

ITA - AITES WORLD TUNNEL CONGRESS 2007 PRAGUE



The 3<sup>rd</sup> Training course  
**TUNNELLING IN URBAN AREAS**  
Prague, 4-5<sup>th</sup> May 2007

# Epping to Chatswood Rail Link

TRAINING MATERIAL PREPARED BY

The Robbins Company, Ohio, USA

&

Odd G. Askilsrud, P.E.



ASSOCIATION  
INTERNATIONALE DES TRAVAUX  
EN SOUTERRAIN  
**AITES**



**ITA**  
INTERNATIONAL  
TUNNELLING  
ASSOCIATION



**1**

**Introduction**

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**2**

**Chapter 1 : Means and Methods**

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**3**

**Chapter 2 : TBM Excavation Scheme**

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**4**

**Chapter 3 : Environmental and Community Issues**

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**Results and References**

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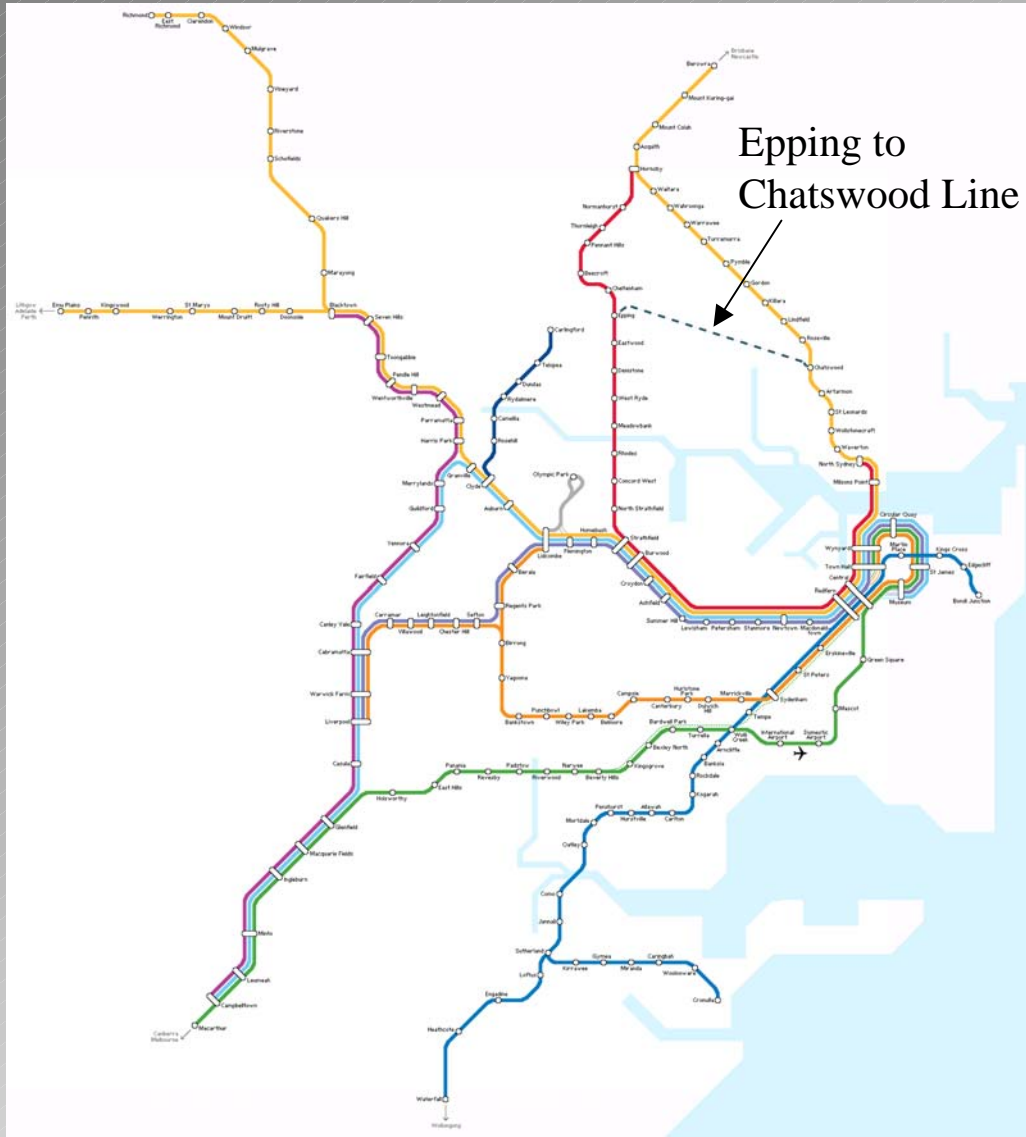
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Epping to  
Chatswood Line

