



**ITA TUNNELLING  
AWARDS 2019**



# Finsbury Park Station Step-Free Access

**UNITED KINGDOM**

PROJECT OF THE YEAR  
INCLUDING RENOVATION (UP TO €50M)

MICHAEL NARDONE, PG  
VICE PRESIDENT AMERICAS  
18<sup>TH</sup> NOVEMBER 2019





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## **Finsbury Park Station**

Step-Free Access – United Kingdom



### **Project Summary**

### **Challenges**

### **Solutions, Sustainability & Safety**

### **Achievements**



Miami, USA 18<sup>th</sup> November 2019



**GOLDER**



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## **Finsbury Park Station**

**Step-Free Access – United Kingdom**



### **A \$25M project with multiple challenges and complexities**

- Project constructed safely while maintaining all station operations
- Holistic Integrated approach temporary and permanent works and construction methodology
- Design Innovation solutions utilising Hand Mining techniques
- Maintaining and adapting existing assets
- Controlling ground movement using discrete excavations and support systems.

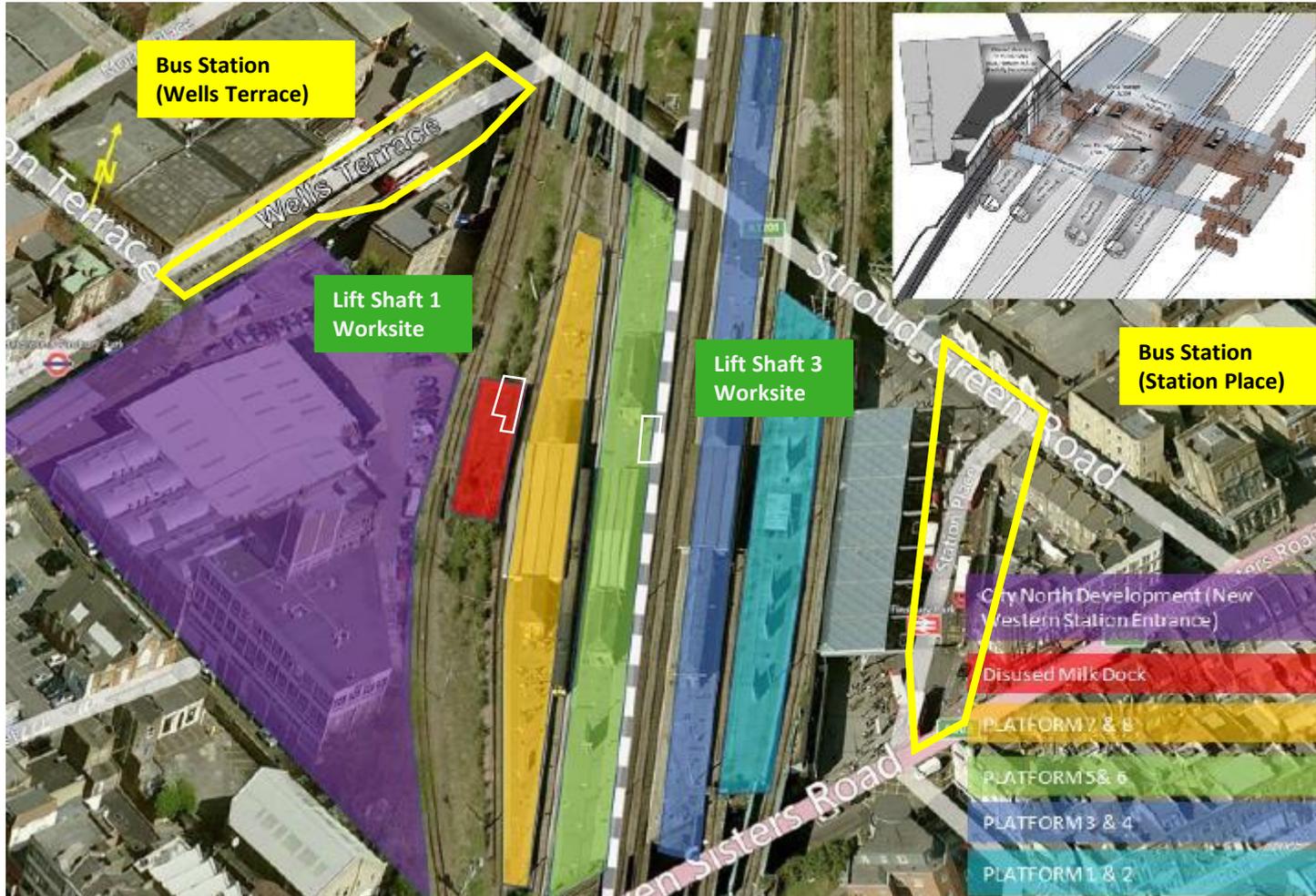




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# Finsbury Park Station

Step-Free Access – United Kingdom



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Miami, USA 18<sup>th</sup> November 2019

