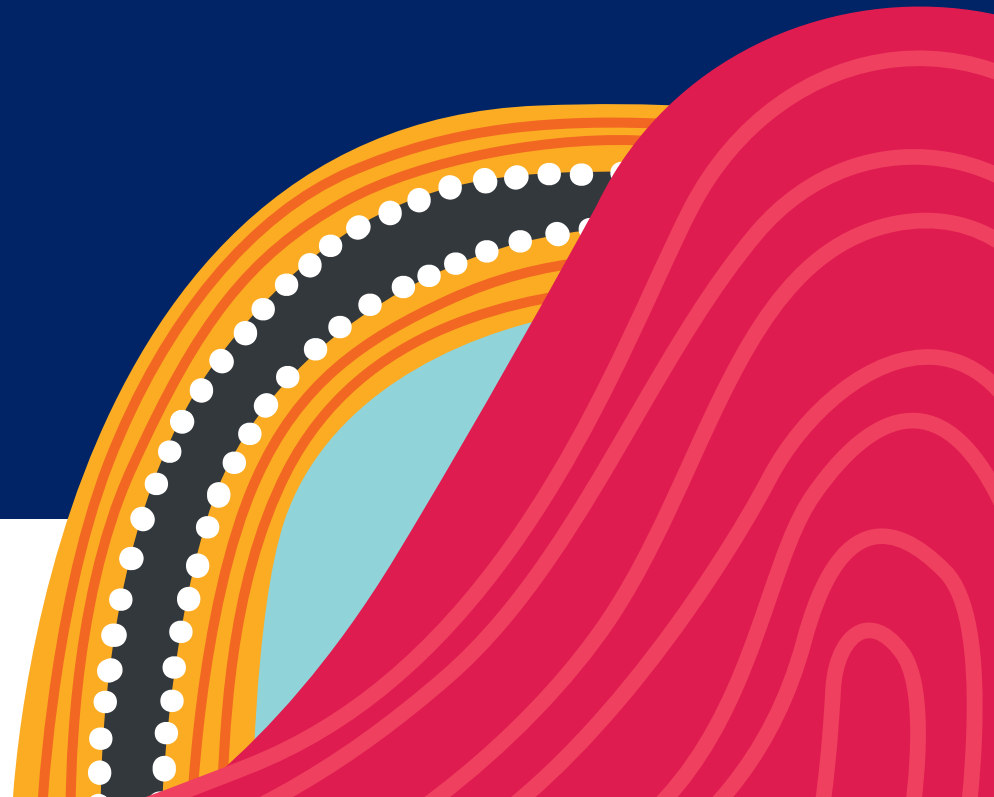
Western Harbour Tunnel

Tunnelling information session – Birchgrove 2024

John Holland CPB Contractors Joint Venture (JHCPB) and ACCIONA

NSW GOVERNMENT

transport.nsw.gov.au



Acknowledgement of Country

We acknowledge the Traditional Custodians of the Country on which the Western Harbour Tunnel is being constructed, including the Gadigal, Cammeraygal, and Wangal peoples, as well as the Aboriginal peoples of Emu Plains, and we pay respect to Elders past and present.

Project overview

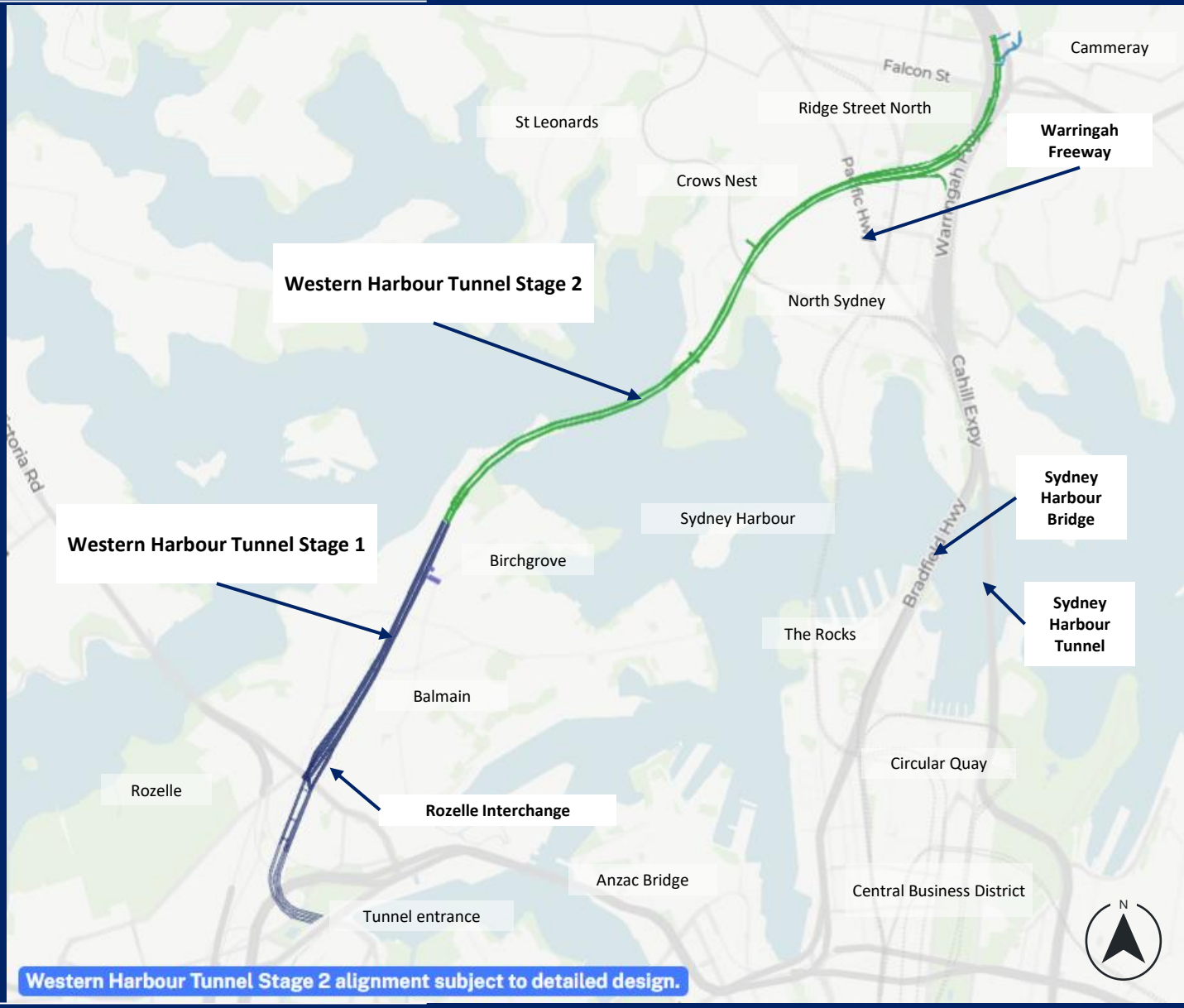
Western Harbour Tunnel (WHT) is Sydney's new harbour crossing

