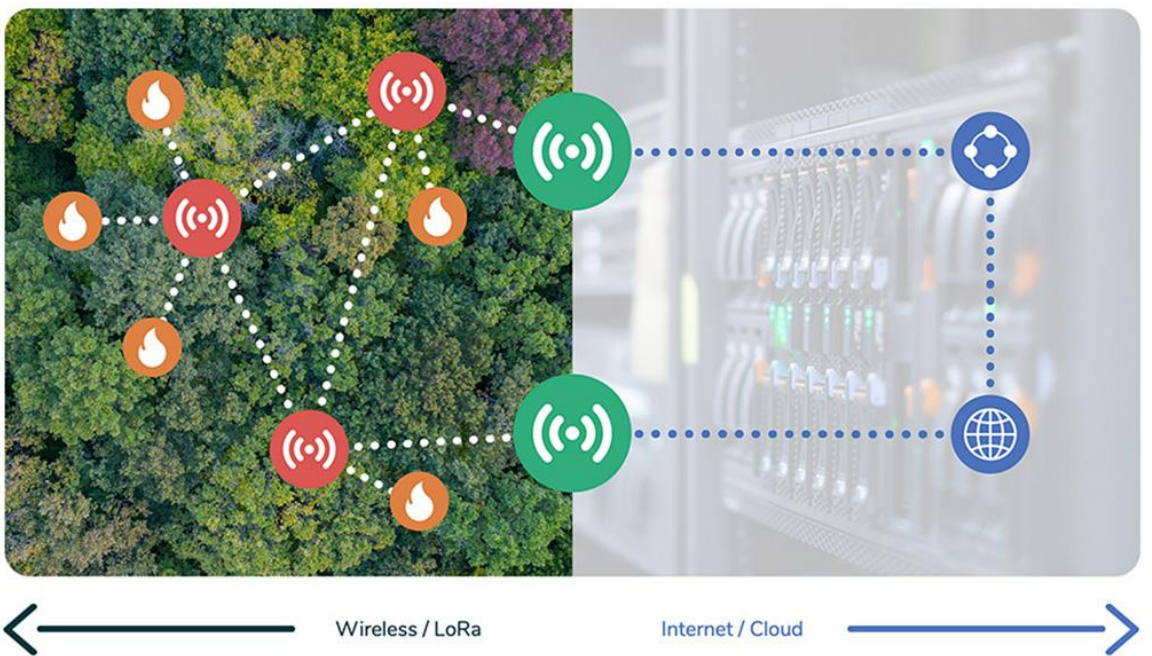
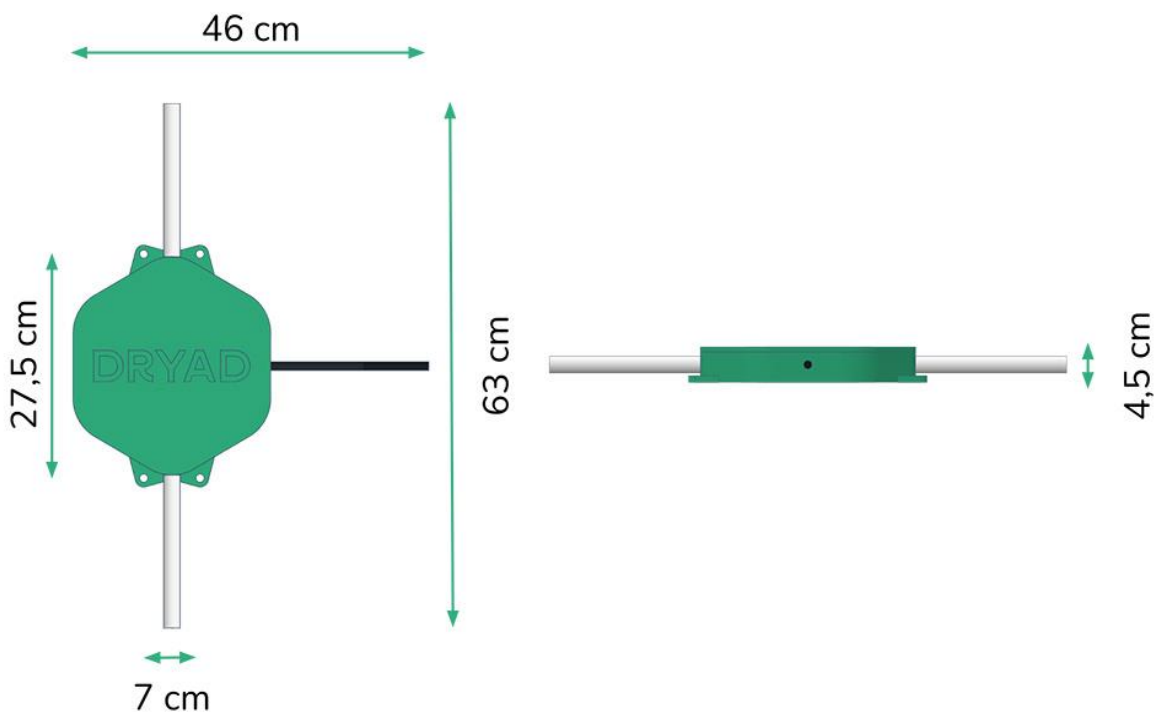
- Receives and sends messages
- 2-6 km range
- Supports up to 100 sensors





