Great Western Electrification

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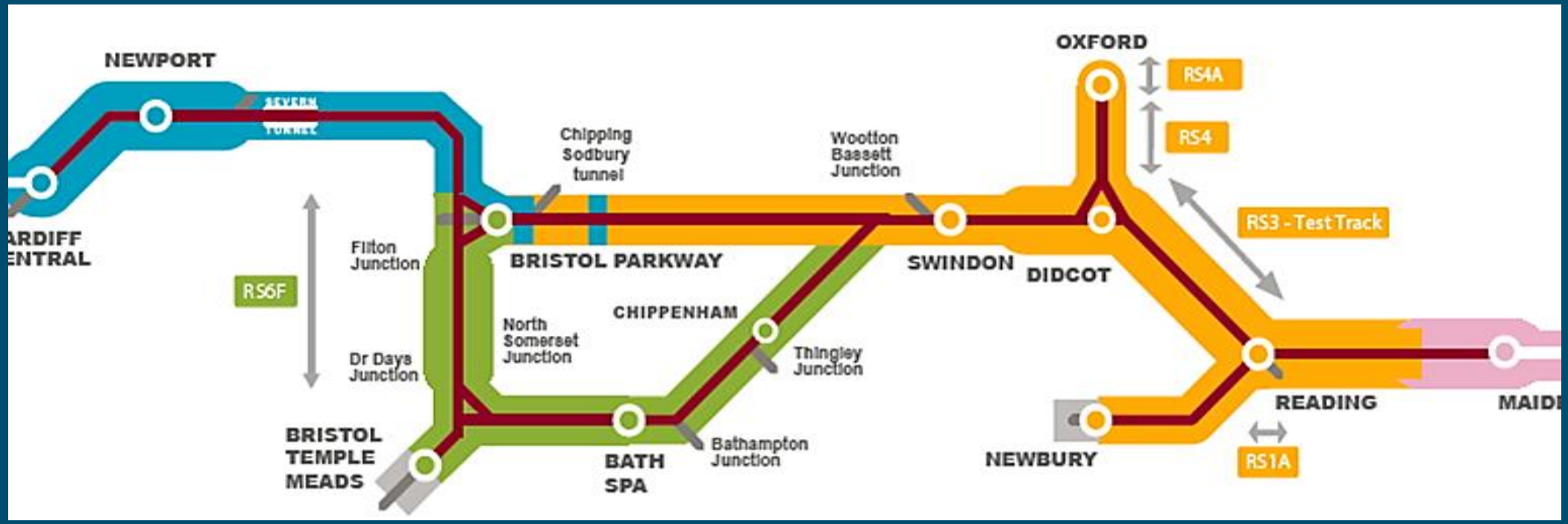
Once upon a time……

Working for you.

Why electrify the railway?



Electrification frees up capacity

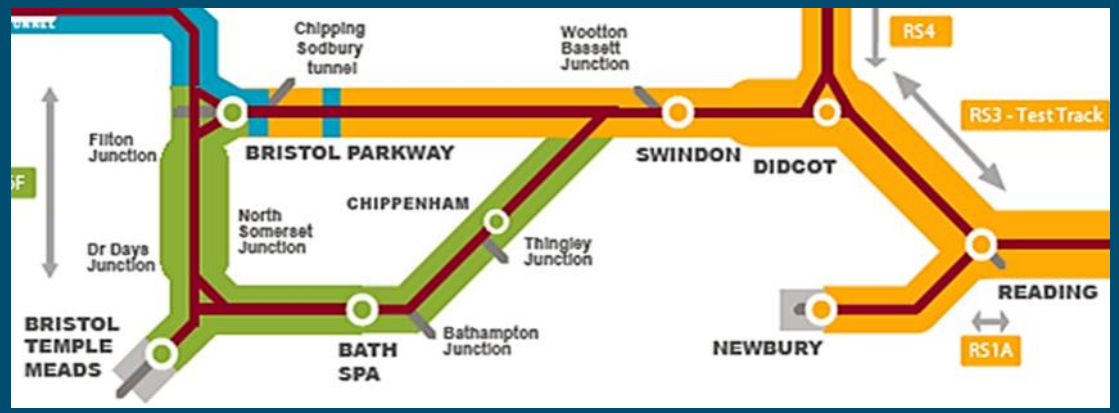
- Faster acceleration of new electric trains creates the capacity for extra trains to run on the GWML

Working for you.