Two 6.5-kilometre tunnels, three lanes in each direction

Connects Warringah Freeway with the Rozelle Interchange

Project is being delivered in two stages:

- Stage 1 – tunnelling from Rozelle to Birchgrove awarded by construction contractor JHCPB. Expected completion mid-2025
- Stage 2 – tunnelling from Birchgrove to Cammeray (including crossing of Sydney Harbour) plus tunnel fit-out by construction contractor ACCIONA. Expected completion late-2028.



Topics covered today:

Stage 1 –

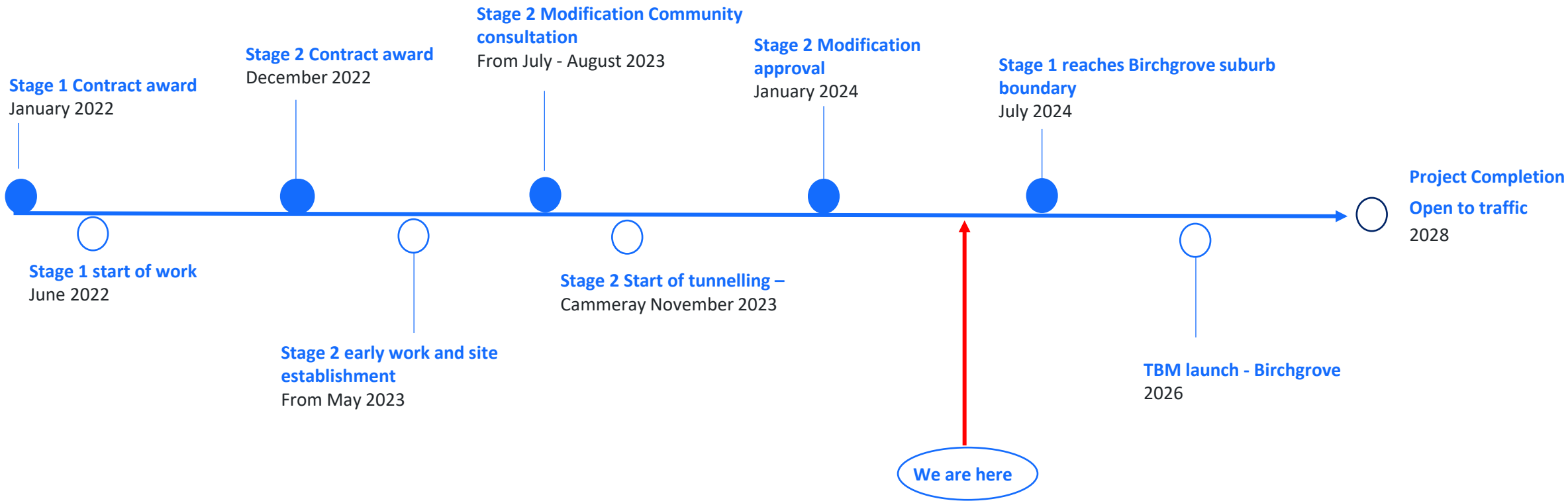
- Engineering
- Environment
- Property condition surveys