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# Border Gateway



- Sensor
- Mesh Gateway
- Border Gateway
- Network Server
- Analytics Platform



# Dashboard • Dryad

Dashboard • Dryad

https://dryad.app/dashboard

Dashboard

Tia Crouch Admin

- Dashboard
- Sites
- Map
- Alert Center
- User Management

Total Sensors	
50	

Sensors of each site	
National Trust UK_Marsden Moor	50

Total Gateways	
3	

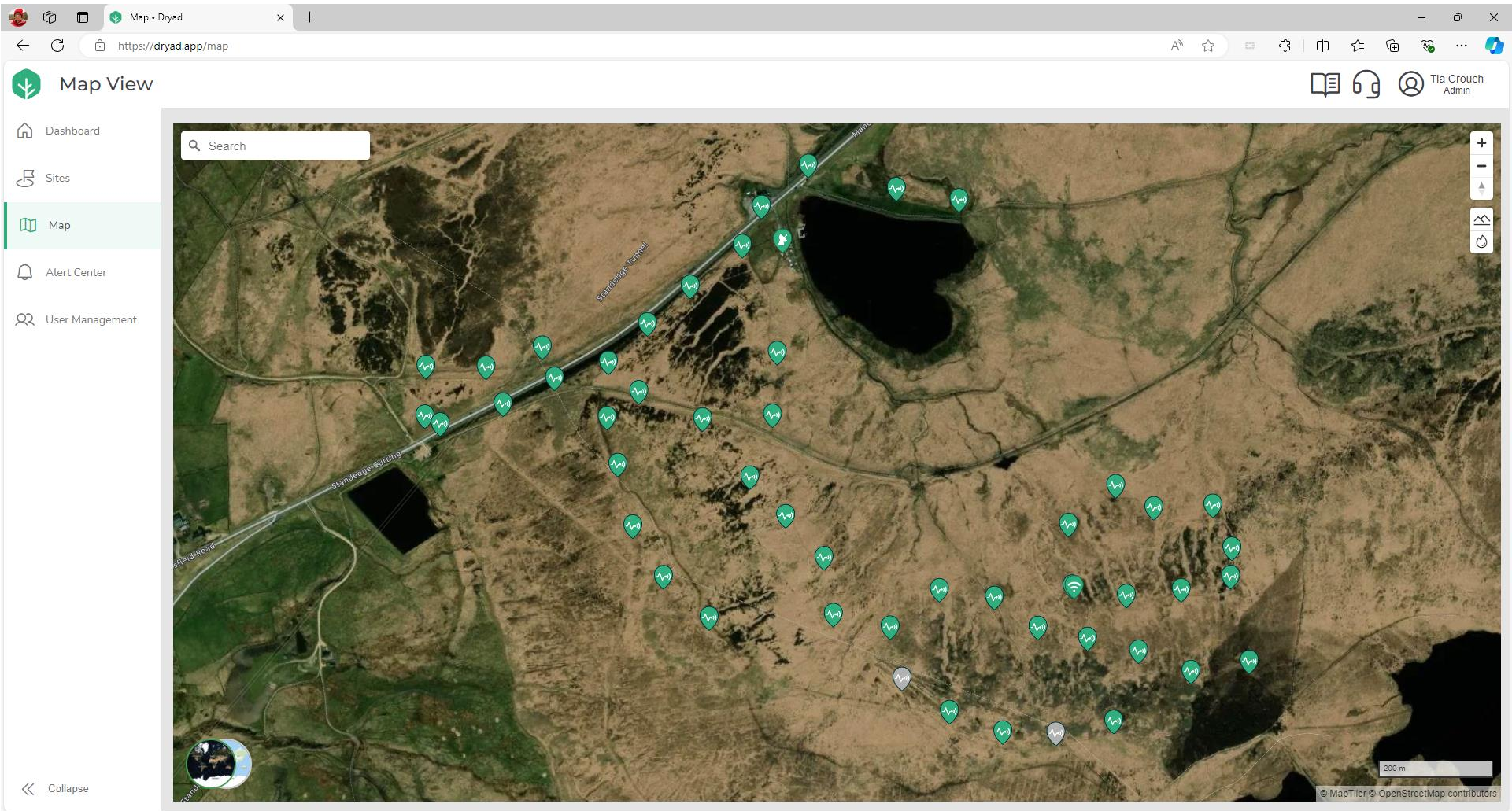
Gateways of each site	
National Trust UK_Marsden Moor	3