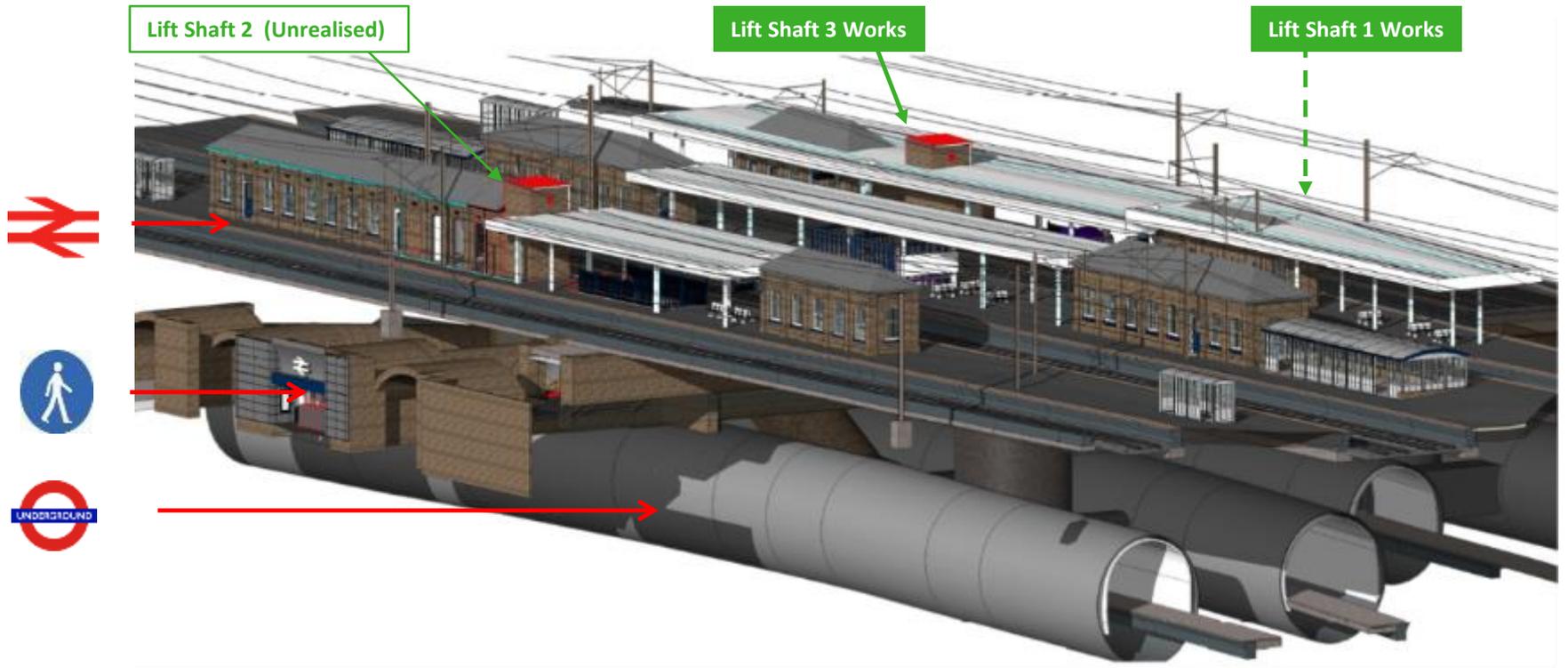
PROJECT SUMMARY



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# Finsbury Park Station

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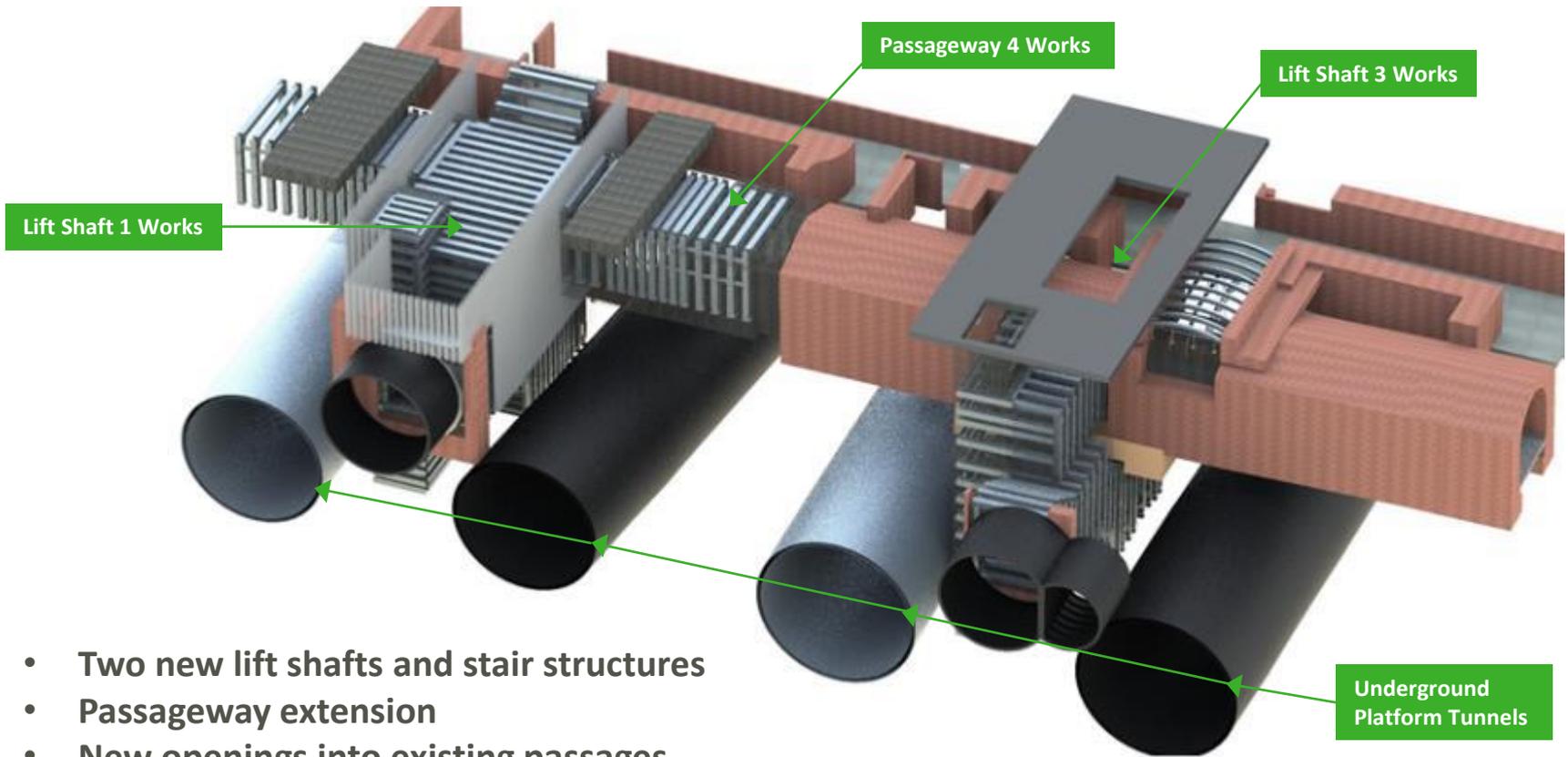




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# Finsbury Park Station

## Step-Free Access – United Kingdom



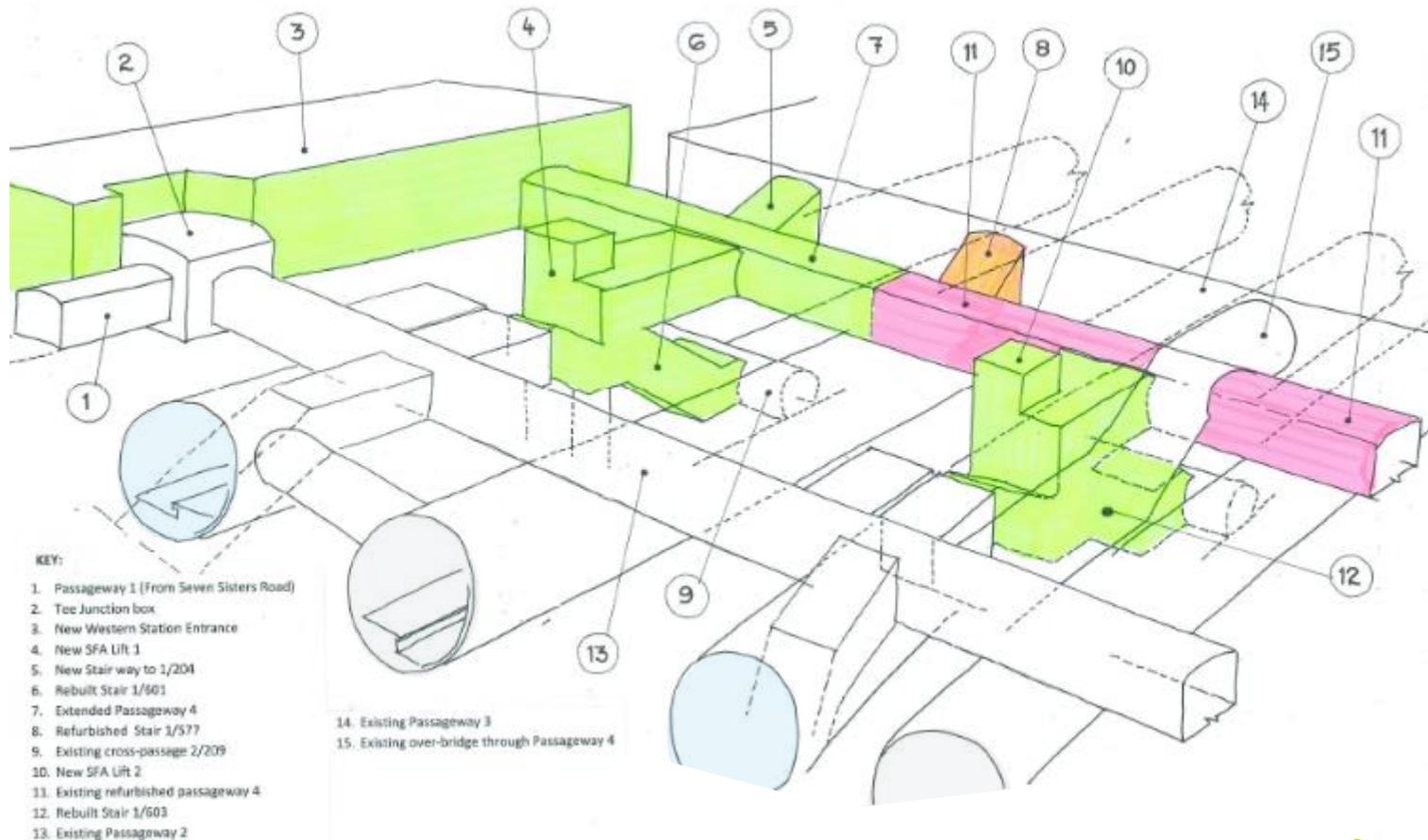
- Two new lift shafts and stair structures
- Passageway extension
- New openings into existing passages
- Demolition of existing stairs