Stage 2 –

- Project update
- Tunnel boring machines
- Launch caverns
- Property

Western Harbour Tunnel - Staying informed

Key delivery milestones



Western Harbour Tunnel Stage 1

01

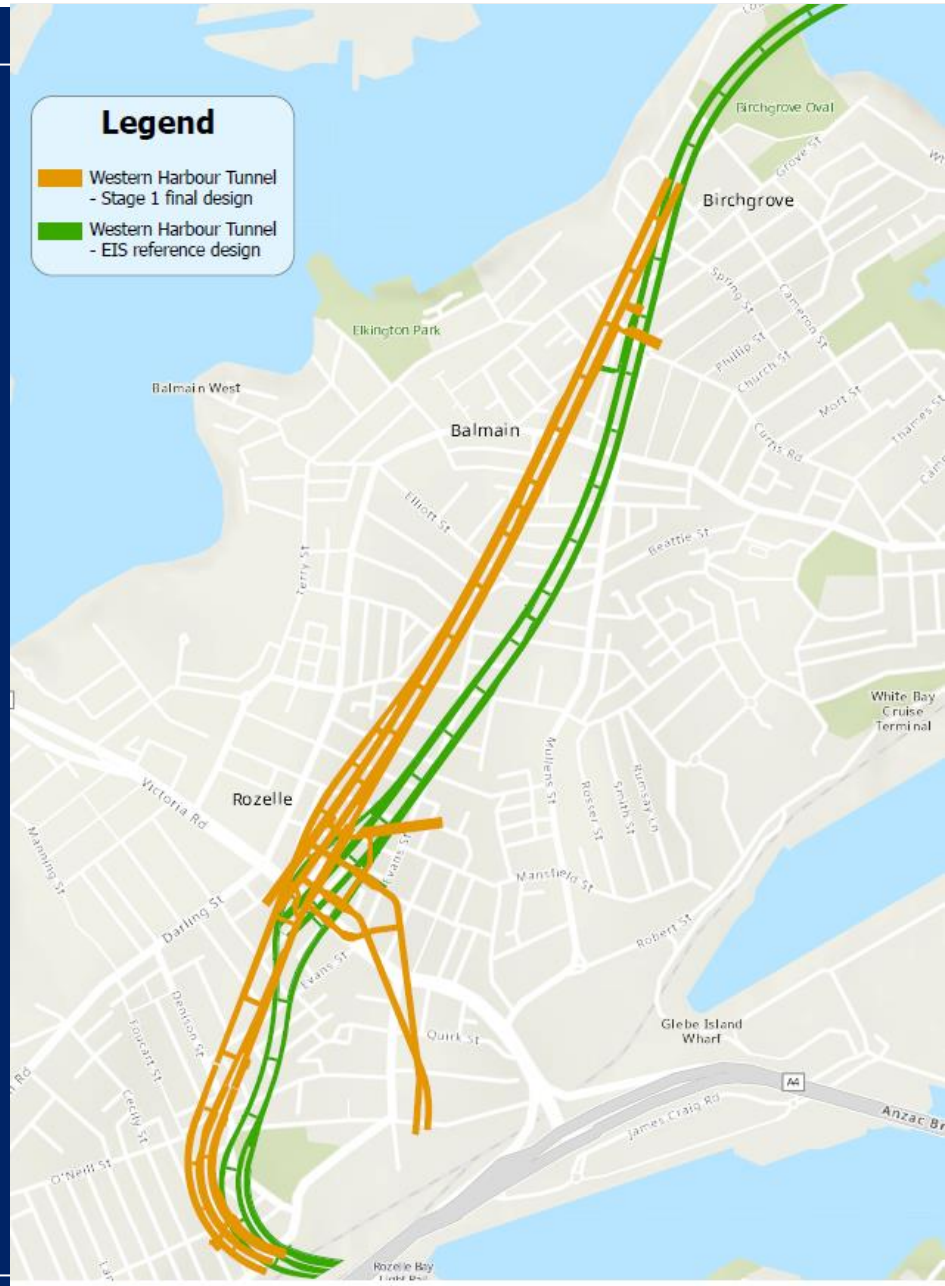
Engineering

Tunnel design & alignment

The tunnel alignment shifted in the final design to take advantage of better ground conditions for tunnelling.

Types of excavation:

1. Traffic tunnels
2. Ventilation tunnels
3. Temporary access tunnels
4. Cross passages
5. Substations and caverns

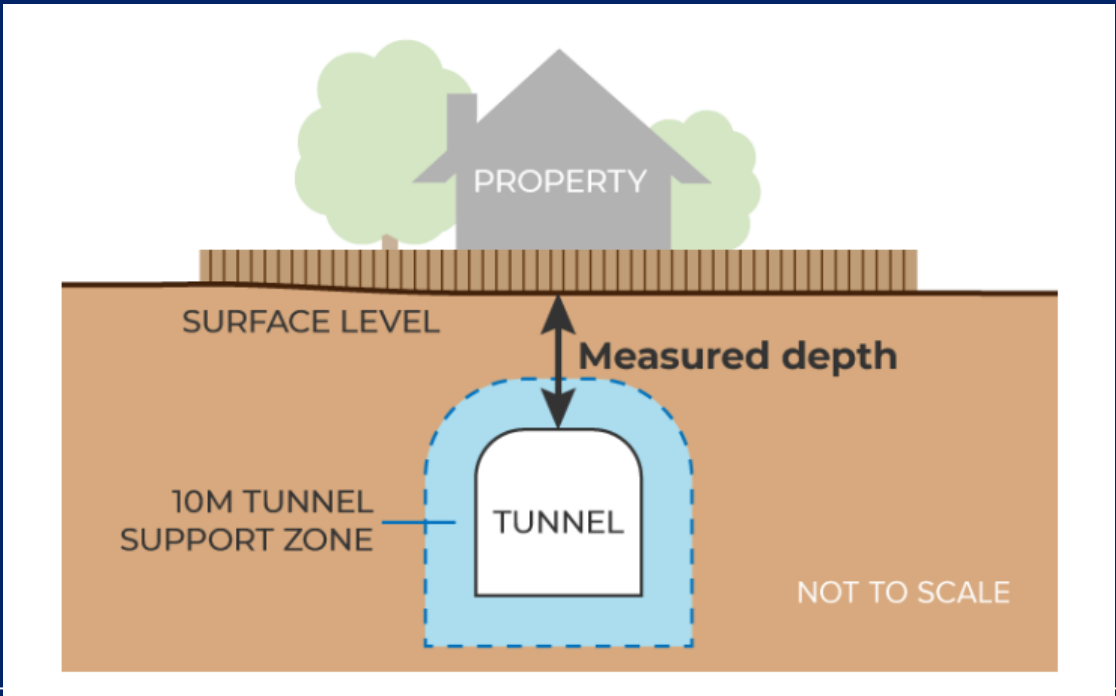


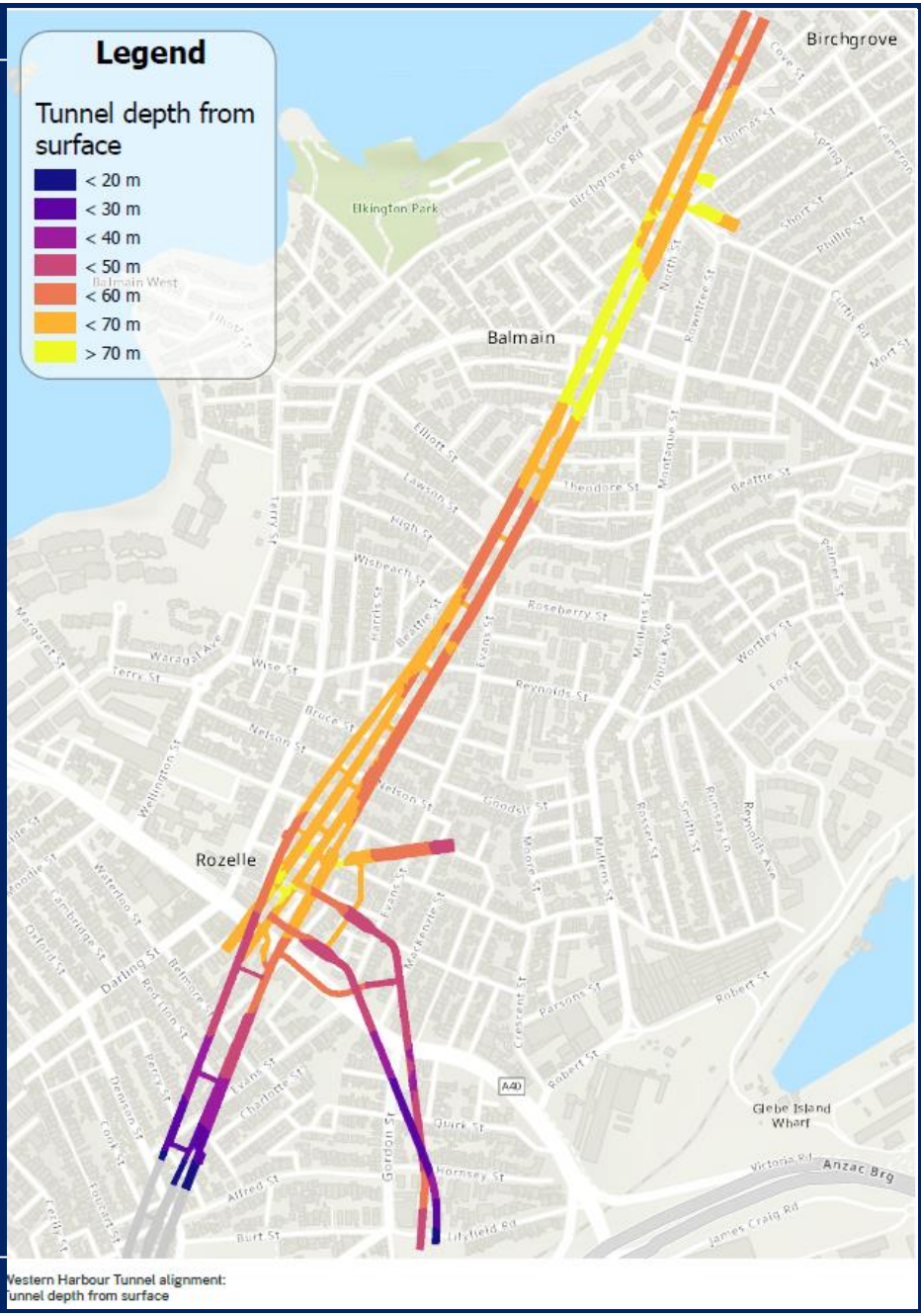
Western Harbour Tunnel alignment:
Stage 1 final design and EIS concept design


North
LEICHHARDT
LILYFIELD
ANNANDALE
ROZELLE
DRUMMOYNE
BALMAIN
Legend
Rozelle Interchange and WHT Stage 1 vehicle tunnels and cross passages
Rozelle Interchange and WHT Stage 1 ventilation tunnels

Tunnel depths

- The WHT Stage 1 tunnels are deep: ranging from 45 metres to 70+ metres
- Tunnels connect with Rozelle Interchange and WHT Stage 2
- Sydney Metro passes under the Rozelle Interchange and WHT Stage 1





Ground conditions

- Gymea and Hawkesbury sandstone
- Very similar ground conditions as the Rozelle Interchange