Total Number Of Sites	
1	

Covered area of each site	
National Trust UK_Marsden Moor	2.52 km <sup>2</sup>

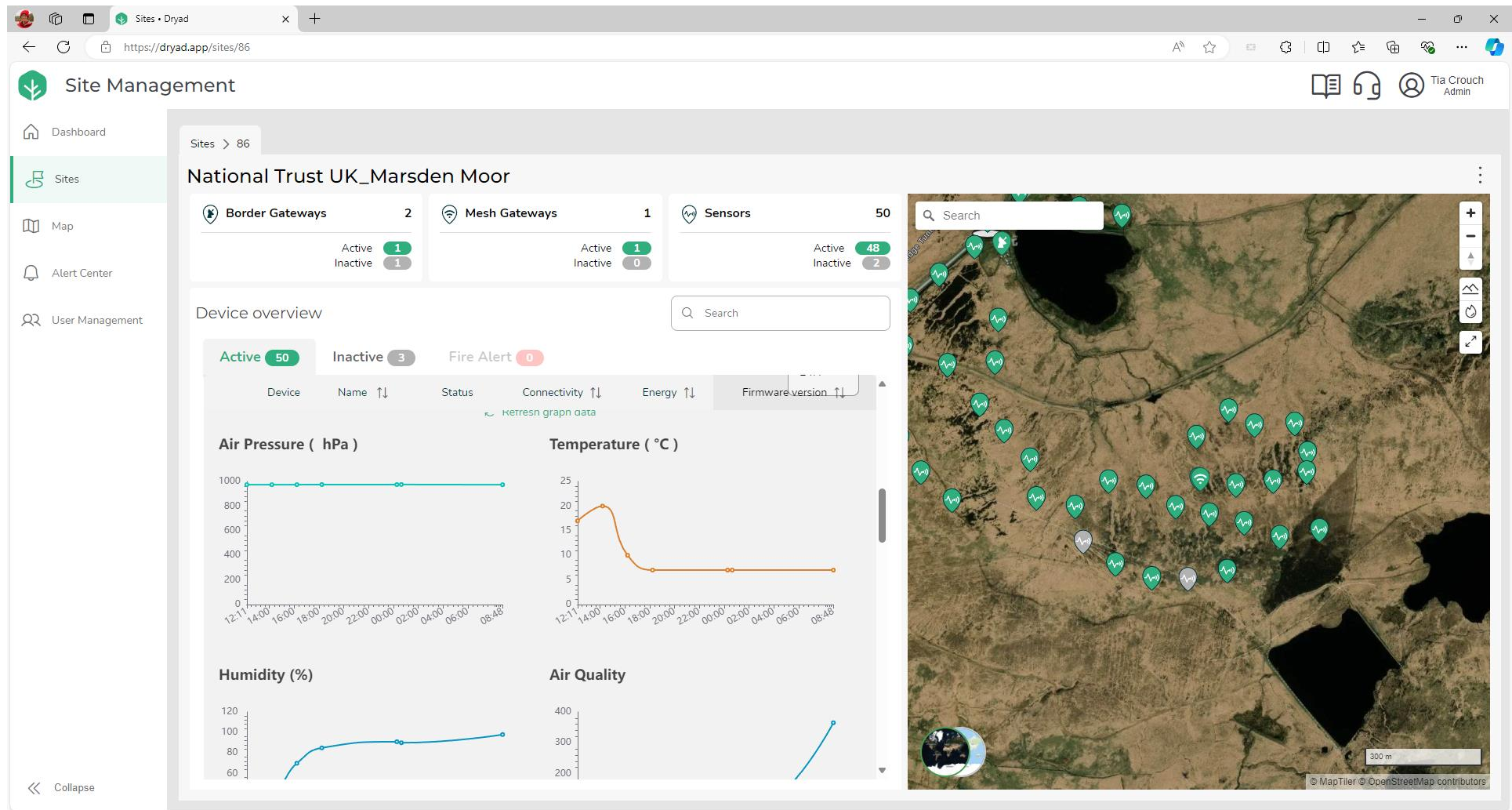
<< Collapse

# Map View



The screenshot shows a web browser window with the URL <https://dryad.app/map>. The page title is "Map View". On the left, there is a sidebar menu with the following items: Dashboard, Sites, Map (highlighted), Alert Center, and User Management. The main area displays a satellite map of a rural landscape. A road labeled "Stardedge Farm" runs diagonally across the map. A large dark pond is visible in the upper right. Numerous green location markers with a white pulse icon are scattered across the map, primarily along the road and in the lower right quadrant. A search bar is located at the top left of the map area. On the right side of the map, there are navigation controls including zoom in (+), zoom out (-), home, and refresh icons. A scale bar at the bottom right indicates 200 meters. The footer of the map area contains the text "© MapTier © OpenStreetMap contributors". The user profile "Tia Crouch Admin" is visible in the top right corner of the application interface.

