

Presentation by Martin Knights

ITA President 2007-10



*Global Leader Tunnels
& Geotechnical Engineering
HALCROW*

“Procurement strategies for large underground infrastructure projects”

Practices and trends for financing and contracting tunnels and underground works

International Symposium Athens 22nd -23rd March 2012

ITA

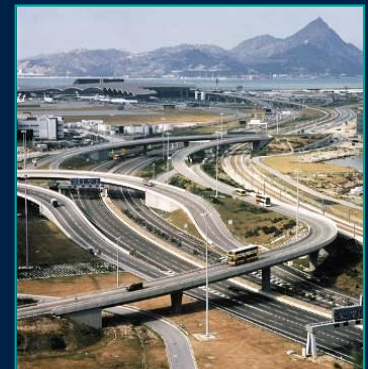


Promoting the use of underground space



Halcrow
A CH2MHill company

Sustaining and improving the
quality of people's lives



Contents

- Introductory general observations
- Visions for the future
- Risk, procurement and quality –general remarks and ITA  perspective
- A collection of UK- Halcrow executed projects
 - *CERN Geneva*
 - *London Crossrail*
 - *UK Channel tunnel rail link*
 - *Brazilian HS Rail*



Its never too late!

``Sorry for the delay``

The train on platform 2 has just arrived ...

.....Kazakh capital's first metro opened after construction lasting 23 years!!

3 February, 2012

*The first metro line in the Kazakhstan capital of Almaty was opened in December after **23 years of construction**. The smart, pristine architecture of stations and trains has led many to agree it has been worth the wait. Residents have reportedly visited just to admire it. **Even a wedding was held rather a trip on its 8.5km single line.***

Construction was halted with the dissolution of the USSR, to be resumed in 2005. The line has seven spotless stations four at deep levels and three sub-surface, which feature marble floors, intricate mosaics and even stained glass windows. The estimated cost was around USD 1bn.

*The project contractors, JSC Almatymetrokurylys, have a long history of underground works including metros in Krasnoyarsk and Kazan, tunnels on the Baikal-Amur railway, various underground facilities in the cities of Novosibirsk, Moscow and Tashkent and mining in Kazakhstan. Plans exist for an expansion of the **Almaty metro system to a total of 45km***

Climate, Tectonic Financial & Political Events in 2007-2012>?



Perfect economic storm

2007



2008

£ \$ HK\$ ¥ RMB



Rise of the BRIC economies

Double dip recession?

€ eurozone crisis!! **2011**

Floods

Earthquakes



2009



Despite this... the Global Tunnelling Industry Trends are....



- *“potential world wide demand is huge for tunnelling over next 20 years **In spite of recent `global events`**”*
- *Particularly in Megacities in Asia, Latin America*
- *Mobility, health and storage driving the agenda*
- *More of worlds population live in urban areas (& growing)*
- *Cities have to use urban space more effectively and sustainably*
- *Public & political acceptance*
- *So **we** have to deliver tunnel projects safely and effectively—to maintain that trust.*
- *More proactive thinking about the 4th dimension*



Martin`s view!

Global Tunnelling Industry Trends



- Asia: India, China, Singapore, Hong Kong
(*Less affected by \$£E crisis*)
- Europe: Current slow down *affected by*
- *Euro crisis*)..but still generally carrying on
..London, Ferman Link, CERN, Alpine base tunnels, metros, storm water tunnels etc etc
- #South America: Brazil, Chile, Argentina etc
(*Driven by mining/China/Olympics*)
- North America: Slow down in '08 + '09 but is improving again
(*Obama stimulus strategy-beginning to work?*)
- Australia: Will continue to develop despite current downturn(*Driven by China's mining needs + east coast population growth*)
- #Gulf: Great Potential
(*Oil & Gas + 20 year urban infrastructure strategies*)
- TBM`S demand significantly up & demand for `super large` machines.

•Source T&T, NCE, Journal over past 12 months



Martins view!

The great haul of China

As Beijing's spending spree extends to Brazil, what does it mean for the world?



China`s Ambitions

- Dream =The moon
- Dream =Under the Himalayas between Tibet and India.
- Reality....
- ``China's monster metro plans``
 - 17 November, 2011
 - **China pledged to invest over USD 161bn in metro projects for 28 cities. As of November, some 12 cities in the country had metro networks. The plan announced by the China's Communications and Transport Association last month would see a total network 250 times the length of the London Underground Circle Line. Over 90 new lines were approved.**
 - **The focus was on metros for smaller cities such as Taiyuan, Urumqi and Shijiazhuang. Other small cities including Dali, Haikou, Zhuzhou and Luoyang were preparing their own proposals**

Read all about it!

Lots of tunnelling work

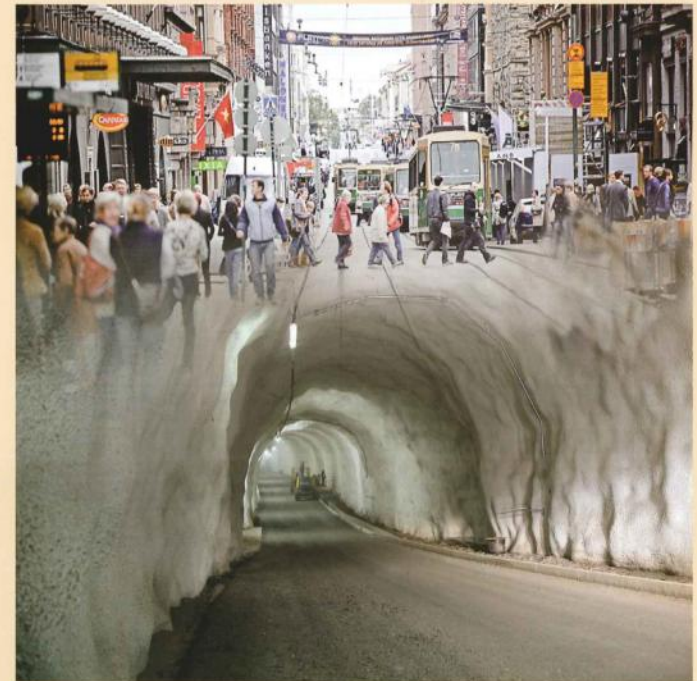
www=worldwidework

TRIBUNE

ASSOCIATION
INTERNATIONALE DES TUNNELS
ET DE L'ESPACE SOUTERRAIN
AITES



ITA
INTERNATIONAL TUNNELLING
AND UNDERGROUND SPACE
ASSOCIATION



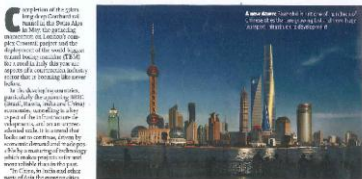
ITA newsletter - la lettre de l'AITES

N° 35 - MAI 2011 - ISSN 1267-8422

TUNNELLING: GLOBAL OVERVIEW

A WORLD OF WORK

The drive to develop infrastructure across China and the Far East has seen an explosion in tunnelling projects. **Adrian Greenman** looks at the major developments.



China's rapid economic growth has led to a massive increase in infrastructure projects, particularly in the transport sector. The government has set ambitious targets for the next decade, including the construction of a high-speed rail network that will connect major cities across the country. This has led to a surge in tunnelling work, as many of these projects involve underground routes. The Chinese government has also invested heavily in the development of the Far East, particularly in Southeast Asia, where it has been instrumental in the construction of the New Silk Road. This has led to a significant increase in tunnelling work in the region, as many of these projects involve underground routes. The Chinese government has also invested heavily in the development of the Far East, particularly in Southeast Asia, where it has been instrumental in the construction of the New Silk Road. This has led to a significant increase in tunnelling work in the region, as many of these projects involve underground routes.



GROWTH FACTOR

The tunnelling industry is experiencing a period of rapid growth, driven by a combination of factors. One of the main drivers is the increasing demand for infrastructure projects, particularly in the transport sector. This has led to a surge in tunnelling work, as many of these projects involve underground routes. The Chinese government has also invested heavily in the development of the Far East, particularly in Southeast Asia, where it has been instrumental in the construction of the New Silk Road. This has led to a significant increase in tunnelling work in the region, as many of these projects involve underground routes.

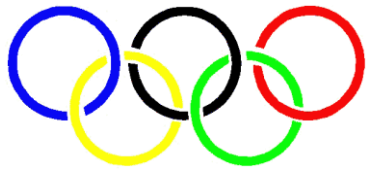
tunnel

Offizielles Organ der STUVA - Official Journal of the STUVA

3
Mai
2011

www.tunnel-online.info

bauverlag



London 2012 Olympics

Qatar 2022 World Cup

Aquatic Centre

Media Press Centre (MPC) /
International Broadcast Centre (IBC)

Olympic Stadium

Fencing

3 Indoor Arenas; Basketball, Handball,
Volleyball and Modern Pentathlon

*Its official--Tunnelling is now an Olympic and World Cup Sport!!>>
“Synchronised tunnelling”*

Olympic Village

Baseball Training

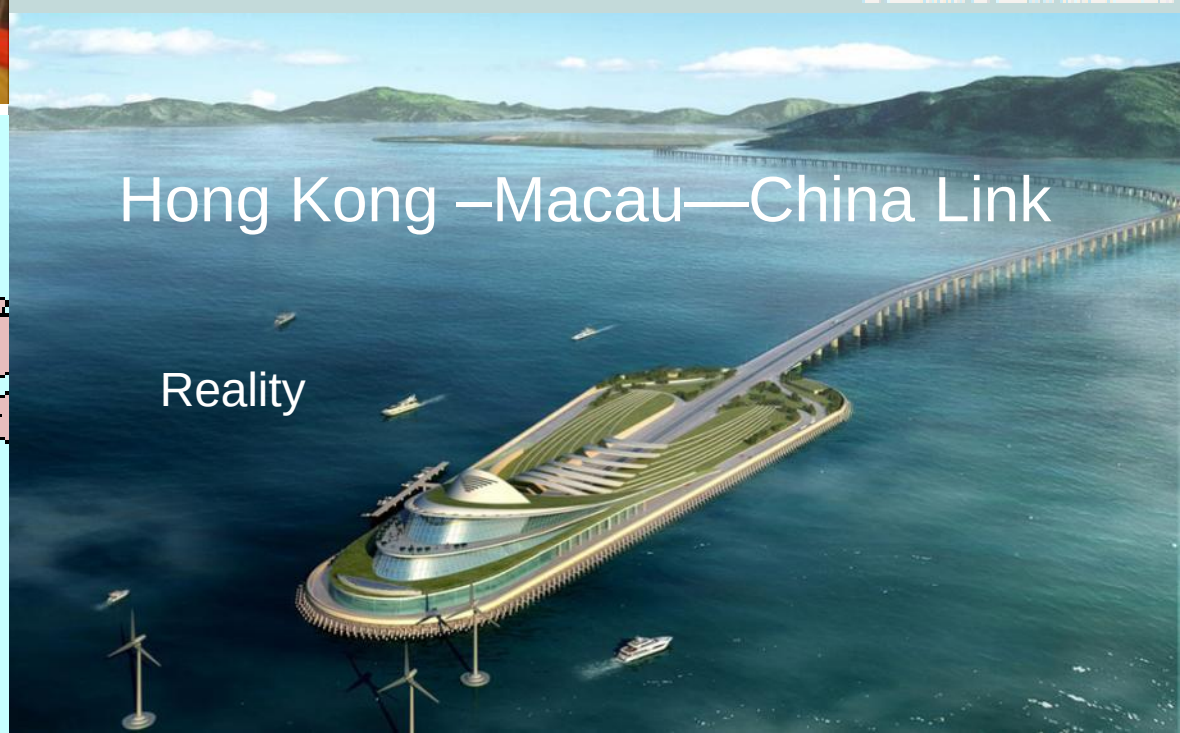
Hockey Centre

BMX Circuit

Velodrome

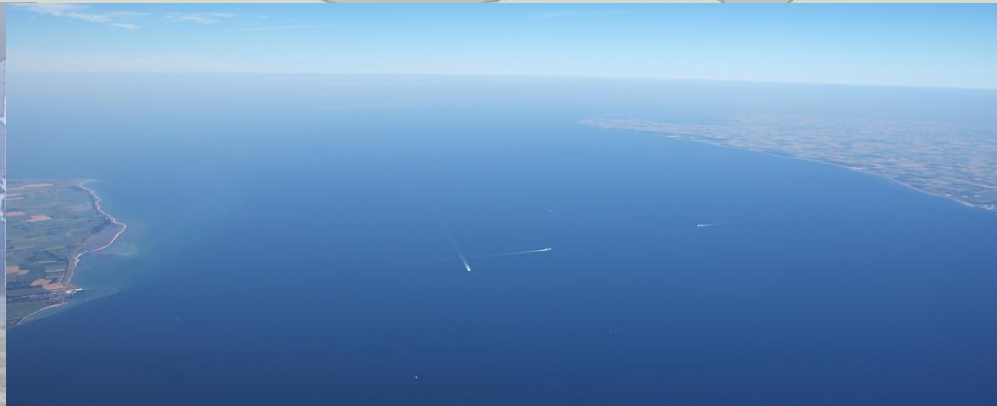
2006>>2022Turin--Beijing-- Vancouver—London—Sochi—Rio—Moscow--Qatar/Doha

Dreaming of possibilities?



Crossing by tunnel
between Denmark
and Germany

No longer a dream



Moscow to New York by train?

Dream ?

Proposed tunnel between Siberia and Alaska

36

2GM Saturday August 20 2011 | THE TIMES

World

The train standing on Platform 6 is the 7.20 for Paris, Moscow and New York – through the Bering Strait

Russia

Nick Holdsworth Yakutsk

It might still be too soon to book your ticket from King's Cross to Grand Central station in New York, but the prospect of such an epic rail journey has just moved a step closer.

The Kremlin gave its blessing this week to the greatest railway project of all time: a 65-mile (106km) tunnel linking Asia and North America under the Bering Strait and connecting railway lines that would allow a seamless train

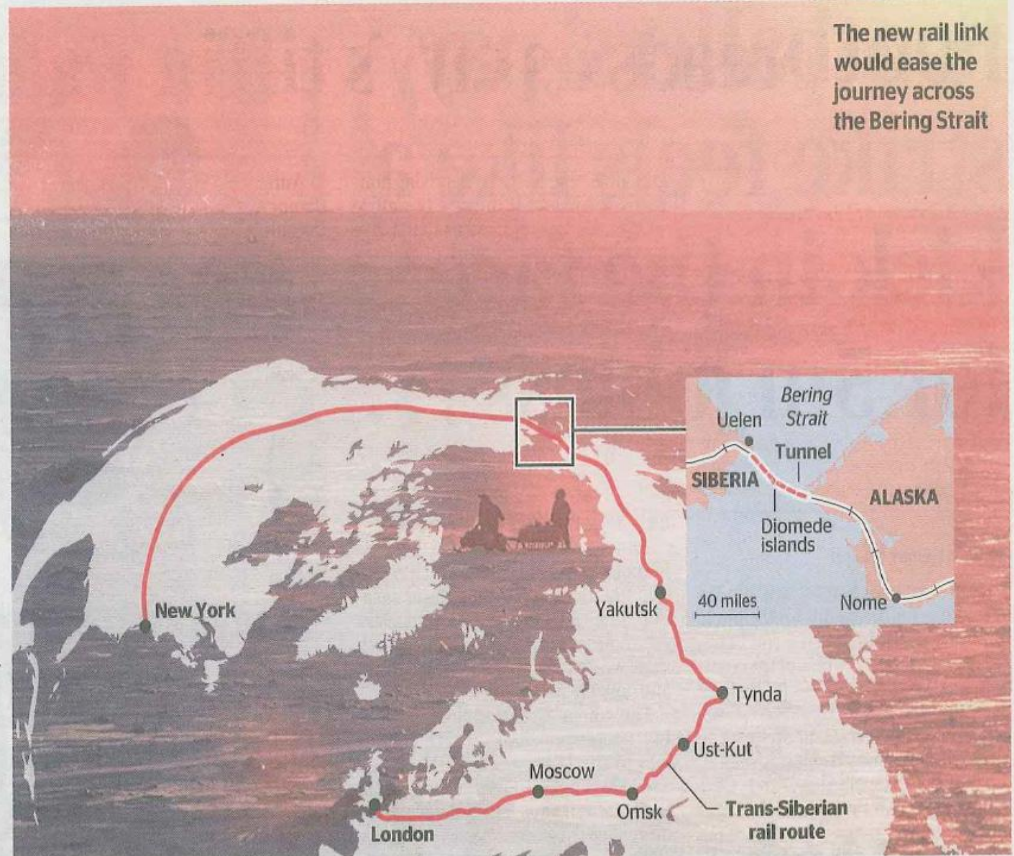
of taking a once-in-a-lifetime journey across the breathtaking wildernesses of Siberia and Alaska, it would be cheaper, faster and more secure than shipping goods around the world. It could carry about 3 per cent of the world's freight, earning £7 billion a year.

Engineers say there is no technical reason why the tunnel could not be built and investors would break even within 15 years of it opening.