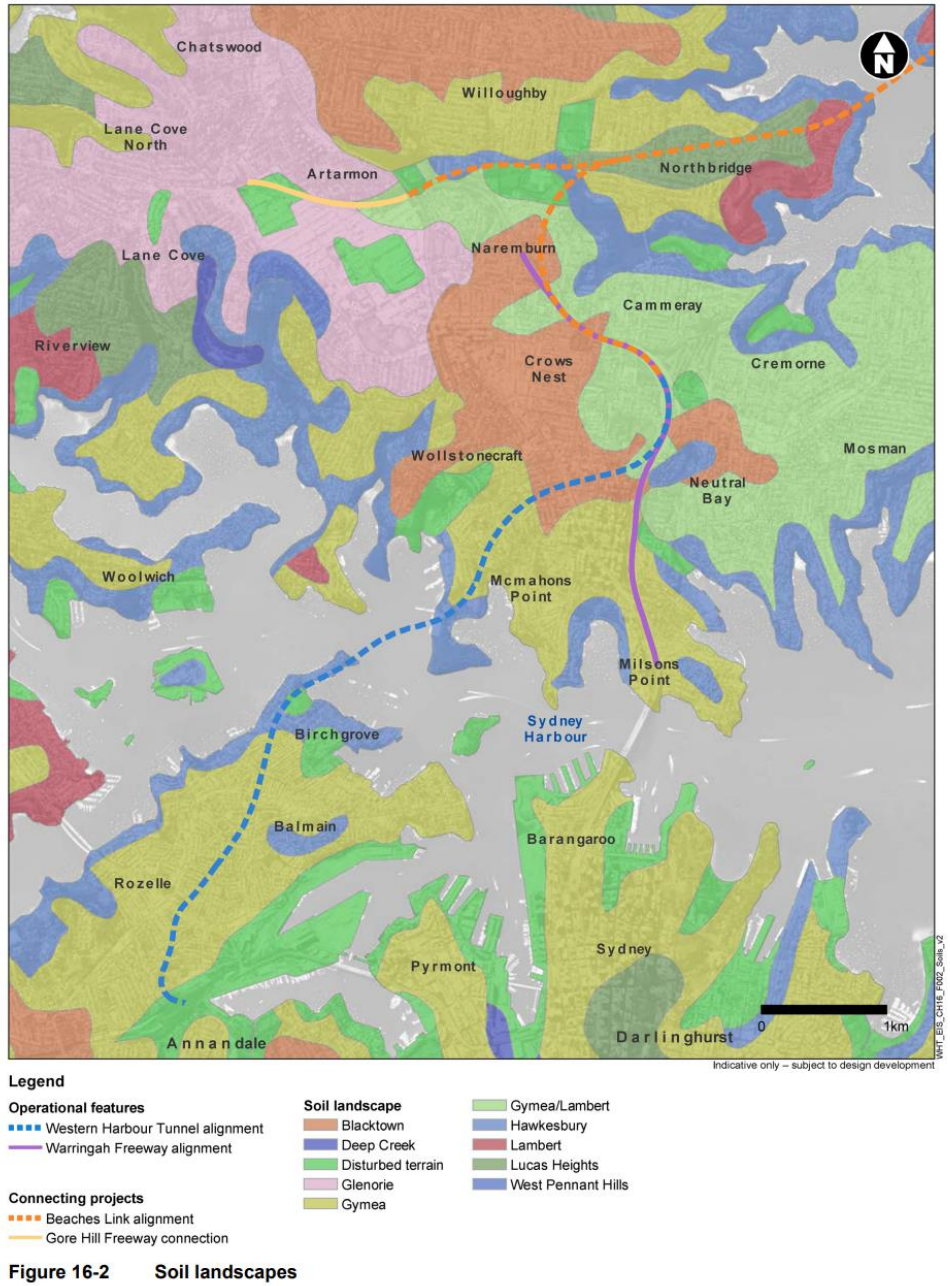


Figure 16-2 Soil landscapes

Ground movement

Types of ground movement

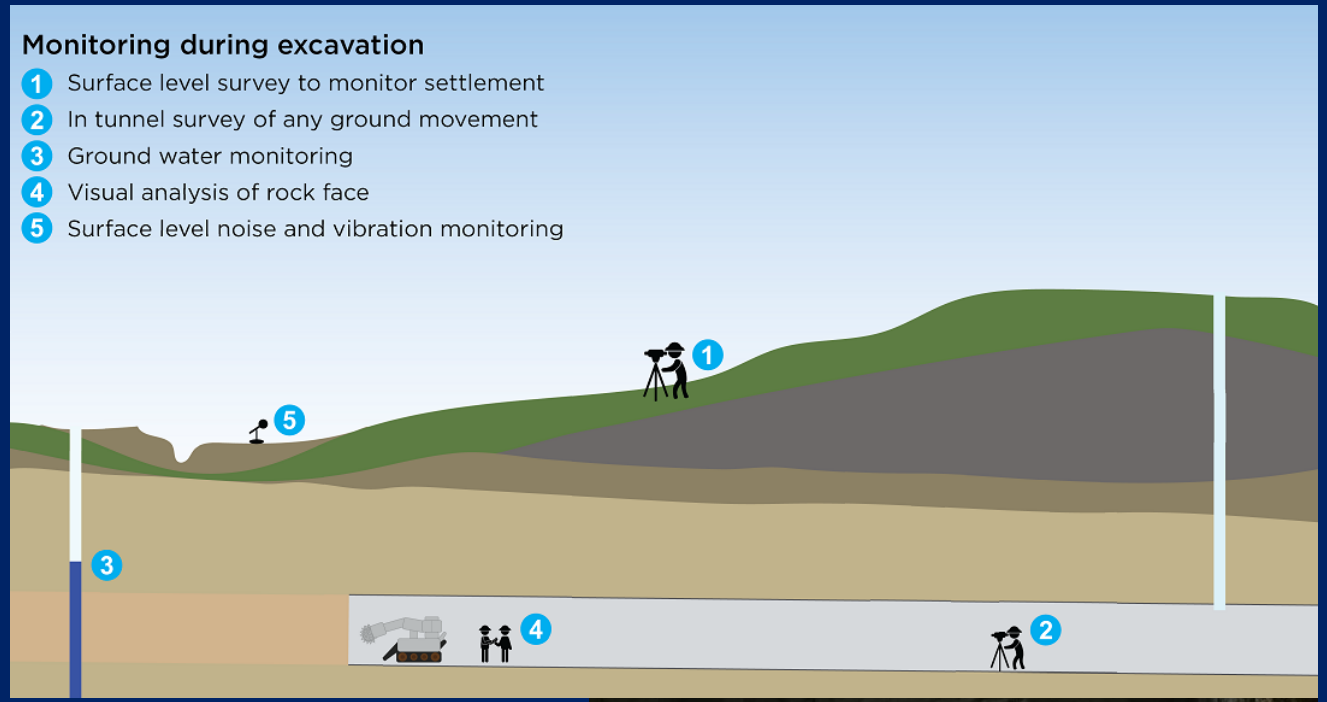
- Tunnel induced settlement
- Groundwater drawdown