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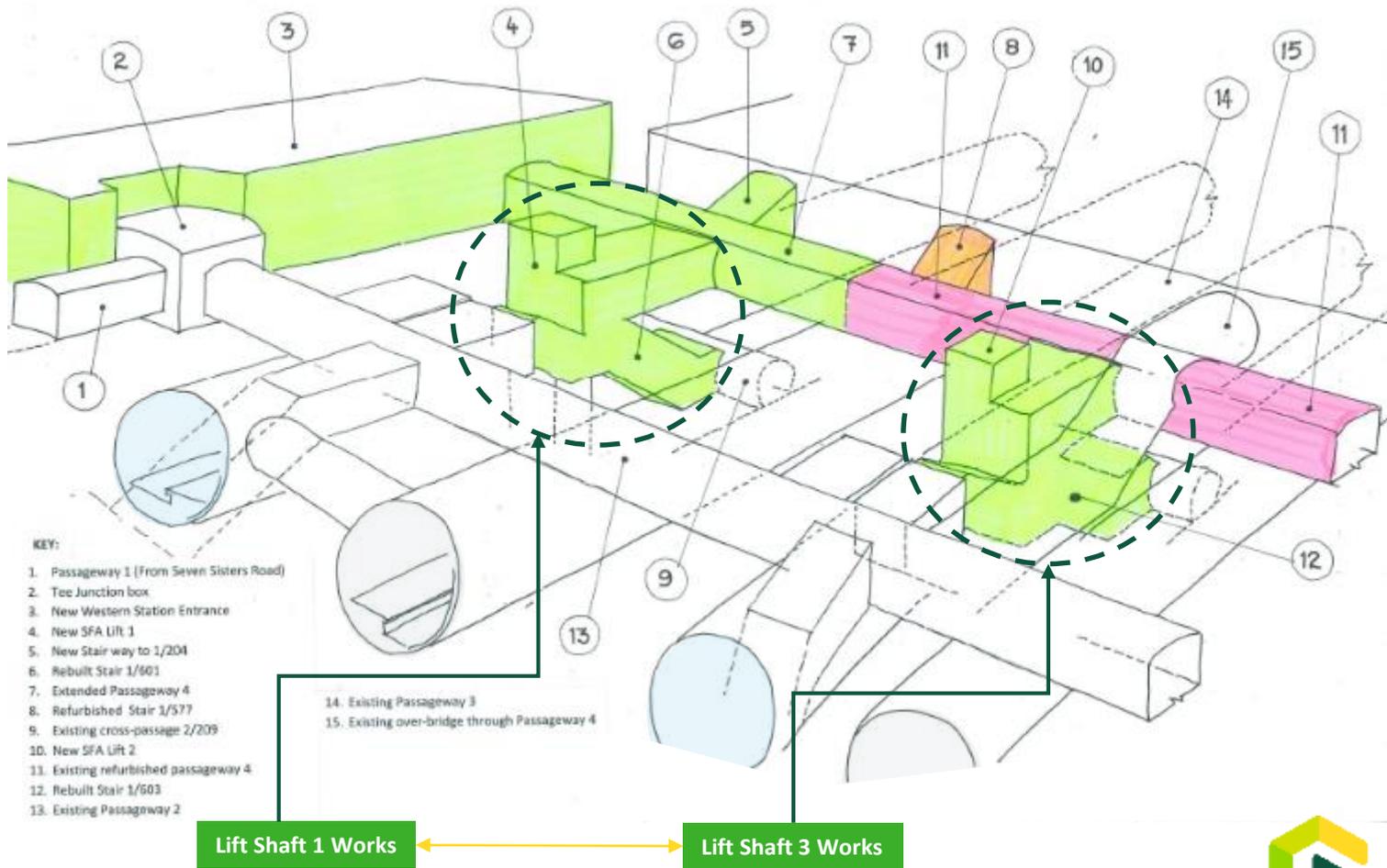




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# Finsbury Park Station

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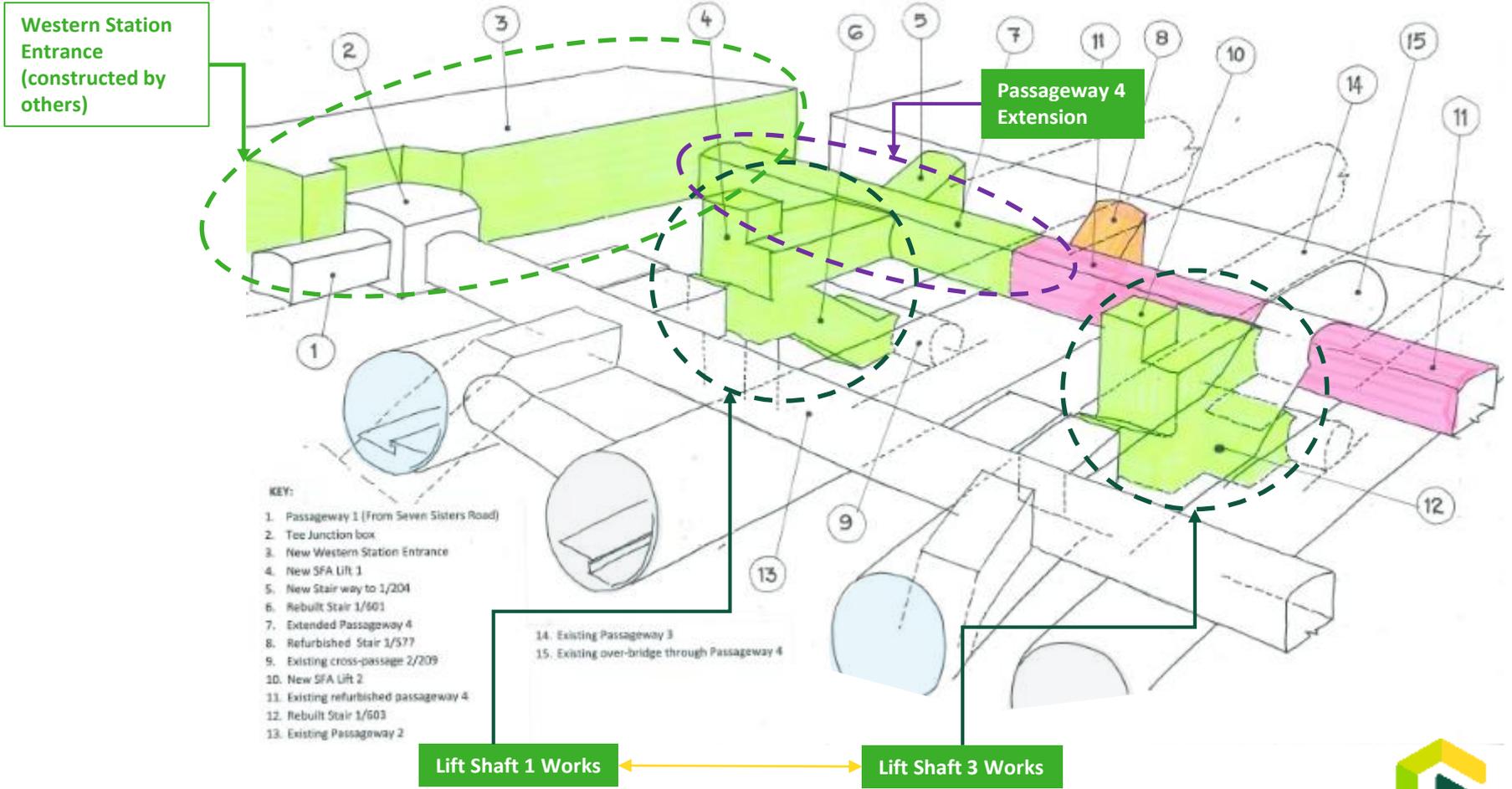




