

Rail and Underground Panel



Date: 16 October 2015

Item: Victoria Station Upgrade

This paper will be considered in public

1 Summary

- 1.1 The accompanying presentation provides an insight into the challenges faced by the Victoria Station Upgrade Programme, and the approaches taken to addressing them.
- 1.2 The presentation describes:
- (a) the need for the scheme;
 - (b) the challenges faced in delivering the complex engineering solution in a very busy central London location while all aspects of this major transport hub continued to operate;
 - (c) the achievements so far delivered while maintaining an excellent safety record; and
 - (d) The engineering approach taken to meet some of the challenges.

2 Recommendation

- 2.1 **The Panel is asked to note the paper and presentation.**

List of appendices to this report:

Appendix 1: Presentation on Victoria Station Upgrade

List of Background Papers:

None

Contact Officer: David Waboso, Capital Programmes Director, London Underground
Number: 020 3054 8228
Email: david.waboso@tube.tfl.gov.uk

Rail and Underground Panel



Victoria Station Upgrade

16 October 2015



Victoria - Transport Hub

- LU Victoria Station
- Network Rail Victoria mainline station to South & South East
 - Victoria Bus Terminal
- Main route to Gatwick Airport
 - Victoria Coach Station



Busy, Urban, Central London Location



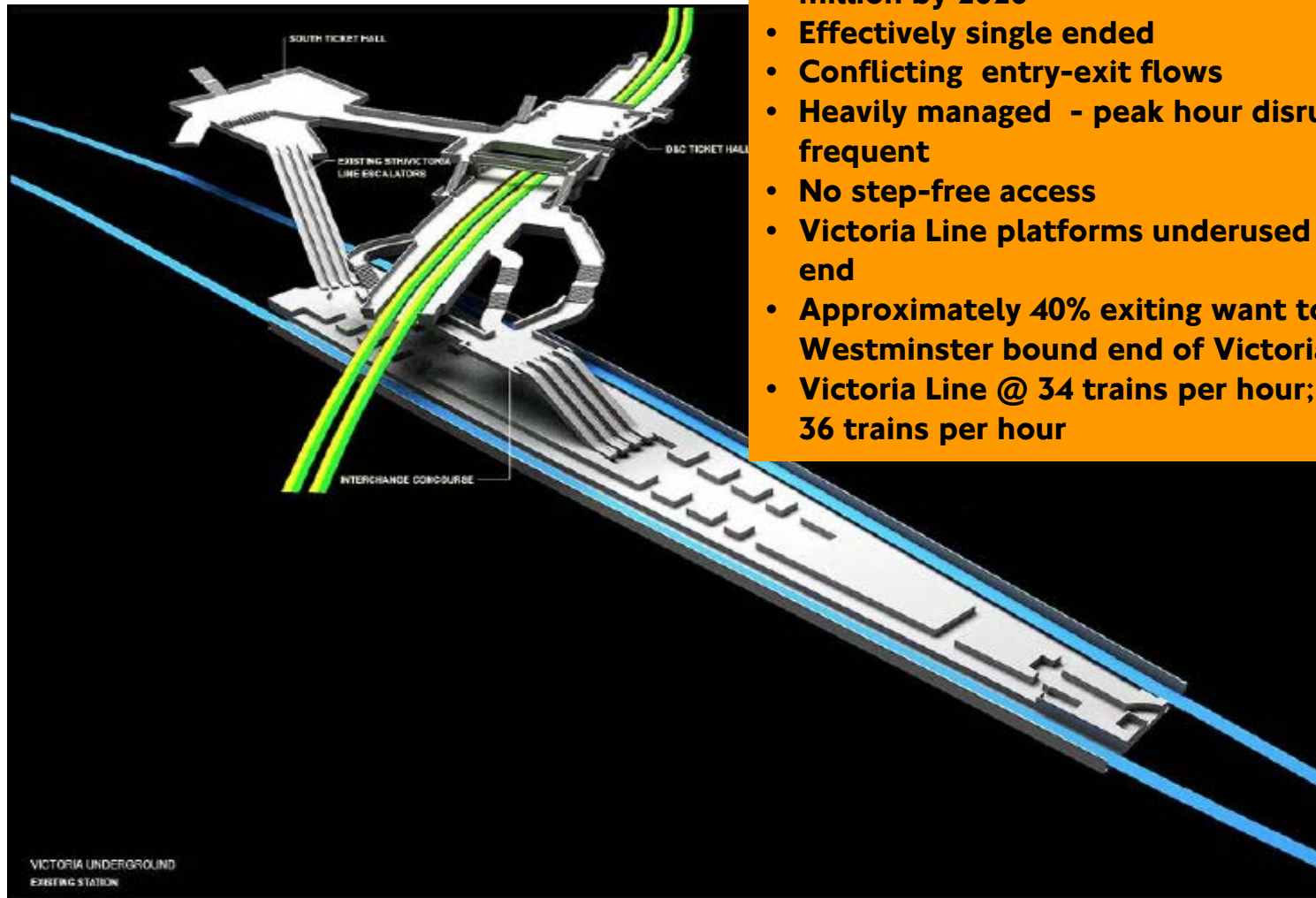
Congestion at London Underground Victoria Station



Why Upgrade?