***Epping to Chatswood Rail Link***



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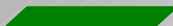
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Robbins

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Epping to Chatswood Rail Link

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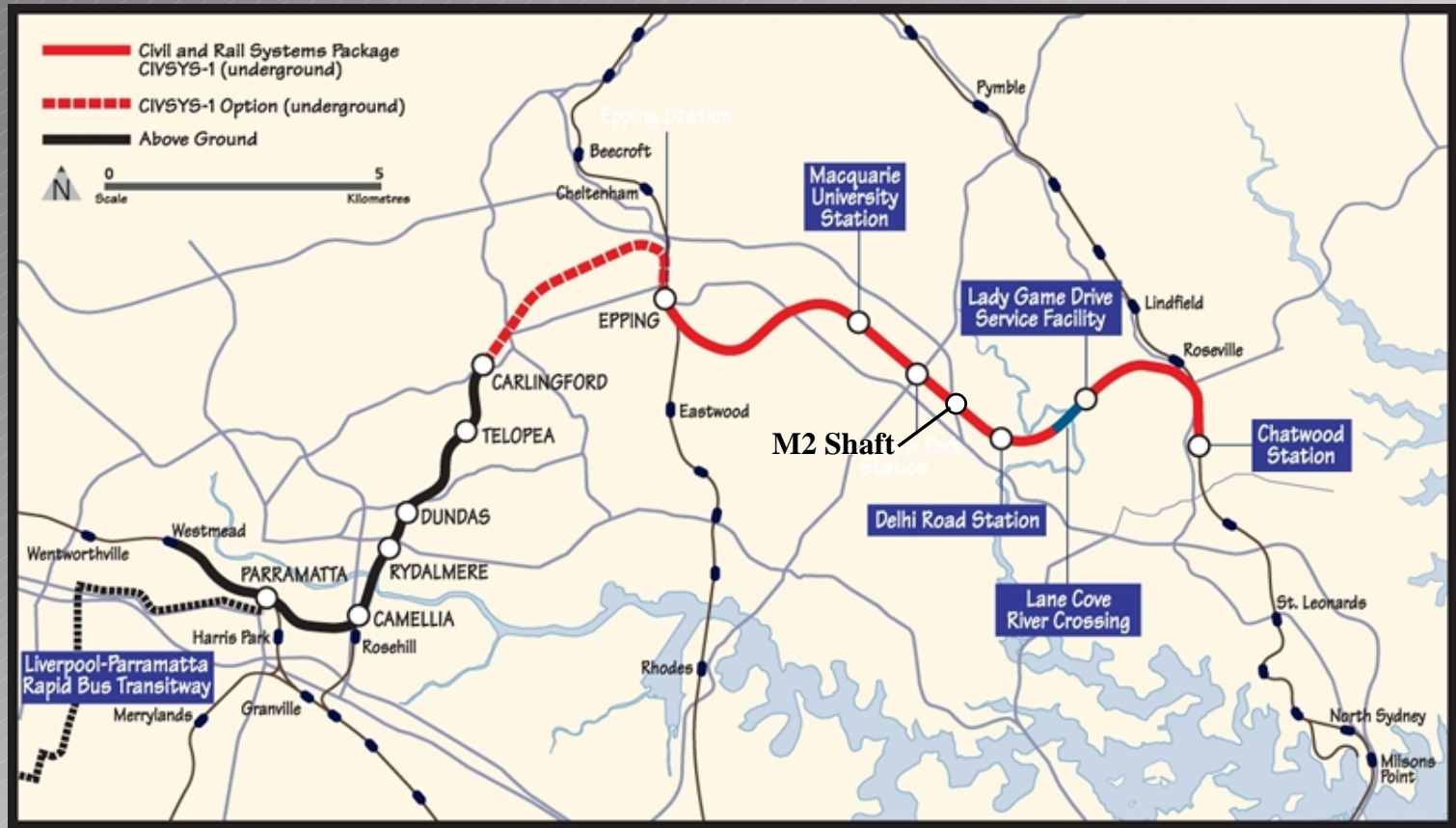
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Tunnel Plan – Tunnelling started in M2 shaft