Benefits of electrification - passengers

More seats, faster journeys

- Electric trains will have more seats than diesel trains of the same length.
- Faster journeys of up to 18 minutes from Bristol to Paddington.



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Benefits of electrification

Better for the environment

- Emits 20-35% less carbon per passenger than diesel trains
- Trains are virtually silent when waiting at stations

Reduced costs of electric trains

- Less maintenance and lower energy costs
- Lighter, causing less damage to track

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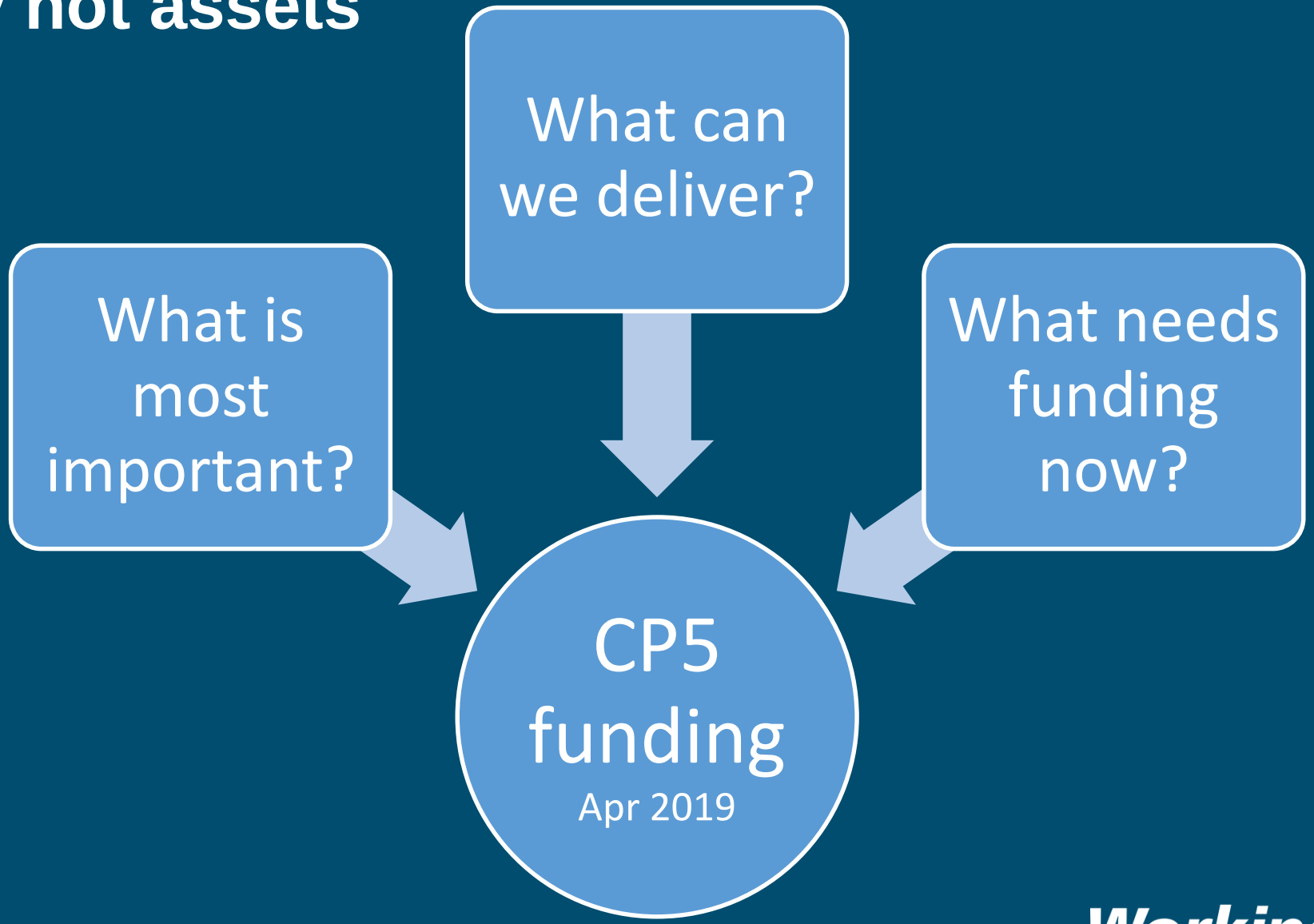
Its getting difficult……

Working for you.

