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5<sup>th</sup> International Seminar on Underground Space  
Health & Safety in Underground Space  
October 18<sup>th</sup>, 2019, Lisboa, Portugal

# Enhancing H&S by Application of Digital Engineering Techniques

Case Studies:

Northern Line Extension  
Thames Tideway Tunnel

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Società Italiana Gallerie  
Italian Tunnelling Society



FGU Fachgruppe für Untertagbau  
GTS Groupe spécialisé pour les travaux souterrains  
GLS Gruppo specializzato per lavori in sotterraneo  
STS Swiss Tunnelling Society

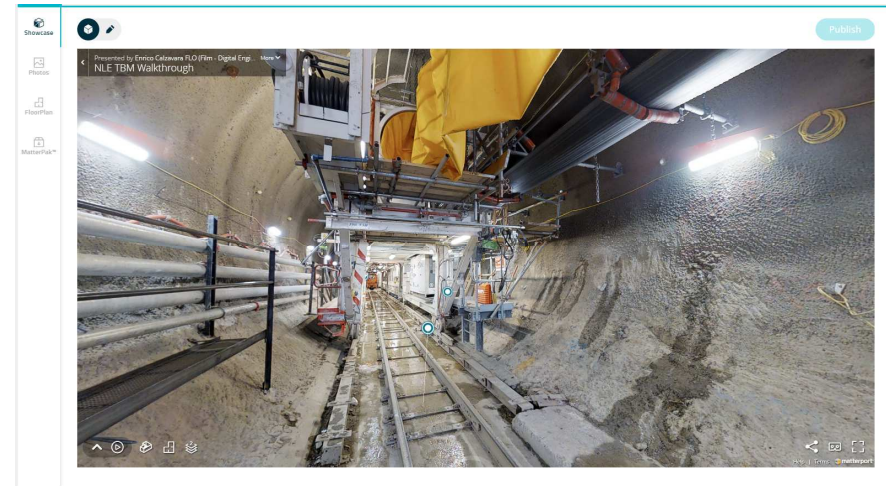
# Introduction

- UK BIM Mandate - 2016
- Benefits for Construction Phase
- Digital Engineering – Ferrovial Infrastructure Lifecycle Management

- Digital Strategy
  - Northern Line Extension
  - Thames Tideway Tunnel
- Progressing Industry – Digitalising