Prior to construction

- Ground investigations
- Geotechnical model
- Inform tunnel design

During construction

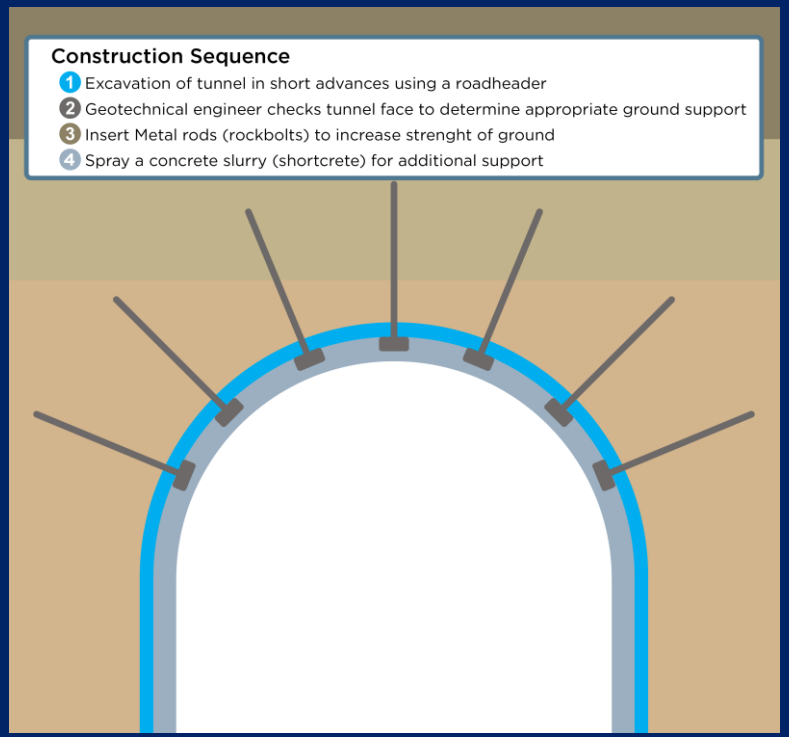
- Monitoring regime



Tunnel excavation

- WHT Stage 1 tunnels are excavated with roadheaders
- Tunnelling work is approved to take place 24/7 and is progressing at approximately 15-20 metres per week

1. Tunnel roof



2. Tunnel floor

Rock hammering

Rock bolting

Shotcreting

Deep bench excavation

Q&A

02

Environment

Noise and Vibration

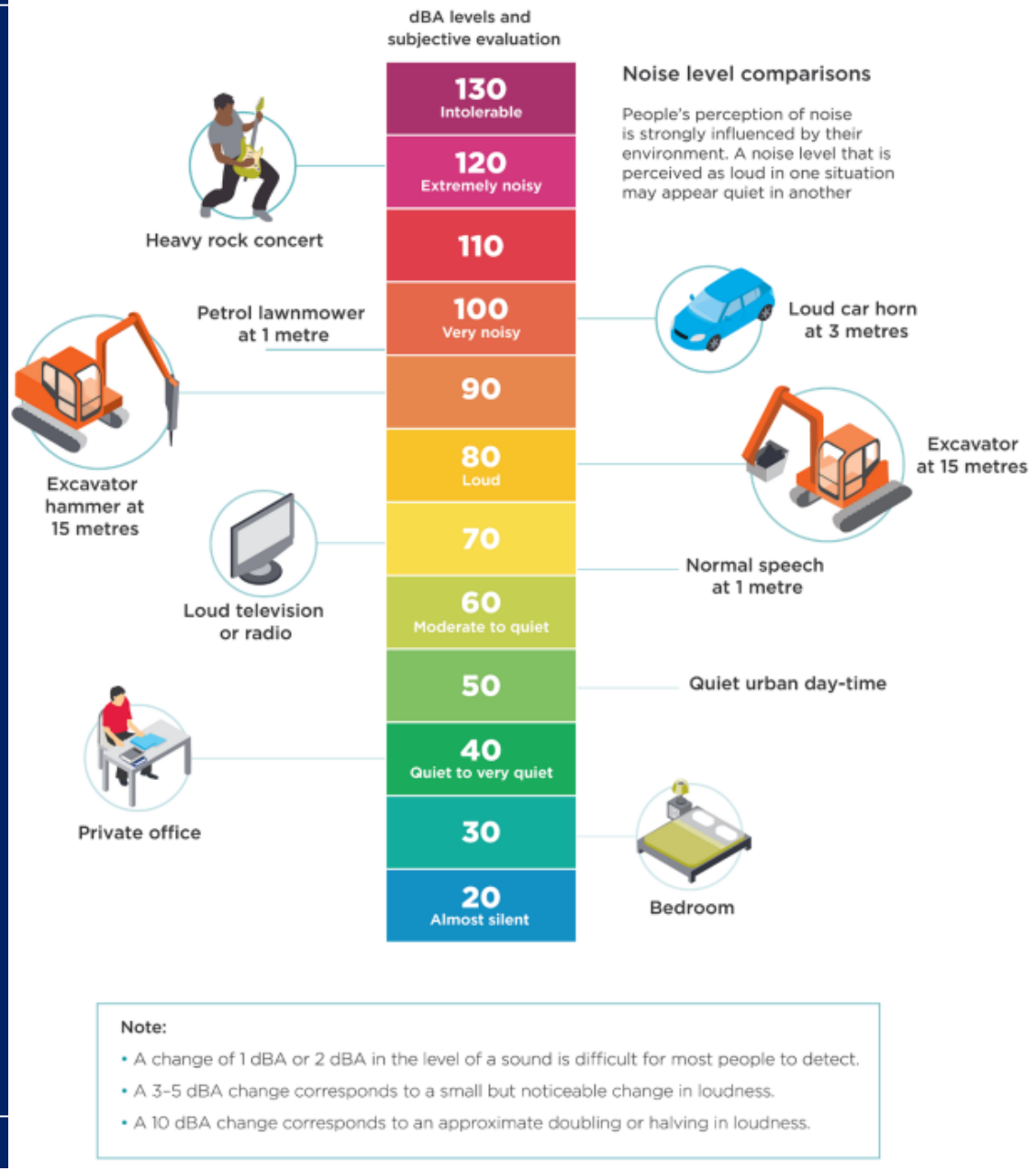
The deeper the tunnel, the less likely you are to hear excavation noise.