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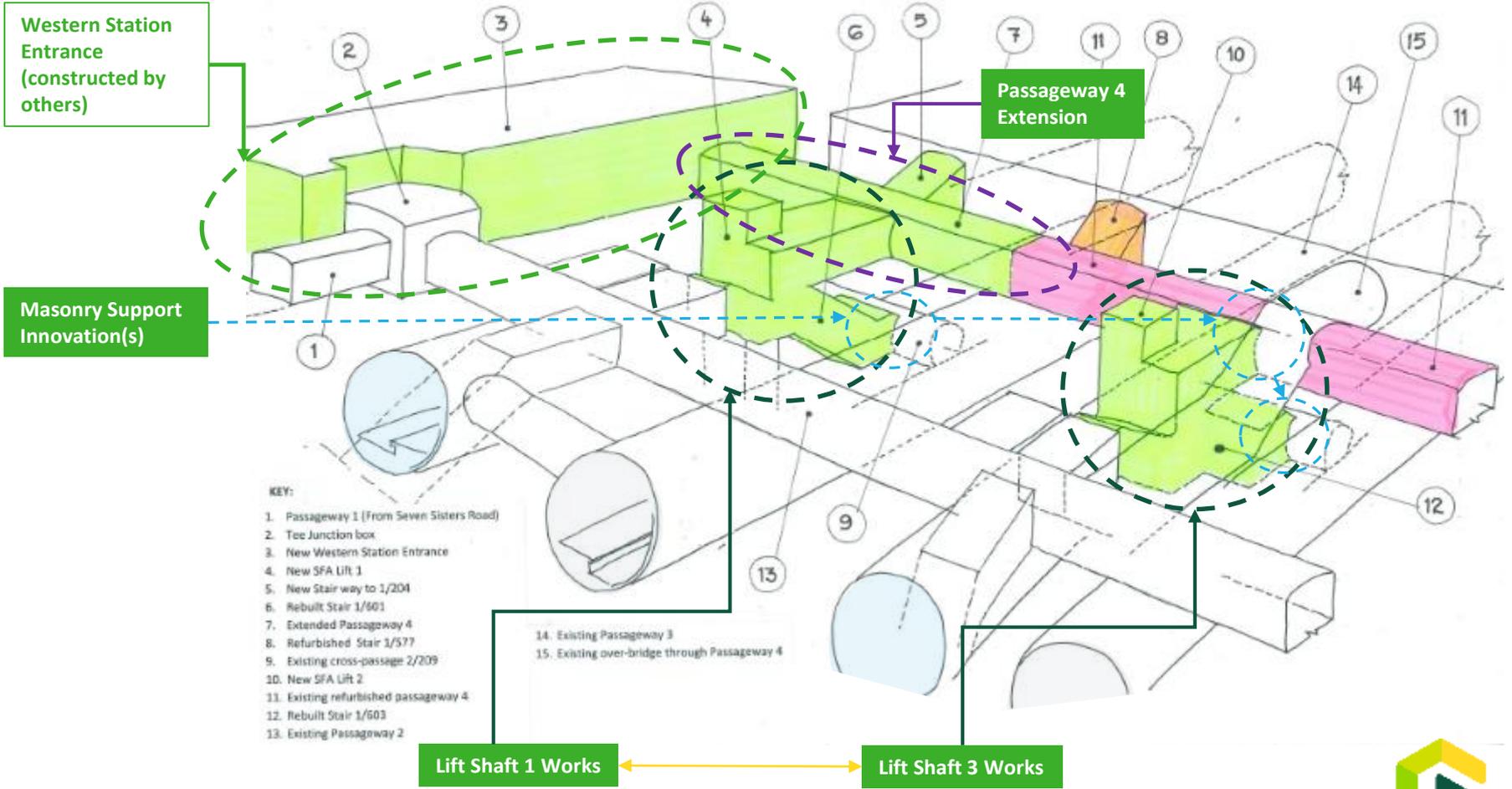




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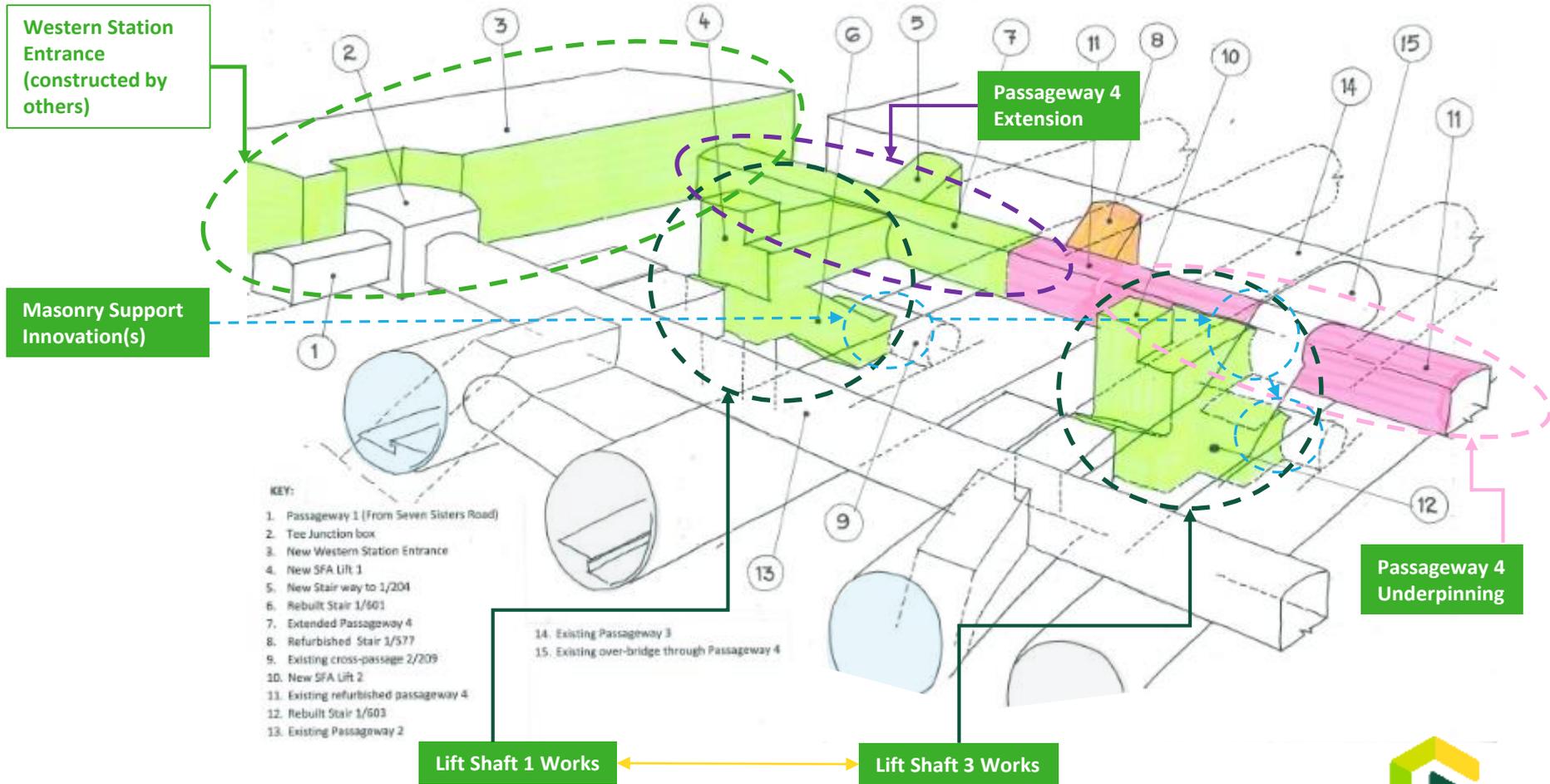




