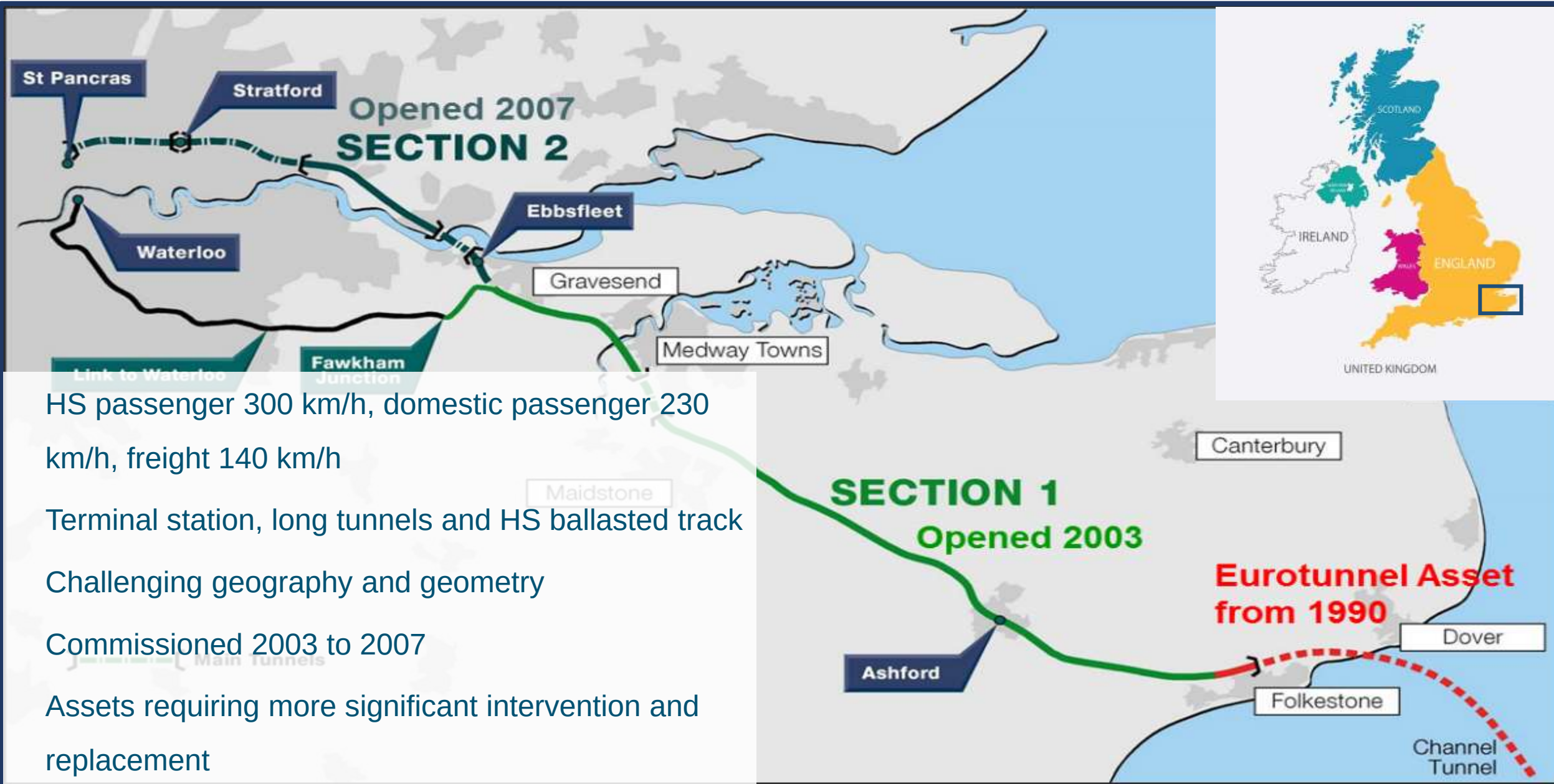




High Speed Track Renewals

How do we do it?