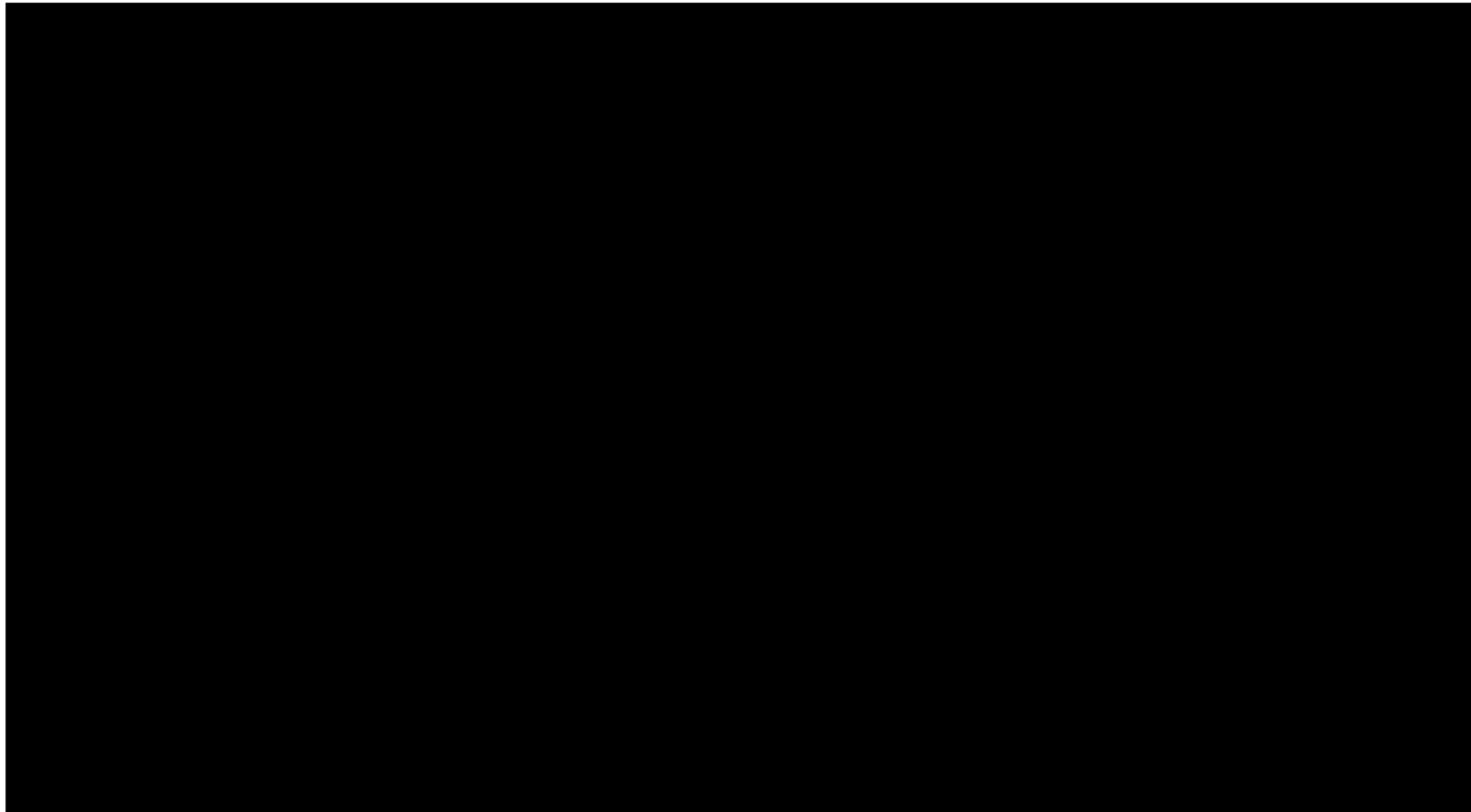


# Matterport: TBM Model

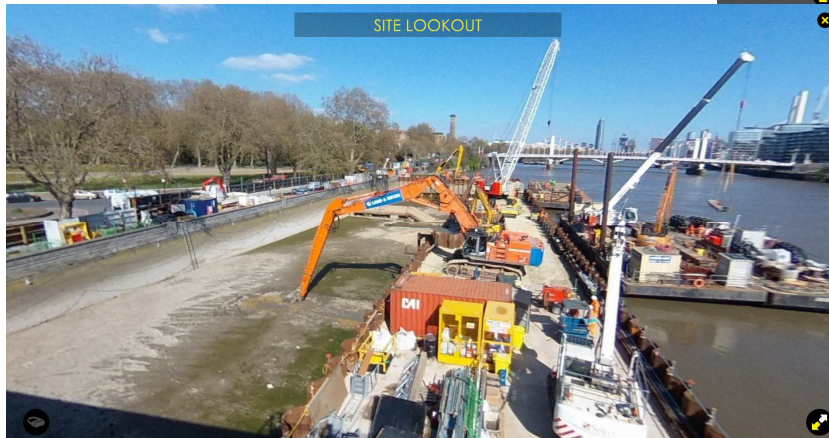
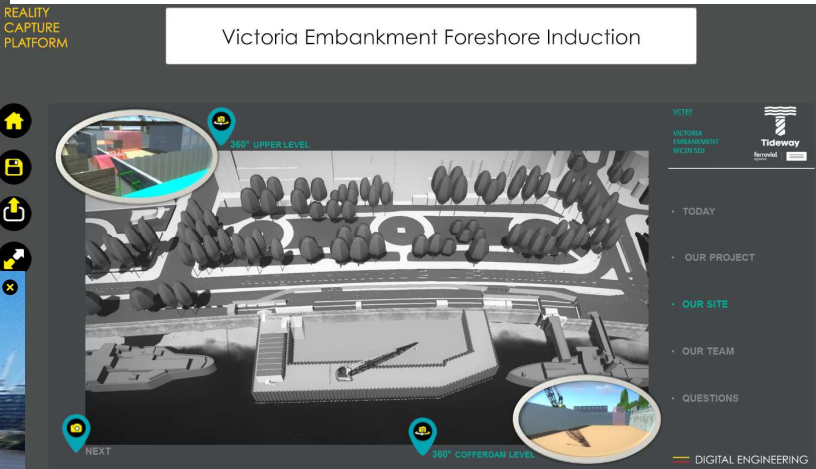
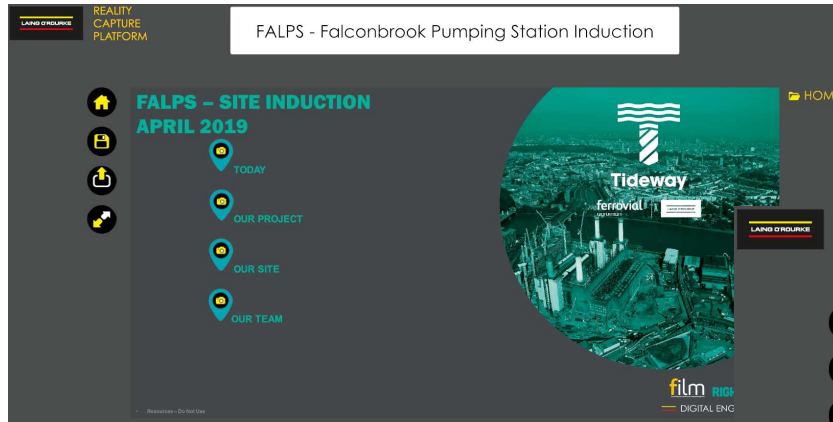


<https://my.matterport.com/models/ReWxm4UCWbF?section=media&media-section=showcase>

# Matterport: Step Plate Junction



# Reality Capture Platform (RCP)



# Site Logistics & Fire Evacuation



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# Construction Sequencing

Digital  
Engineering

film  
From the real world to the virtual

## Step Plate Junction Construction Methodology Northern Line Extension, London, UK November 20

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# H&S Possession Pamphlet

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 AITES  
 Sociedade Portuguesa de Geotecnia  
 Comissão Portuguesa de Túneis  
 LABORATÓRIO NACIONAL DE ENGENHARIA CIVIL  
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# Immersive Technology: VR Headset



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# Obrigado!



**Tideway**

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