Mr Levinthal was among several Kremlin officials, including Vladimir Nazarov, the deputy secretary of the Russian National Security Council

JEAN-ERICK PASQUIER / GAMMA-RAPHO VIA GETTY

The new rail link would ease the journey across the Bering Strait



Dreams of more ,Rail .Road Hydro tunnel schemes in the Himalayas



Kishanganga Hydro Scheme Kashmir

Busan Geoje immersed tunnel, South Korea

Halcrow



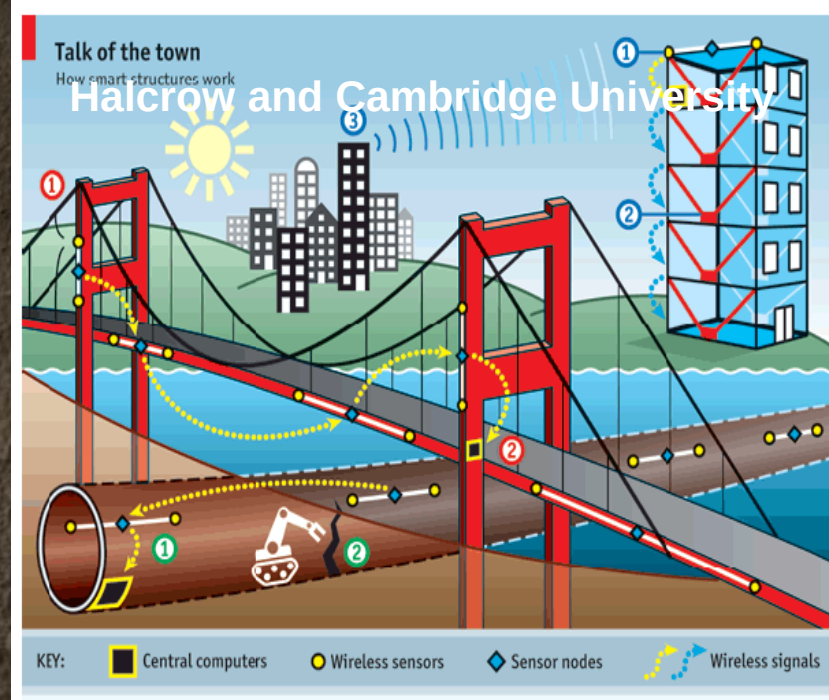
The London Hub Dream?



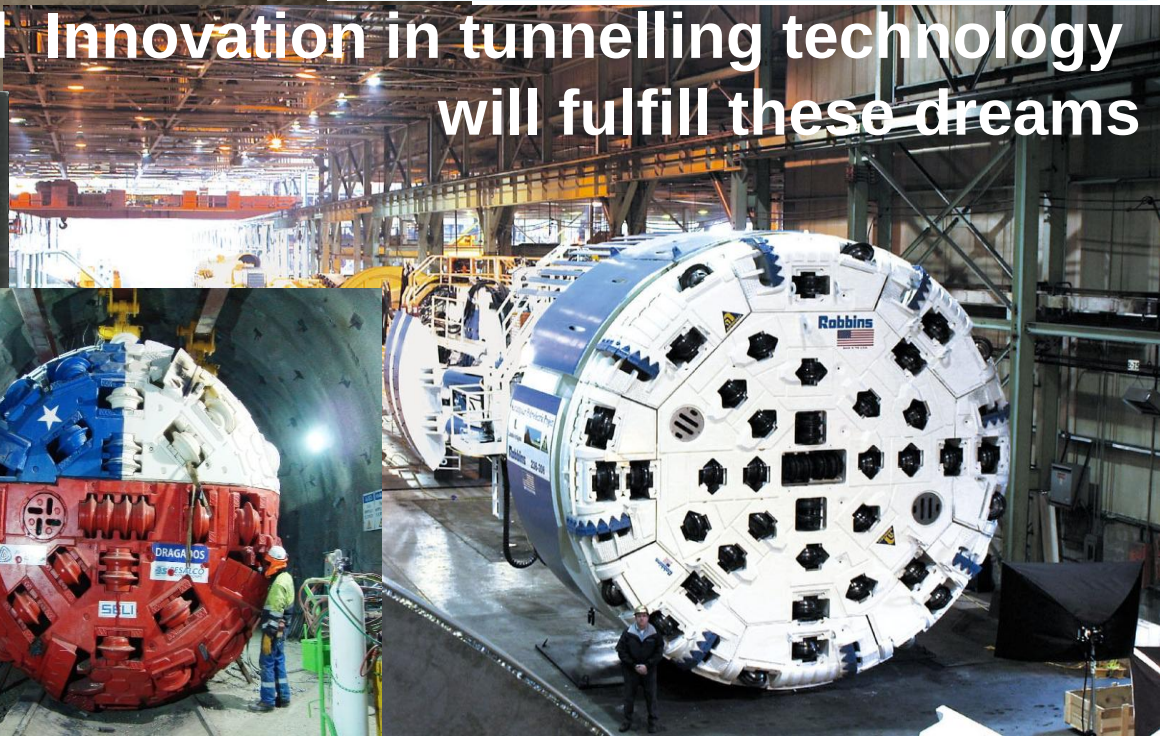
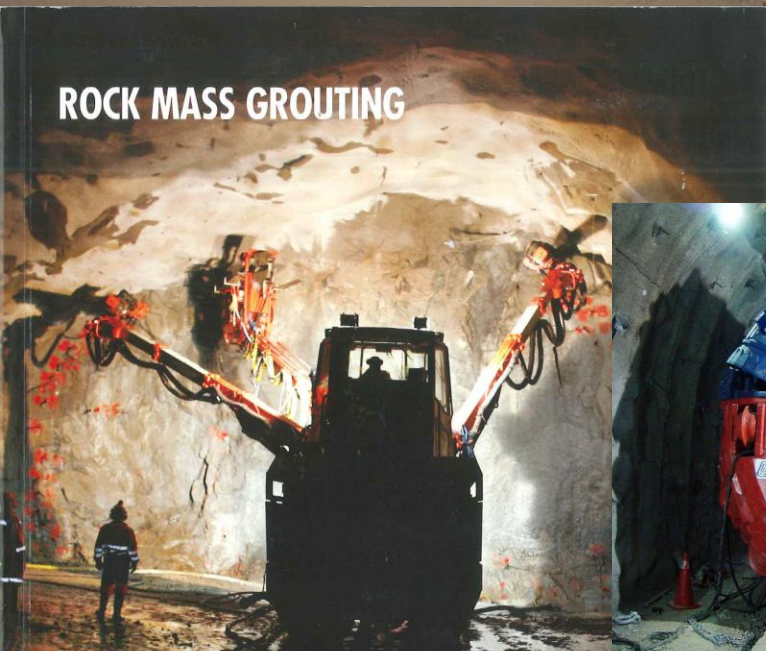
Get the politicians on our side!!

We need Political will





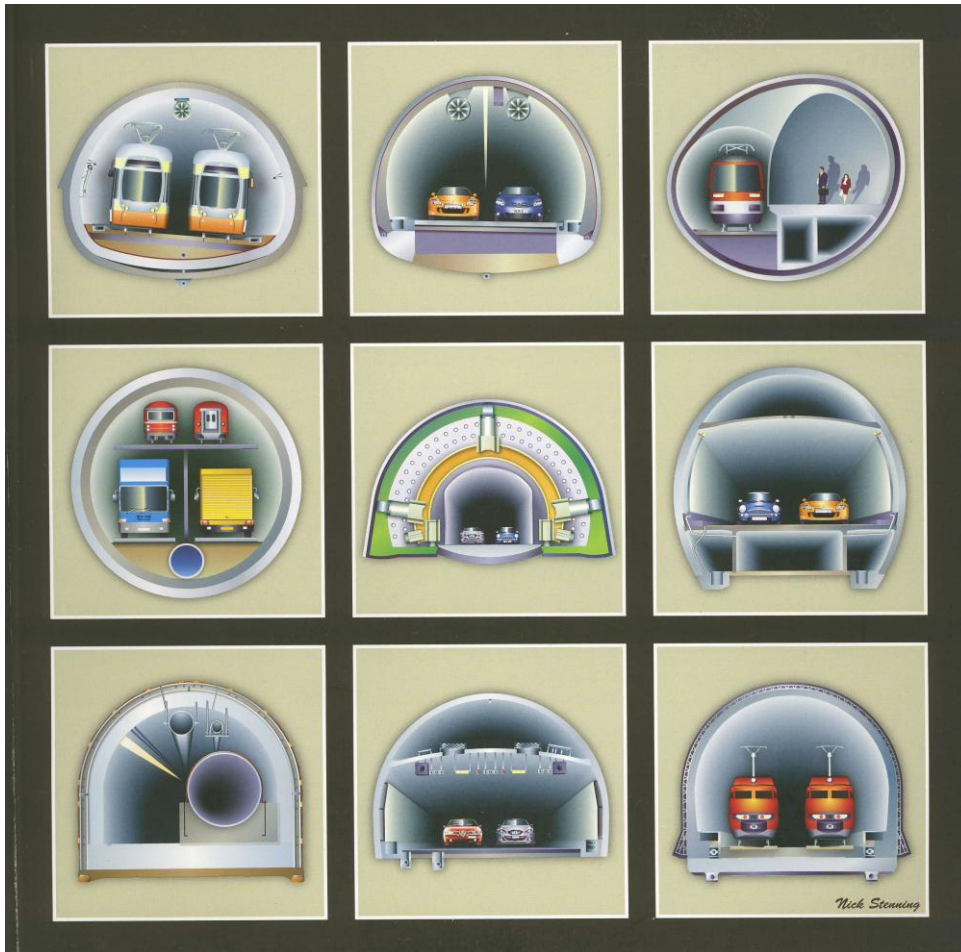
Political will and Innovation in tunnelling technology will fulfill these dreams



Question- Is tunnelling risky?

Tunnelling is not risky!

The risks just need to be planned for & managed....
....methodically by experienced and competent companies & people
using the right equipment AND PROCUREMENT .

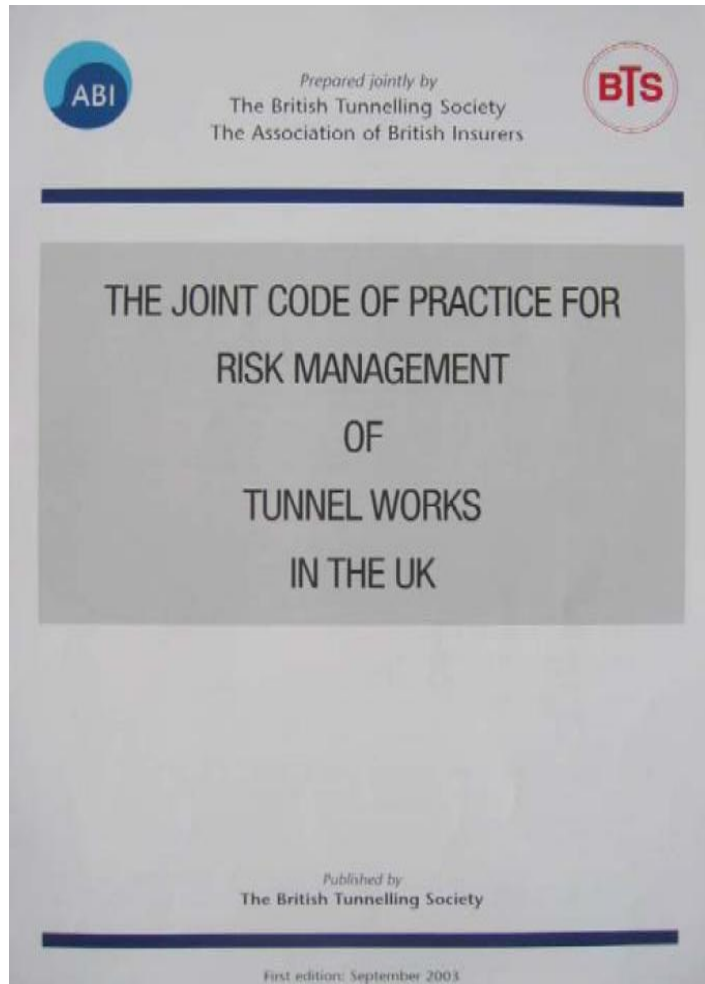


***“No construction project is risk free.
Risk can be managed, minimised,
shared, transferred or accepted.
It cannot be ignored.”***

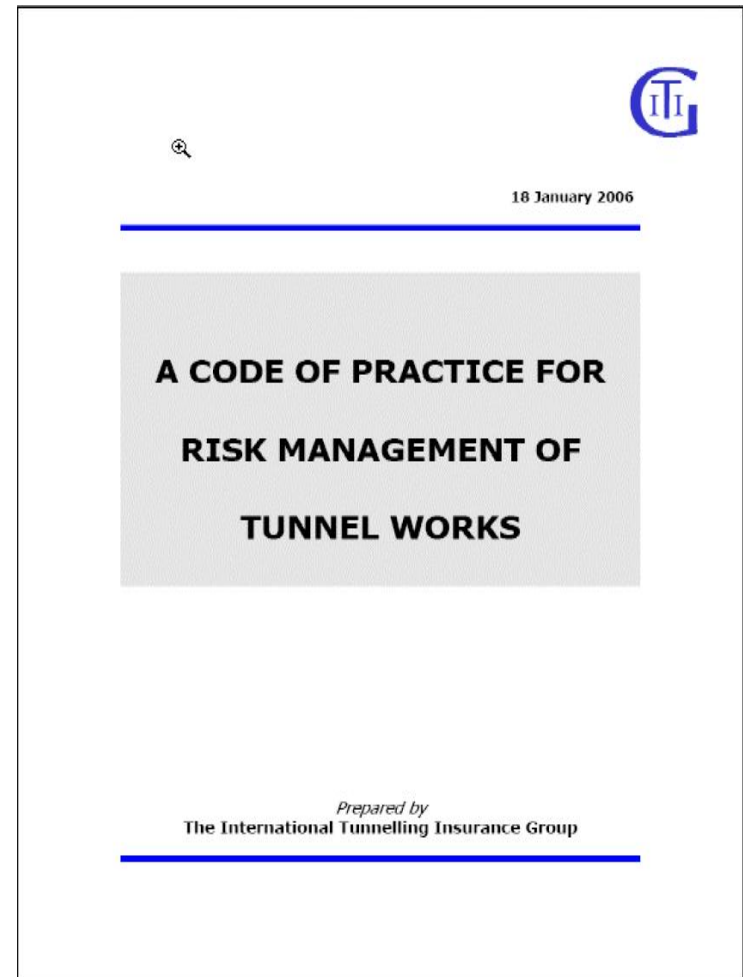
Risk Ownership

- The party who 'owns' a risk will pay for it if it materialises
- 'Who Pays' for risk is a contractual issue
- 'Who Manages' a risk is non-contractual – and is determined by who is best to manage
- Usually - risks owned by party with best ability to influence the outcome

BTS & ITIG Codes



www.britishtunneling.org



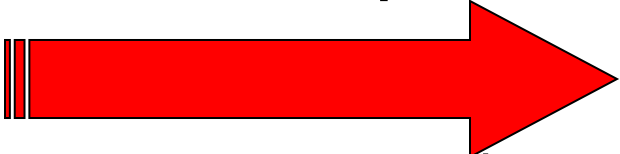
www.imia.com (Being updated now by ITA & ITIG)

Contract Requirements ... in a nut shell !!

Lawyer?>>
Arnold ?



Role of Contracts

- Keep fair balance among quality, schedule and costs
- Mix of technical and performance specifications → quality control
- Independent auditing and full disclosure of control parameters
-  Incorporate risk management and risk sharing

Role of Contracts& Procurement

Front end considerations

- Early Strategy Reviews
- Decide client high level requirements (Q, \$,Time, Maintenance& Operability)
- Aspirations re team ethos
 - What are the rules?
 - What are the key risks
- Select appropriate type of Contract



Role of Contracts& Procurement

These issues relate to **client** participation

- Must have competency in-house
- If not ..get help!
- Understand influence of procurement
- Must understand competency of selected designers and contractors
- Must be proactive in risk management
- Cannot offload risk (to those who can't manage it)
- Insurers proactive participation
- Need to attract right bidders
- Insurers can withdraw insurance if....



More front end devoted to Procurement Strategy

ITA says that --Tunnelling is not risky if you...