Victoria Station 2008

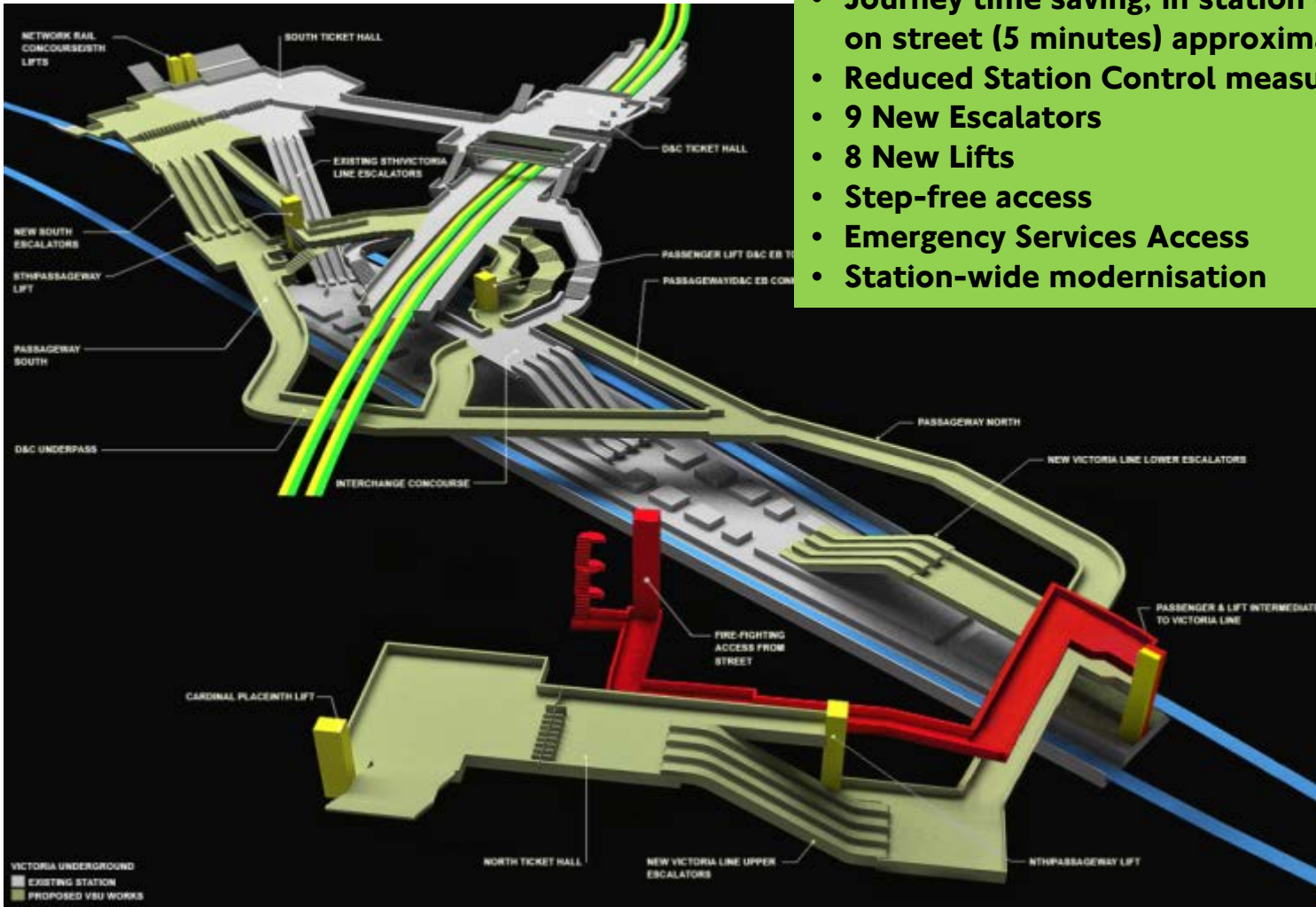


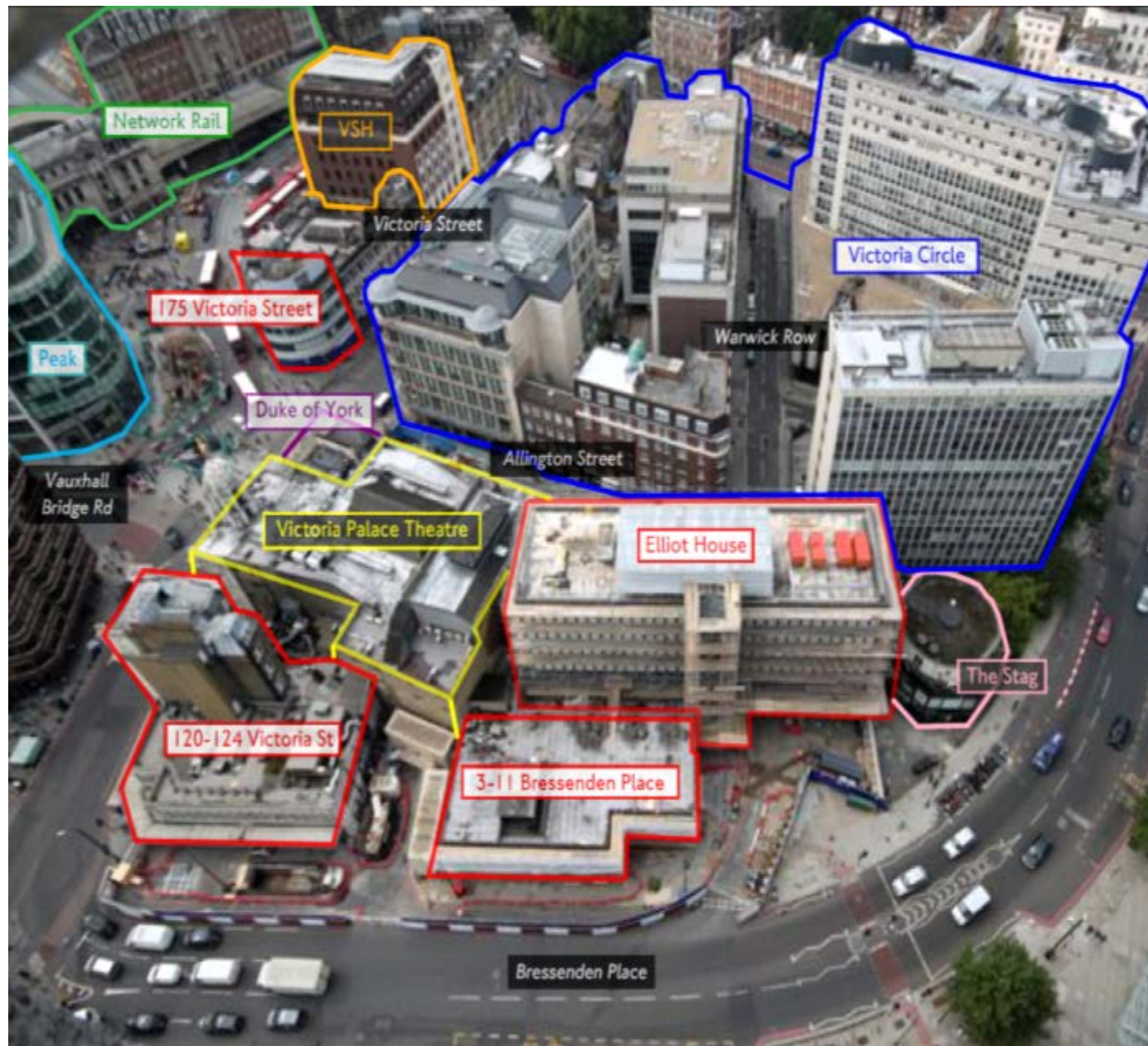
- Insufficient capacity – over 82 million journeys per year NOW; forecast 100 million by 2020
- Effectively single ended
- Conflicting entry-exit flows
- Heavily managed - peak hour disruption frequent
- No step-free access
- Victoria Line platforms underused at north end
- Approximately 40% exiting want to be Westminster bound end of Victoria Street
- Victoria Line @ 34 trains per hour; target 36 trains per hour