First Phase: 6.7 km to Epping

Second Phase: 5.3 km to Chatswood

Geology: Hawkesbury Sandstone

***Epping to Chatswood Rail Link***

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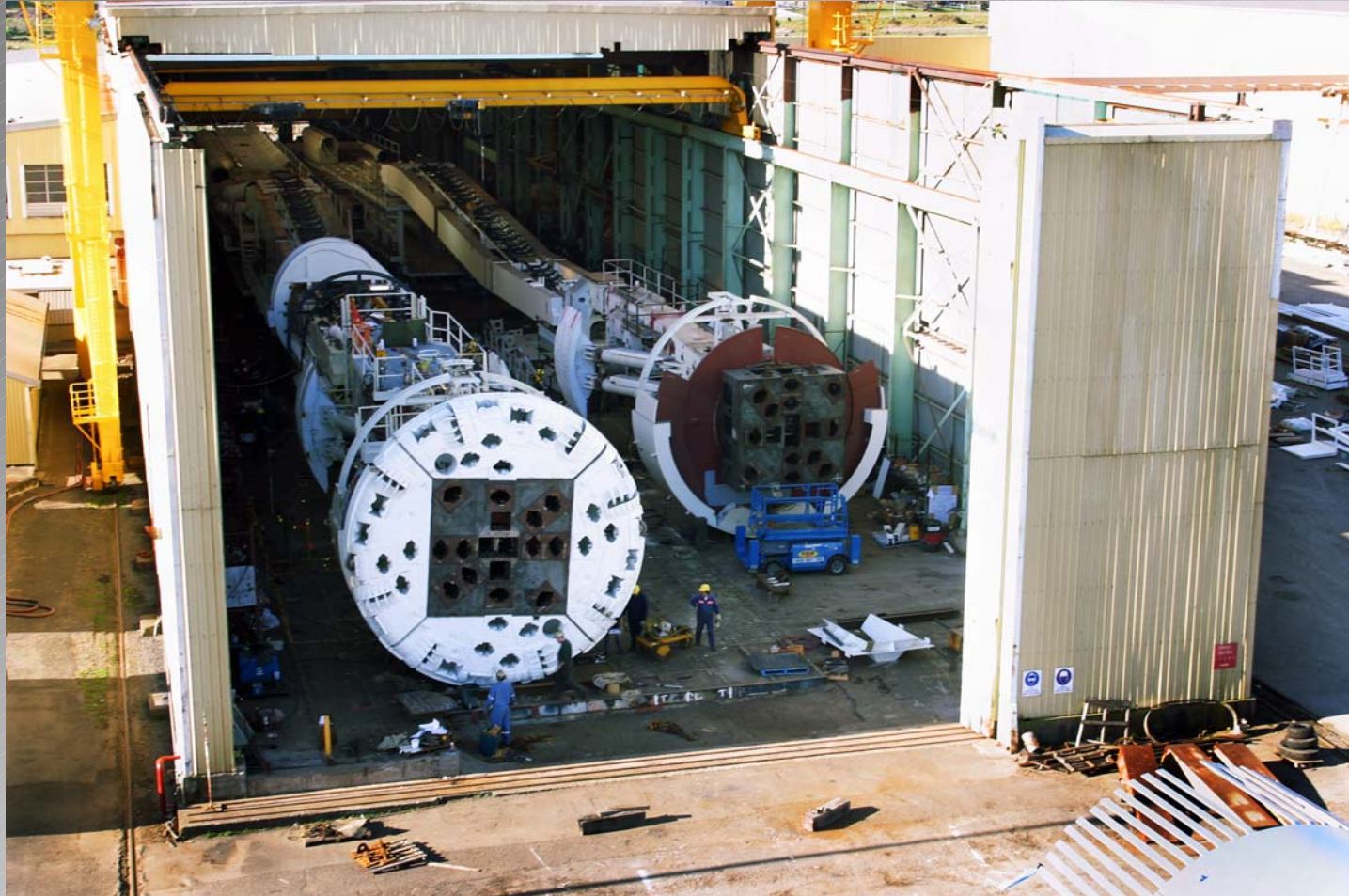
# Chapter 1: Means and Methods