- Formulate a **risk policy** to establish a common platform for all parties involved
- Identify risk **as early** as possible in the project, thereby risk mitigation measures can be implemented in a timely manner
- Use methodical and systematic process of risk assessment maintaining the **awareness /upkeep** of actions to manage risk issues.
- Thereby tunnelling risks will be proactively and responsibly managed
- ...**using competent people of course!**



ITA says that –Tunnelling risks should be managed by experienced people

- Management of Risks on Projects = Good Project Management
- Good Project Management includes the responsible and equitable allocation of risks to those who can best manage a specific risk
- You can achieve fair allocation of Risks by using appropriate and fair use of Procurement Strategies & selecting the right Contract
- ITIG Codes and ITA and BTS Guidance support this aim



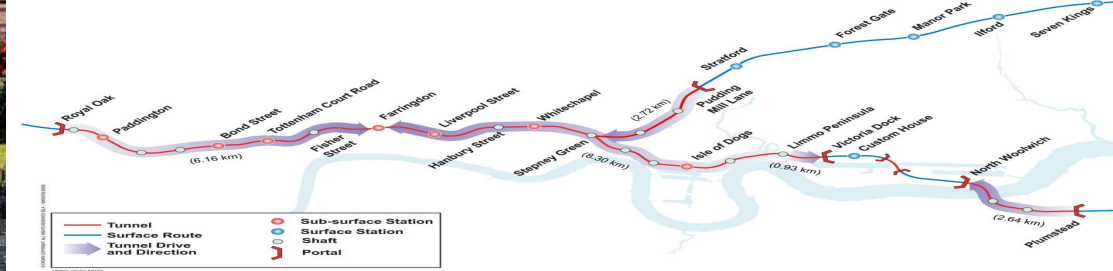
*And Think **Quality** too!*

- Quality is not just about specification & control
- **Its about a culture & attitude**
- Quality Management=Risk Management
- Quality =Sustainable Solutions
- Quality & Durability =Good Asset Management
- **Without quality there is no respect or care.**
- You should all care about quality
- Quality always differentiates
- **Good people, good companies & good use of technology = Quality Service and Solutions**

London 2 new big tunnel projects

- Railway across(under) London 42km tunnels
- `Super sewer` @40km tunnels

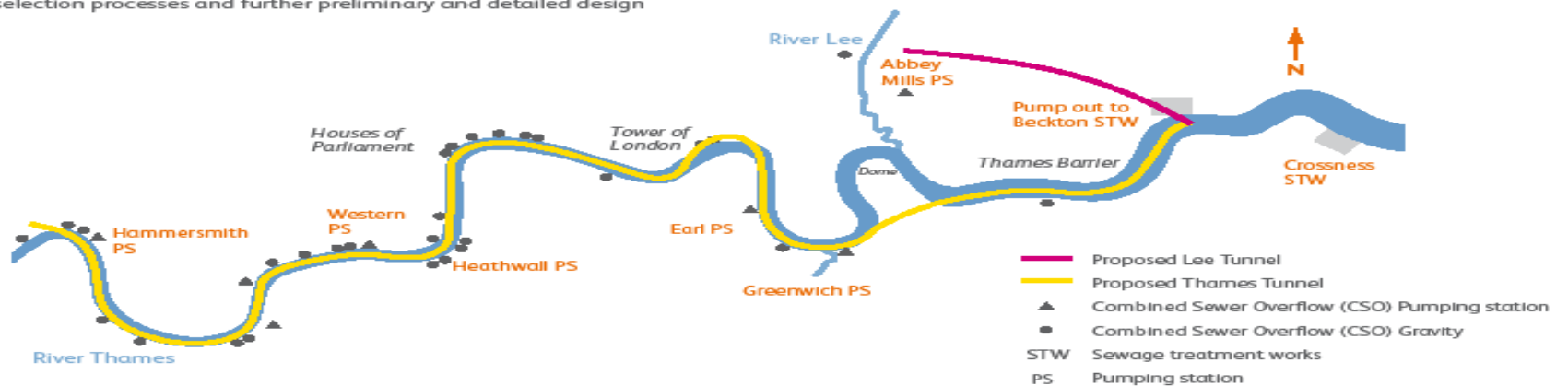






Lee Tunnel and Thames Tunnel routes

The Thames Tunnel route is indicative only and subject to site selection processes and further preliminary and detailed design



London`s big rail project

just starting to tunnel

- **Project Overview**
- **Progress to Date**
- **Procurement Policy**
- **Packaging Strategy**
- **Contracting Strategy**



Introduction

21 km of new sub-surface twin-bore railway through London



network

Crossrail Benefits



£42bn+



14,000
people



24 Trains p.h.



200 million journey per year

Programme

2009 2010 2011 2012 2013 2014 2015 2016 2017



15th May 2009
Construction begins
at Canary Wharf



2012 - 2017
Tunnel and station
construction



2014 - 2017
Systems Install

**2018- Phased
opening**

New trains

- 200m long – 10 carriages, each with three sets of doors
- Powered from overhead catenary 25kV
- 1,500 seated and standing passengers per train
- New generation - modern, more energy efficient, greener, lighter, quicker and fully accessible

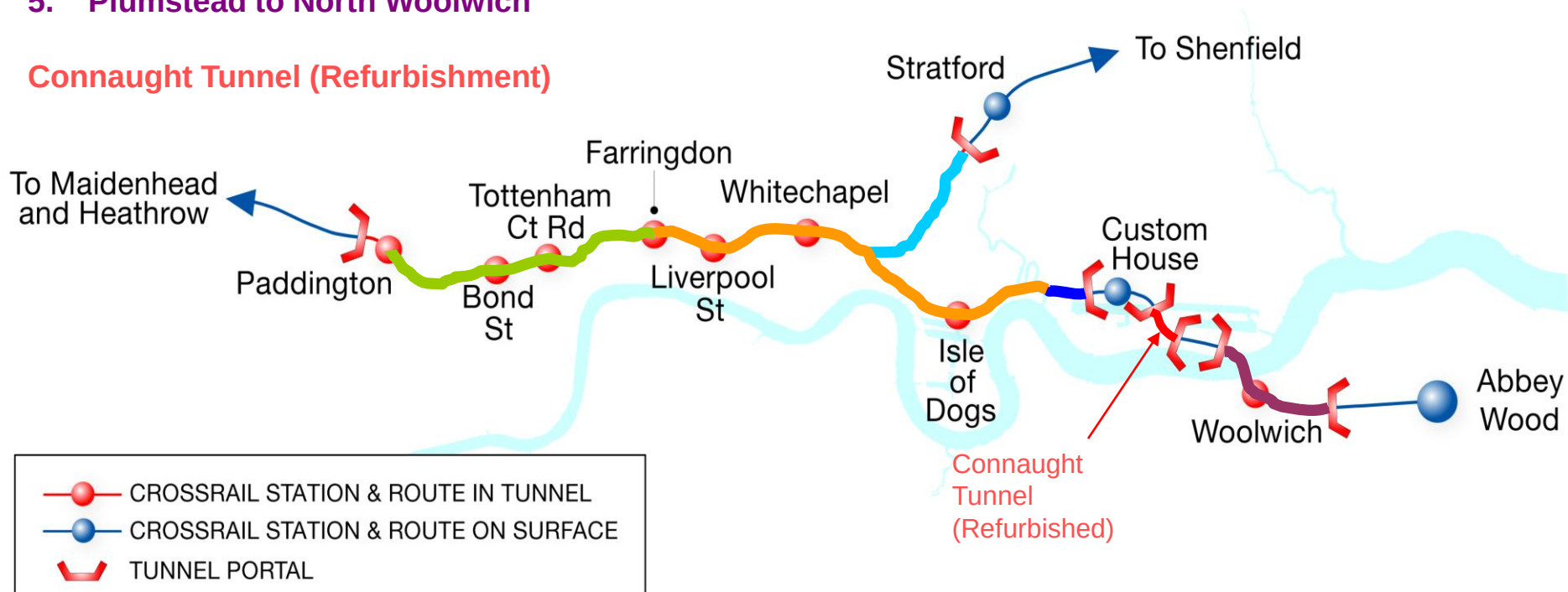


Tunnelling Strategy

Proposed TBM Drives

1. Royal Oak to Farringdon
2. Limmo to Farringdon
3. Stepney Green to Pudding Mill Lane
4. Limmo to Victoria Dock Portal
5. Plumstead to North Woolwich

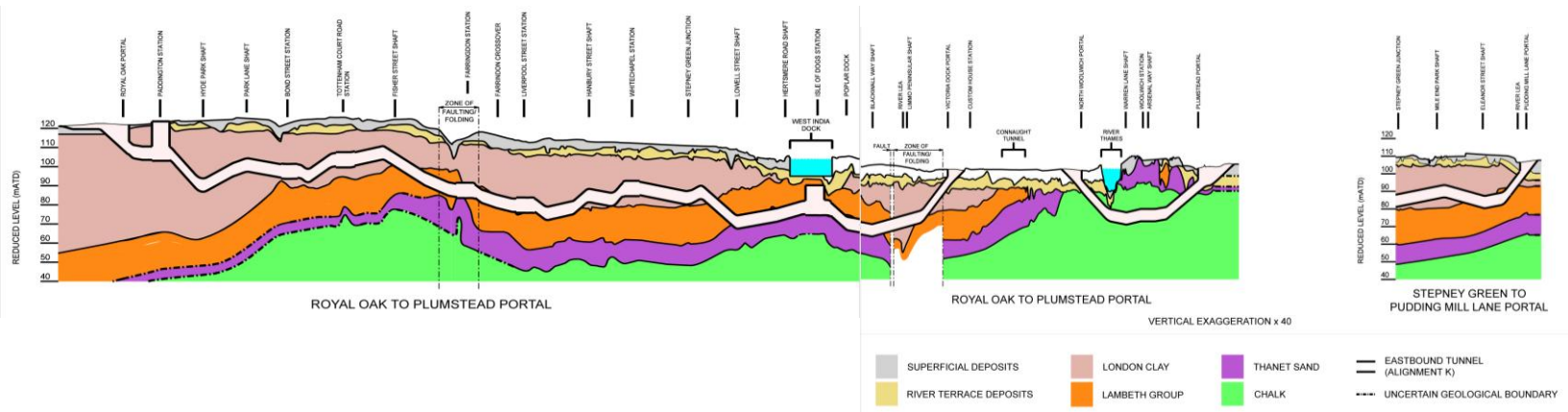
Connaught Tunnel (Refurbishment)



This map illustrates the proposed Crossrail 2 route from Royal Oak in the west to Plumstead in the east. The route is divided into several segments with varying lengths:

- Royal Oak to Bond Street:** 6.16 km, primarily a surface route.
- Bond Street to Farringdon:** A tunnel segment.
- Farringdon to Whitechapel:** A tunnel segment.
- Whitechapel to Stratford:** A tunnel segment.
- Stratford to Seven Kings:** A surface route.
- Stratford to Plumstead:** A tunnel segment.

Key stations and locations along the route include Royal Oak, Paddington, Bond Street, Tottenham Court Road, Farringdon, Liverpool Street, Whitechapel, Stepney Green, Isle of Dogs, Victoria Dock, North Woolwich, and Plumstead. The map also shows the River Thames and various landmarks like the Isle of Dogs and the Victoria Dock Custom House.



CRL High Performance TBM Specifications

- All TBM's to be used on CRL will be closed face types, EPB or Slurry pressure balance
- Designed to work 100% in closed mode and developed for each varying ground condition
- CRL have opted to use EPB types for all the tunnels except the Thames Tunnel drives where SPB will be used, this is a decision based on our experiences on the CTRL Thames crossing where the TBM's performed exceptionally well



Driven Tunnel Segments

- Wire and polypropylene fibre reinforced segments have been selected for their durability and resistance to fire damage, As proven on CTRL





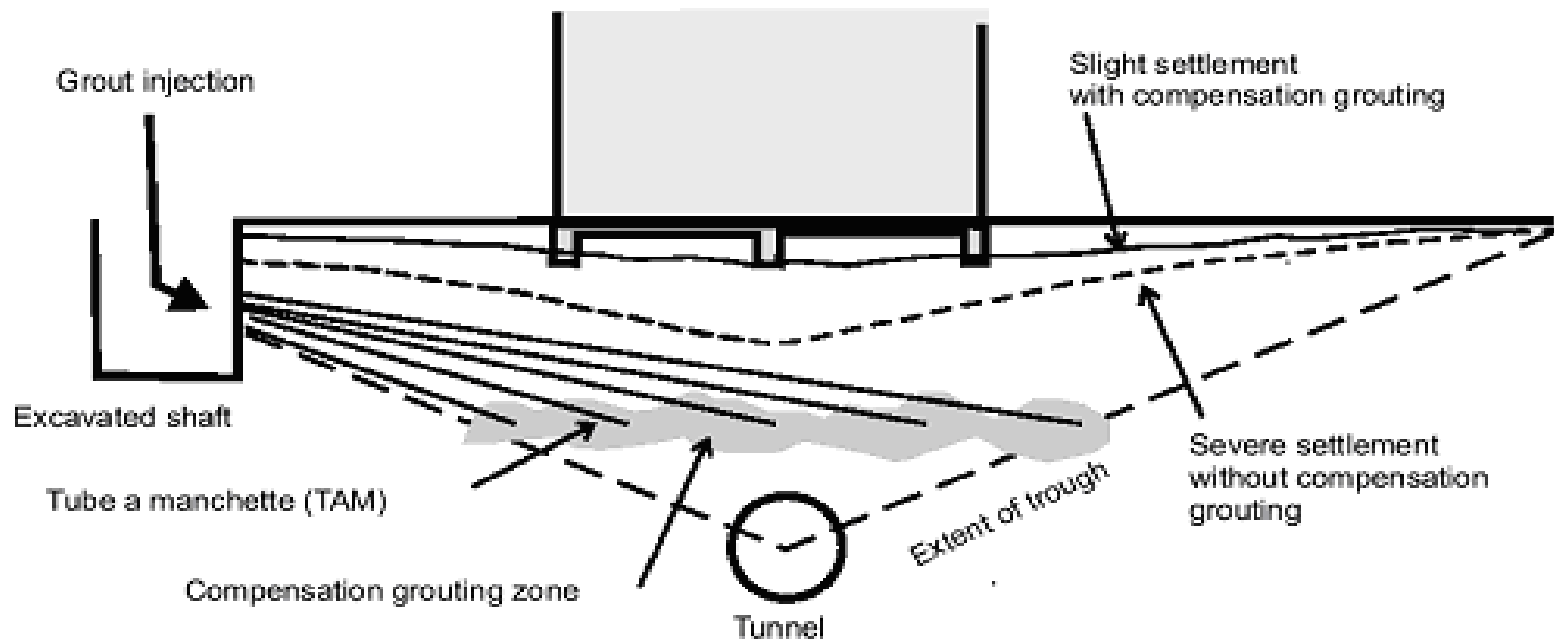
Ground Movement:

All tunnelling generates ground movement and Crossrail will affect:

- 2500-4000 Buildings
- 50 LU Tunnels
- >5 NR Surface structures
- 1000's Utilities



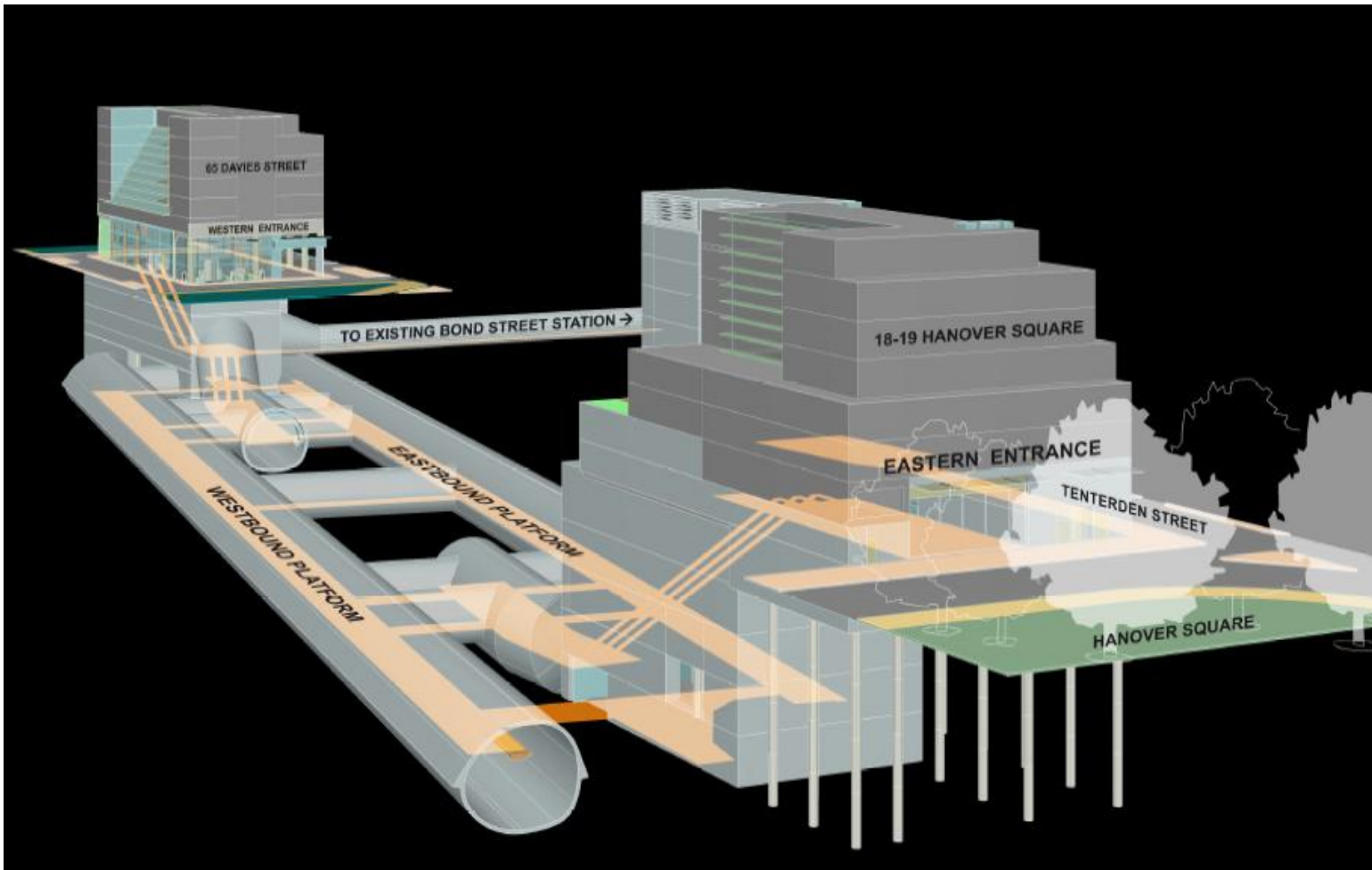
Primary Mitigation: Compensation grouting