Victoria Station 2018

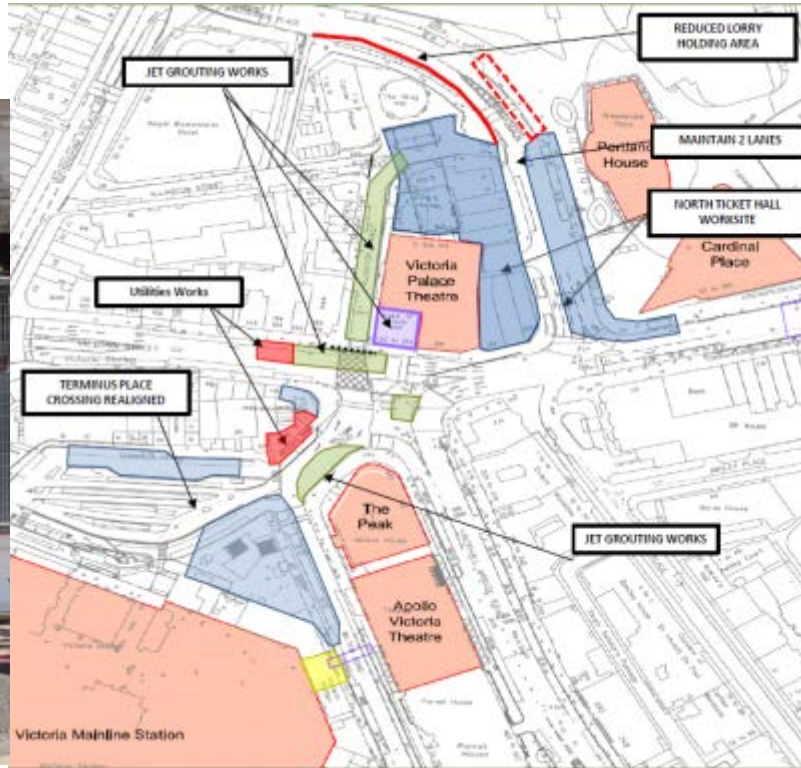
- Station enlarged by 110%
- Double ended
- Journey time saving, in station (6 minutes) on street (5 minutes) approximately
- Reduced Station Control measures
- 9 New Escalators
- 8 New Lifts
- Step-free access
- Emergency Services Access
- Station-wide modernisation





Important, high profile stakeholders impacted directly by the works:

- Victoria Palace Theatre
- Apollo Theatre
- Network Rail Victoria Station
- Land Securities Development (Nova)
- Close proximity to Westminster Parliament
- Residents
- Local Businesses
- London Underground Victoria Station
- TfL Buses
- TfL Surface Transport