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Shop Assembly at Forgags Shipyard, New South Wales

***Epping to Chatswood Rail Link***



# Chapter 1: Means and Methods

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Cutterhead and Cutterhead Support, Ring Beam Erector,  
Roof Drills/Probe Drills

***Epping to Chatswood Rail Link***

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# Chapter 1: Means and Methods

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Lowering TBM Down the Shaft  
*Epping to Chatswood Rail Link*



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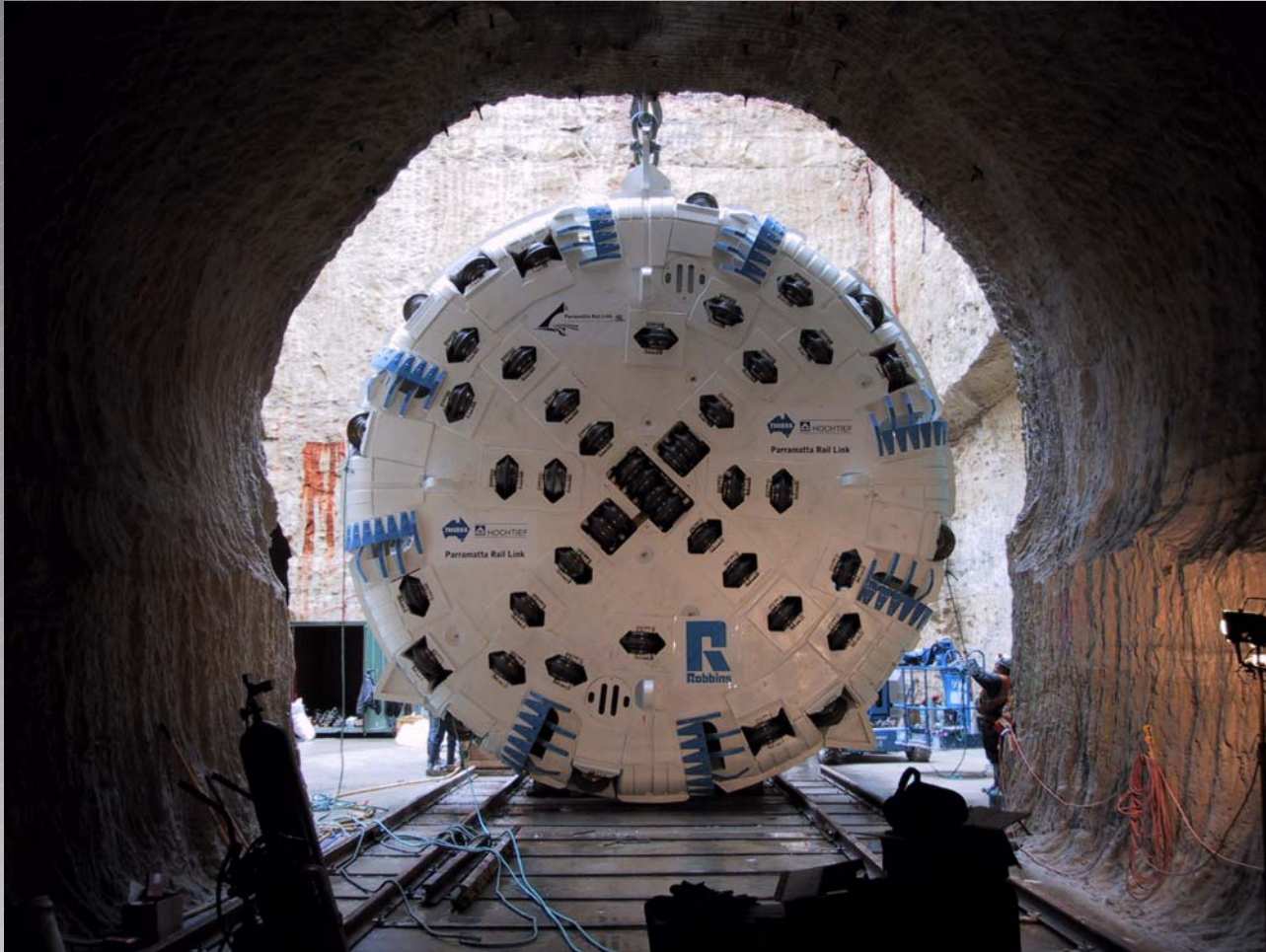
# Chapter 1: Means and Methods