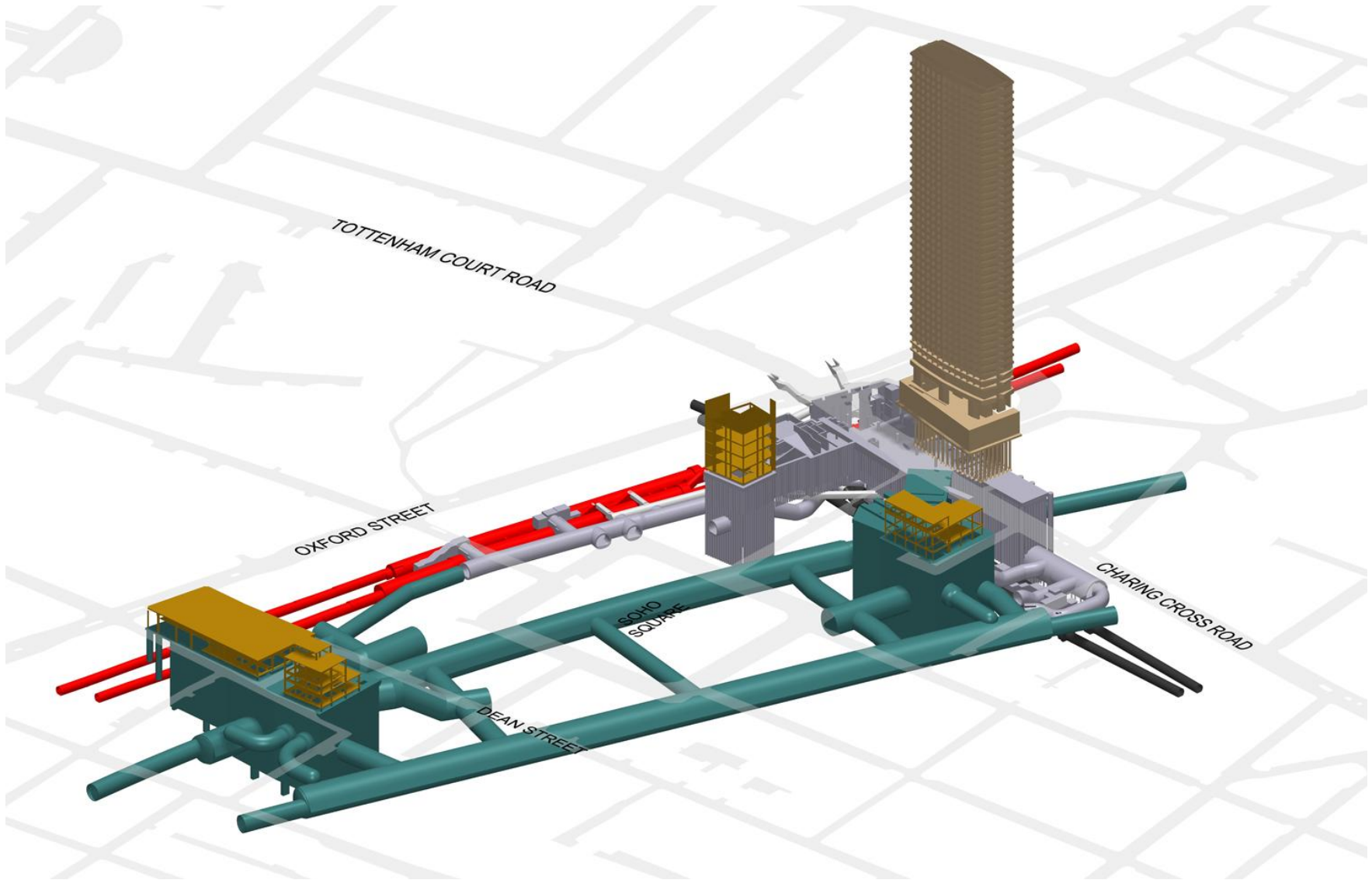
Paddington Station

Bond Street Station





Tottenham Court Road Station



Tottenham Court Road Station



Procurement Policy

- 33 Key Policy Principles
- Best affordable value for money
- Responsible Procurement
- Formal market engagement strategy
- Use of Project Bank Accounts
- No cash retentions
- Use of NEC suite with 'light touch' amendments



Packaging Strategy

Rolling Stock & Depot

West Tunnels,
Shafts &
Portals

West Stations

Central
Tunnels,
Shafts &
Portals

Central
Stations

West Tunnels,
Shafts &
Portals

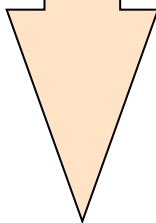
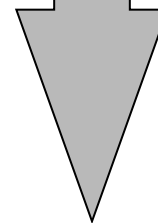
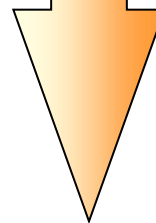
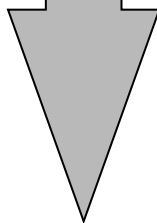
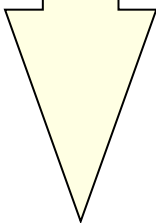
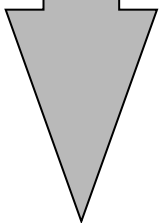
East Stations

Systems

Logistics

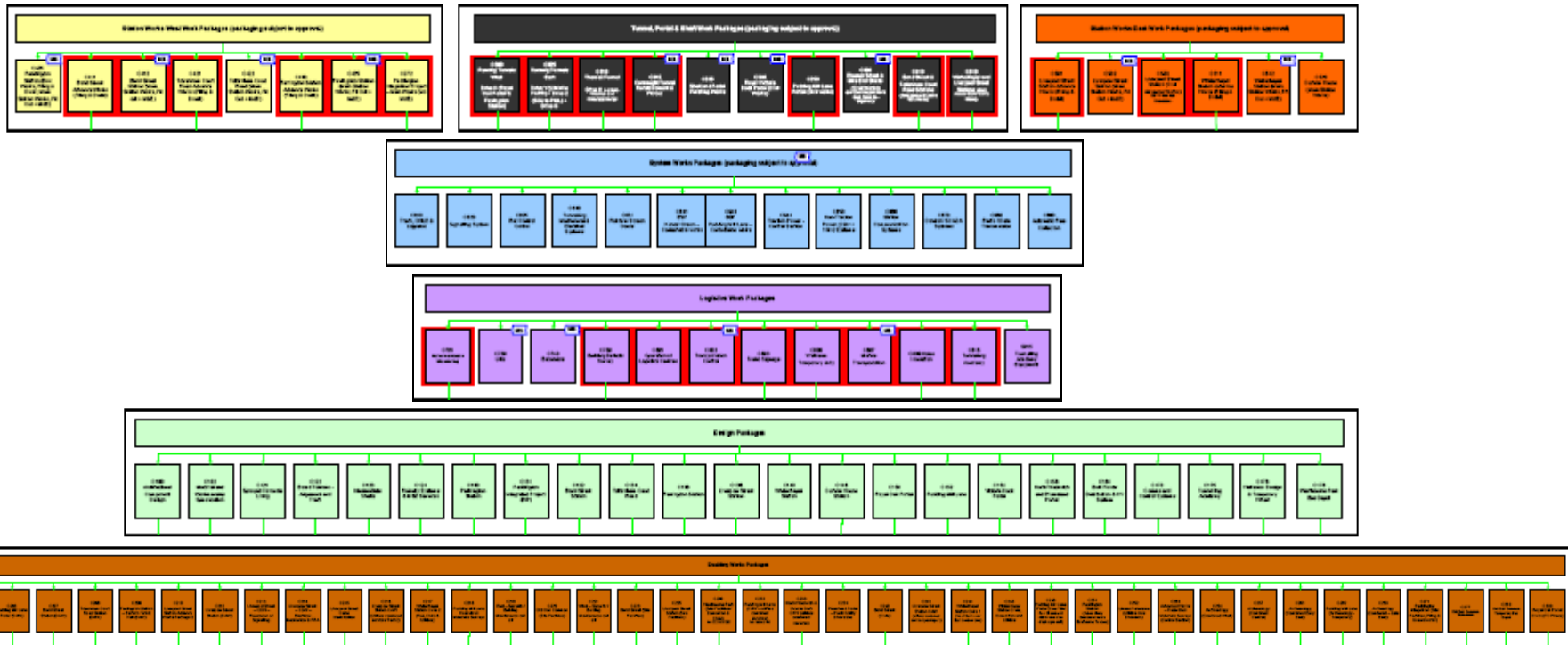
Design

Enabling Works



Design
Architecture
Enabling works
Site Investigations
Construction
System Wide Works
Signalling
Rolling stock etc

Packages





Supply Chain

- Stakeholders
- Client
- Project Partner
- Project Delivery Partner [Halcrow](#) Bechtel Systra
- Framework Design Partners
- Construction Contractors
- System wide Contractors
- Suppliers

Contracting Strategy

- NEC suite of agreements
 - Tunnels; Stations; Systems; Logistics and Linewide
- Cost based contracting
- Aligned incentives
- Target with pain/gain



Contracting Strategy

- NEC3 with 'light touch' amendments
- Main Works Option C (Target Contract)
- Optimal Contractor Involvement (OCI)
- Responsible procurement throughout the supply chain

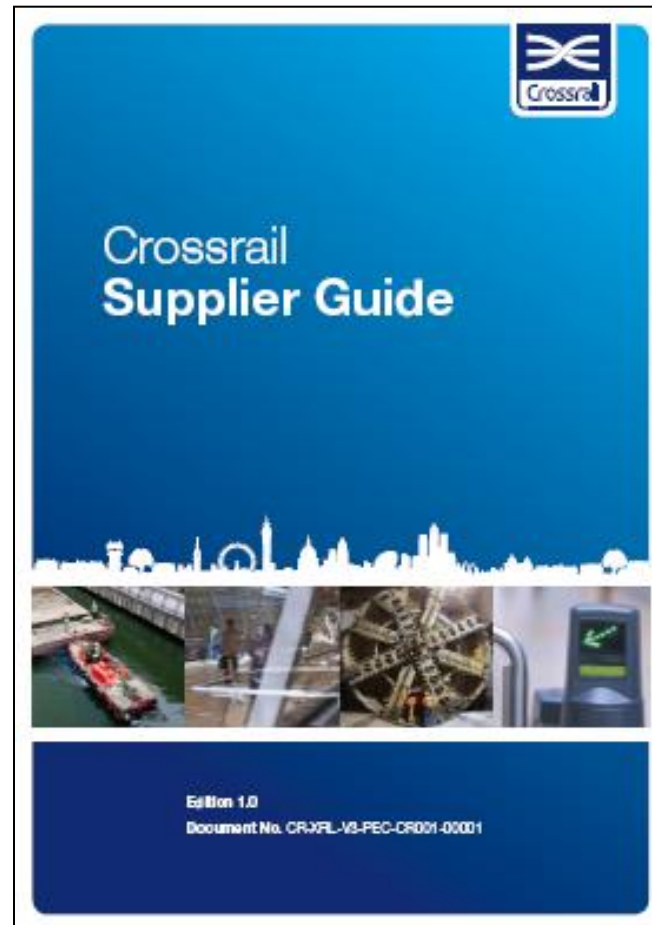


Types of Opportunity

- **Direct opportunities (with CRL) above EU thresholds** – Advertised in OJEU and notified on CompeteFor (excludes framework call-offs).
- **Direct opportunities (with CRL) below EU thresholds** – Advertised on CompeteFor (excludes framework call-offs).

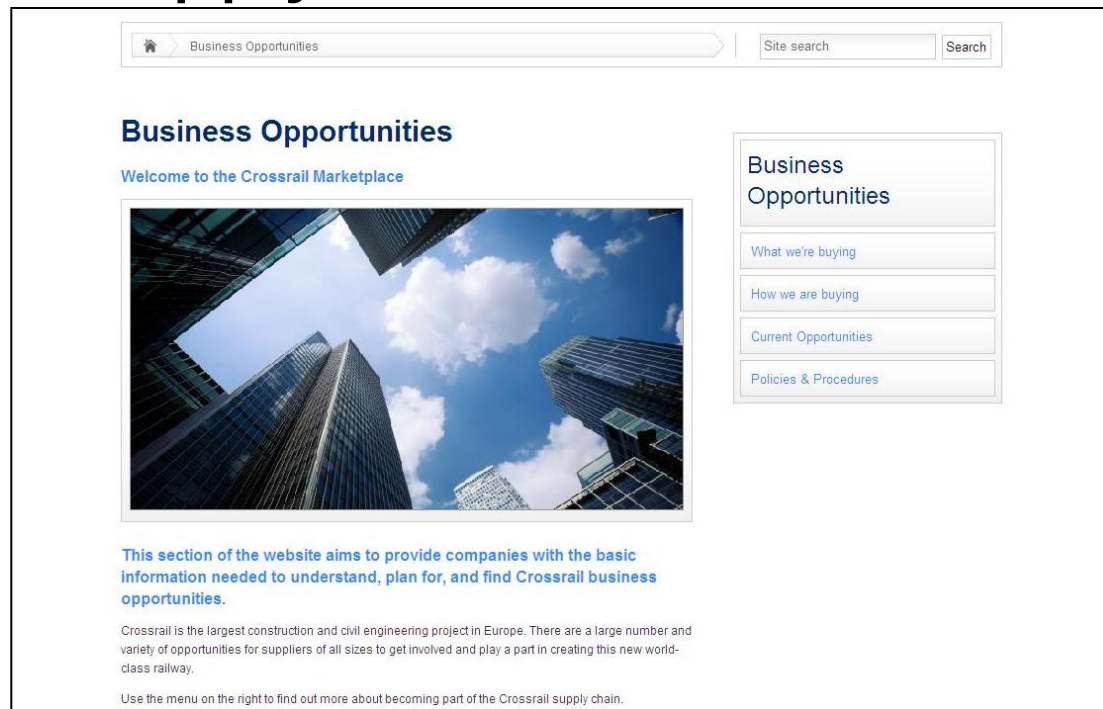
Supplier Guide

- Crossrail website includes a **Crossrail Supplier Guide** available for download



Crossrail Website

- Supplier section of the **Crossrail website** (www.crossrail.co.uk/supply) aimed at prospective suppliers and their supply chains.



Awards and Opportunities Information

- Crossrail website includes **awarded contracts** and **opportunities information** available for download

Details of Crossrail's design contracts and regular updates to this document can be found at www.crossrail.co.uk/appointments-opportunities



Crossrail Procurement Status – 11 February 2011

Ref	Package Description	*Status (forecast CIL publication date)	Tenderers / CRL Suppliers With Contact Details	Cost Range
TBA	Shaft & Portal Finishing Works	Pre CN (Q4 2011)	Packaging strategy currently being developed	TBA
TBA	Royal Victoria Dock Portal - Civil Works	Pre CN (Q3 2011)	Packaging strategy currently being developed	TBA
TBA	Eleanor Street & Mile End Shafts - Civil Works	Pre CN (Q2 2012)	Packaging strategy currently being developed	TBA
C411	Bond Street Advance Works - Piling & Dwall	Awarded	JV: Costain Ltd/ Skanska Construction UK Ltd chris.littlefair@costain.com	£25m to £100m
C421	Tottenham Court Road Advance Works - Piling & Dwall	ITT	• JV: BAM Nuttall Ltd/ Kier Construction Ltd • JV: Balfour Beatty Civil Engineering Ltd / Morgan Sindall Group Plc/ VINCI Construction Grands Projets • JV: Costain Ltd/ Skanska Construction UK Ltd • JV: Laing O'Rourke Construction Ltd/ Strabag AG • Carillion Construction Ltd • Sir Robert McAlpine	£5m to £25m

* Pre Tender denotes procurement will be from existing CRL Framework
 * Pre CN denotes Pre Contract Notice publication via OJEU
 * PQG denotes contract notice issued and pre qualification is underway
 * ITT denotes the list of current bidders
 * PIN denotes that CRL has issued a Periodic Indicative Notice (PIN) via OJEU

8

Use of CompeteFor

- Maximising the use of CompeteFor (www.competefor.com)

The screenshot shows the CompeteFor website for London 2012. The header features the CompeteFor logo and the tagline "CompeteFor - giving businesses unique access to London 2012 and other major contract opportunities". A left sidebar contains navigation links: Vision and Objectives, Help, Useful Links, Notice to Users, Register, and Login. Below these is a "HELPDESK" section with contact information for UK and international callers, and a note about impaired hearing. The main content area is titled "Welcome To CompeteFor - London 2012" and includes a "REGISTERED USERS LOGIN" section with a "User Login" form. The form has fields for Username and Password, a "Login" button, and a "Keep me logged in" checkbox. Below the login section are two columns: "WHAT IS COMPETEFOR?" and "HOW TO REGISTER". The "WHAT IS COMPETEFOR?" section includes a small image of a bridge and text explaining the service as a free brokerage for supply chain opportunities. The "HOW TO REGISTER" section includes a small image of a bridge and text explaining the registration process, which is free of charge and involves creating a user account and publishing a full business profile. A link to a short video on the registration process is provided at the bottom.

CompeteFor - giving businesses unique access to London 2012 and other major contract opportunities

Welcome To CompeteFor - London 2012

REGISTERED USERS LOGIN

User Login

* Indicates required field.

Username * Password *

☒ Keep me logged in

Not registered? [Register](#) for an account. [Forgot your password?](#) Have your [password hint e-mailed](#).

WHAT IS COMPETEFOR?

CompeteFor is a free service that enables businesses to compete for contract opportunities linked to the London 2012 Games and other major public and private sector buying organisations.

With a particular focus on supply chain opportunities, CompeteFor acts as a brokerage service, matching buyers with potential suppliers. It also facilitates access to focused business support, through the national Business Link network, helping to boost the long-term competitiveness of your business.

Registering on CompeteFor will bring you closer to accessing new business opportunities relevant to your sector. This service is delivered through a partnership between public and private sector organisations, working closely with the London Organising Committee of the Olympic and Paralympic Games (LOCOG) and the Olympic Delivery Authority (ODA).

HOW TO REGISTER

Any business can register on CompeteFor. It's easy, free of charge, and only needs to be done once to access thousands of contract opportunities.