- roadheader excavation – refrigerator humming
- rock bolting – intermittent drilling noise
- rock hammering – repetitive tapping sound

We predict noise levels in properties along the alignment by using a model called ‘Gatewave’.

Noise is not expected to exceed 45 decibels at any properties in Birchgrove.

The project has an independent Acoustic Auditor to verify our model, noise predictions and noise management.



Vibration (structures)

Vibration from tunnelling is minimal for properties on the surface.

Vibration thresholds are based on the German DIN Standard for heritage structures and the British Standard BS7385 for standard structures. These standards are very conservative.

- Cosmetic damage for heritage building threshold = 2.5mm/ sec
- Cosmetic damage for residential building threshold = 7.5mm/ sec

Highest level recorded with a roadheader on the Rozelle Interchange project was less than 1.0 mm/ sec

Ground movement

- Ground movement can be caused by many different factors such as seasonal climate variations, vegetation and a natural process known as shrink-swell.
- A certain amount of settlement is allowed, with limits set by the Department of Planning, Housing and Infrastructure (DPHI).
- WHT Stage 1 has an extensive ground monitoring program in the local area.

An underground monitor in a basement

Survey targets on the façade of a building

Survey markers installed on the surface along the tunnel alignment

Q&A

03

Property

Property condition surveys (PCS)

- A PCS involves a photographic account of a property's condition
- All properties within 50 metres of the tunnel alignment are eligible for a PCS
- Pre-construction PCS offers are made 8-12 weeks before tunnelling starts
- PCS are free for property owners
- A copy of the PCS report is provided to the property owner

Property claims process

1. Notify the project team as soon as you notice changes at your property

2. All claims are unique and are treated as such

3. We take every claim seriously and will conduct a thorough investigation including:

    - Property condition survey review
    - Visual inspection of the damage
    - Vibration reports
    - Ground monitoring data from the project
    - Satellite imagery
    - Any prior or current development applications for the property
    - Construction work near the property at the time of the damage
    - In some instances, the project will engage an independent engineering specialist to investigate

Property claims process

4. The project team will provide a written determination including high-level summary of the reasons leading to the outcome of the investigation

5. If you're not satisfied with the determination, we can meet with you to explain the basis for the determination in greater detail, including any data relating to the decision

6. If you do not agree with the determination and would like your claim escalated, you may request a review by the Independent Property Impact Assessment Panel (IPIAP) through Transport for NSW

Subsurface acquisition

- Subsurface acquisition is managed by Transport for NSW
- The subsurface acquisition process has been completed for all properties above the alignment for WHT Stage 1
- Transport can answer any questions you may have about subsurface acquisition

Q&A

Western Harbour Tunnel Stage 2

Project update

North Sydney

- Tunnelling started in Cammeray in November 2023 and excavation is progressing below the Warringah Freeway
- Tunnelling at Ridge Street is expected to start in May 2024

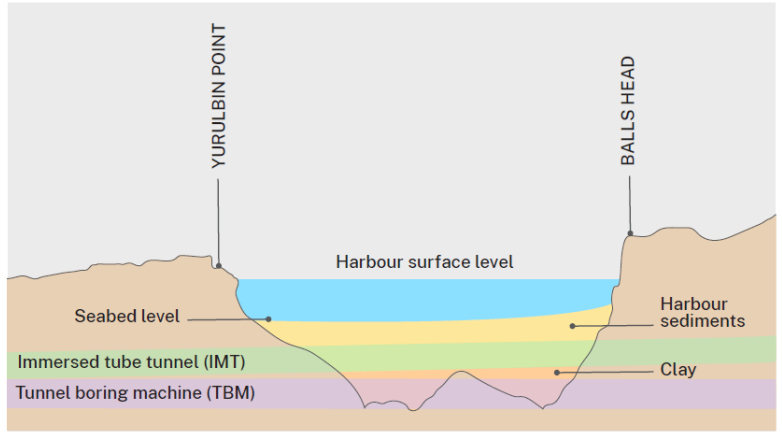
Inner West

- Installation of a permanent power supply in Rozelle and Lilyfield is planned to start from July 2024
- Motorway Operations Complex at Rozelle Parklands in Lilyfield Road established from April 2024
- Site established at Glebe Island from April 2024
- Tunnelling for Stage 2 in Birchgrove is expected to start in Q3 2025

Tunnel boring machines get the green light

The approved modification to the construction method for tunnelling under the harbour means that we can now use tunnel boring machines (TBMs) instead of an immersed tube tunnel.

Using TBMs will significantly reduce our impact on local communities and the environment.