Asset Overview



The Challenge

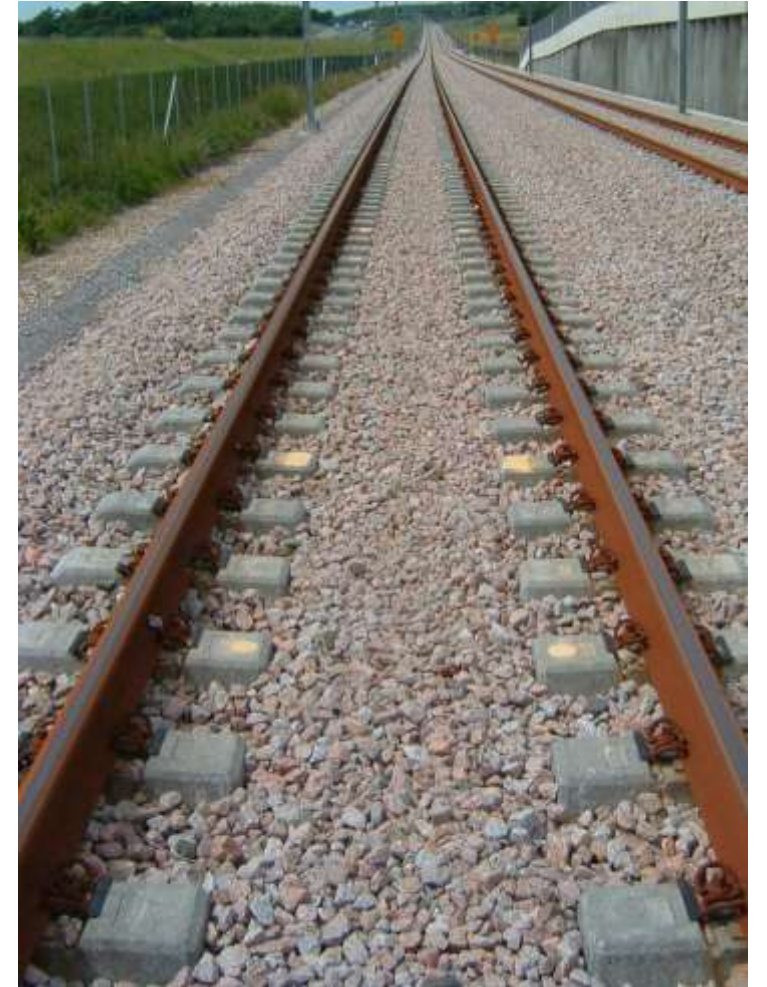
- Produce robust business case for Control Period 4
- Show how this aligns with a long term plan
- Demonstrate good asset management
- Demonstrate value for money
- Maximise asset performance
- Maintain asset availability

Why Change Approach?

- Continuous improvement
- Renewal capability developed over last few years
- CP3 plan based on expected asset behaviour
- Renewal timescales in years
- Observed condition has not always matched expectations
- Age, traffic and geometry of other high speed lines
- Alignment with industry models
- Approach to construction, maintenance and performance

Track Modelling approach

- Use wealth of data to inform decisions
- Shift from time to tonnage
- Identify key influencers on deterioration
- Factor in geometry and fixed features
- Model 'artificial wear' due to maintenance
- Critical limits and factors of safety
- Ability to build in extra channels
- Flexibility for future demand



Work Bank Development

- Identify target years from model
- Smoothed plan by control period for efficient delivery
- Quantify additional maintenance / unused life
- Manage interfaces and islands e.g. S&C



Delivery Integration



Future Development

- Fill in knowledge gaps
- Update and iterate on the deterioration model
- Improve data quality
- Automation and machine learning
- Access optimisation
- Possession management efficiency





- **Original Activity Description**

- 30km of ballast refurbishment/cleaning starting from 2022/23 at 10 km per year.

- **Driver**

- Condition
- Track geometry is degrading rapidly at certain sections, requiring tamping at least once a year, supplemented by manual hand-packing. Some sites have been tamped over 20 times and hand-packed over 50 times.
- Extreme track alignment due to the imposed land constraints; poor ballast quality for speed of line in construction.
- HS1 has similar operating condition to LN3 Paris to Calais, 300km/h and 20MGT; at LN3, SNCF started their ballast refurbishment campaign approximately 5 years ago, when the ballast was 22 years old (over 450 MGT). Our ballast is currently 20 years old but will be 21-25 when the campaign is started.

- **Risk**

- Increases in operational expenditure
- Operational restrictions imposed (ESR/TSR), resulting in train delays.
- Public complaints due to rough ride.