Capacity not assets



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- **Increase capacity between London and Cardiff/Bristol**
- Bristol Parkway new platform
- Electrify Paddington to Cardiff
- Four tracking Filton Bank
- Rationalise Bristol East junction

- **Run EMUs to Newbury**
- Electrify between London and Newbury

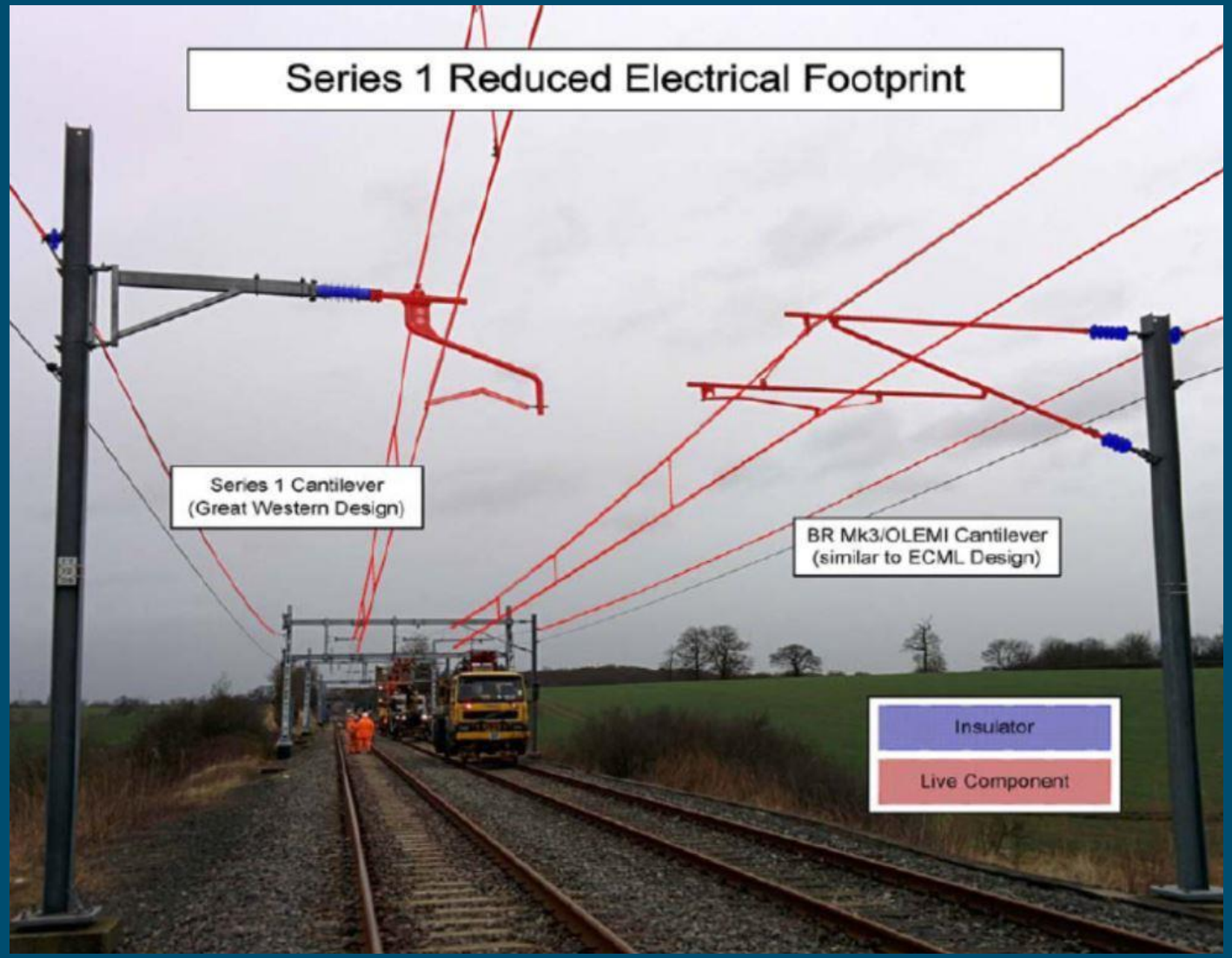
Working for you.

Working for you.

Building Overhead Line Equipment (OLE)

Working for you.

Series One – A new Electrification system



Working for you.

Building OLE – 130 mile long work site

15,000 OLE foundations

13,000 OLE masts/legs

1,500 OLE portals

Working for you.

Trial holes and ground conditions

Working for you.

OLE portal booms

Working for you.