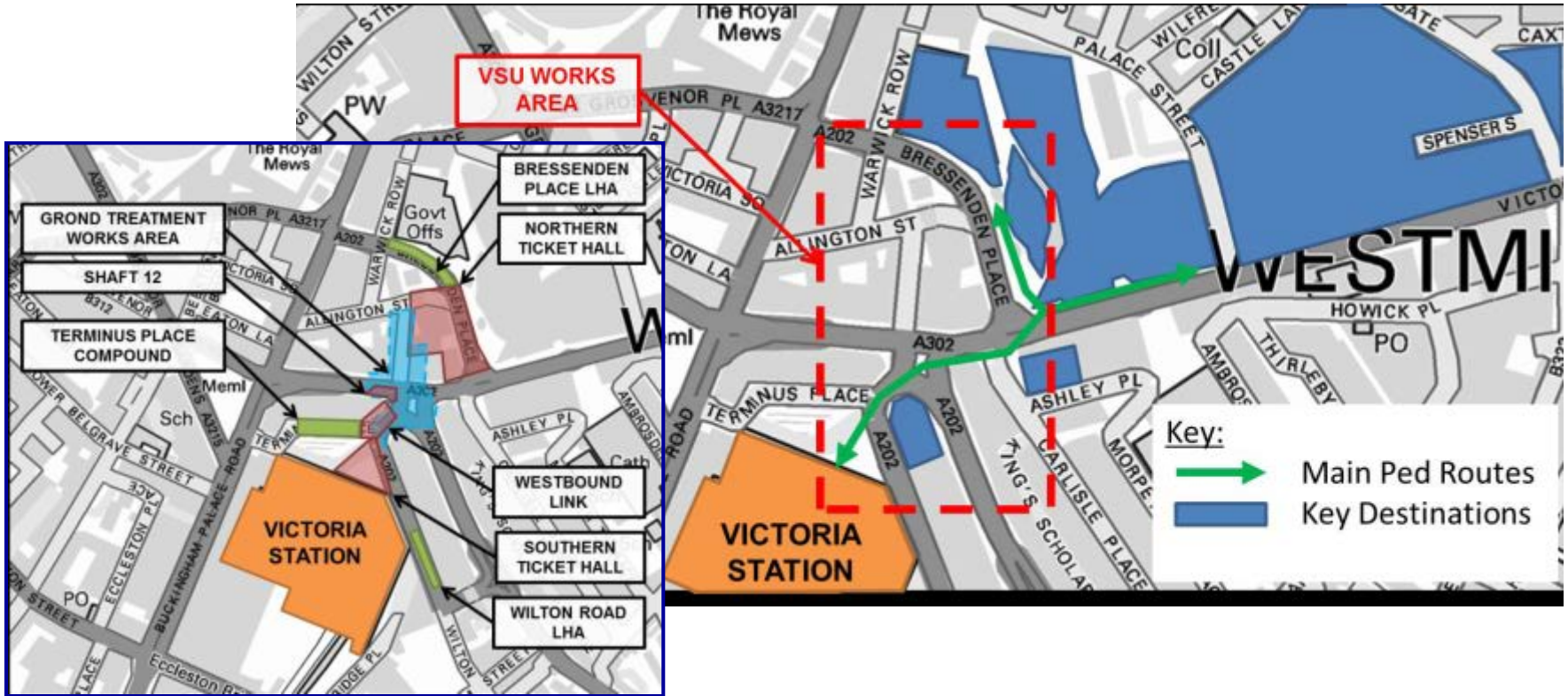


KEY	
	Worksites
	Jet Grouting Worksites
	Advance Jet Grouting Worksites
	TM Closure
	Station Entrance
	Lorry Holding Area
	Temporary Relocated crossing
	Pedestrian crossing
	Utility works
	Zone of TM Works

VSU – Worksite Plan

MARCH 13

- 37 Traffic Management phases
- Successful implementation to date
- Good relationship with Highway Authorities – Westminster, TfL
- Ongoing evaluation and adjustment on site with Authority input, e.g., signal crossing times
- On-site trials before implementation
- Aim for consistent appearance



- Worksites located in the main origin and destination routes
- Routes require multiple road crossings
- Changes phased to maintain pedestrian and traffic flow through area



- Estimated Final Cost within Project Authority set in 2009

Project Milestones	PAM Target Date/ Actual Date	Forecast Date (@ P05 FY1516)
Completed Milestones		
Start on Site - Primary Traffic Management stage 1 commences [Allington St (East link) closed]	Achieved 03/05/2011	
Completion and Bring into Use of Network Rail to LUL Ticket Hall stairs (Sussex Stairs)	Achieved 31/05/2012	
Commence South Ticket Hall Main Works	Achieved 15/10/2012	
North Ticket Hall Piling Complete	Achieved 21/11/2013	
South Ticket Hall Main Piling Complete	Achieved 21/02/2014	
Ground Treatment Complete (All Jet Grouting complete)	Achieved 11/09/2014	
North Ticket Hall Box Civils Complete (Closure of Moling Hole)	Achieved 12/03/2015	
Realignment of Bressenden Place Road System	Achieved 11/08/2015	
Project Completion Milestone		
South Ticket Hall and remainder of VSU works (Sectional Completion S4) – Delivered into Service	04/06/18	14/02/18



- Accident Frequency Rate - 0.2 (period 4) - Best recorded AFR rolling 13 periods = 0.1 (period 6, 2014/15)
- Lost Time Injuries (LTI) 0.2 (period 4) - Best recorded LTI rolling 13 periods = 0.2 (period 7, 2014/15)
- 251 days without a Reportable injury (last reported December 2014) and 118 days without an LTI (last reported April 2015)
- 676,228 man-hours since last RIDDOR (Period 9 (2014) – Period 5 (2015))
- VSU has achieved ½ Million man-hours RIDDOR free on three occasions.
- Continuous Improvement Plan
- High focus on workforce engagement
- Considerate Constructors Scheme (CCS) Gold Award 2014 & 2015
- CCS Most Considerate Site Runner Up 2015



• *1,000,000 hours without a reportable accident in 2012*

Excellent Safety Record



Exploring all options has allowed us to reduce time and cost

Examples:

- Paid Area Links (PAL) 6 alternate design – 21 weekend possessions planned, changed to a Xmas blockade of 6 days and 3 weekend possessions – considerably reducing impact on the travelling public.
- PAL 1 cut and cover instead of tunnelling – £1.7m, time = saved 110 days from original design and added 77 days float to sectional completion.
- Replacement of conventional reinforcement in tunnel secondary lining with fibre reinforcement. Time saved and safety improved for this resource hungry activity - savings at £229k