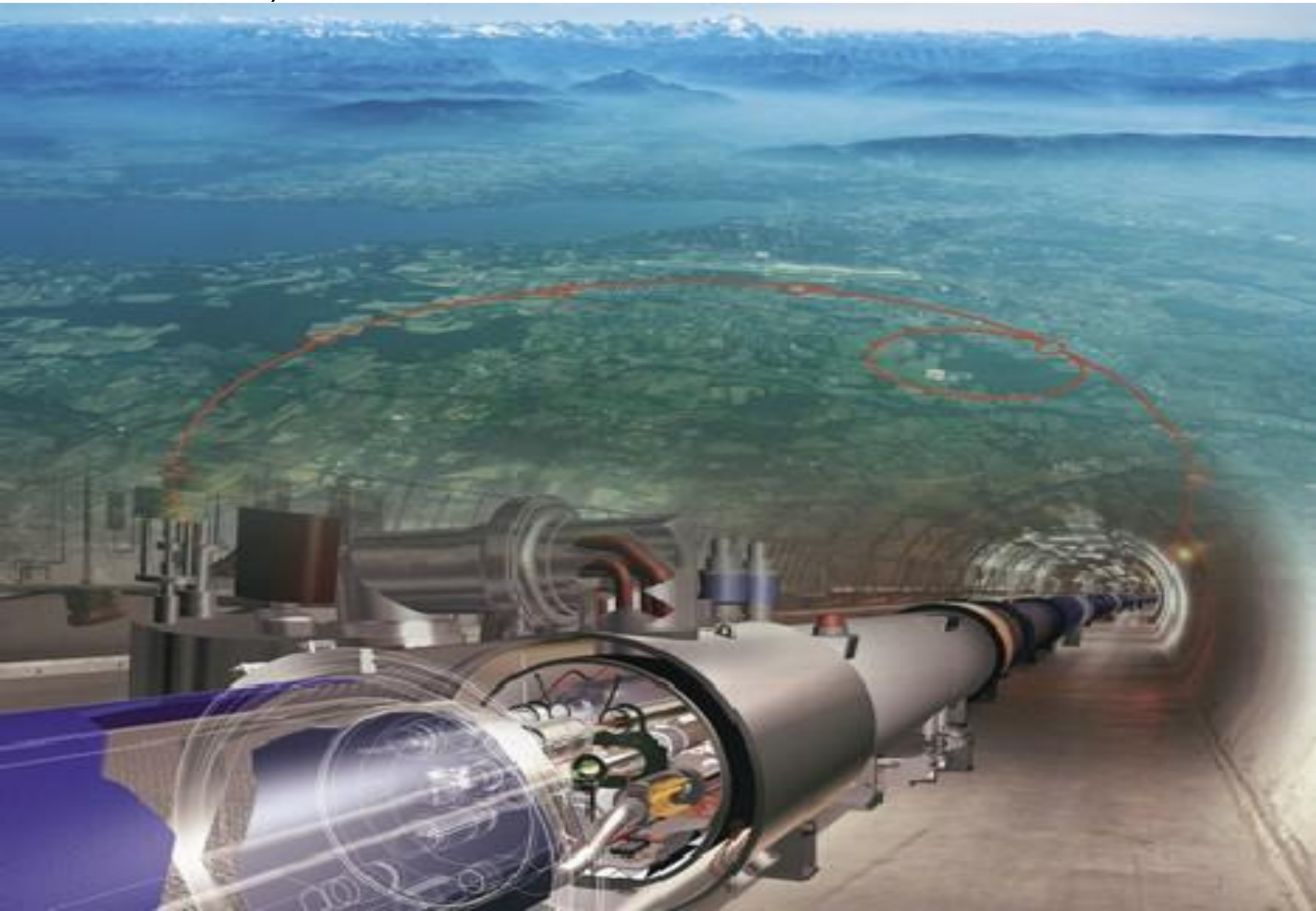
First you will need to register the basic details of your business to create a user account. This will allow you to view opportunities and gain access to relevant business news and events.

To apply for contracts advertised on CompeteFor, you **must complete and publish a full business profile**. Once published, your business profile will be used to match your business with contract opportunities you can then apply for. You can also use CompeteFor to search for suitable businesses to partner with.

[View a short video on the registration process.](#)



CERN, SWITZERLAND



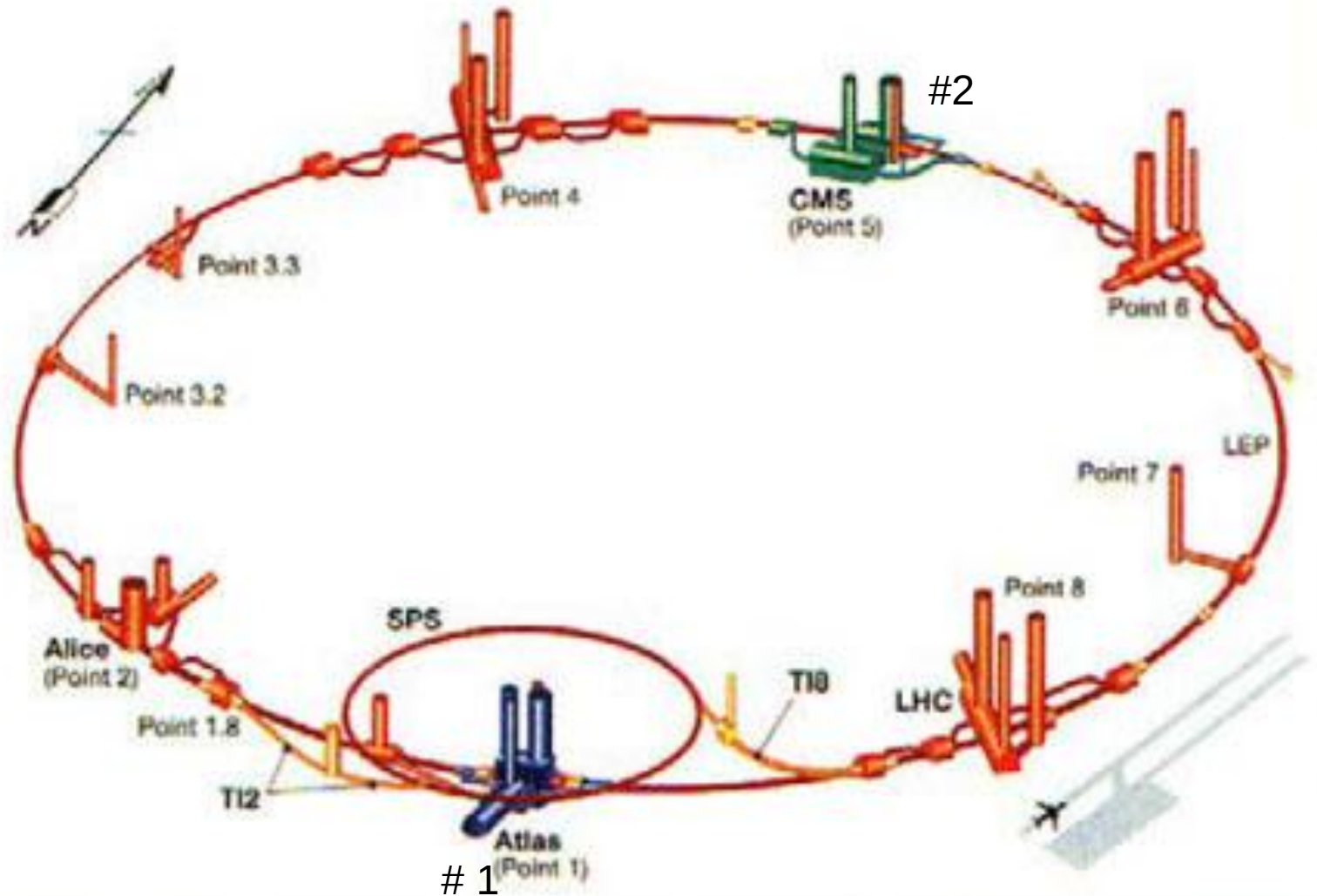
Recent LHC Civil Projects

from LEP to LHC in 10years



Retro fitting an Alliance Contract

Construction Packaging



Package3

- Combination of tunnels,caverns,shafts, surface works in different locations around the CERN circle.
- KBR designer 1996-2003
- Taylor Woodrow- AMEC -Spie B jv
- Commenced construction 1998
- Completed early 2003

Physical needs and constraints

- The need to construct the services caverns as **close** to the experimental areas as possible.
- The **integration** of the new works into the existing structures
- Lots of multi geographical **interfaces** .
- The presence of the existing structures which remain **operational** for the first two years of the construction period;
- To meet the **tight overall LHC project schedule**, as much of the construction work as possible needed to be completed **before** the final LEP shutdown.
- However, major portions of the works **can only be executed thereafter, when all the LEP equipment will have been dismantled and removed from the tunnel.**

And then there were problems post award of contract

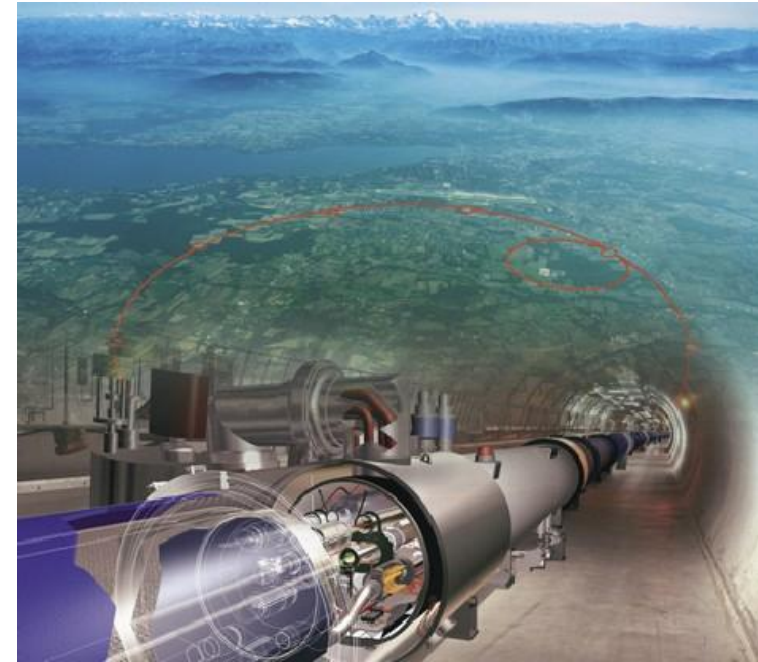
- Programme changes by client.
- Resequencing of underground works & changes to scope.
- 35 hr week!

Modification to Contract

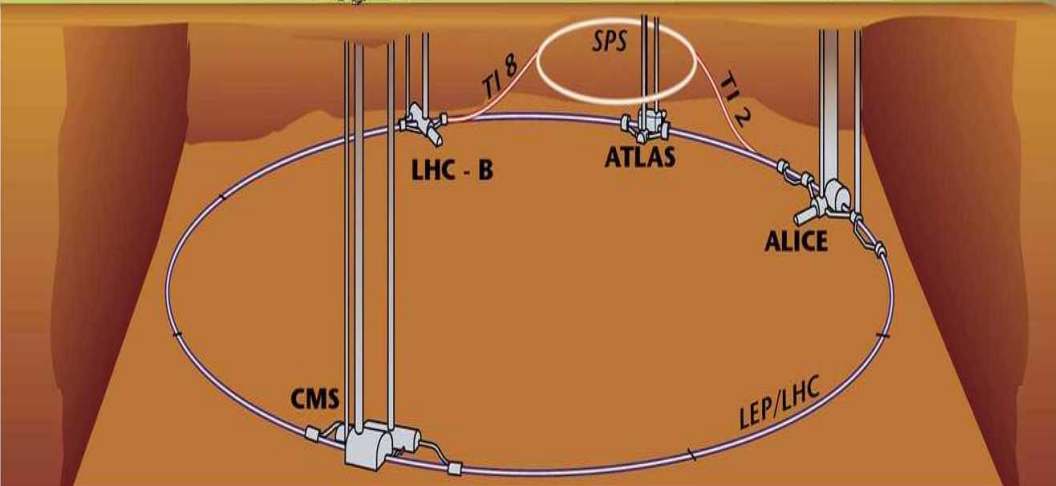
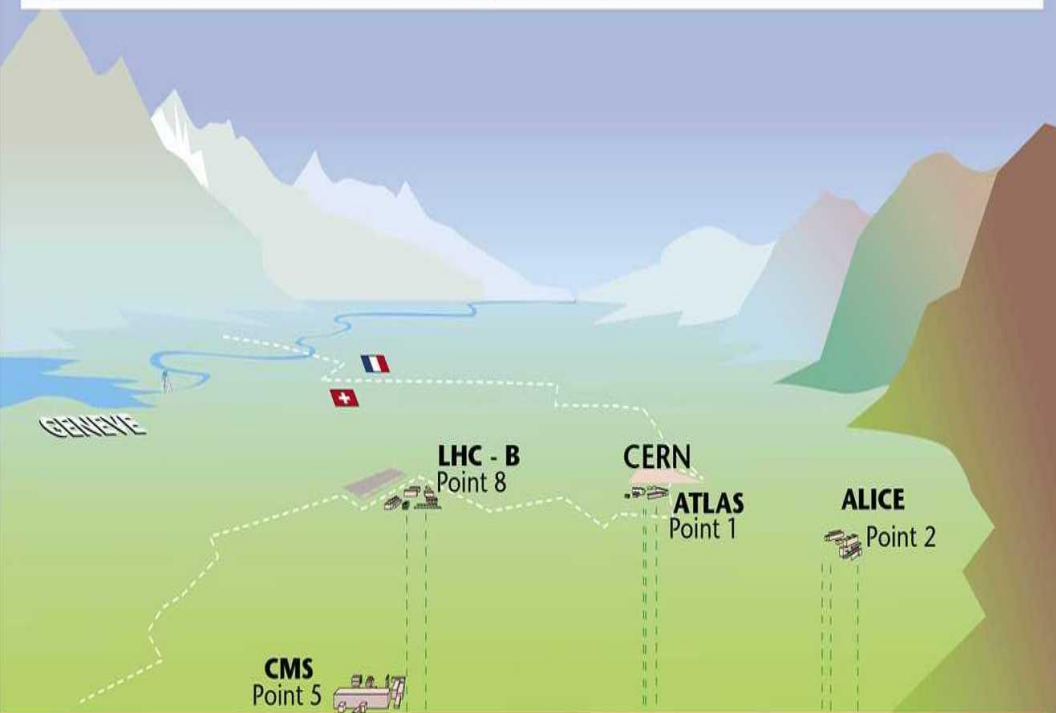
- Conditions of Contract – Modified FIDIC with remeasure bills of quantities
- Changes by client to scope, schedule, access dates, completion dates exceeded 15% of the contract value, rates and quantities not applicable
- CERN needed to change ..but how? Transparency was vital!
- CERN had to work within the existing Contract. All risks must remain as allocated within the Contract.
- Alliance formed Client Contractor with Consultant as Facilitator
- Revised Target Price with cost reimbursement – 10 month process to agree basis of changes, programme, rates, fee , overheads ,contract and payment arrangements
- Rules had to be agreed.
- Continuous review

Reflection

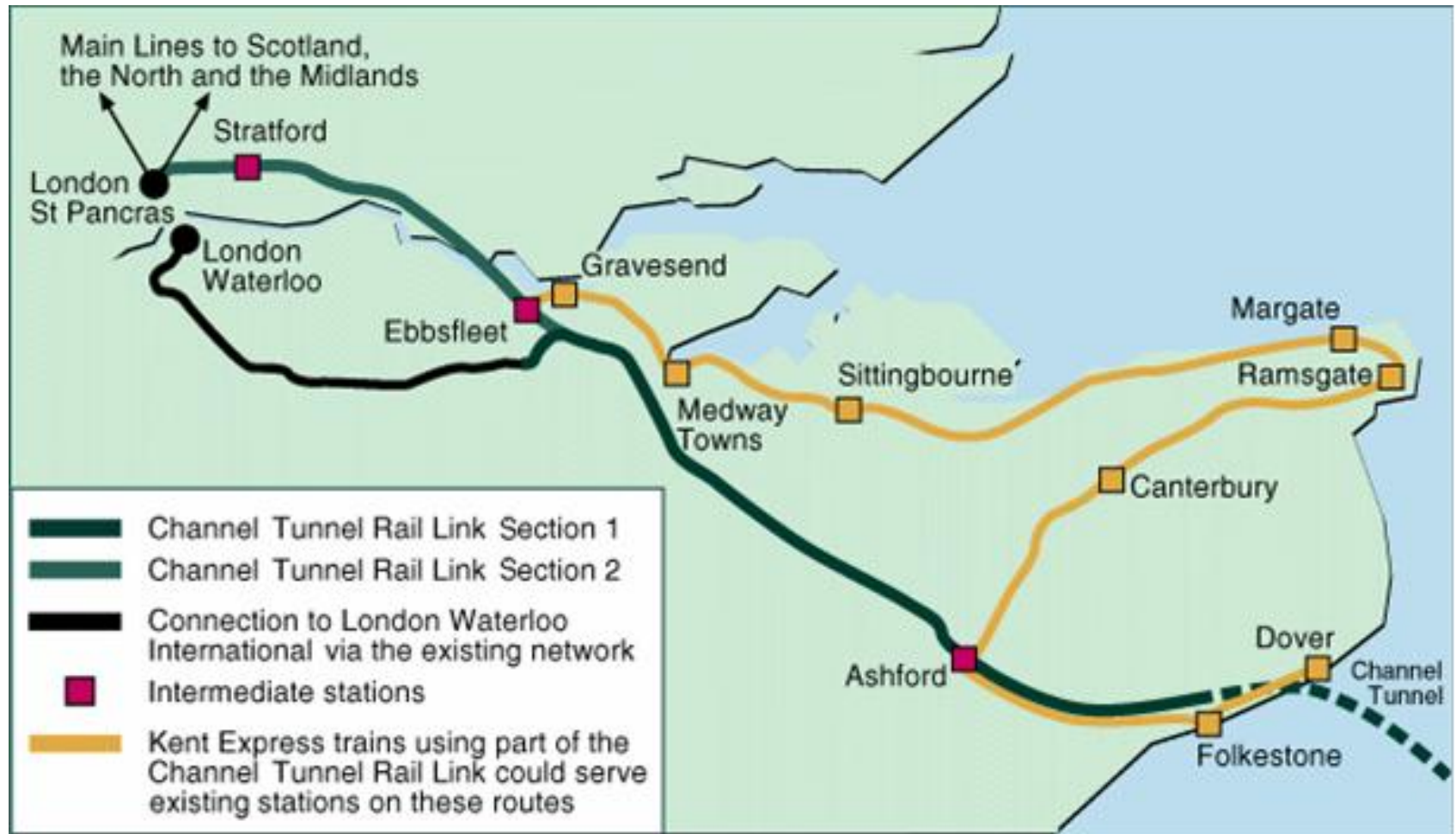
- Kept to schedule
 - Cost savings shared 70/30
 - Cost discipline for CERN
 - Contract incentivised to keep costs down
 - Collaborative approach (with rules)
 - Behaviours had to change
 - Focus on the costs
 - Rewarded for this approach
 - Trust saved the day!
 - CERN management needed to demonstrate transparency for members
-
- *Lessons learned= spend more front end time defining the scope& interfaces ... before committing to work .*
 - ***....& keep the scientists under control!!!***
 - ***I hope they find the Higgs boson !***