To get the wires up

108 road bridges

31 foot bridges

13 station awnings

6 tunnels

Working for you.

Bridge reconstruction

Working for you.

Bridges/Highways

Working for you.

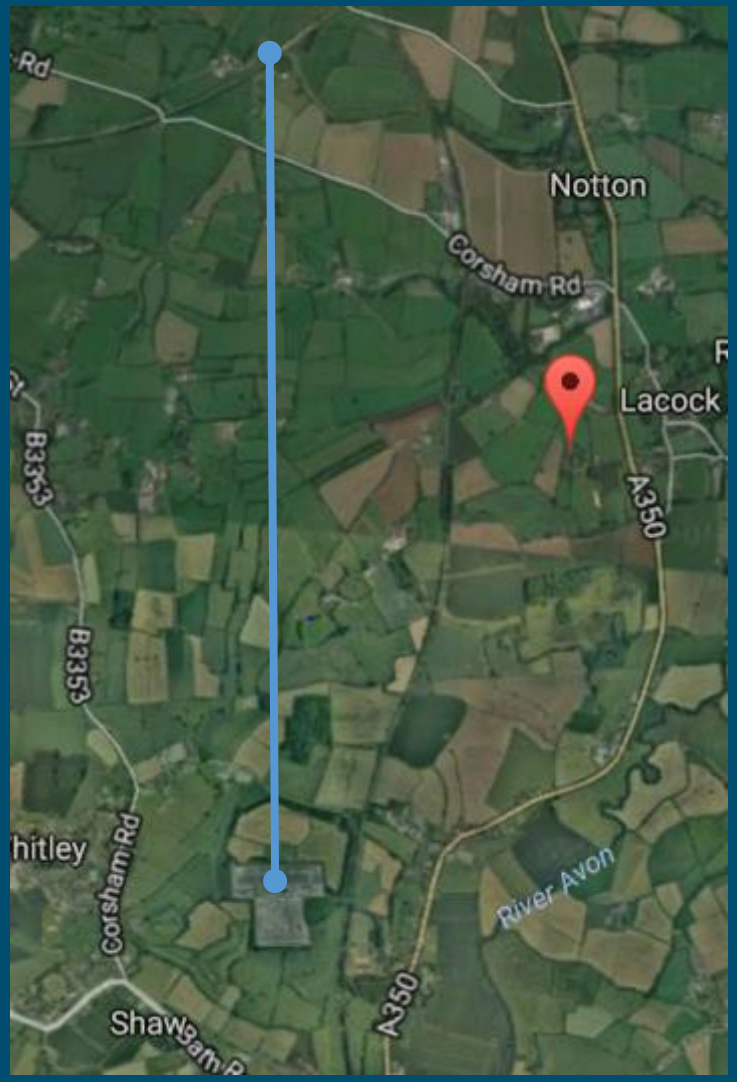
Not all bridges are equal……

Working for you.

Getting power to the wires

Working for you.

Digging up fields



6m wide trench
4km long

Working for you.