# Device Overview



**Site Management** | Tia Crouch Admin

Sites > 86

### National Trust UK\_Marsden Moor

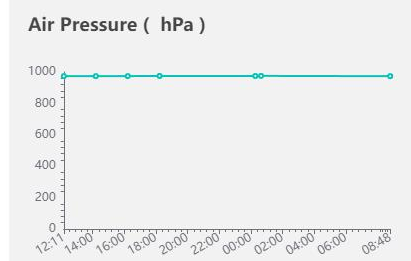
<b>Border Gateways</b> 2	<b>Mesh Gateways</b> 1	<b>Sensors</b> 50
Active: 1 Inactive: 1	Active: 1 Inactive: 0	Active: 48 Inactive: 2

**Device overview**

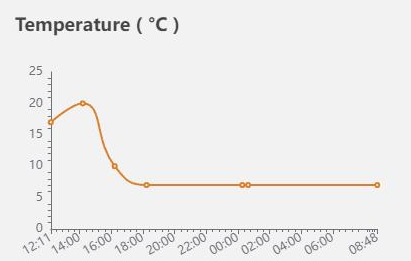
Active: 50 | Inactive: 3 | Fire Alert: 0

Device	Name ↑↓	Status	Connectivity ↑↓	Energy ↑↓	Firmware version ↑↓
Refresh graph data					

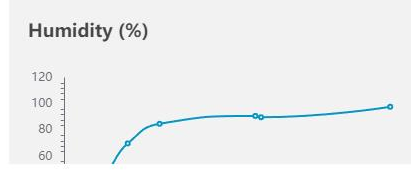
#### Air Pressure ( hPa )



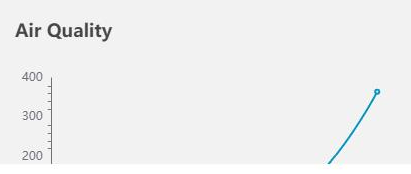
#### Temperature ( °C )