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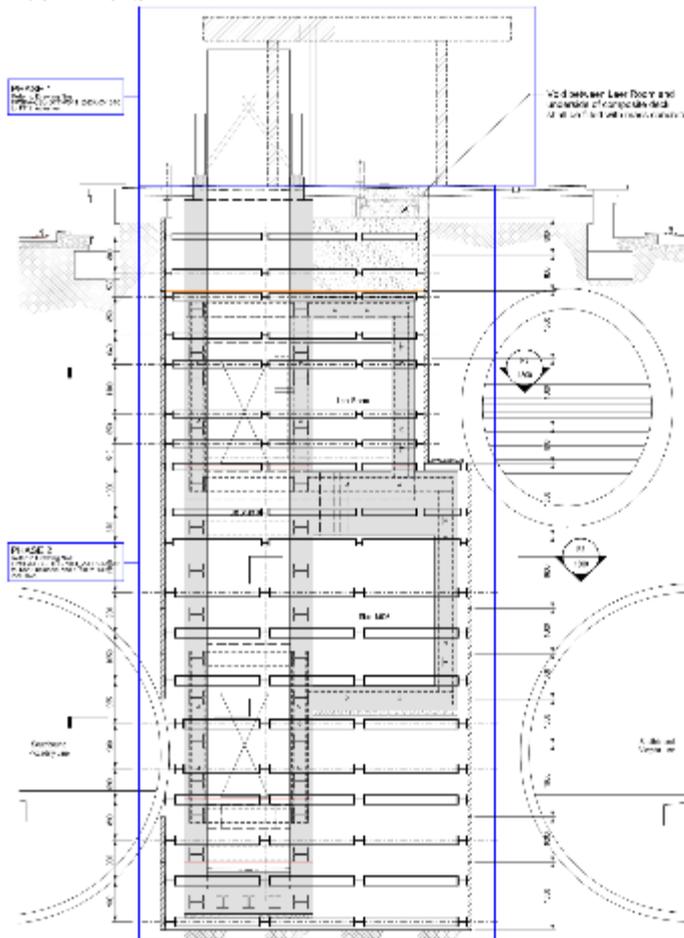




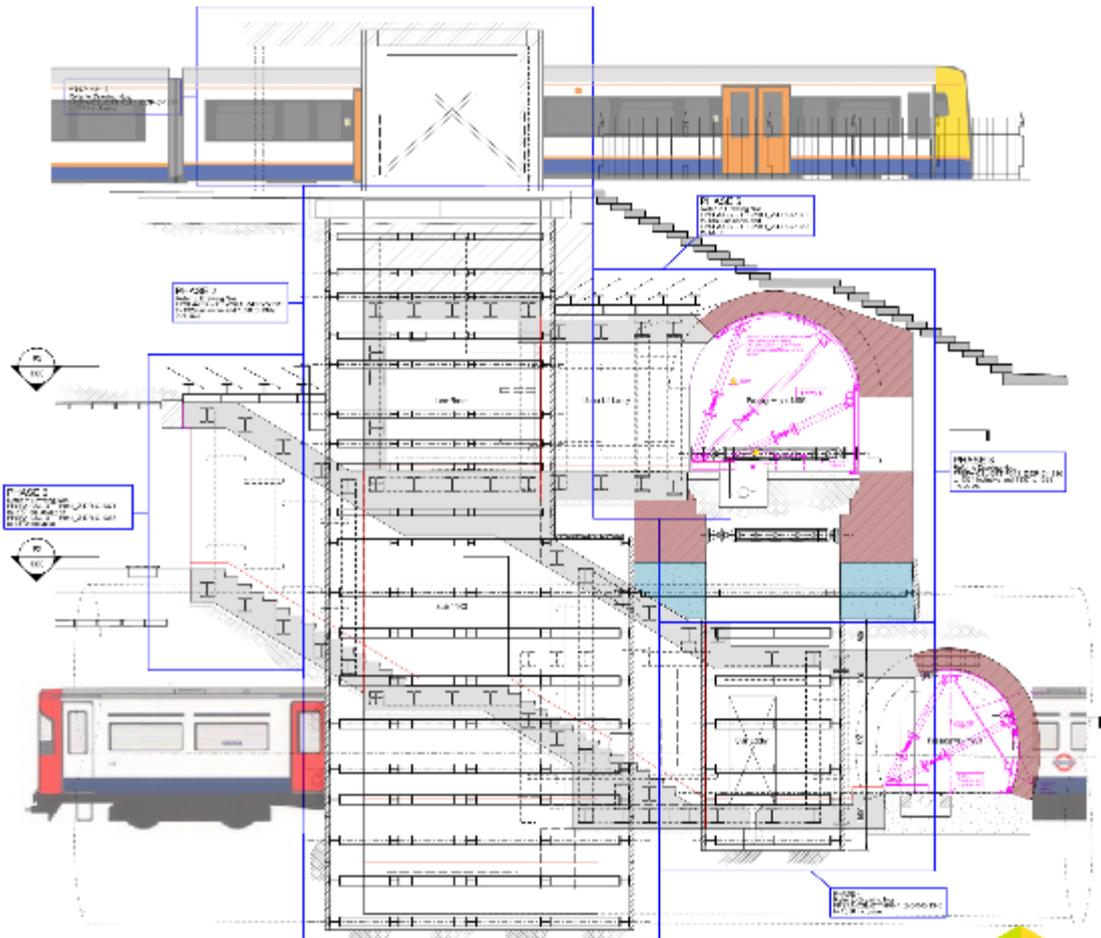
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# Finsbury Park Station

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1 Cross Section Through Lift Shaft



2 Longitudinal Section Through Stair



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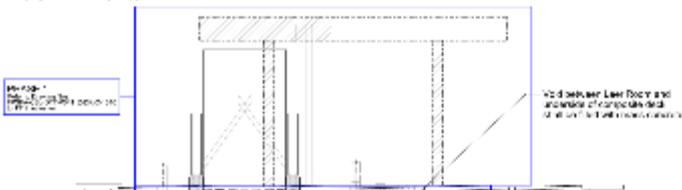
# Finsbury Park Station

## Step-Free Access – United Kingdom

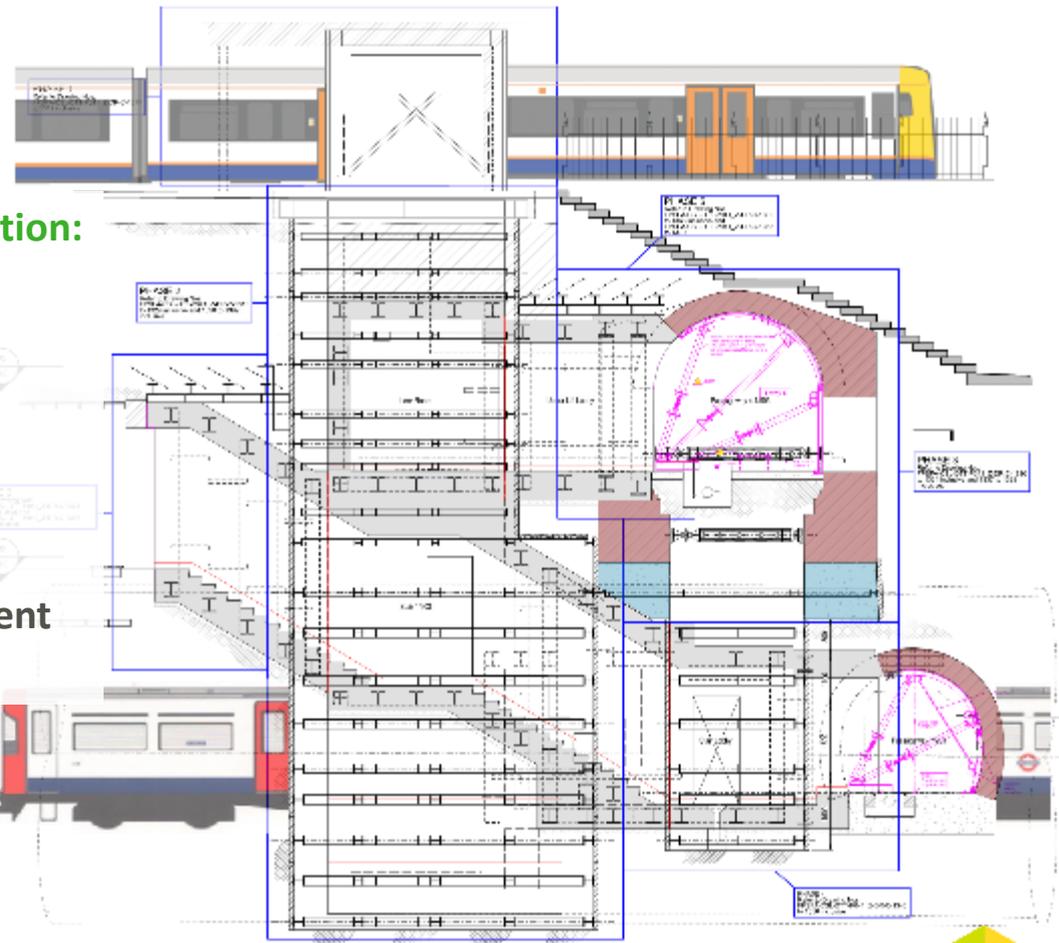


### Hand Mining was the only pragmatic solution:

- Obviously safety critical environment
- Complex sequential excavation and support methodology was most effective approach
- Quick and adaptive in resolving unexpected in-ground conditions
- Inherently adaptive for working adjacent to legacy assets