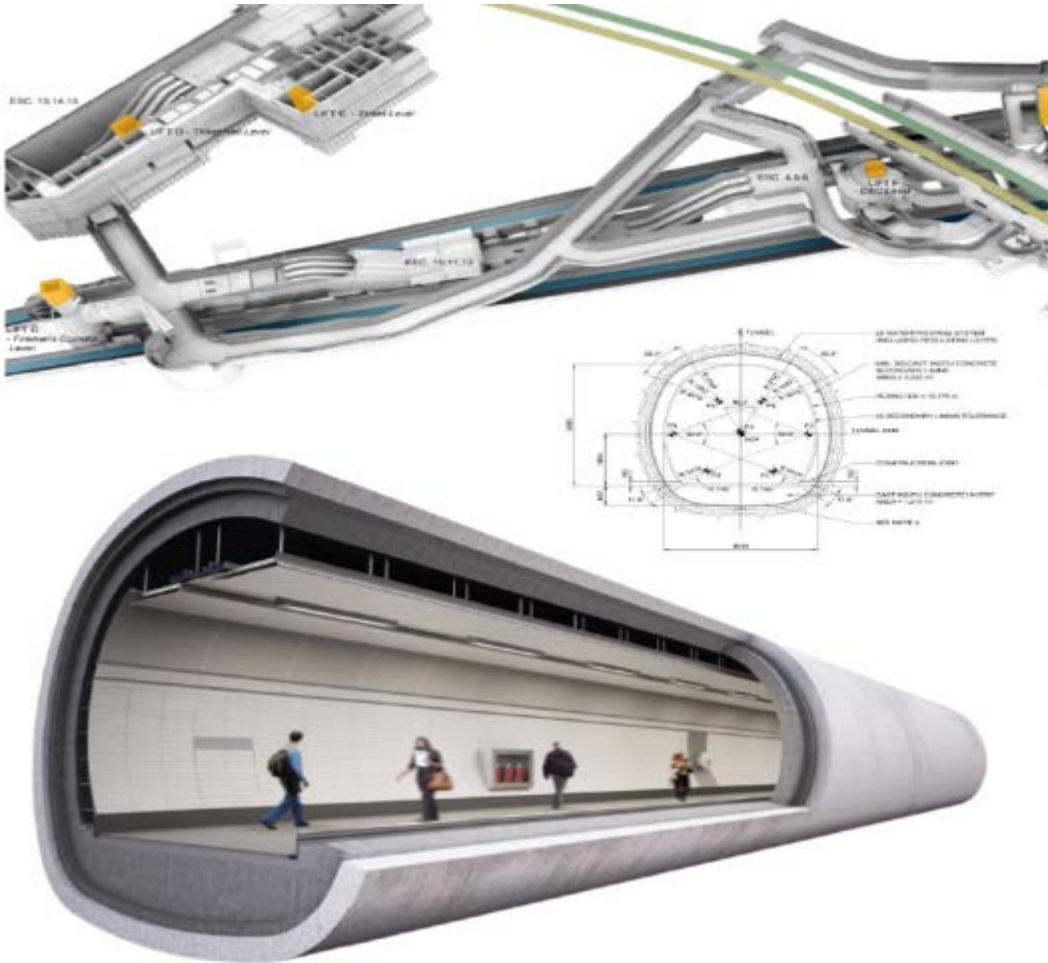
VSU has made a major contribution to all these TfL people initiatives

- **LU & Taylor Woodrow Bam Nuttall Apprentices Programme**
 - Project Managers
 - Quantity Surveying
 - Site Engineers
 - Site Trades
 - Administrators
- **Women in Construction**
- **Construction Skills Certificate Scheme**
- **Bring Your Daughters to Work Day**
- **Graduate Placements**
- **Graduates/Apprentices Permanent Roles**



Key Challenges – Tunnelling in shallow water bearing ground

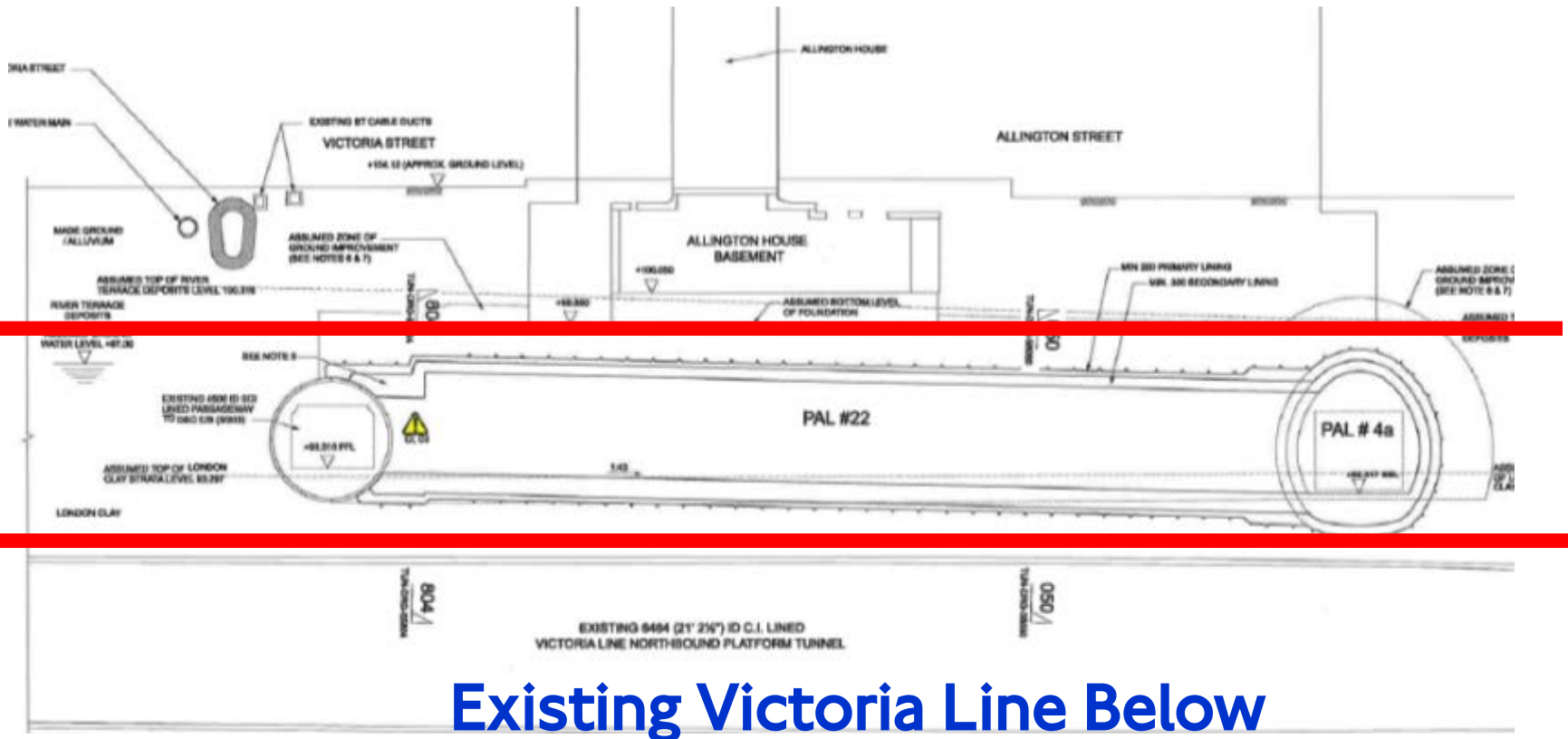
VSU Tunnels (Paid Area Links (PALS))