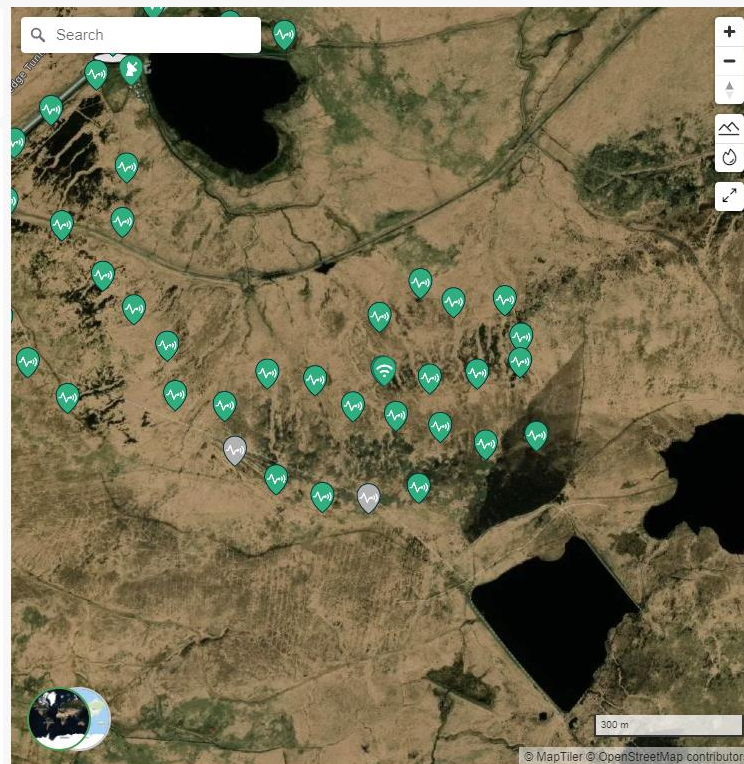


#### Humidity (%)



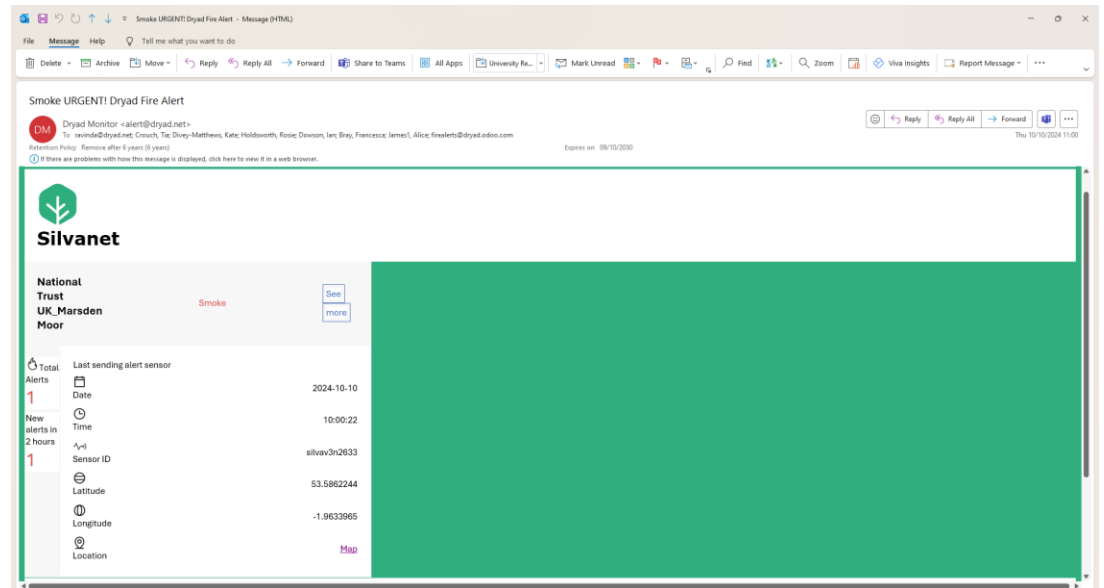
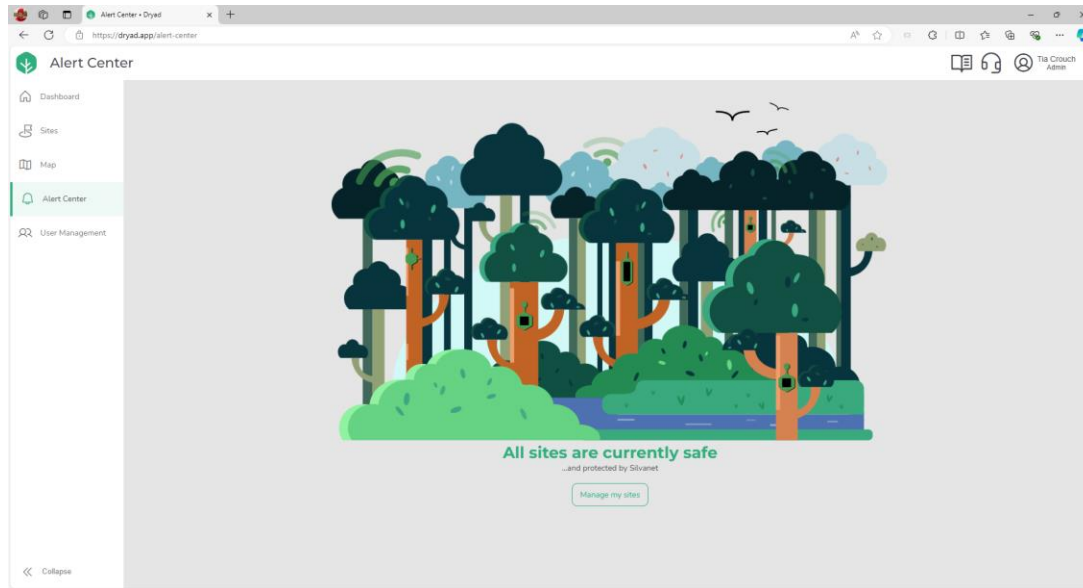
#### Air Quality





Map showing sensor