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Cutterhead in Shaft Area

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# Chapter 1: Means and Methods

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## TBM Key Data

- Boring Diameter: 7.2 m
- Total Length: 210 m
- Total Weight: 460 t TBM + 600 t Back-up
- Cutterhead Power: 2300 kW
- Total Power: 3200 kW
- Max. Thrust Force: 1400 t

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# Chapter 1: Means and Methods

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## TBM Layout

- TBM: approx. 25 m
- Bridge: approx. 25 m
- Back-up: approx. 160 m
  - Equipment Decks (#1-8) 60 m
  - California Decks (#9-11) 85 m
  - Service Decks (#18 + 19) 15 m

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# Chapter 2: Excavation Scheme

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- Epping to Chatswood Video



*Epping to Chatswood Rail Link*

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# Chapter 2: Excavation Scheme

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Crown-Mounted Conveyor – 1.8 m diameter ventline,  
concrete invert and utilities

***Epping to Chatswood Rail Link***



# Chapter 2: Excavation Scheme

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Concrete Truck – 5m<sup>3</sup> capacity



# Chapter 2: Excavation Scheme

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Rubber Tired Agitator Truck – Detail of Sliding Deck

***Epping to Chatswood Rail Link***



# Chapter 2: Excavation Scheme

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Turntable on back-up





# Chapter 3: Environmental / Community Issues

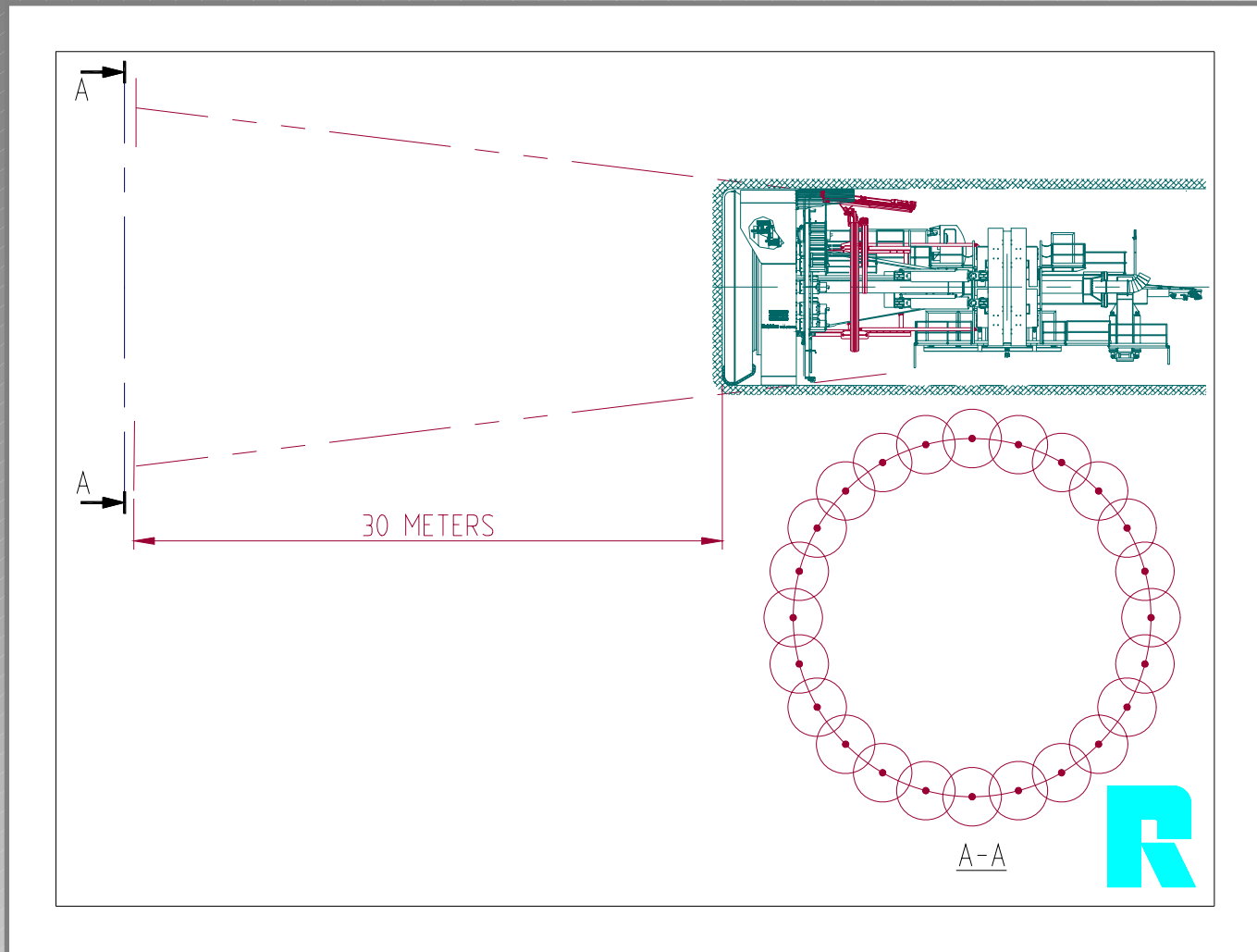
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Probe Drill Pattern for Consolidation Grouting