- **Mitigations**

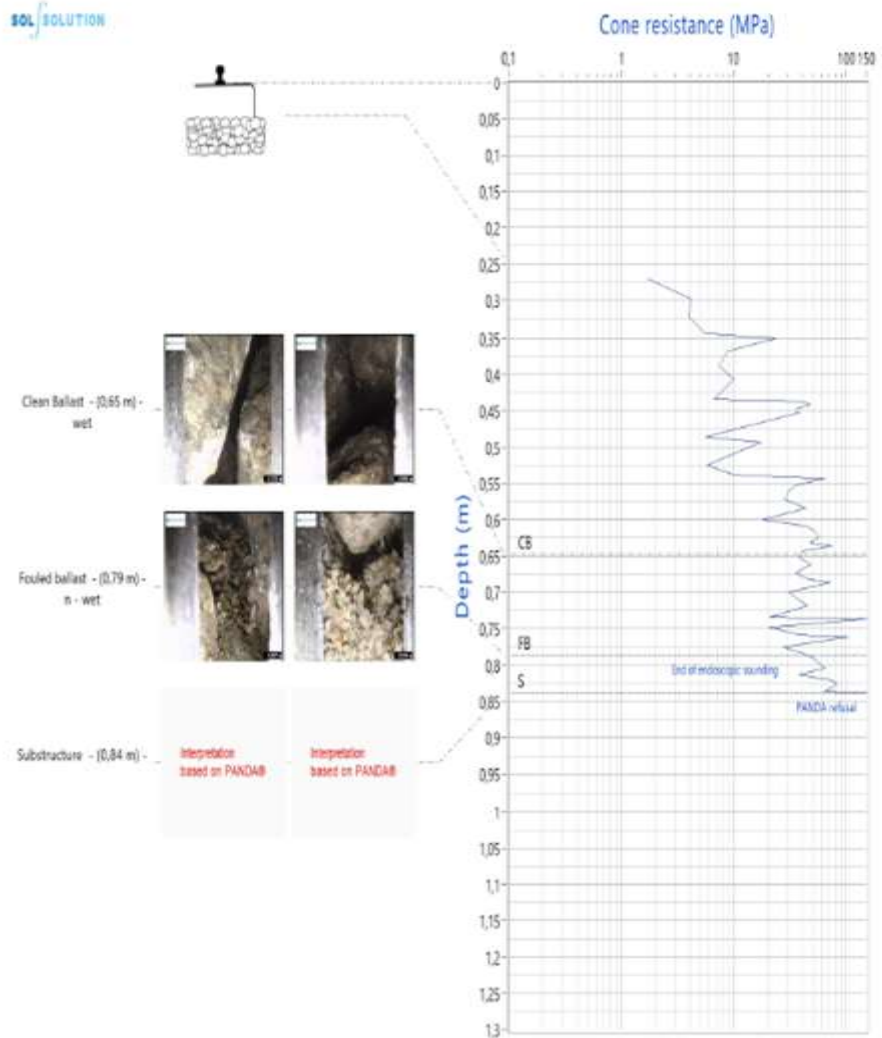
- Increase in tamping activities in excess of £1m a year, which also degrade the life of the ballast quicker, or imposing speed restriction for safety reasons.

- **Delivery Risks**

- Approval of specialist plants and the availability of machine, access and staff.