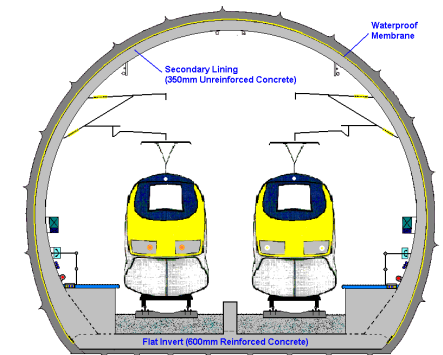
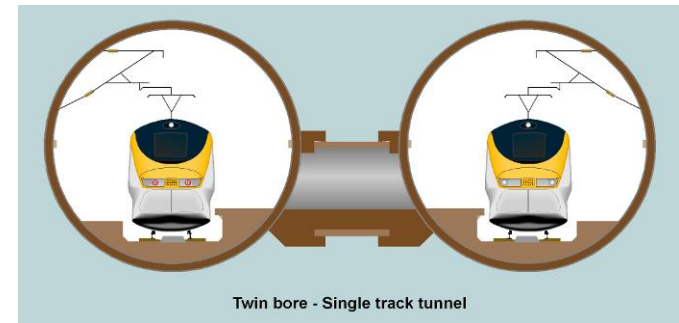
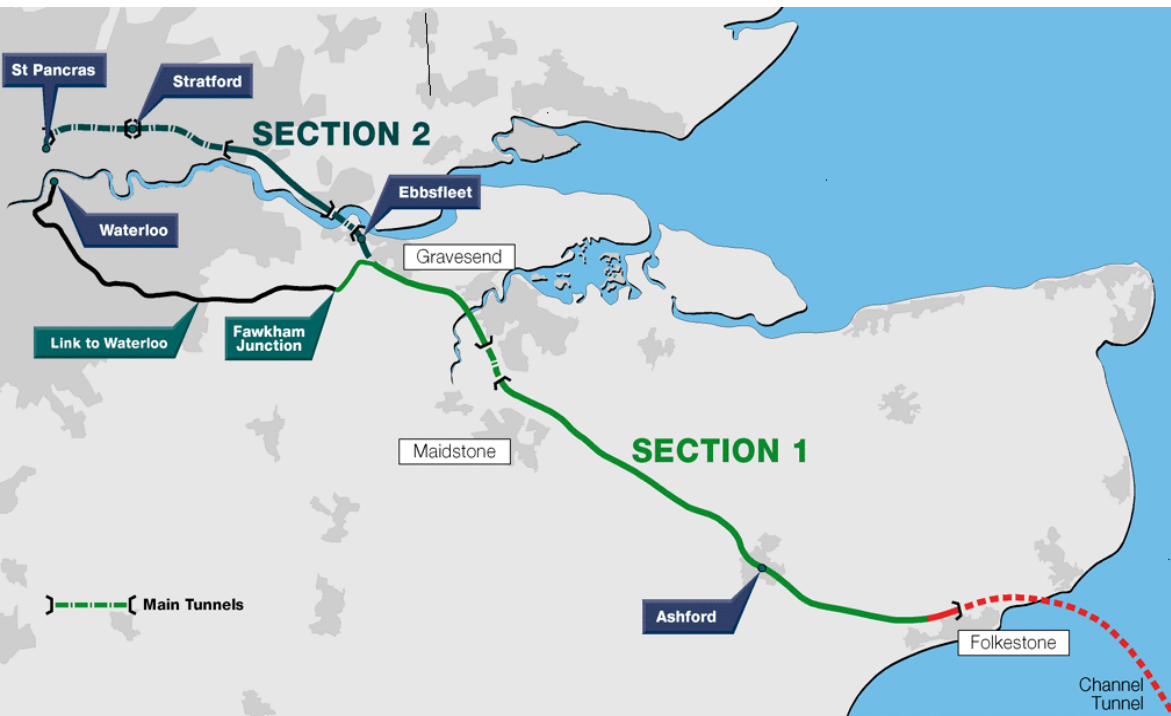
Overall view of the LHC experiments. CERN GENEVA



High Speed 1 UK



- **High Speed 1 (UK)**
- *London Tunnels for High Speed 1, (Channel Tunnel Rail Link)*





6/11/1999

London tunnels, High Speed 1



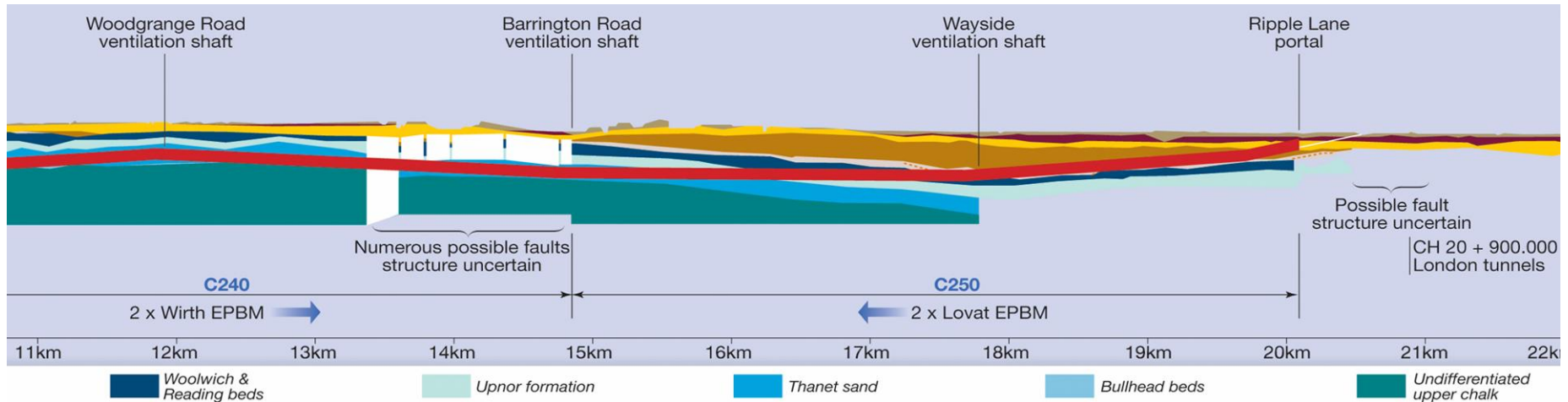
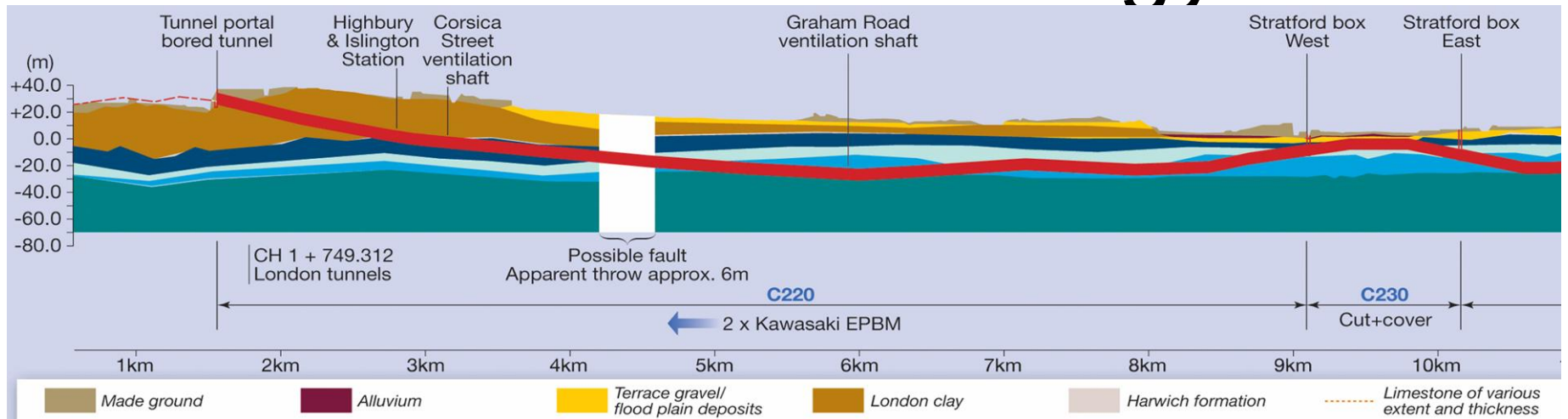
North Downs Tunnel. High Speed 1



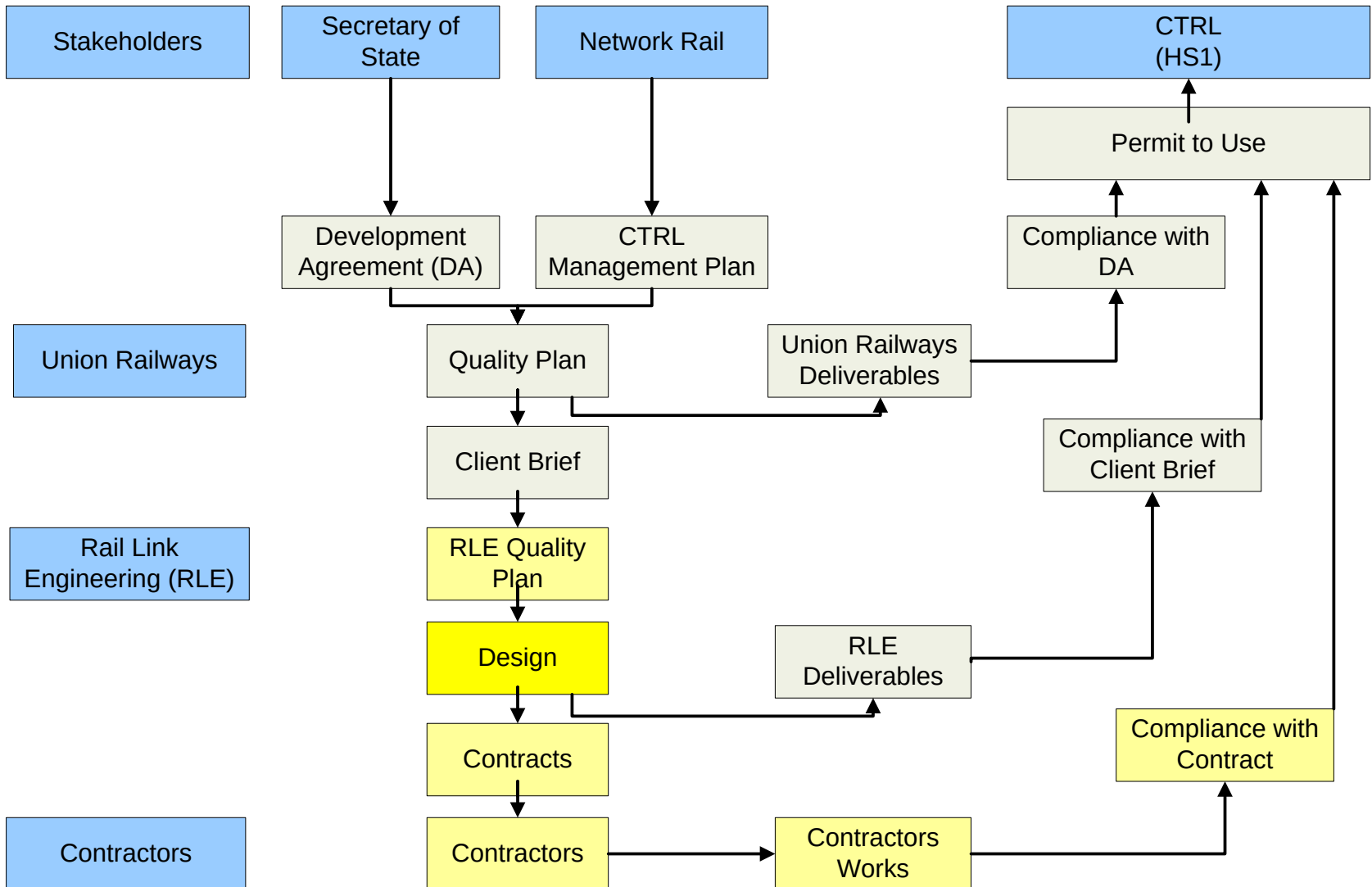
5 Contracts: London Tunnels and Stratford Box



Area 200 - Geology



CTRL Delivery Mechanism



Contractors and

RLE

Awarded £/ €
(Jan/Feb 2001)



Nishimatsu

SKANSKA

C220- 7.5km (£145m/€203m)

Skanska

C230- 1.1km (£105m/ €147m)

**Costain, Skanska,
Bachy**

C240- 4.7km (£125m/ €175m)

**Nuttall, Wayss and
Freytag, Kier**

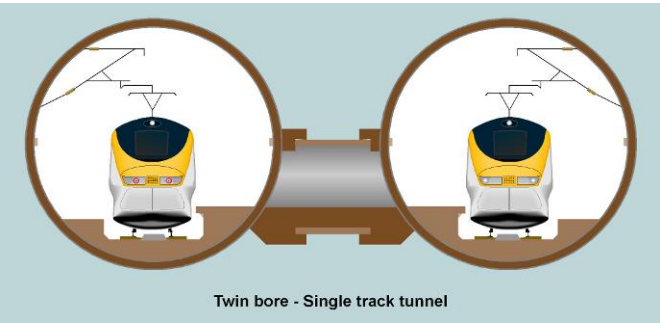
C250- 5.2km (£115m/ €161m)

Value Engineering: Prior to Contract Award

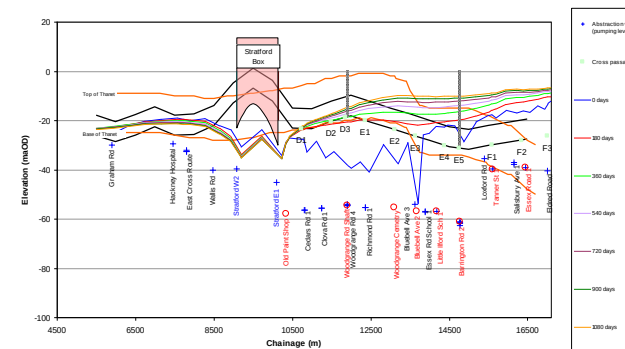
- Stratford Land Raise



- Location of X passages



- 'Regional' Dewatering



Problems

Mid 2001 - when the tunnels contracts went to site

Forecast predicted the Budget (*including contingency*) for Area 200 would be broken just on the Stratford Stn Box

(which still had to deal with issues including contamination, live railways, design development & National Grid lines).

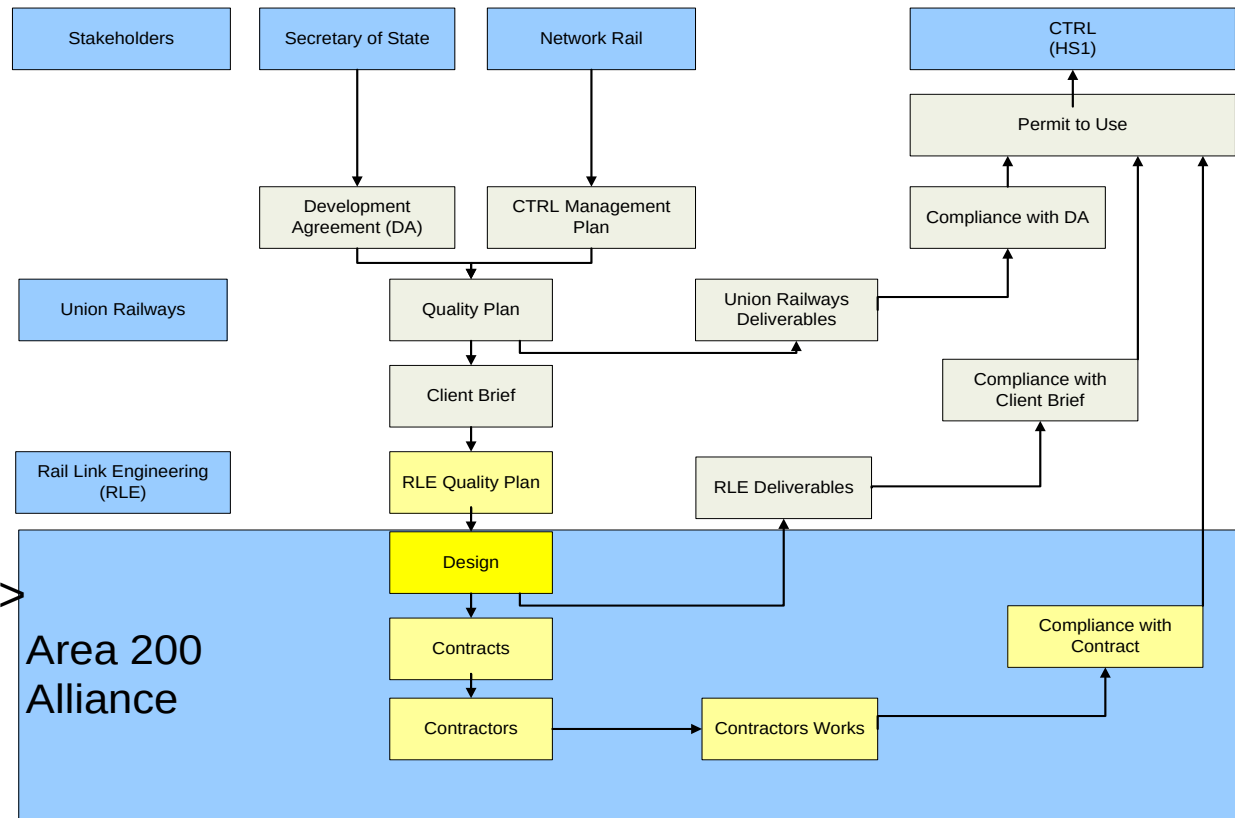
The *contingency* had been intended to cover:

- Design Development
- Settlement mitigation (!)
- Dealing with others
- Unforeseen/omission in scope
- Interfaces between contracts including delays
- So a new delivery model was needed!