Vegetation

Private land

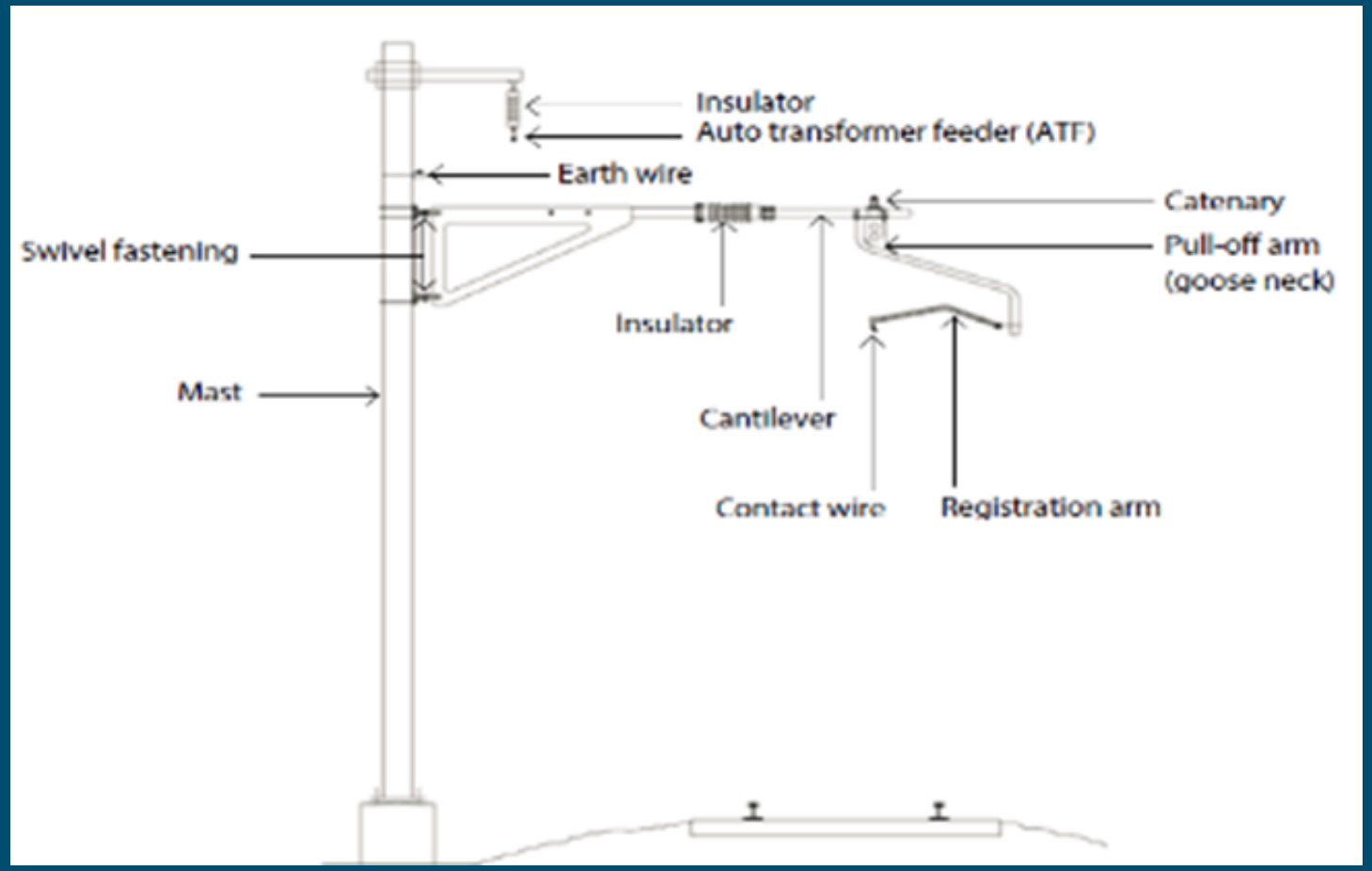
Fencing

Screening

Grows back!

Working for you.

Getting the wires in the right place



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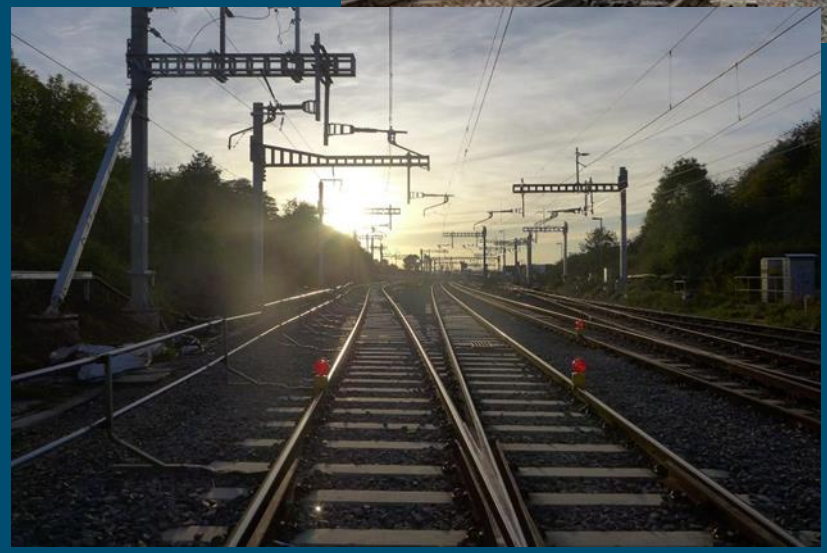
Accessing the railway

- Survey
- Dig trial hole
- Foundation
- Mast
- Small parts steel
- Wiring
- Registration
- Testing / Commissioning
- Snagging
- Fixing
- Handback