SOL SOLUTION



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PANDOSCOPE® Site: HS1

Line: TLR3

Track id: UP

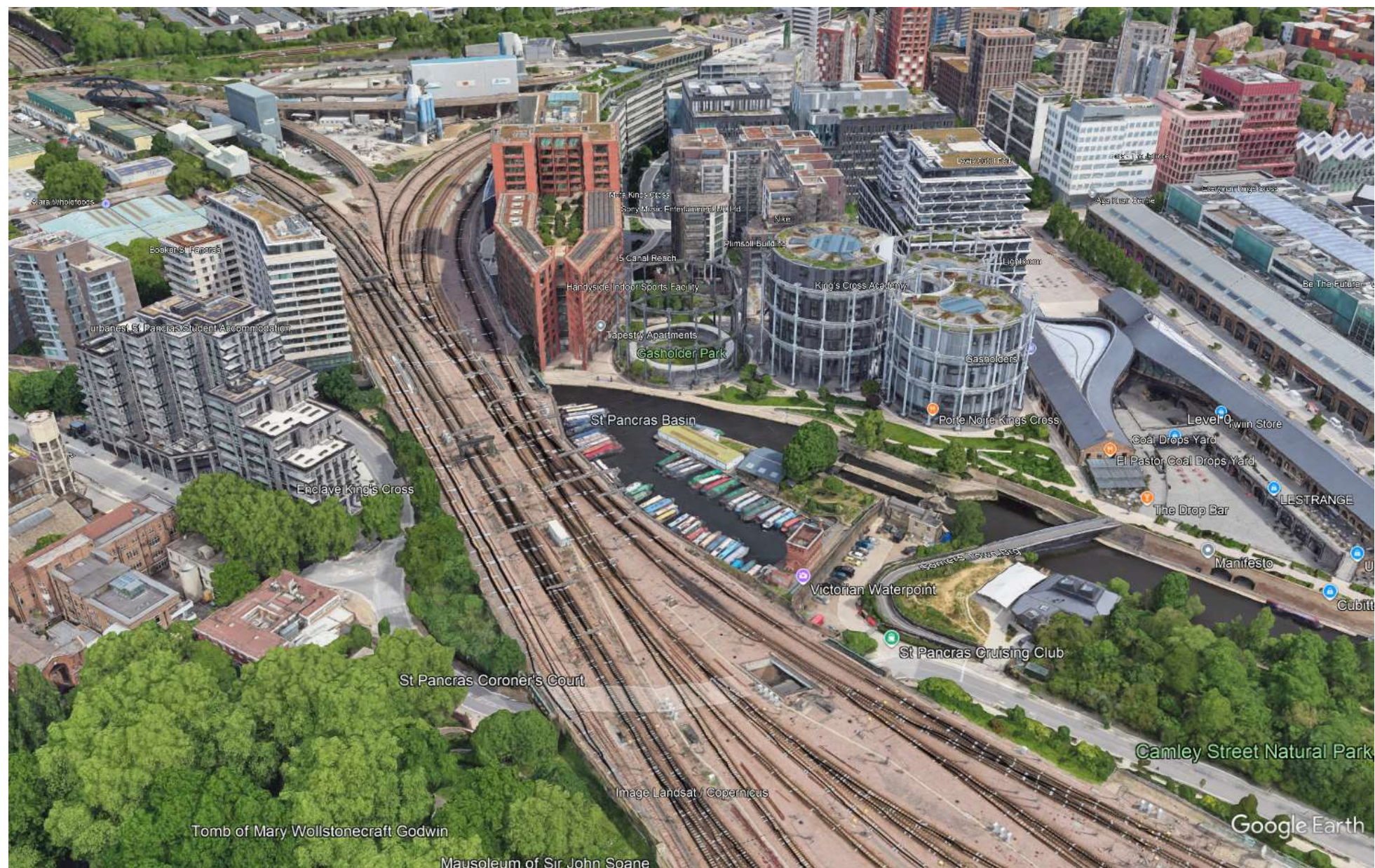
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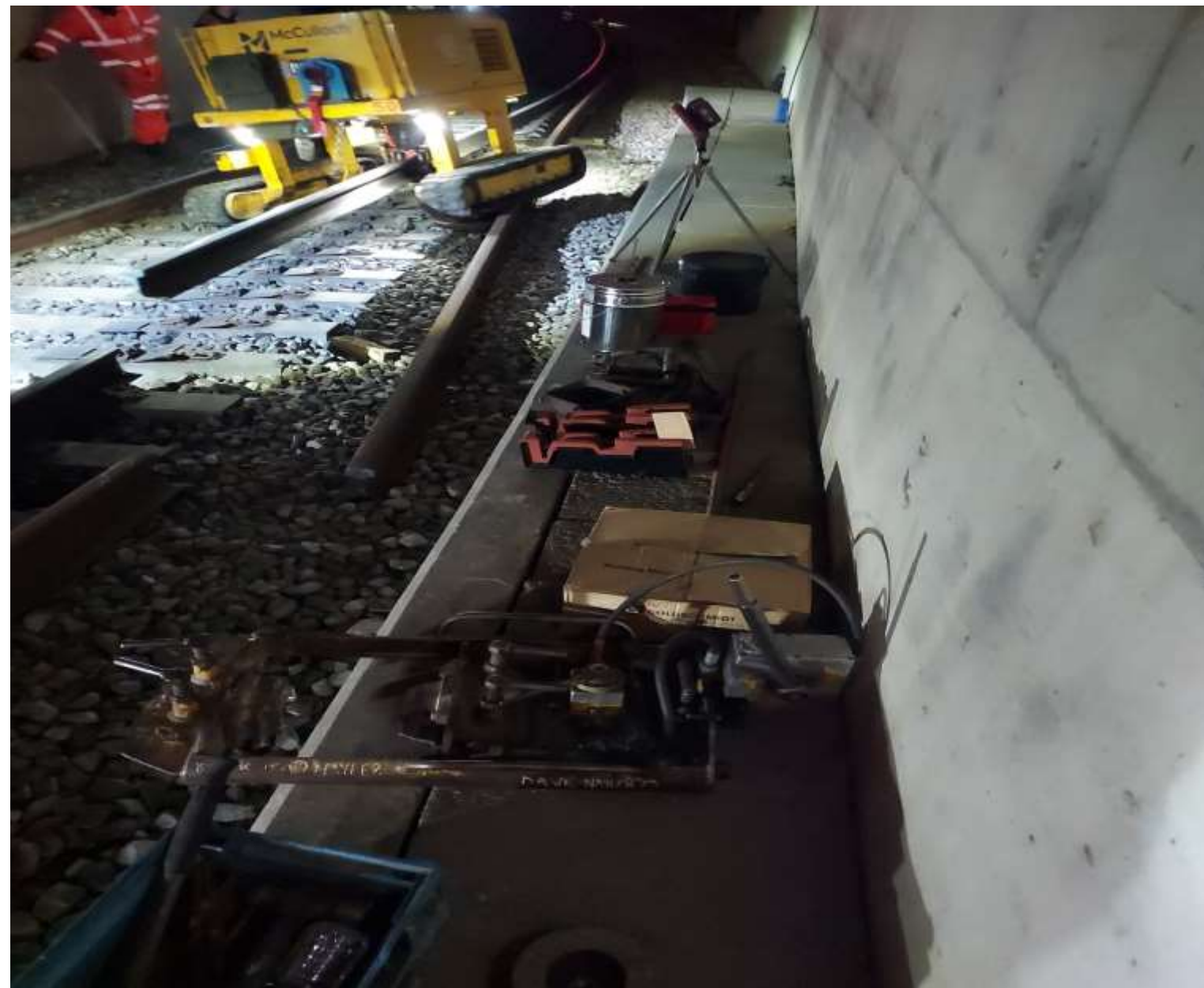
Area: Plain Track