- Ground not conducive to tunnelling as it is water bearing making construction of tunnels very difficult.
- Ground treatment required to make ground impermeable to allow for tunnelling.
- Ground treatment required from the surface –known as jet grouting – installing columns of grout into the ground.
- Busy urban environment making surface access complex.
- Substantial number of traffic management schemes required to gain access for jet grouting.
- Existing building basements, foundations and utilities impact tunnel design.
- Existing tube tunnels impact design.
- Stakeholders impacted – local theatres, businesses, residents, property developers, operational stations.

Paid Area Links - Constraints

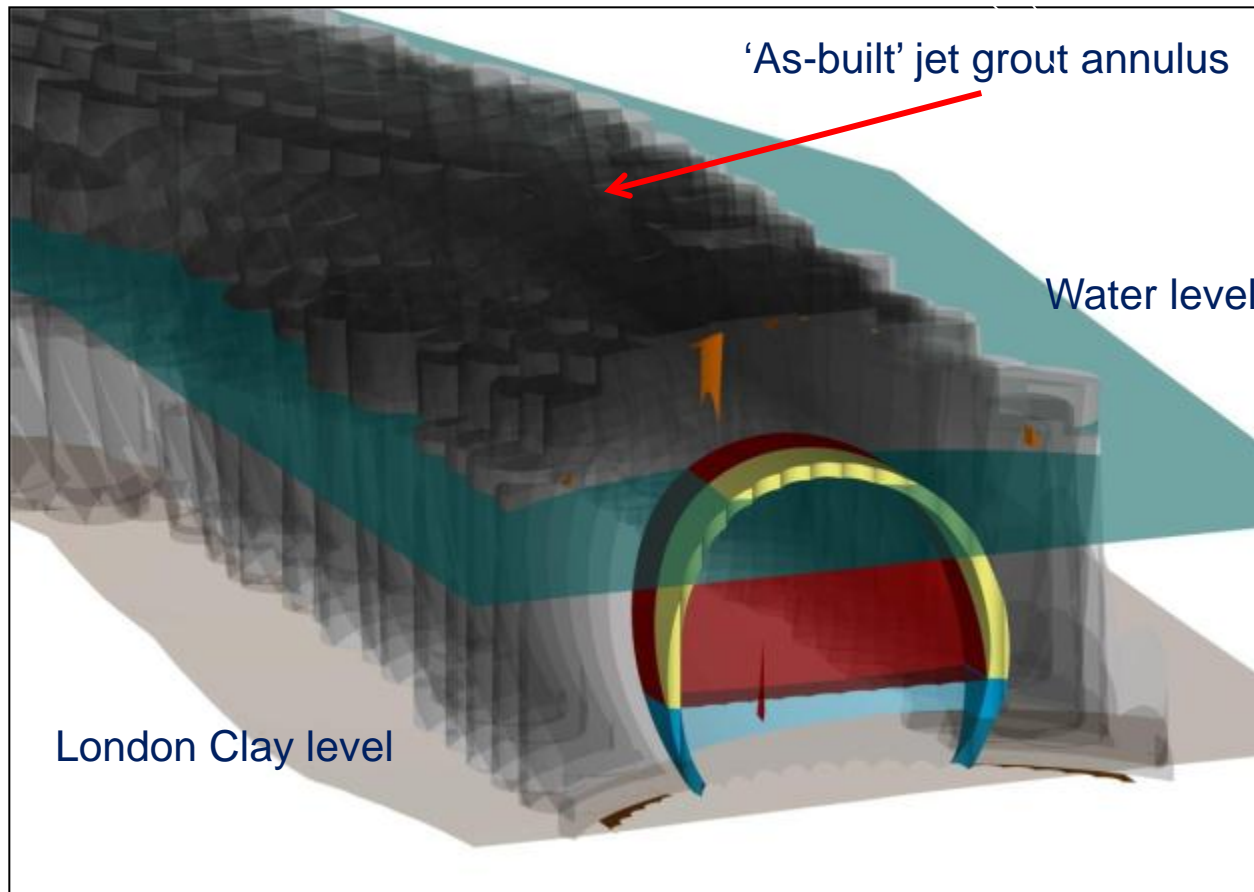
Existing Buildings & Utilities Above



Existing Victoria Line Below



Ground Treatment - The grey jet grout columns treated the ground from the surface and formed a wall of weak concrete that was then mined through to create the tunnels.