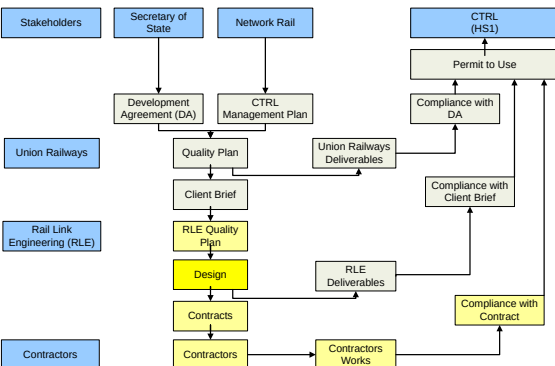
The Alliance

“To work with one budget and one programme to deliver Area 200 under budget and ahead of schedule”

New delivery model



Original delivery model



New delivery required

- **Removal of contract Compensation Events**
- **Removal of Pain Share arrangements**
- **A pooling of Budgets**
 - **4 contracts**
 - **Contingency**
 - **Field Engineering budget**
- **Retention of all other aspects of the Contract (NEC Option C)**

Purpose?

- **To deliver the job within this combined budget & within the programme.**

How did it work?

- **By managing the risks between us.**
- **Searching for savings.**
- **Minimising costs through co-operation.**
- **Disciplined weekly meeting plus ad-hoc meetings.**

***A fundamental rule was that
nobody was disadvantageded***

Co-location - behaviours



Behaviours:

- Collaborative
- Open (especially with problems)
- Trust



TEAM 200 ALLIANCE - T2A

ROLL OUT MEETING

25th MARCH 2002

Main Hall

University of East London



TEAM 200 ALLIANCE - T2A

- **Agenda for the Afternoon**
 - **Why do we need to change**
 - **What are our future objectives**
 - **What are we changing in the Contract**
 - **How will working practices change**
 - **What challenges do we face**
 - **Where are we now re Schedule & Budget**
 - **Any questions... and are you still with us!!**



TEAM 200 ALLIANCE - T2A

- **Since Contract Award we have encountered a number of problems**
- **Late release of design has seriously delayed Stratford Box**
- **This has seriously delayed the launch dates for C220 & C240**
- **Signalling problems have seriously delayed West Rail Bridge**
- **Railtrack / CRG issues delayed commencement of Graham Rd**
- **The informal Alliance is not able to manage these issues**



TEAM 200 ALLIANCE - T2A

- **We identified the need for RLE and all Contractors to**
- **work collaboratively as a single team**
- **work flexibly across Contract boundaries**
- **develop solutions that are best for the project not the contract**
- **set aside ‘Contract’ issues and focus on the work**
- **develop an incentive scheme that would promote the above**

TEAM 200 ALLIANCE - T2A

HOW IS THIS DEALT WITH?

- **SUPPLEMENTAL AGREEMENT**

- Addendum to Main Contract

- + Disapplies Compensation Events (incl. Retrospectively)

- + Defines the POT & has mechanisms for measuring any surplus

- + Defines MILESTONES & how payment of any surplus relates to achievement of milestones.

TEAM 200 ALLIANCE - T2A

T2A has:

- One budget
- One programme
- One team

TEAM 200 ALLIANCE - T2A

One Budget.

- Manage Costs
- Reduce Waste
- Improve
Efficiency

TEAM 200 ALLIANCE - T2A

Manage Costs

Manage Costs..... not Margin

Control Expenditure

TEAM 200 ALLIANCE - T2A

Improve Efficiency

Communications

Decision Making

Resist Changes

TEAM 200 ALLIANCE - T2A

We have to
Perform

(nowhere to hide)

TEAM 200 ALLIANCE - T2A

**Responsible for delivery
of:**

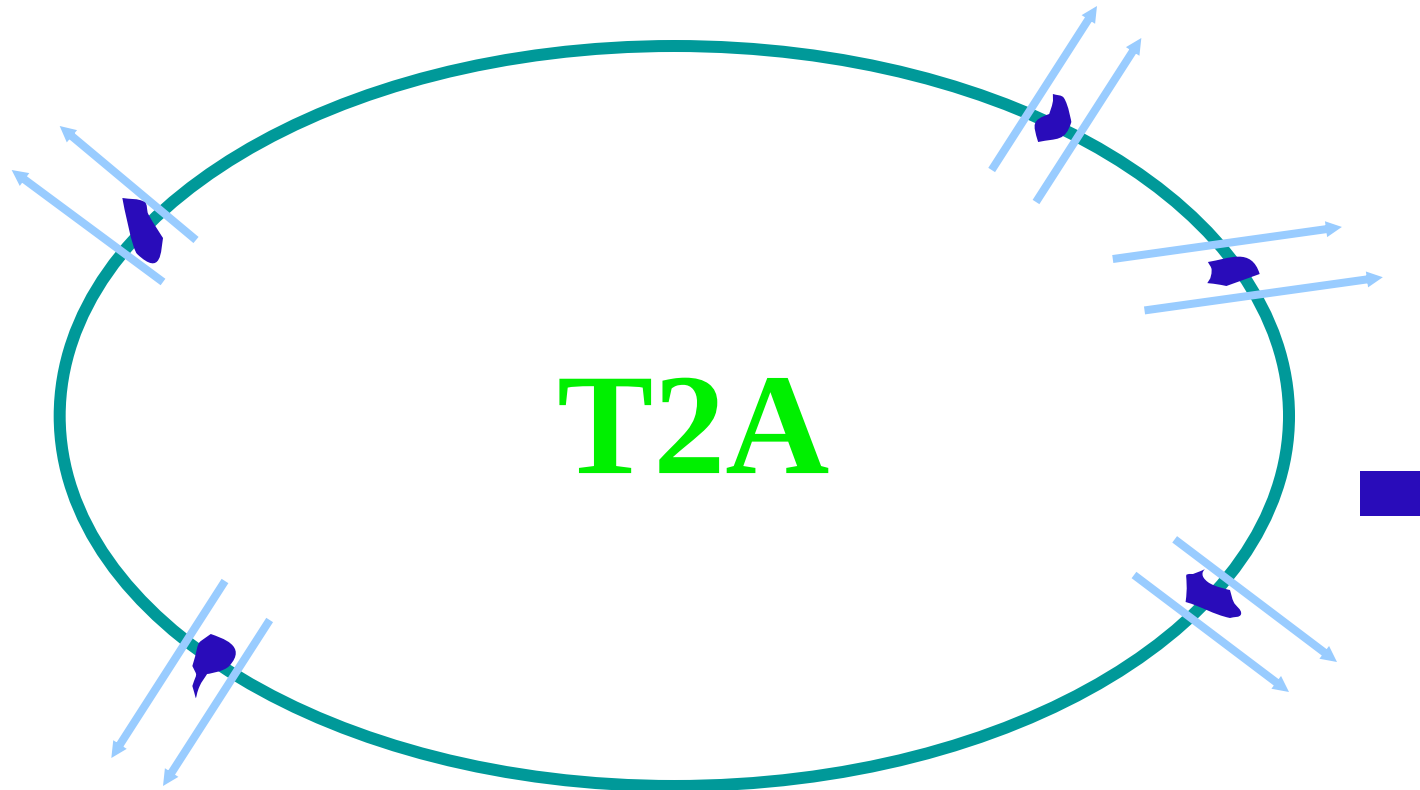
- *Health & Safety*
- *Quality*
- *Environment Management*

TEAM 200 ALLIANCE - T2A

Organisational Changes

TEAM 200 ALLIANCE - T2A

Organisational Concept



I Galloway

**ALLIANCE STEERING
GROUP**

ALLIANCE MANAGEMENT BOARD

G. Field

T. McDonald

D. Court

R. Ibell

I. Morgan

J. Horner

K. McManus

**URN
RLE
Interfaces**

**Cost
Monitoring**

**Programme
Monitoring**

**Budget
Monitoring**

**Environmental
Management**

**Project
Control
Interface**

**Field
Engineering**

AREA 200 ALLIANCE

CURRENT SITUATION

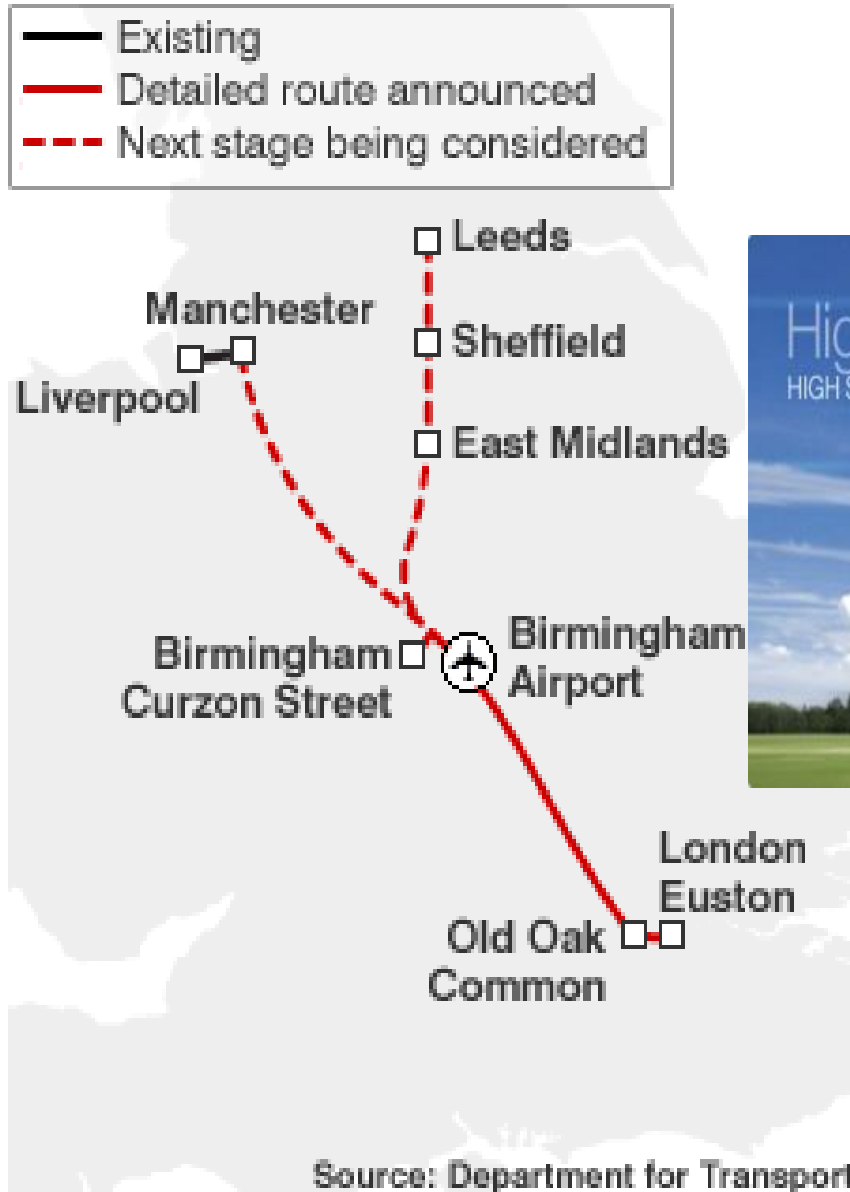
	Target Price	Trends	Forecast Price
C220	144	15.16	159.16
C230	107	22.74	129.74
C240	115	7.82	122.82
C250	115	5.75	120.75
RLE Supervision	11		11
RLE Allowances	60		8.53
	552		552

AREA 200 ALLIANCE

Contract	Award Value	Forecast Out-turn Cost	Final Target	Actual Out-turn Cost	Contract Payment	Incentive Bonus	Cost to Employer
C220	144	147	150	148	148.00	320	151.20
C230	107	132	130	130	130.00	320	133.20
C240	115	121	121	119	119.00	320	122.20
C250	115	124	126	125	125.00	320	128.20
RLE Supervision	11	10	10	11	11.00		11.00
RLE Allowances	60	18		3	3	320	3.00
	551.20	552.00	537.00	536.00	536.00	1600	537.80

And next HS2

First stage of high speed network

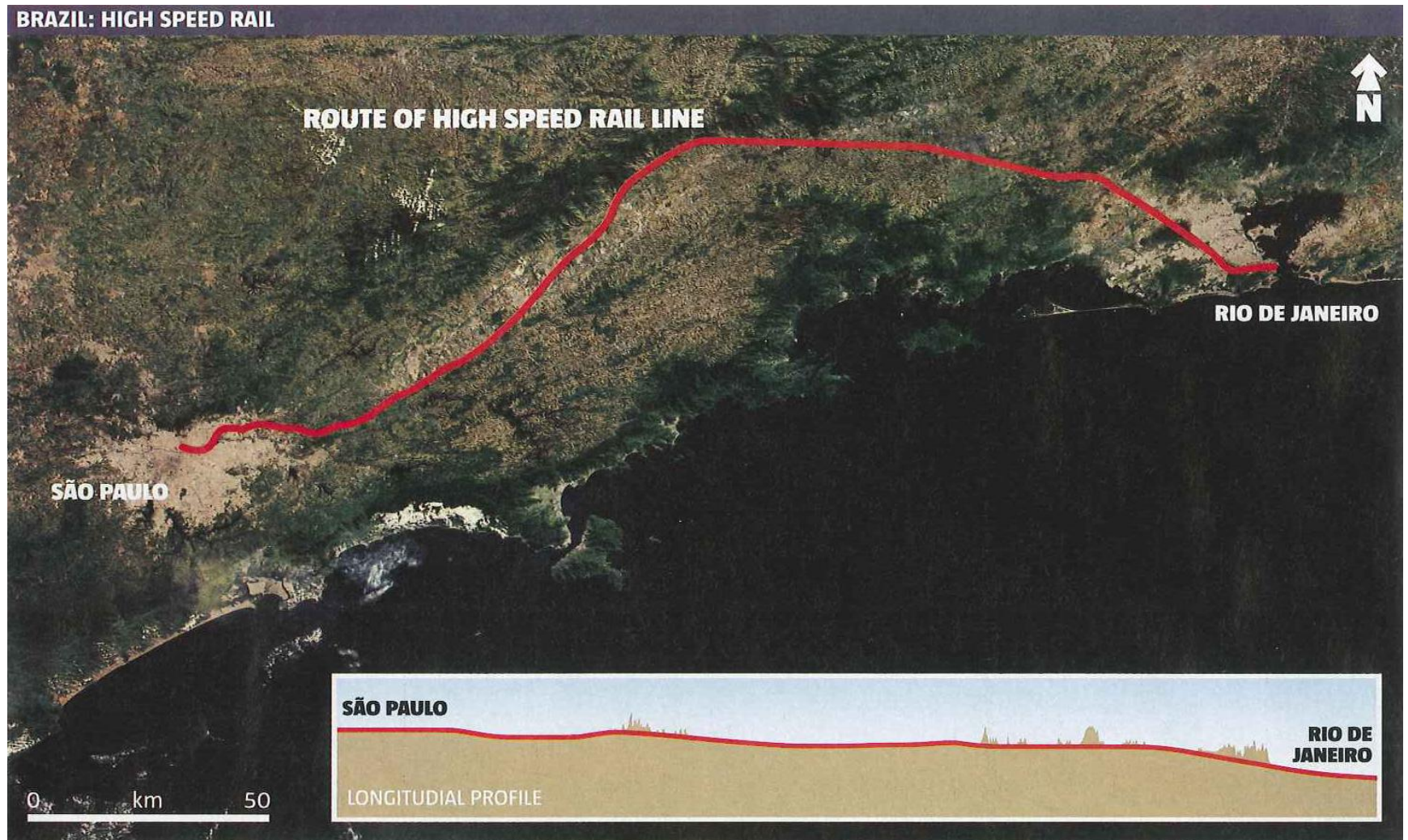


Will we have learned from HS1?