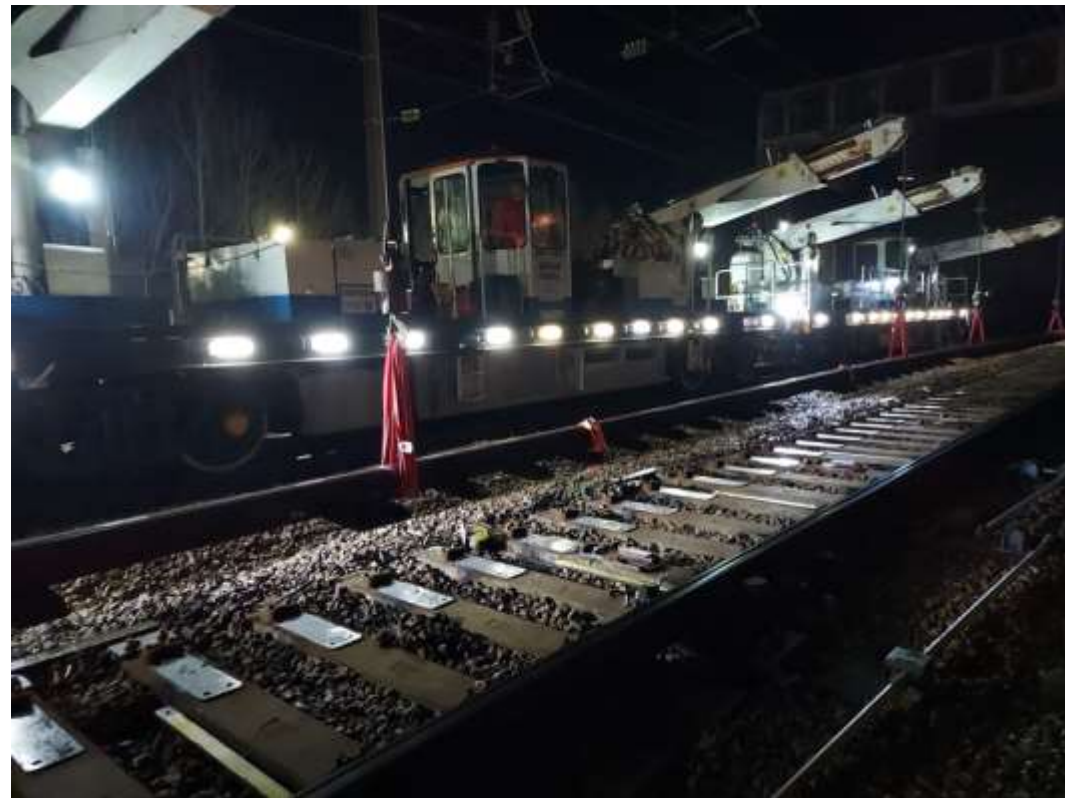
Sounding: 008

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Transferrable Lessons

- Know your asset
- Understand your customers
- Be consistent... but adaptable
- Build a solid foundation
- Take a system view
- Never stop developing