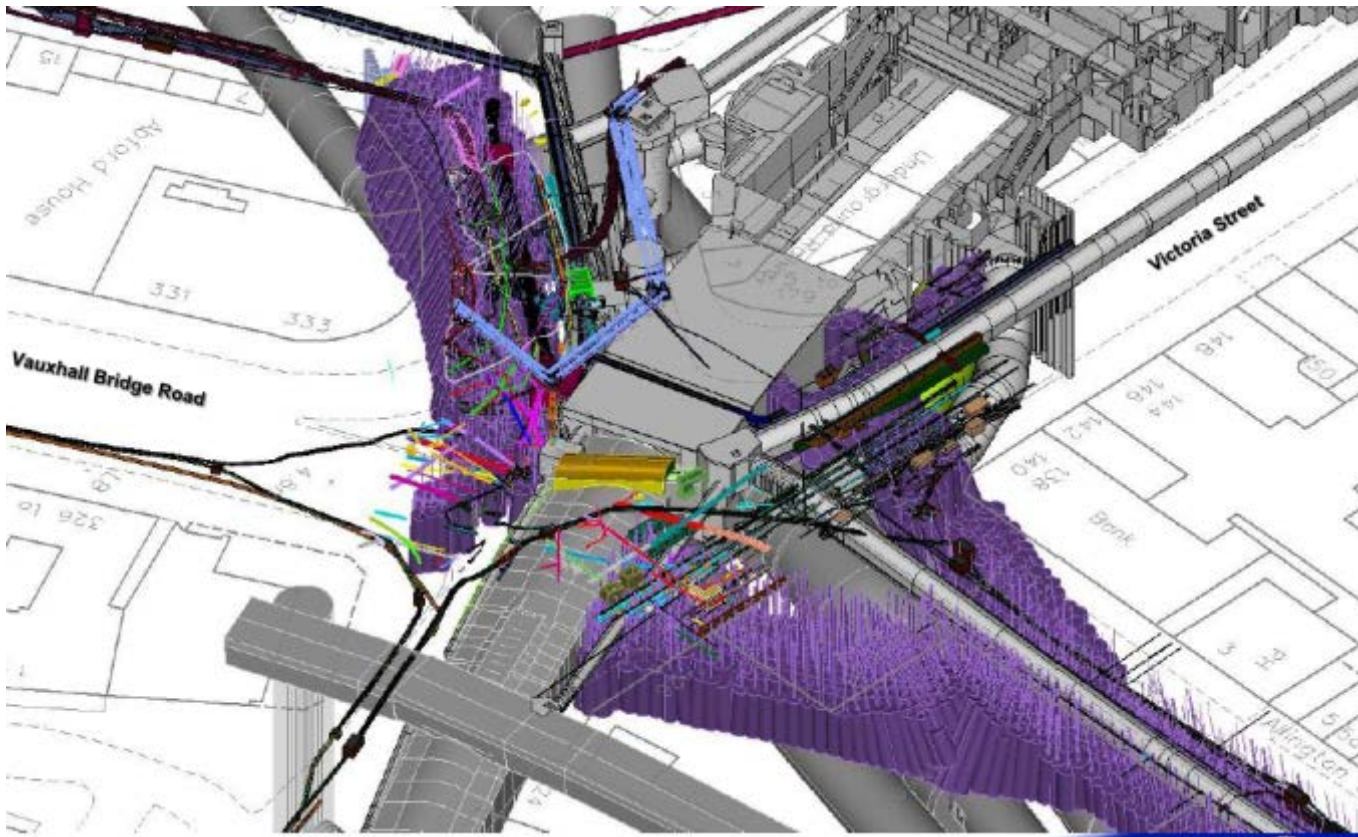
Tunnelling through Jet Grout



The Facts

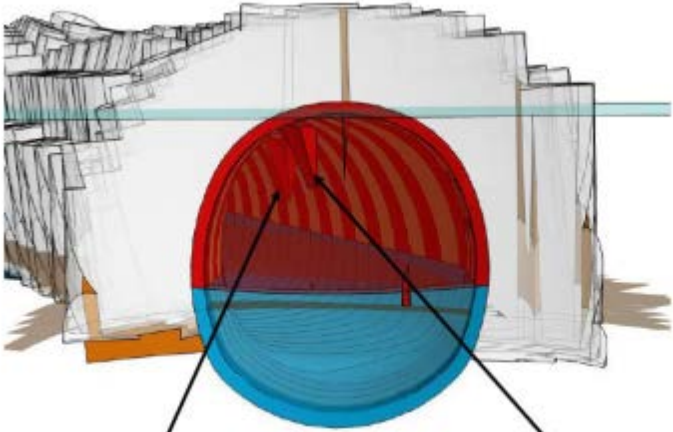
- £40m Temporary Work Contract
- 2 years to undertake
- 2000+ jet grout columns

Building Information Management (BIM) used extensively to deliver the Project



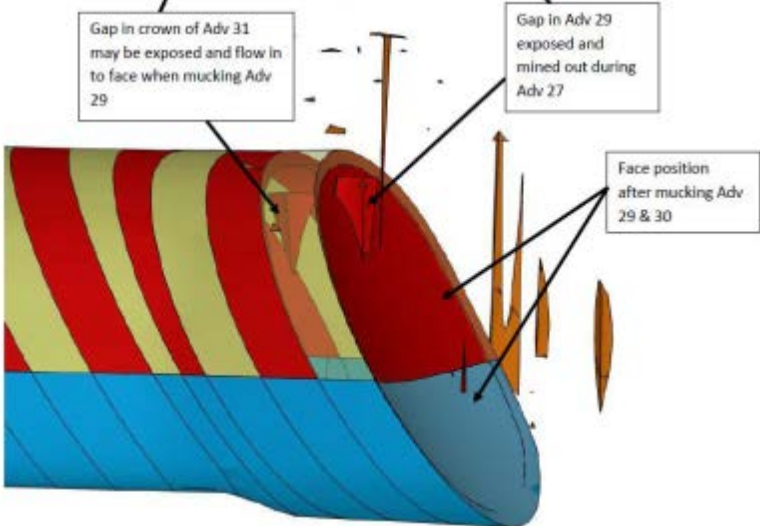
BIM has allowed the project to design the works from a 3D perspective leading to clash avoidance. VSU has met the new Government standards in regards to usage of BIM on construction Projects.

Effective BIM – Pre-identification of water pockets in treated ground was accurate, leading to greater safety and more certainty in delivery of the works.