locations on Marsden Moor. Includes search bar, zoom controls, and a 300m scale bar.

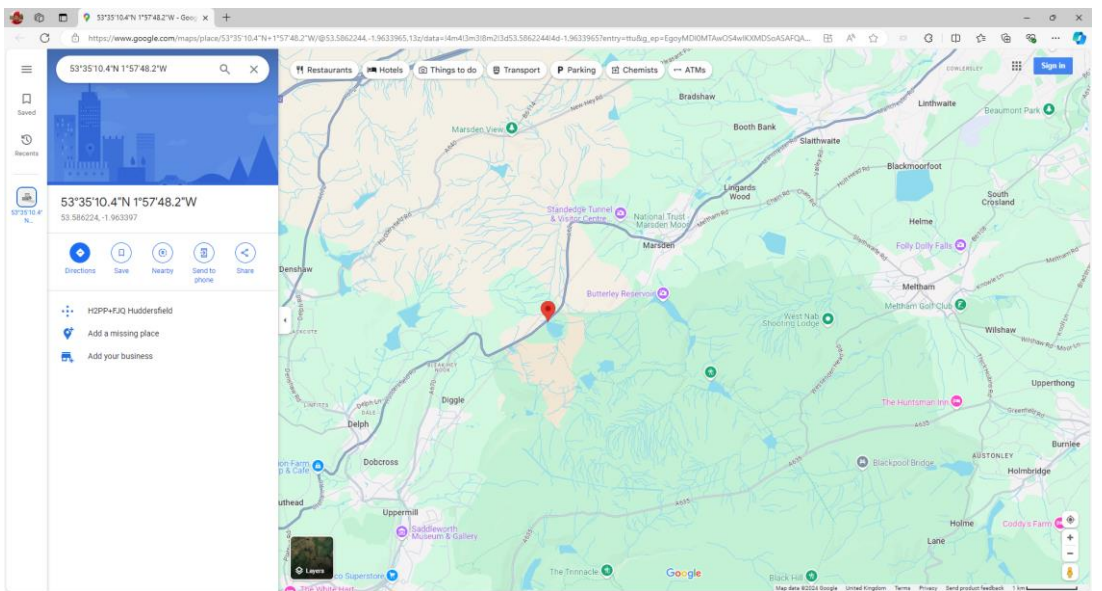
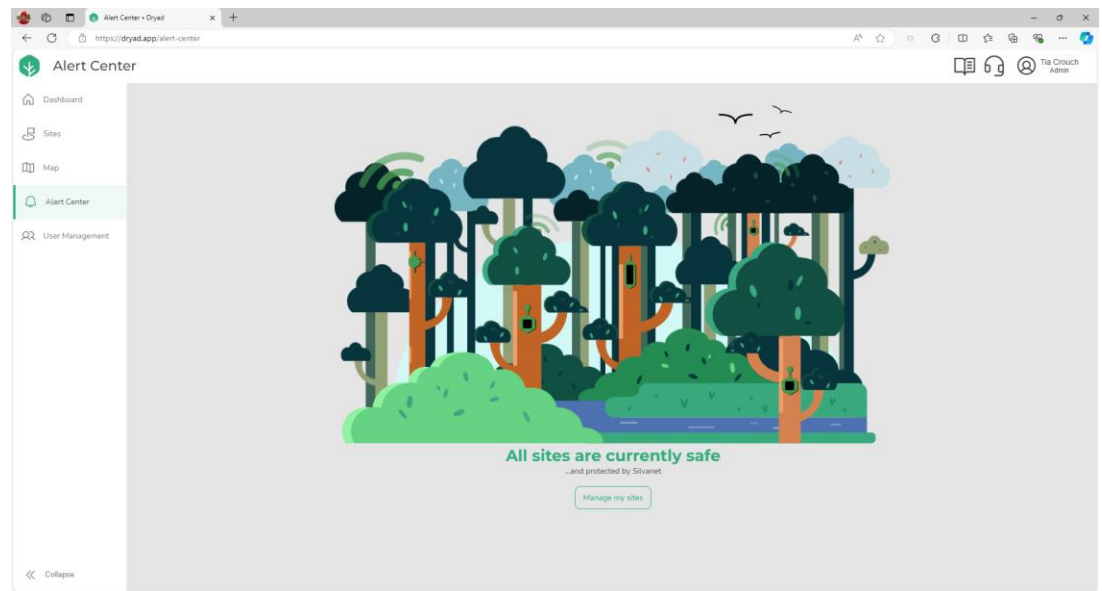
# Alert Centre