1 Cross Section Through L11 Shaft



2 Longitudinal Section Through Stair

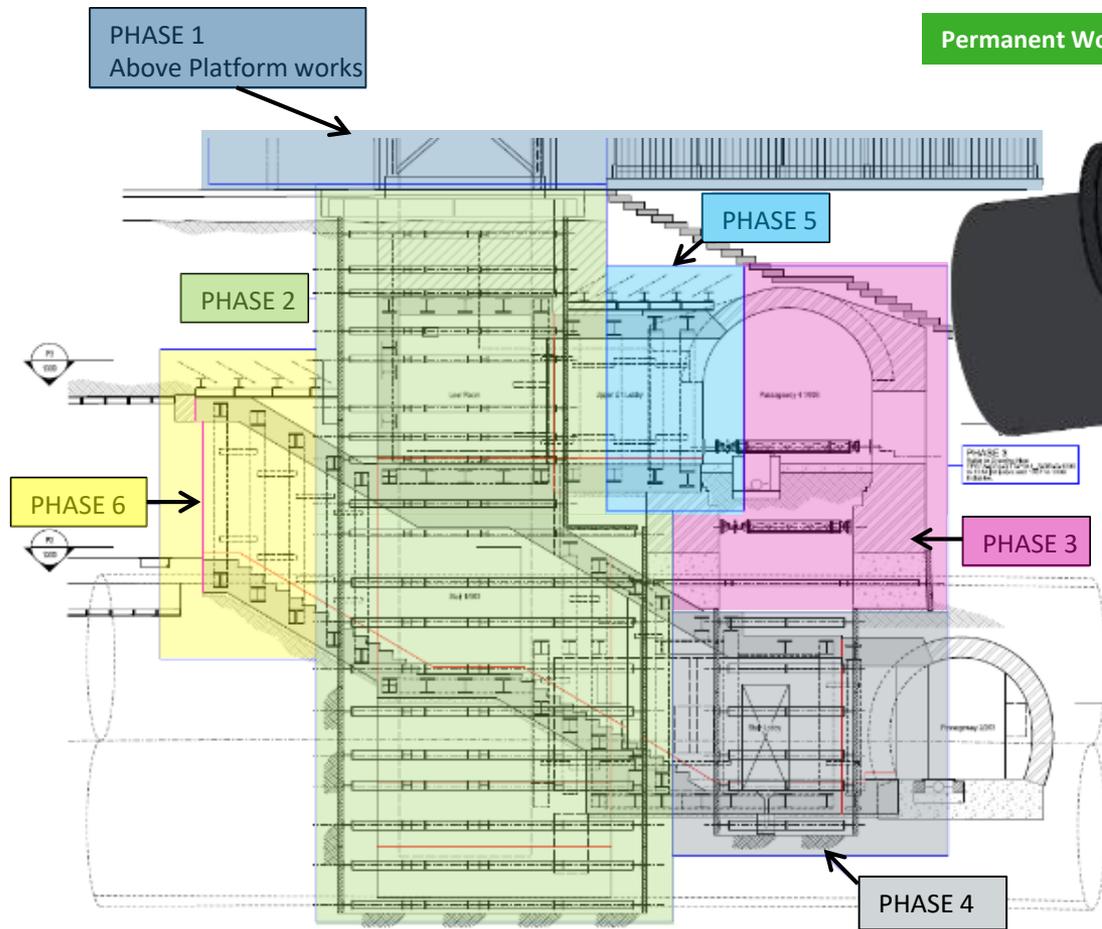




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Permanent Works

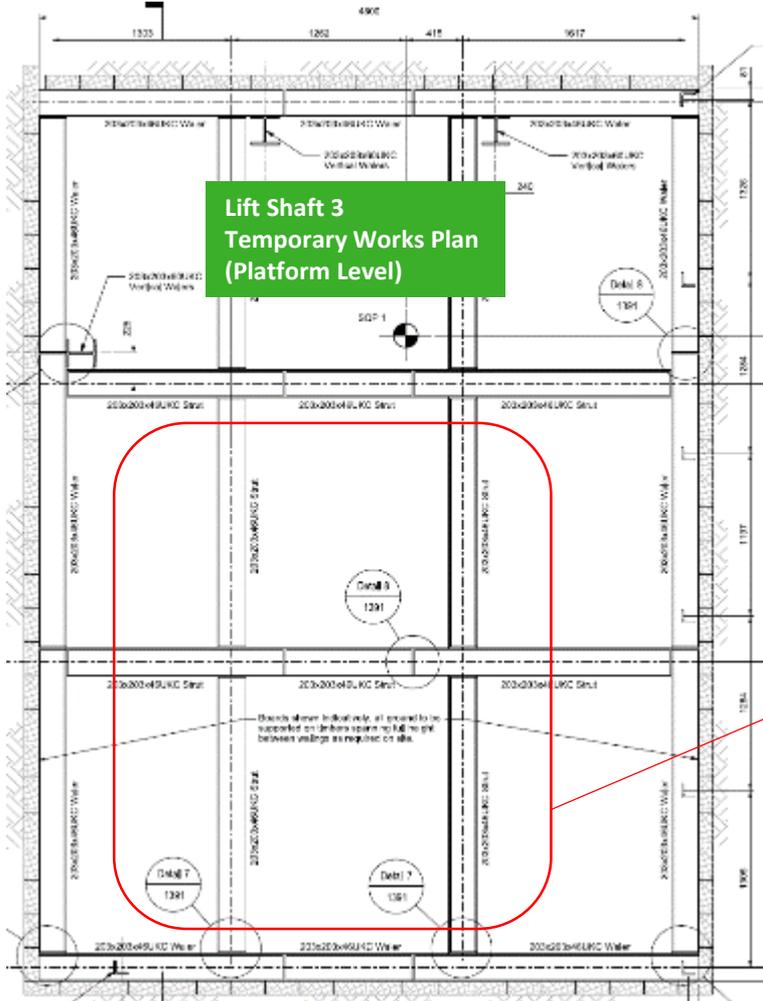
- Small, discrete sequential excavations
- Immediate introduction of support
- Safe, controlled ground movements
- >100 detailed staged operations