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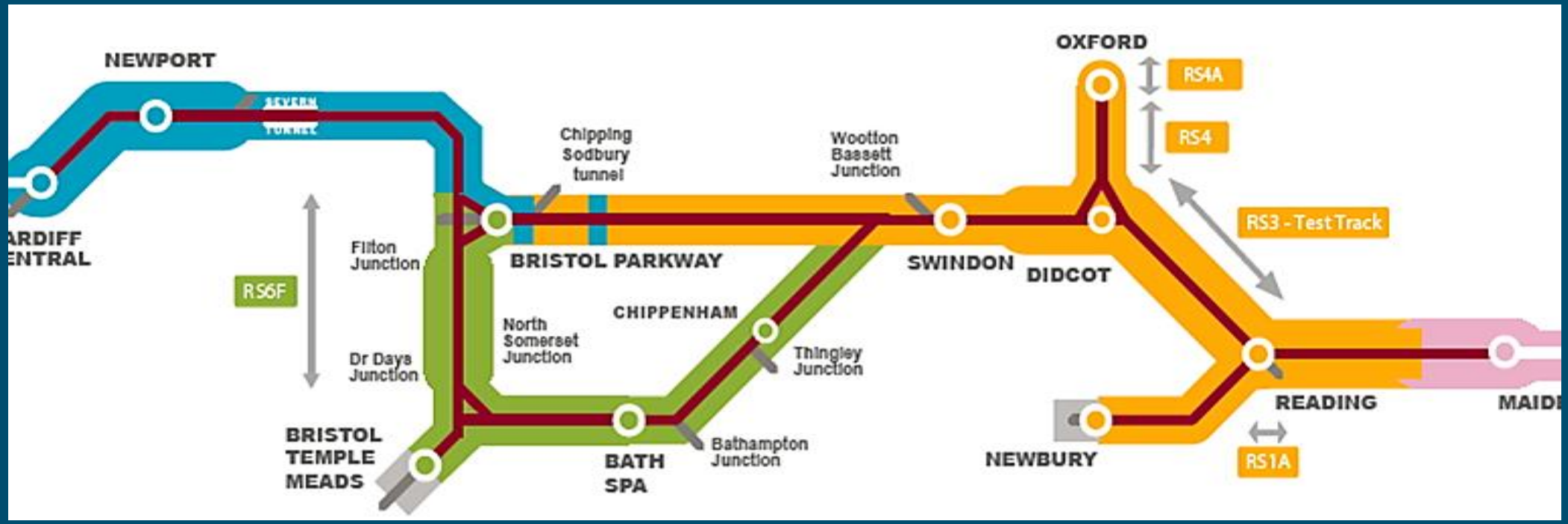
Where are we now?



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- **Increase capacity**

- Faster train services
- More frequent train services
- Increased seating capacity
- Reduce carbon
- Quieter
- Reduce maintenance and operational cost

Options for Traction Energy Decarbonisation in Rail

					Electric		Autonomous Power			
Future Rolling Stock Category	**Description**	**Total Self-Powered Range Required (miles)**	**Total Max Power Per Vehicle (kW)**	**Approx. Engine Energy Output Per Vehicle Per Day (kWh)**	**AC Electric (OLE)**	**DC Electric (third rail)**	**Diesel**	**Hydrogen**	**Battery**	**Biodiesel**
A	Shorter distance self-powered with 75 mph maximum speed	500	275	1,200	✓	✓	✓	✓	×	✓
B	Middle distance self-powered with 100 mph capability	800	400	2,400	✓	✓	✓	×	×	✓
C	Long distance self-powered with 125 mph capability	1100	550	4,620	✓	×	✓	×	×	✓
E-A	Electric to 100mph, self-powered to 75mph	250	300	600	✓	✓	✓	✓	×	✓
E-B	Electric to 100mph, self-powered to 100mph	400	400	1,200	✓	✓	✓	×	×	✓
E-SH	Electric to 100mph with ability to do short hops 'off wire'	50	400	150	✓	✓	✓	✓	✓	✓
F-A	Electric to 125mph, self-powered to 75mph	250	300	600	✓	×	✓	✓	×	✓
F-B	Electric to 125mph, self-powered to 100mph	400	400	1,200	✓	×	✓	×	×	✓
F-C	Electric to 125mph, self-powered to 125mph	550	550	2,310	✓	×	?	×	×	?
F-SH	Electric to 125mph with ability to do short hops 'off wire'	50	550	210	✓	×	✓	✓	✓	✓
Freight	Freight loco capable of hauling 2500 tonne trailing load	750	2400	18,000	✓	✓	✓	×	×	✓