Gap in crown of Adv 31 may be exposed and flow in to face when mucking Adv 29

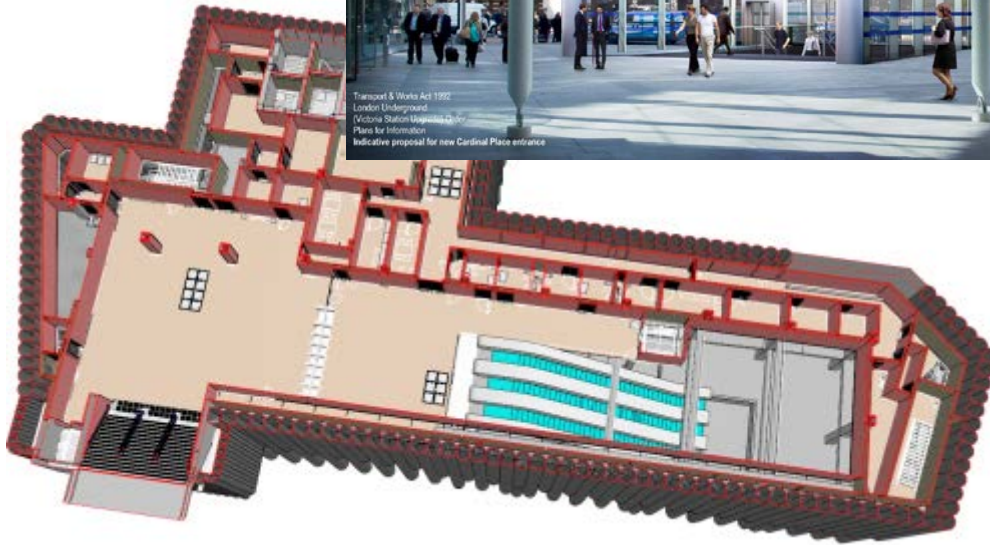
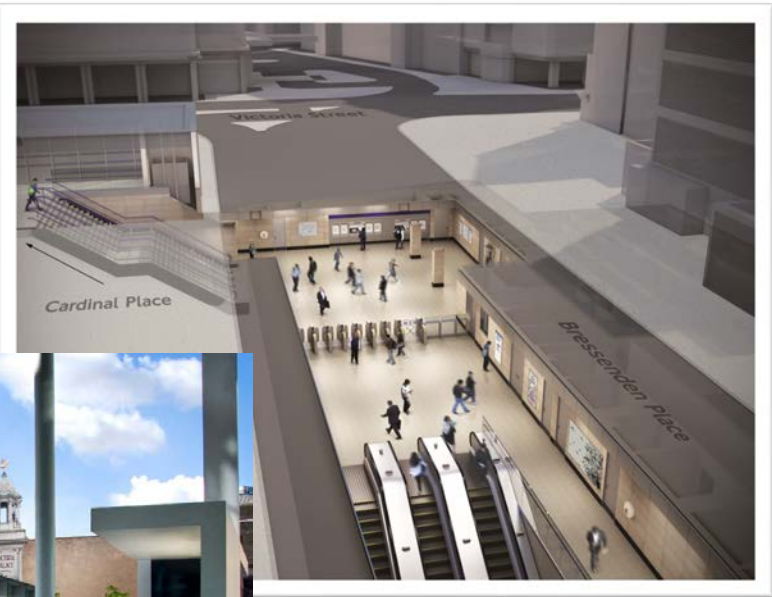
Gap in Adv 29 exposed and mined out during Adv 27



Face position after mucking Adv 29 & 30



North Ticket Hall (NTH)



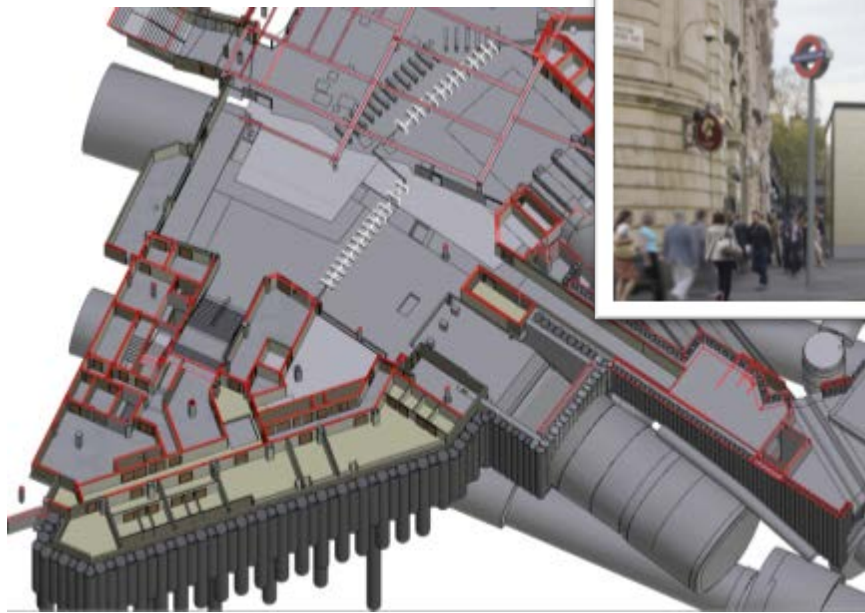
Challenge - to build the Ticket Hall under two lanes of running traffic. Bressenden Place is a key trunk road on the TFL road network

NTH – a Game of Two Halves



The Ticket Hall box has been built under Bressenden Place. Construction of the box had to take place in two halves, and Bressenden Place had to be switched over to allow it to keep running over a 3 year programme.

South Ticket Hall (STH)



Challenge to build Ticket Hall adjacent to LU operation Station and under a Grade II listed facade of Victoria National Rail Station

Key future milestones

- **District & Circle underpass Civils complete – October 2015**
- **Little Ben island restoration – December 2015**
- **Bressenden Place full reinstatement – July 2016**
- **NTH Delivery into Service – Dec 2016**
- **VSU COMPLETE – June 2018**



Successfully delivering complex works in a challenging environment, while keeping Victoria moving

- We are responding to the capacity growth in London's transport system
- We have the capability to manage complex projects while maintaining the operation of our stations
- Close engagement with multiple stakeholders and securing the best capability in the supply chain
- Utilise innovative and award winning engineering solutions

This needs sustained investment going forward to meet London's demand.