Significant tunnelling and bridges

High Speed Rail Brazil



BRAZILIAN QUICKSTEP

TAV Brazil

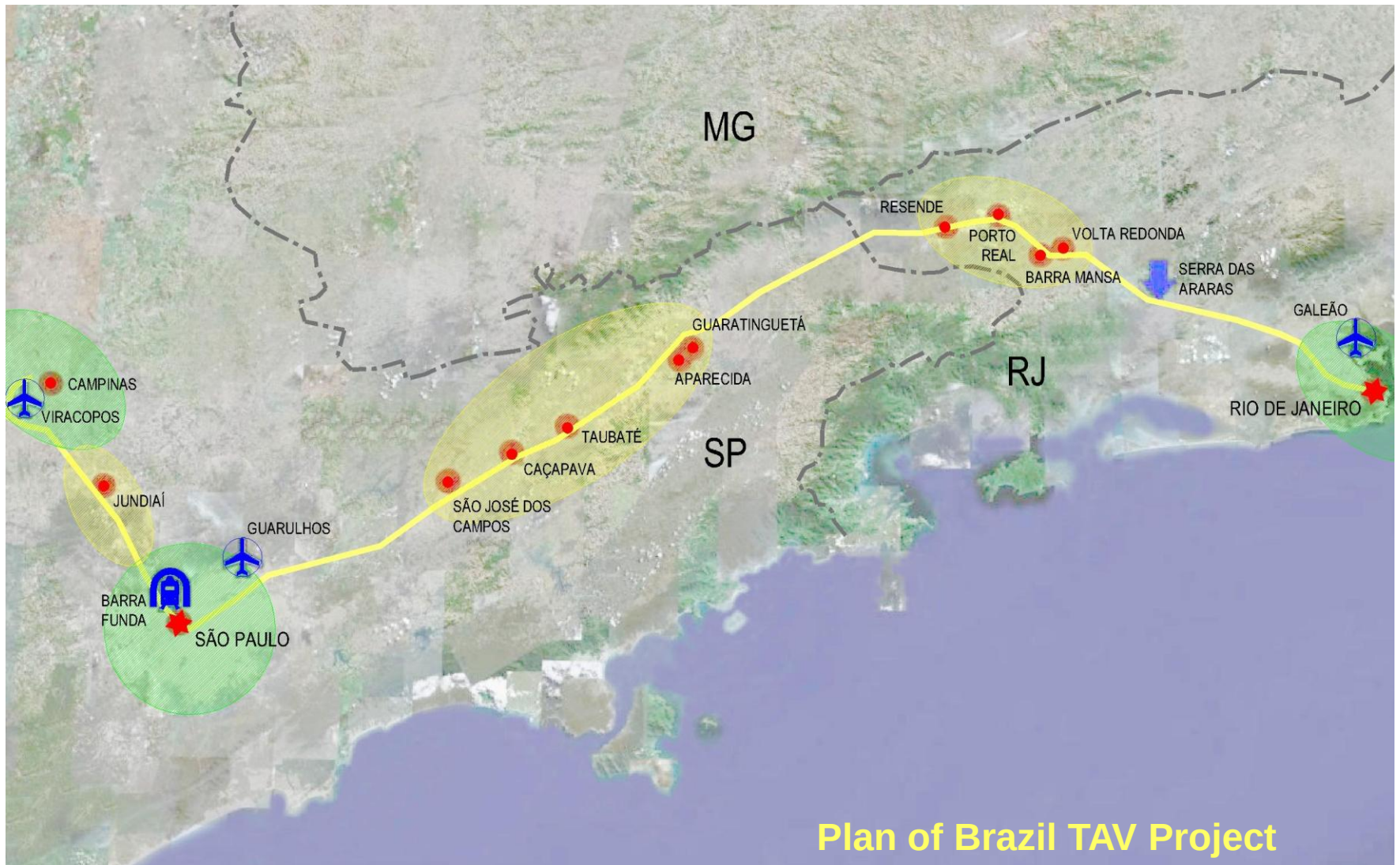
- Following the recent elections the scheme remains a priority , and work on the 515km route should begin in...?



TAV Tunnelling

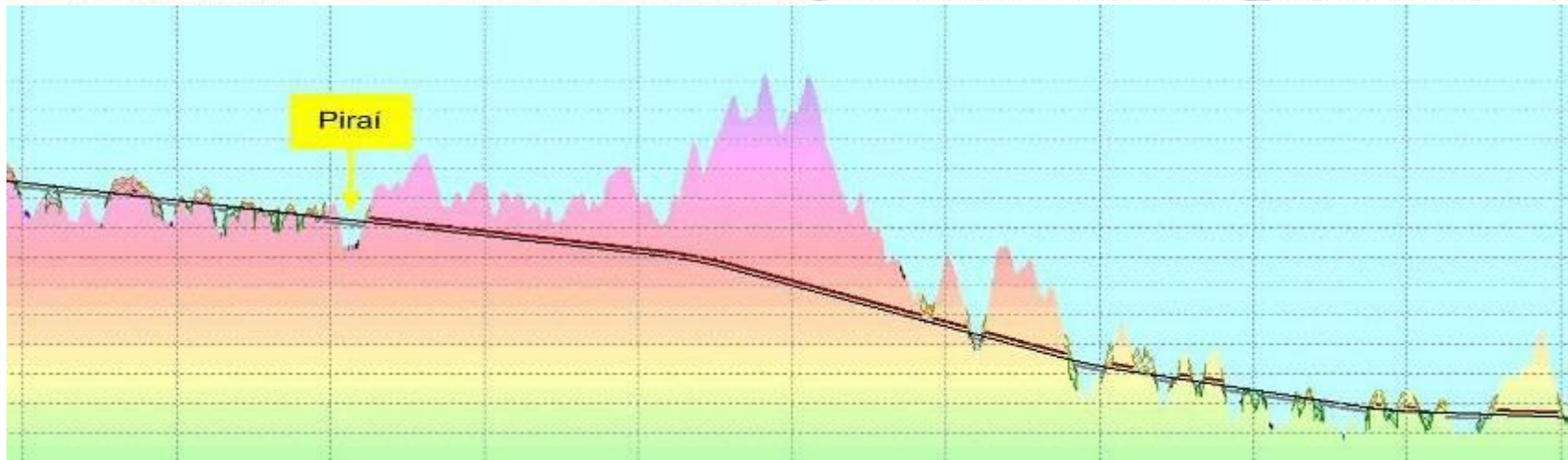
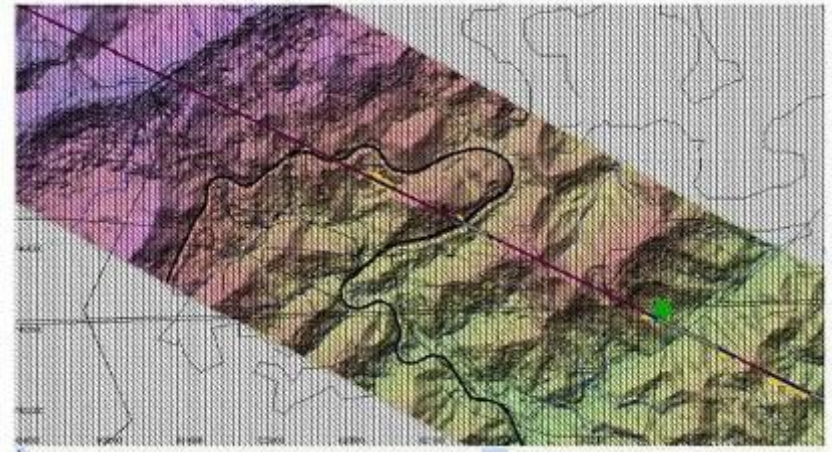
- 6 years to plan and construct
- +90km tunnels--@50km >1km long(4>7km long)
- TBM and Conventional tunnelling
- Logistics and planning challenge
- Soft and Hard Ground
- Tunnelling= >30% of total construction cost





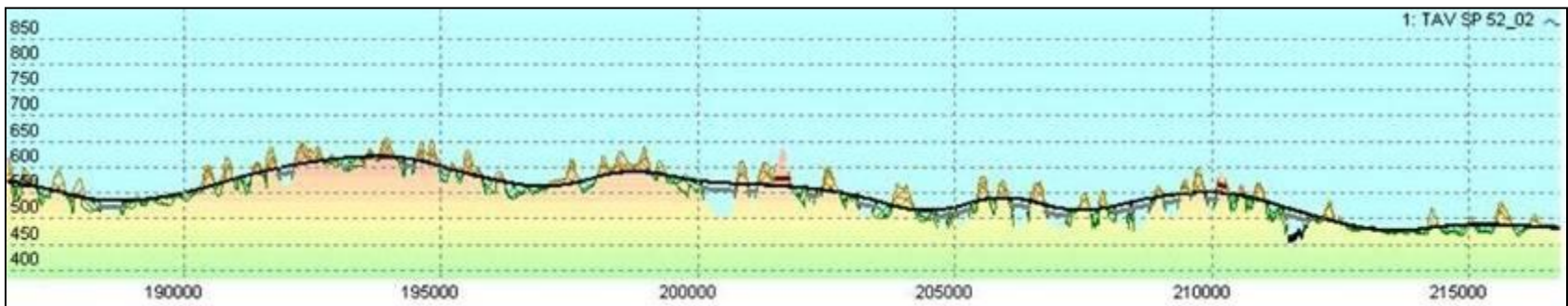
Alignment Studies

Critical Areas - Serra das Araras Mountains



Alignment Studies

Critical Areas - Queluz, Lavrinhas & Cruzeiro 'Sea of Hills'



NCE



POTENTIAL BIDDERS

Bidders are believed to include:

China – China Railway Construction Company (CRCC), China North Locomotive and Rolling Stock Industry Corporation, China Investment (national wealth fund) and China Development Bank

France – Alstom and SNCF

Germany Siemens and Transrapid/Maglev

Japan – Mitsui, Mitsubishi, Toshiba, Hitachi and Japan East Railway

South Korea – KRNA, KRRI, Hyundai, Samsung Engineering and SK Engineering & Construction

Spain – Talgo

Source: Infrastructure Journal

Brazil TAV Concession Model – developing options

TAV Procurement Roles

ETAV is the new Government agency set up to act as the Government client & deal with technology transfer.

ANTT is the “*Agencia Nacional de Transportes Terrestres*”
i.e. the transport regulator/agency responsible for all surface transport in Brazil.

The Brazilian Government is represented by both these agencies
– and the funding will be routed
through **BNDES** (the Brazilian Development Bank),
who receive all their capital from the Government.

Key issues with original business model

Risk profile

- Almost all risks passed to private sector
- All risks bundled into a single Concession – apparently too much risk for a single consortium
- Compounding of risks between construction & operations phases (particularly construction cost overrun risk & revenue risk)

Construction

- Construction cost: large difference between published estimate and some contractor estimates - and concern over who bears cost overruns
- Mandatory requirements e.g. stations (esp. Galeão Airport) may lead to increase in overall construction cost estimates
- Further design work needed to reduce construction cost risk

Key issues with original business model (2)

Structural

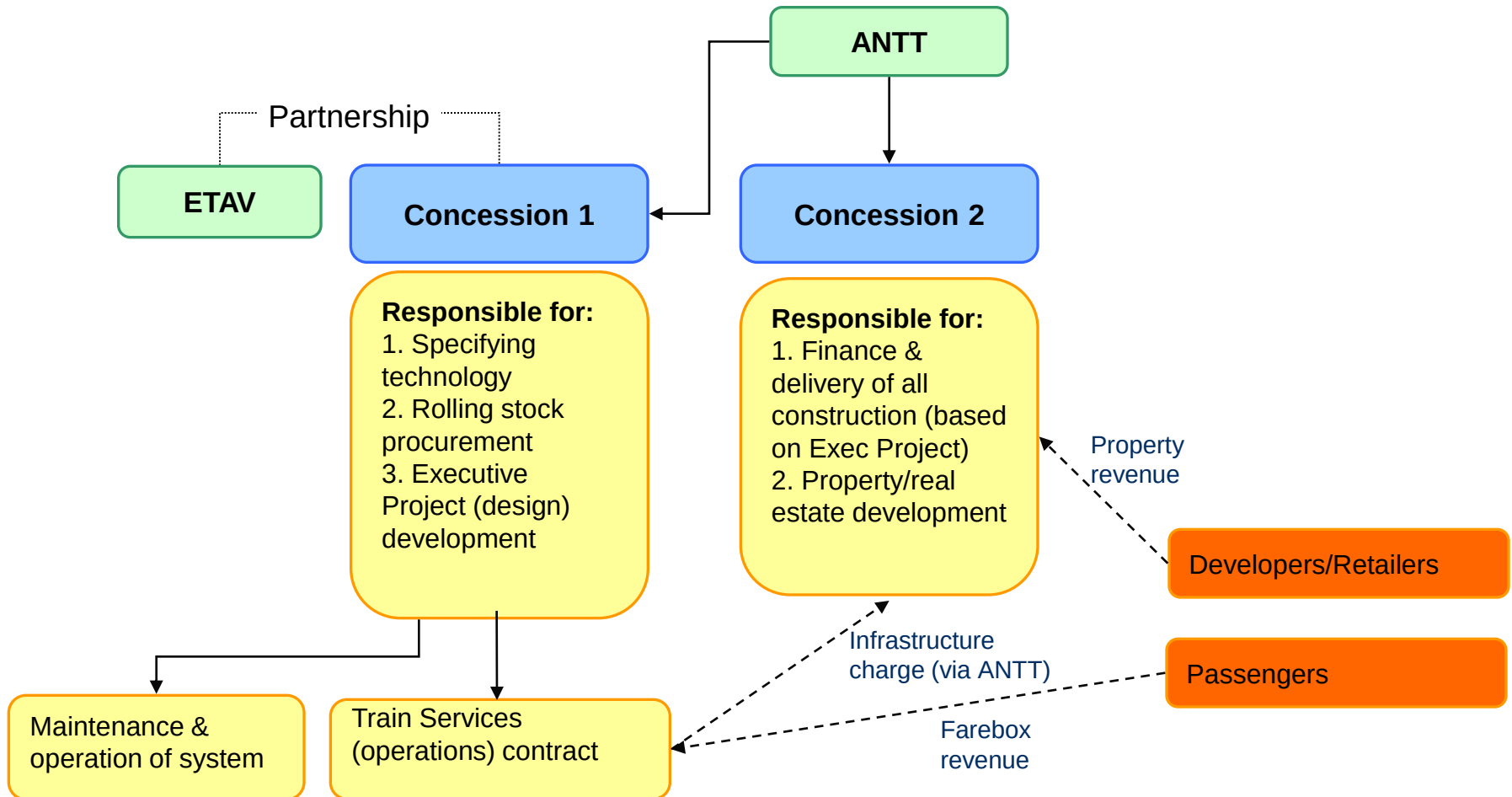
- Need for foreign technology providers to join with Brazilian firms increased risk
- Technology providers seemed reluctant to take on whole programme

Other

- **Technology transfer:** breadth & cost of technology transfer programme
- **Financing:** level of equity required was relatively high
- Public transport access in São Paulo (Campo de Marte station)

ANTT's new business model for TAV (simplified)

This new business model addresses most of these issues, drawing on international best practice – including HS1



In summary the procurement of the Brazilian HSRail Project TAVis to date.... very late!

- 3 false starts in 2 years
- Based on `One for all procurement` ie fund,plan,design, procure,build and operate @30 +years
- Govt desire v local market resistance and environmental lobby stalled process
- 4th attempt –taking time
- Latest concept is:
 - -Concession to plan & operate
 - -Concession to design and build
- Edital(RFP)out soon if politicians and developer can agree scope and procurement
- `The need, the business case, and technology is there.. but Political will is not, and the internal market is dictating the pace

*Political will needed
to start project!*



Finally some overall summary thoughts

- Get procurement strategy **sorted out early** ie what are the owners key requirements?
- **Engage** with market
- Get **politicians** to promote the project
- Only do *`light touch`* **amendments** to standard contracts.
- Manage the interfaces
- Do not **over specify** ie allow market to *`add value`*.
- **Don't get involved** in means and methods
- Management of Risk , Quality and Safety are key considerations **in deciding procurement route**.

ITA says Act Safely..always!

All parties here **today** have a role to play in the management and commitment to safety

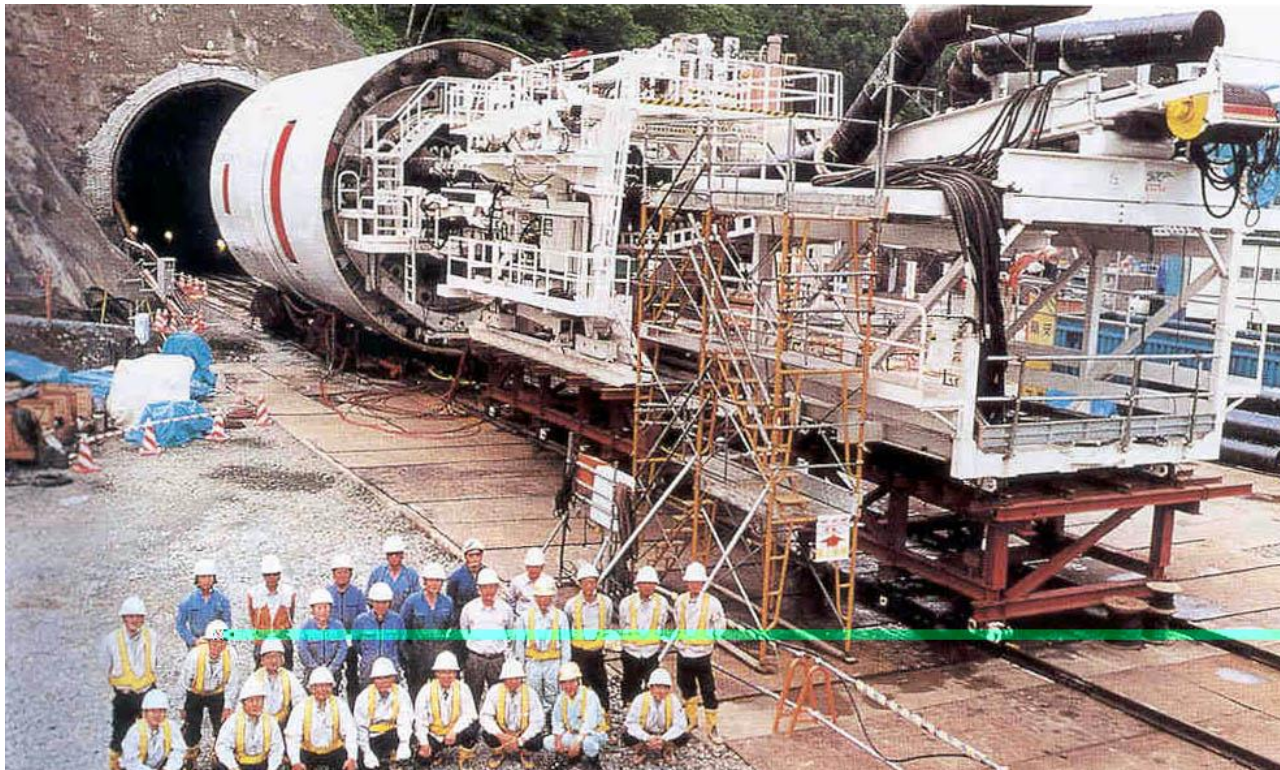
- Client
- Designers
- Coordinators for H&S
- Contractors
- TBM Manufacturers
- Workforce
- Professional Organisations
- Regulators and Standards makers
- Insurers



The most vital contribution to safety in any tunnel is a trained and disciplined workforce

Safety is the responsibility of every person on site..... and the office....

In fact everyone here today!!





ITA

Halcrow
A CH2MHill company

Thank you



Sustaining and improving the
quality of people's lives