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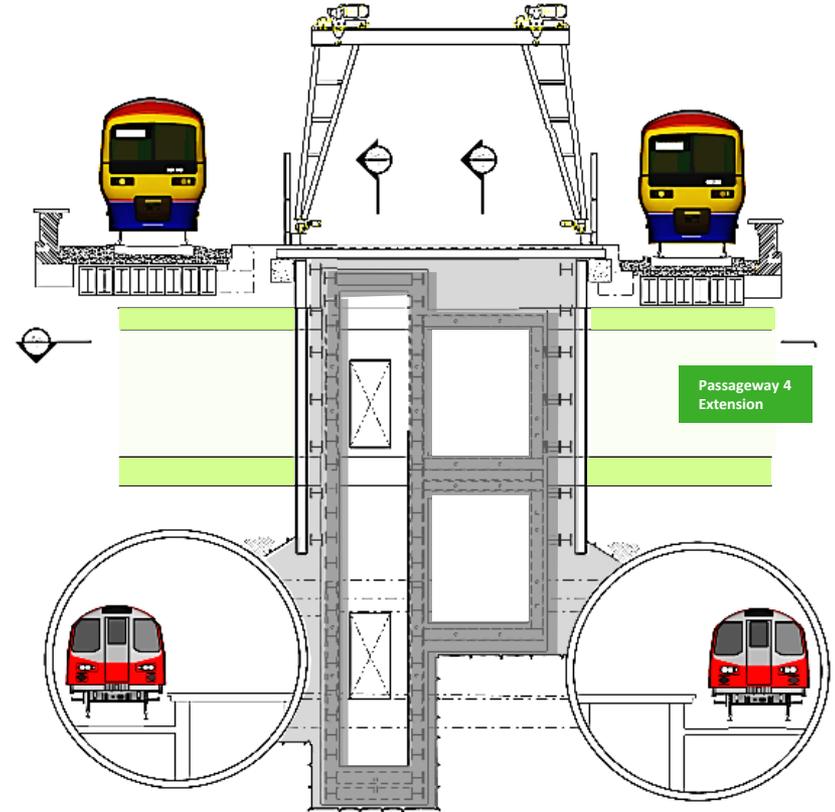
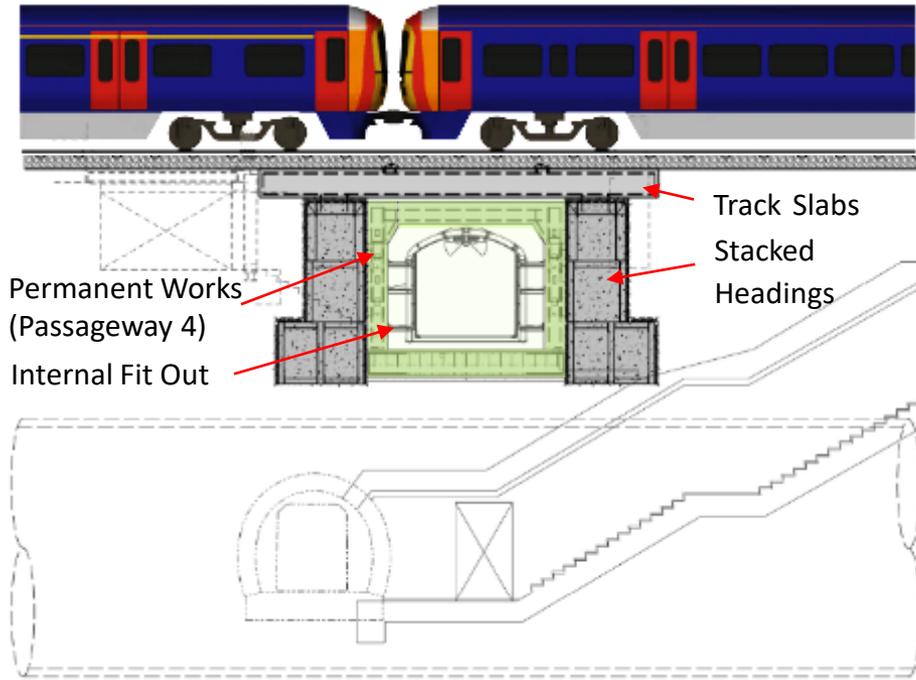
- Temporary works were detailed for flexibility, simplicity, speed & safety
- Holistic approach allowed recovery of temporary works members for re-use



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- Reduced risk, ability to control and minimise ground movements
- Excavation between and under the Overground and next to the Underground lines
- Safe operational continuity, track slabs undermined with stacked headings



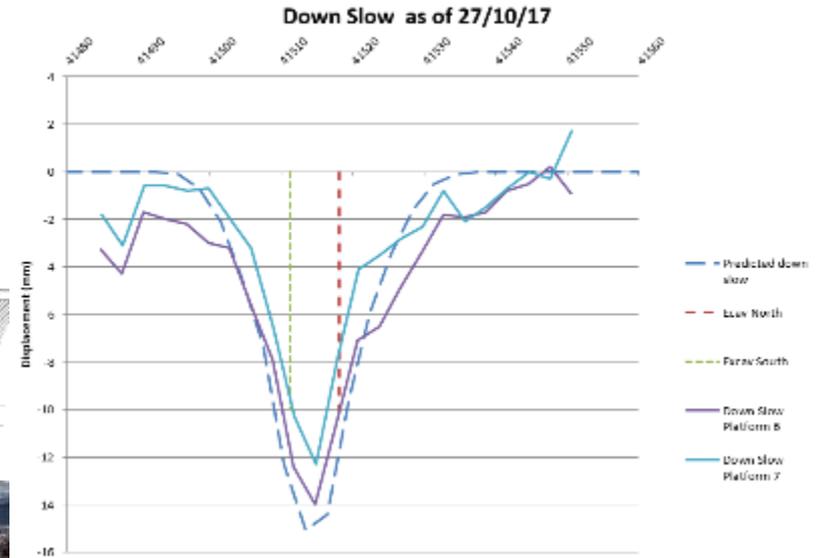
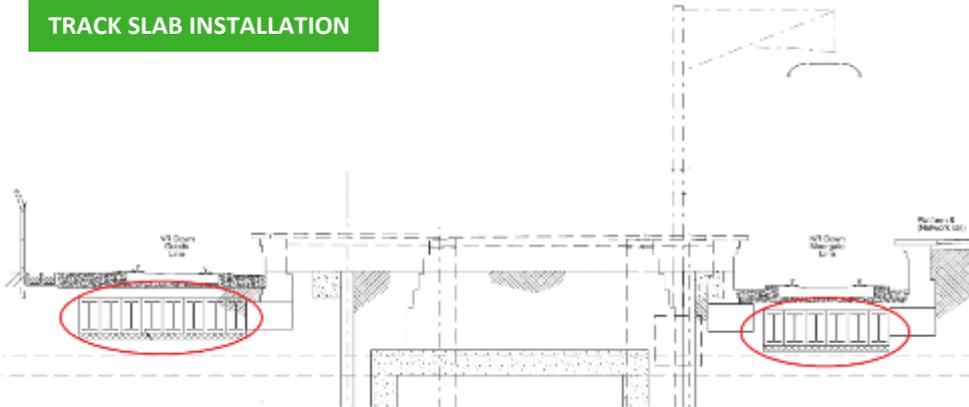
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### TRACK SLAB INSTALLATION



Example of actual Network Rail track movement versus predicted values

Predicted movement and extent of damage assessed at the following locations:

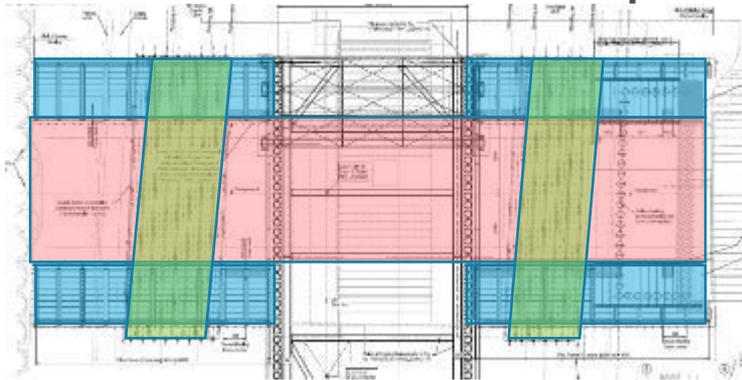
1. NR Tracks
2. NR Platforms
3. NR Underground Structures
4. LU Platform Tunnels and Tracks
5. LU Underground Structures



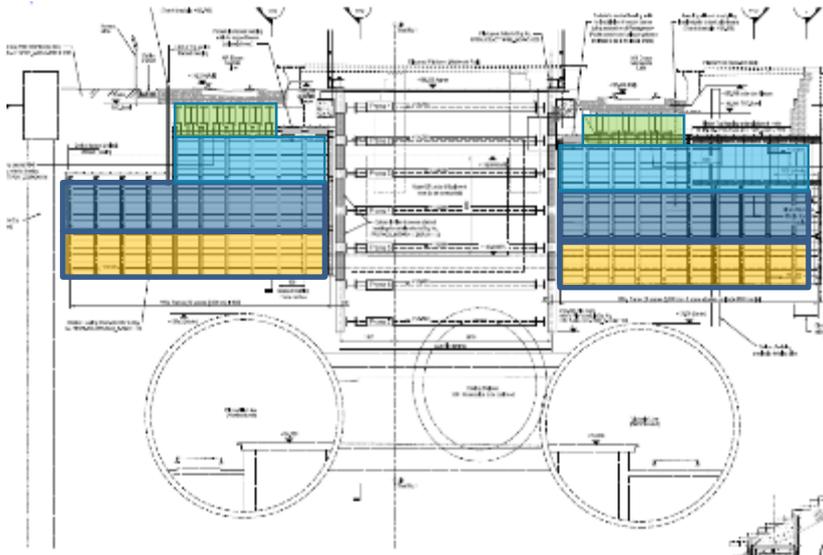
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Plan