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# Results and References

1

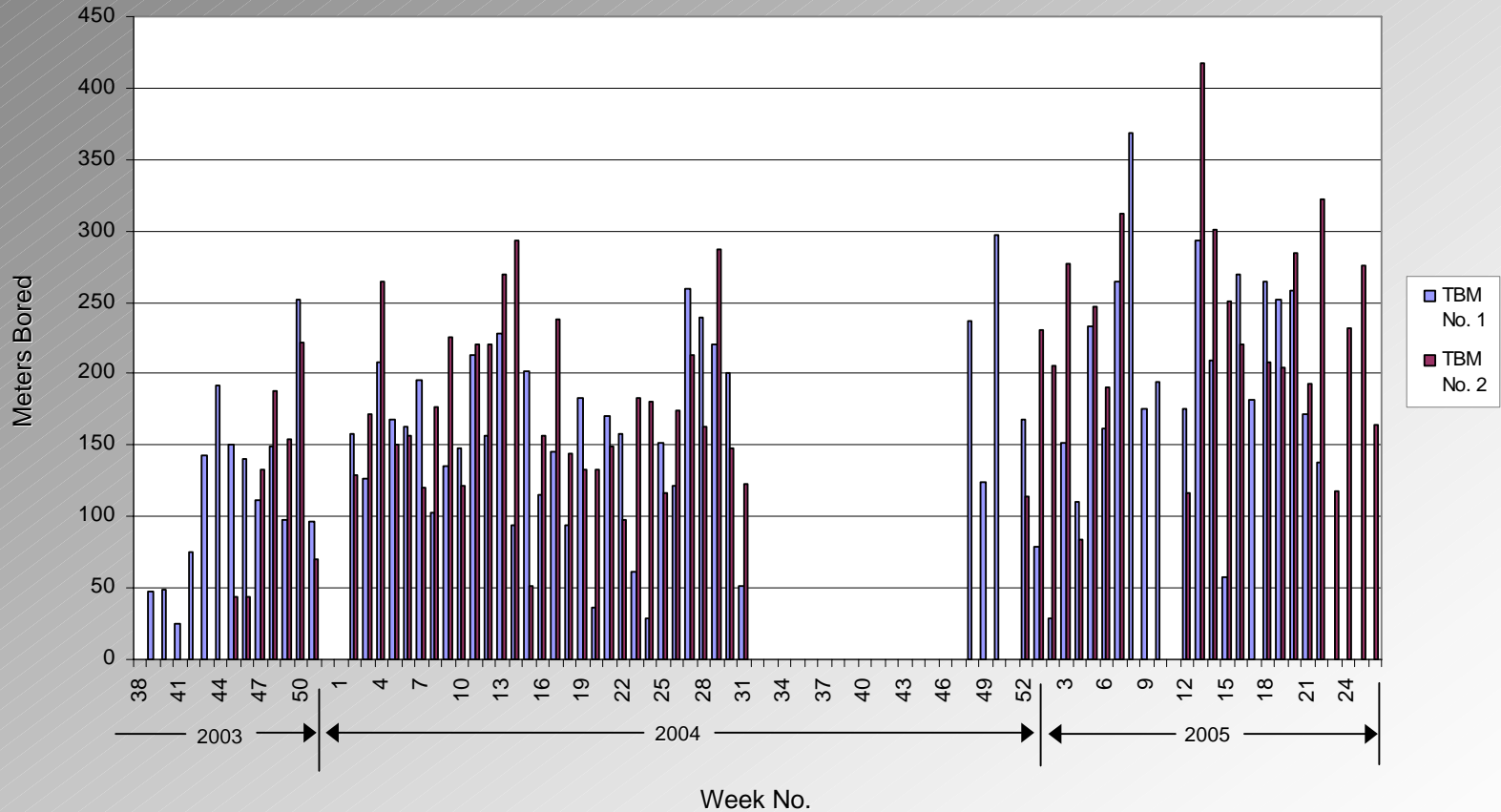
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**EPPING TO CHATSWOOD RAIL LINK**  
Sydney, Australia  
**METERS PER WEEK**



***Epping to Chatswood Rail Link***

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Breakthrough at Epping

***Epping to Chatswood Rail Link***

# Results and References

1

ITA Paper  
By Odd G. Askilsrud, P.E.  
Tunnel Engineering and Applications, Inc.

2

**ITA-AITES World Tunnel Congress – Prague, Czech Republic**

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**Training Course  
MECHANIZED TUNNELLING IN URBAN AREAS – CASE HISTORY  
Prague 4-5<sup>th</sup> May 2007**

**The Robbins Company**

4

**Solon, Ohio, USA**

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Training Material Prepared By  
Odd G. Askilsrud, P.E.

***Epping to Chatswood Rail Link***

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# Results and References

1

1. Robbins in-house documentation.

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2. Tunnels & Tunnelling International

a. “Tenders Issued for Sydney Link” – Jan. 11, 2002.

b. “First Parramatta Milestone Achieved” – Dec. 1, 2003.

c. “Full Speed Ahead on Sydney’s Rail Link” – Feb. 1, 2004.

d. “First Bore Broken Through in Sydney” – Aug. 1, 2005.

e. “Epping to Chatswood-The Final Touches” – Sept. 1, 2005.

f. “Sounds of Excavation” – Nov. 1, 2004.

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3. Tunnelling & Trenchless Construction

a. “Sydney Undermined!” – Aug. 2004.

b. “Sydney Moves Key Step Closer to New Rail Link” – Sept. 2006.

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