It is the railway’s legal responsibility to ensure boundary measures are in place to prevent human and livestock incursion. We often fall short of our obligations where boundary measures are expected to perform in hostile environments without sufficient intervention. Preventative measures are not consistently adopted. The design or condition of the boundary measure is not always appropriate for the risk presented by the adjacent land use.

**Analysis of causes**

- **Protection of the landowner**
  - No requirement for landowner to notify when adjacent land use change.
  - No requirement for landowner to notify when adjacent land use change.
  - Not understood by those responsible for asset.
- **Data capture**
  - No specific guidance on how to handle data if changes in adjacent land use.
  - No specific guidance on how to handle data if changes in adjacent land use.
  - Not understood by those responsible for asset.
- **Inspection**
  - No technology to identify changes in adjacent land use.
  - No technology to identify changes in adjacent land use.
  - Not understood by those responsible for asset.
- **Technology and Materials**
  - Materials technology used does not suit purpose.
  - Materials technology used does not suit purpose.
  - Not understood by those responsible for asset.
- **Installation**
  - No specific guidance for temporary installations.
  - No specific guidance for temporary installations.
  - Not understood by those responsible for asset.
- **Tension wire products**
  - No technology to detect changes.
  - No technology to detect changes.
  - Not understood by those responsible for asset.
- **Resilience**
  - Difficult to reach locations.
  - Difficult to reach locations.
  - Not understood by those responsible for asset.
- **Human and livestock**
  - Struck by vehicles.
  - Struck by vehicles.
  - Not understood by those responsible for asset.

**Prioritisation of issues**

- **Lack of standard design**
  - No specific guidance for temporary installations.
  - No specific guidance for temporary installations.
  - Not understood by those responsible for asset.
- **Lack of defined preventative measures**
  - No specific guidance for temporary installations.
  - No specific guidance for temporary installations.
  - Not understood by those responsible for asset.
- **Lack of defined preventative measures**
  - No specific guidance for temporary installations.
  - No specific guidance for temporary installations.
  - Not understood by those responsible for asset.
- **Lack of defined preventative measures**
  - No specific guidance for temporary installations.
  - No specific guidance for temporary installations.
  - Not understood by those responsible for asset.

**Analysis of the situation**

We seek to operate with robust boundary measures able to meet their expected life cycle within the operating environment. We require design specifications fully tested to provide sufficient protection to withstand incursion by human and livestock. This will include benchmarking various materials used in fence construction and the methods of installation in terms of post and cladding, tension and durability.

We seek to understand how we can protect our assets from degradation. This will include protection methods and processes for steel and timber products. It will also include research into natural and introduced corrosive agents and reactions.

When boundaries fail, we seek portable systems that maintenance teams can use after incident and deploy efficiently.

We rely on a combination of inspection and information provided by others to update registers on land use. We want to develop to a stage where we always know what the land adjacent to the asset is used for, so the boundary can be adapted accordingly. We need to explore alternative methods that can provide consistent information regarding land use change.

We manage approximately 28,000km of boundary measure. We need to be confident that inspection covers all of the asset. Inspections are undertaken by field teams over terrain that is difficult to access safely. We seek safe inspection methods that can be completed by other methodologies, especially when access is interrupted.

We need assurance that any boundary repairs undertaken provide either the same or improved security, compared with the original installation. This includes assessing temporary measures that have been installed to repair the boundary where problems have occurred. Repair products must be effective without the need for regular maintenance and be quick, easy and cost-effective to carry out.

**Specific research needs**

We seek to operate with robust boundary measures able to meet their expected life cycle within the operating environment. We require design specifications fully tested to provide sufficient protection to withstand incursion by human and livestock. This will include benchmarking various materials used in fence construction and the methods of installation in terms of post and cladding, tension and durability.

We seek to understand how we can protect our assets from degradation. This will include protection methods and processes for steel and timber products. It will also include research into natural and introduced corrosive agents and reactions.