Section

- Steel pile installation (for main pit) & track slabs installed during early possession
- All other works carried out while all lines remained operational
- Goods Rail Line utilized to transport spoils to staging area and import construction materials



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## **Finsbury Park Station** Step-Free Access – United Kingdom

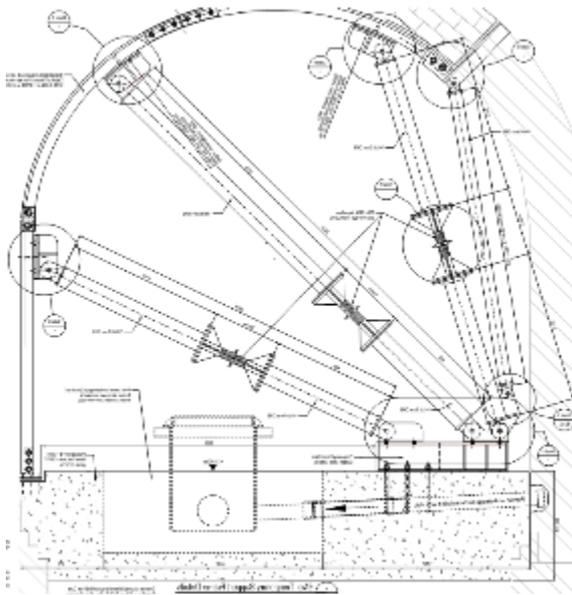


**Permanent works installed between the stacked headings,  
below the track slabs, carrying live rail loads during construction**



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TEMPORARY  
CONDITION



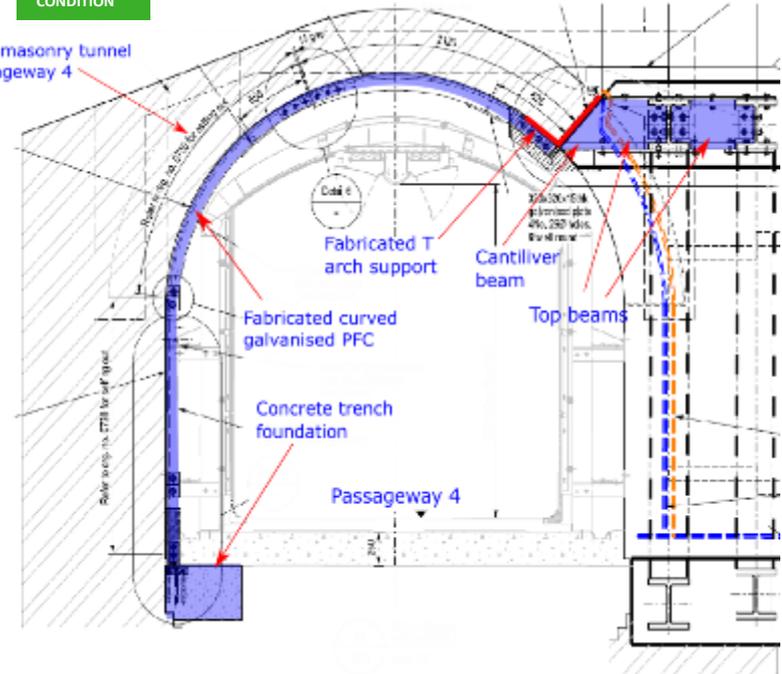
## Finsbury Park Station

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PERMANENT  
CONDITION

Existing masonry tunnel  
on Passageway 4



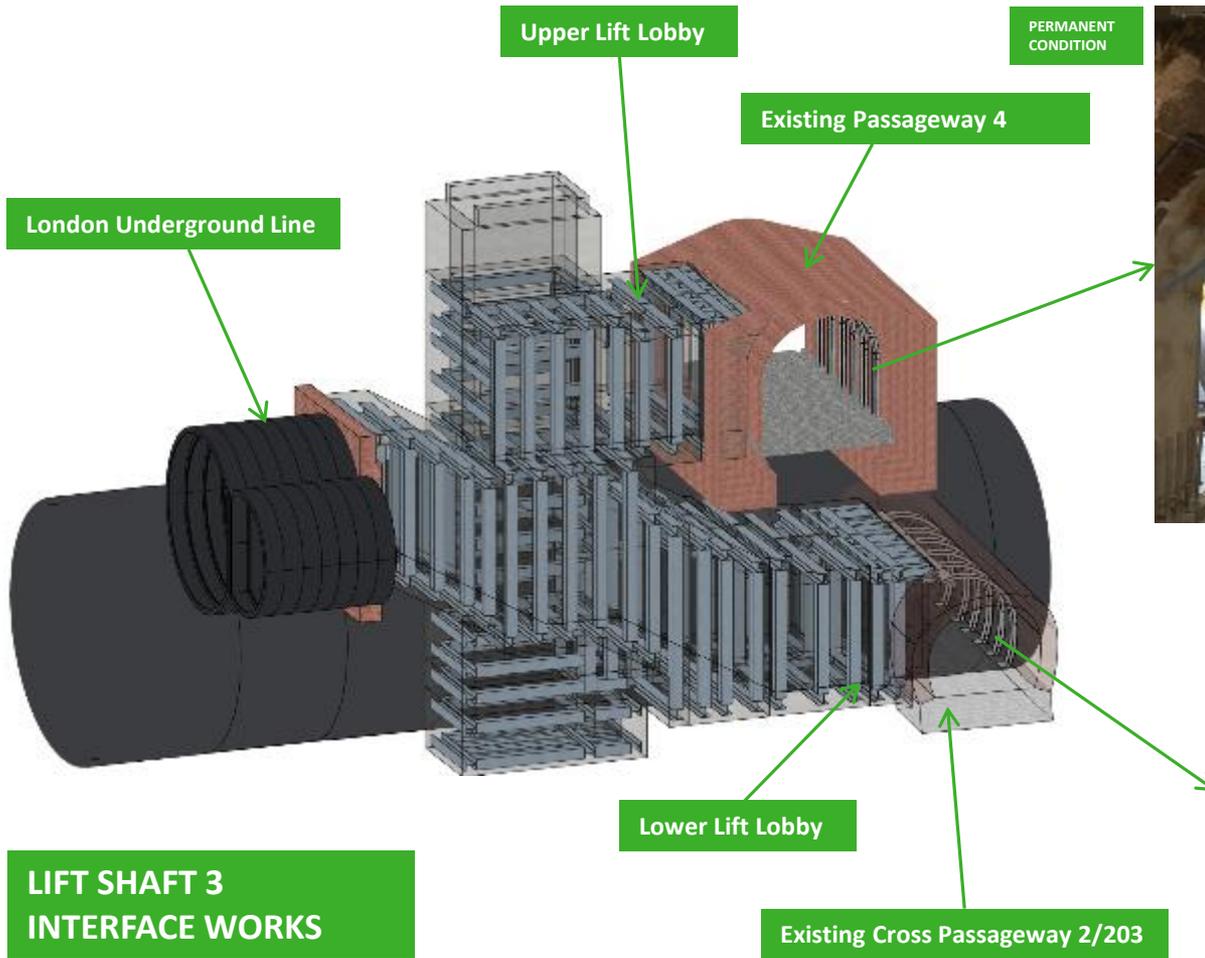
- Allowed constant rail operation throughout the works
- Cost-effective and less intrusive method to form the connection.
- Reduced the risk of damaging the existing Assets
- Less temporary works were necessary
- Successfully implemented and utilised in several locations



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**Innovative temporary & permanent masonry tunnel support shown in temporary support condition prior to formation of new opening**



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**Underpinning of distressed dis-used passageway between the two Underground Platform tunnels to allow new opening and undermining to form a new access to new lift shaft**



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**Existing Passageway 4 Underpinning**