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# Alert Centre





# Installation of Wildfire Sensors





# Installation of Mesh & Border Gateway



Device overview

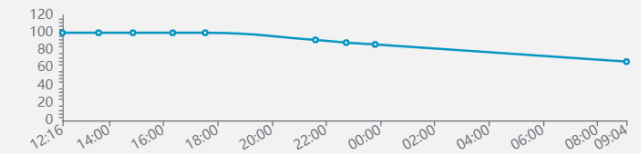
Search

Active 50 Inactive 3 Fire Alert 0

Device Name ↑↓ Status Connectivity ↑↓ Energy ↑↓ Firmware version ↑↓

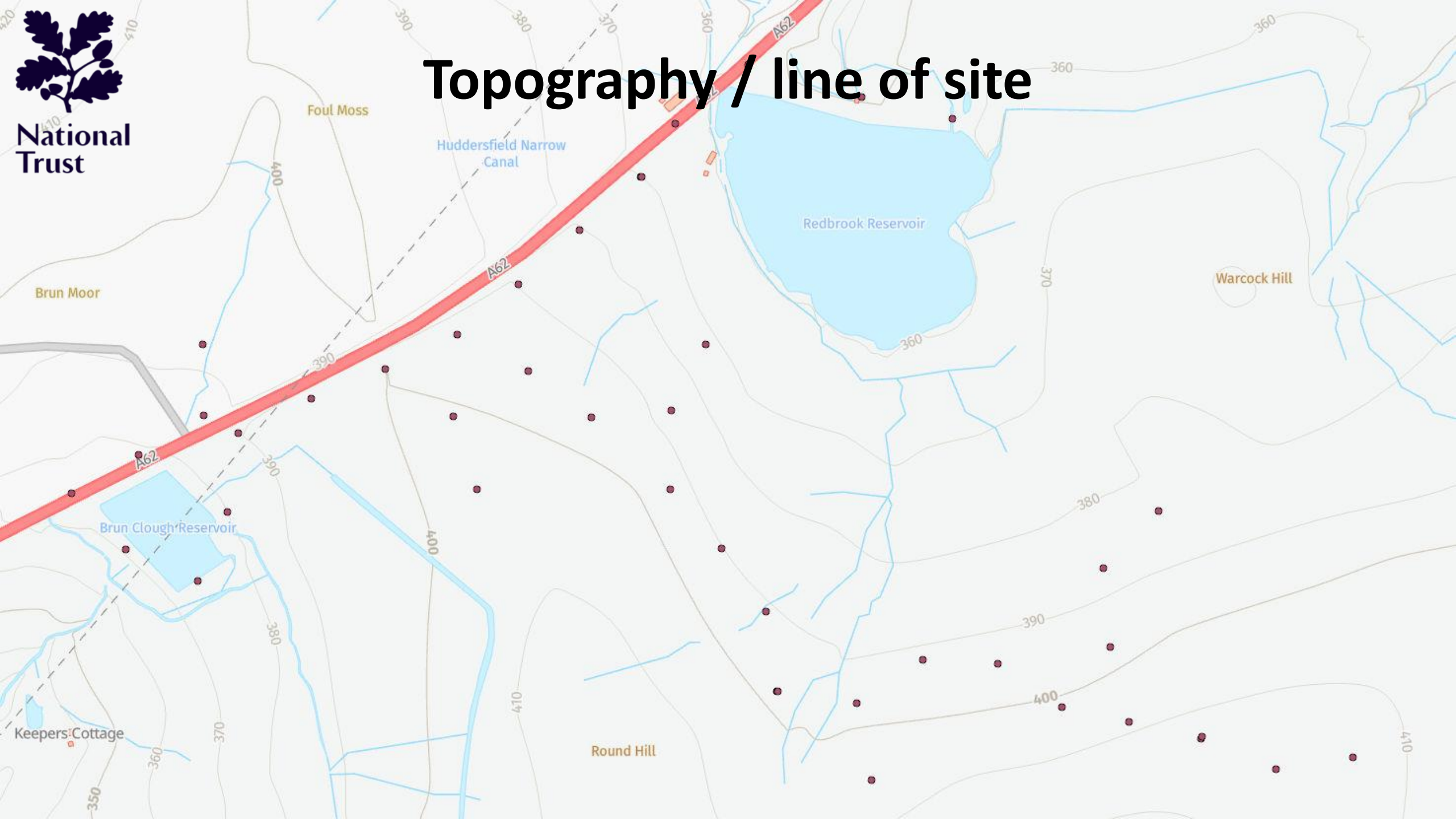
Refresh graph data

Energy Level %



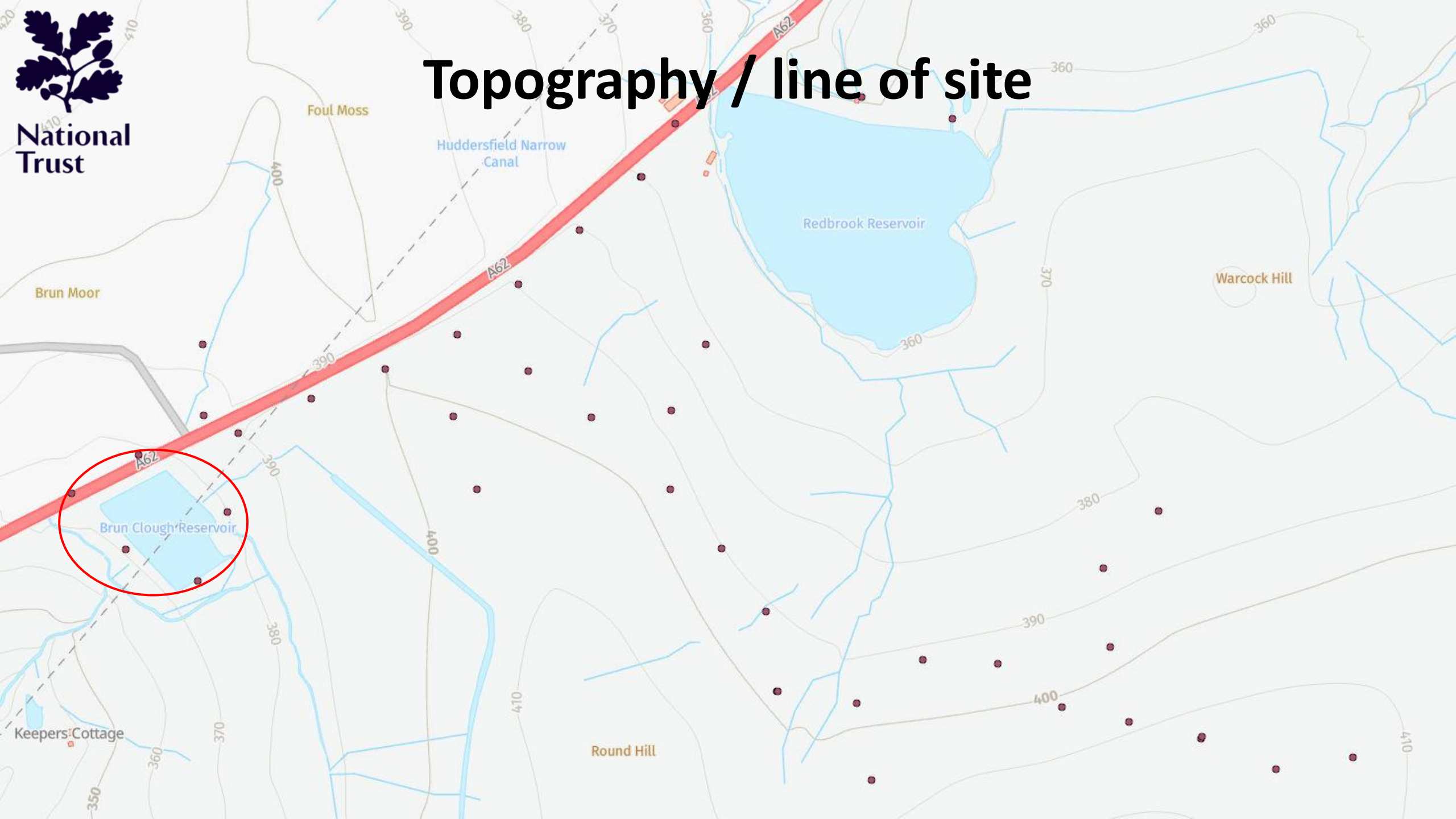


# Topography / line of site

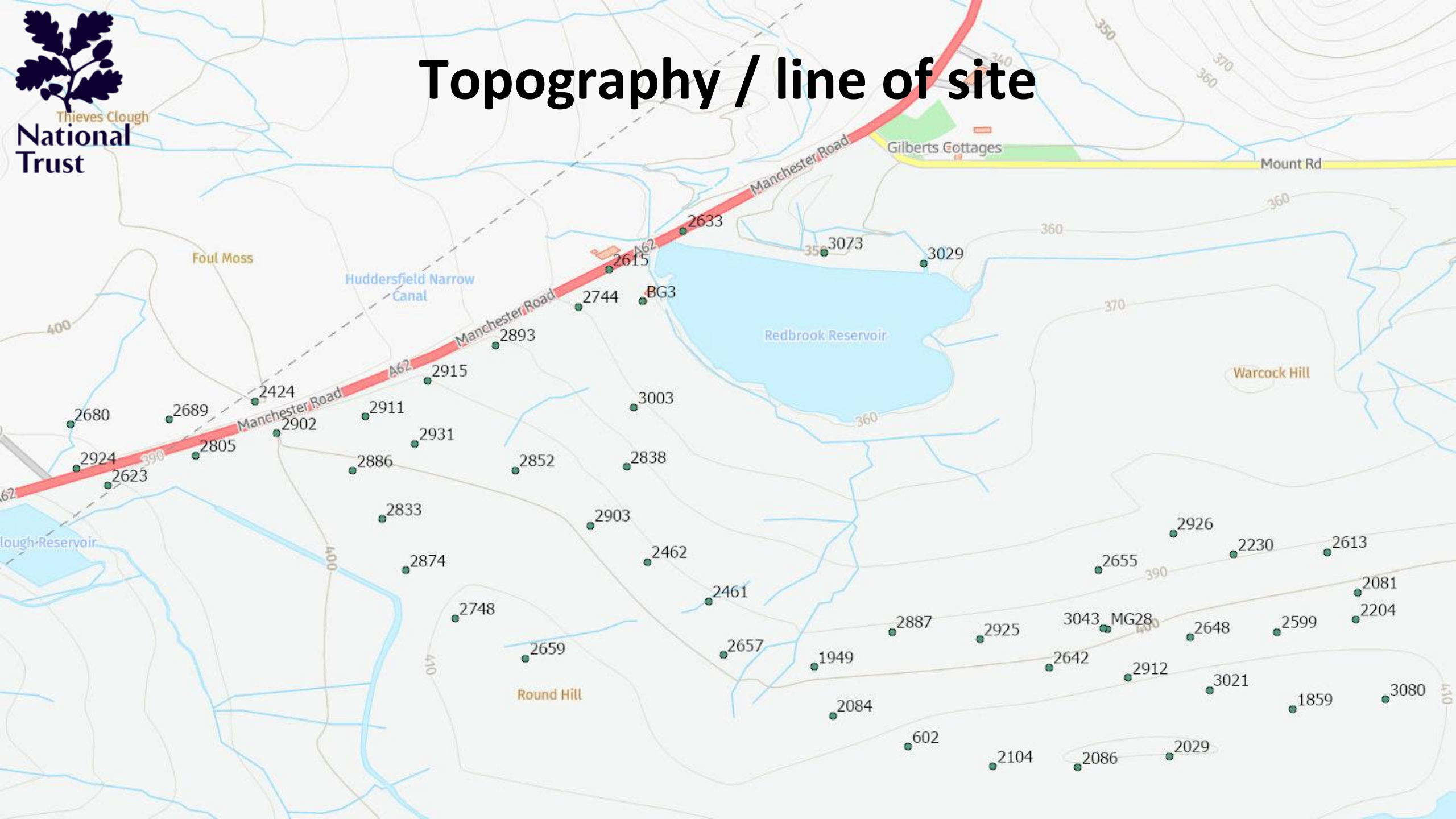




# Topography / line of site



# Topography / line of site



# Other challenges & learnings

1. Technology designed for forests
2. Oversensitive sensors / false alerts
3. Offline sensors
4. Publicising the project / vandalism
5. Email notification
6. No fires in project area



# Cost

Item	Cost (untaxed amount)
Wildfire Sensor	€48.51 (£40.43)
Mesh Gateway	€371.76 (£309.82)
Boarder Gateway	€549.02 (£457.55)
Wildfire Sensor service fee	€7.28 (£6.07) per sensor, per year
Mesh Gateway service fee	€55.76 (£46.47) per MG, per year
Boarder Gateway service fee	€82.35 (£68.63) per BG, per year
Shipping	€40.00 (£33.34)
Total	€3,888.39 (£3240.58)

- Costs quoted in May 2023 – could be higher now
- Shipping likely to be higher for a bigger order
- € converted to £ 15/10/2024

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# Conclusions & future of project

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- Moorland setting with few trees & varied topography
- Sensors, MG, BG work successfully with solar panel
- Not triggered by fire outside of detection radius
- Interference / vandalism limited (so far)
- False alerts seems to have reduced but continue pilot for a further year
- Focus use in more remote areas – phone network / satellite