Stage 2 tunnel alignment is subject to detailed design and is not to scale

Key benefits

- Yurulbin Point temporary construction site no longer required
- Berrys Bay temporary construction site no longer required
- Cofferdam no longer required
- No dredging required
- No temporary impact to Birchgrove Ferry Wharf
- NSW Government commitment to deliver Berrys Bay master plan earlier

Tunnel boring machines

Tunnelling below Sydney Harbour

Photo credit: Sydney Metro

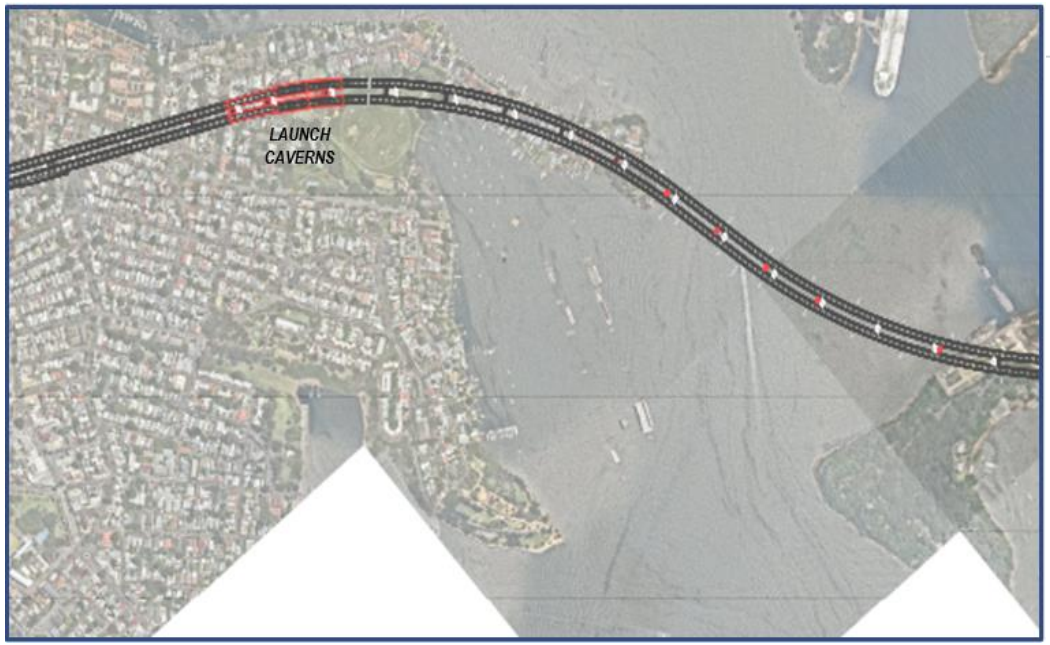
We are using slurry tunnel boring machines (TBMs) to excavate the tunnel below Birchgrove, Sydney Harbour and Balls Head.

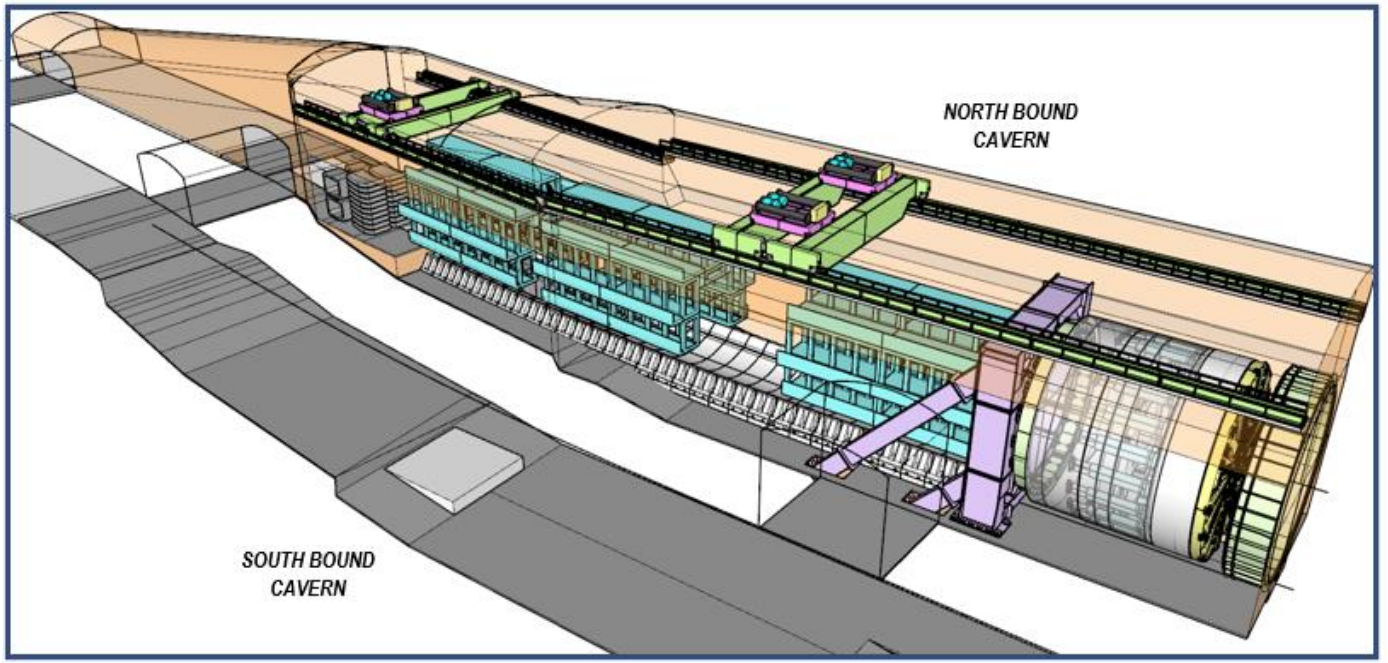
Our TBMs are around 16 metres in diameter and can cut through about 45-65 metres of earth every week.

Each machine is manned 24/7, with up to 20 people working on a TBM at one time.

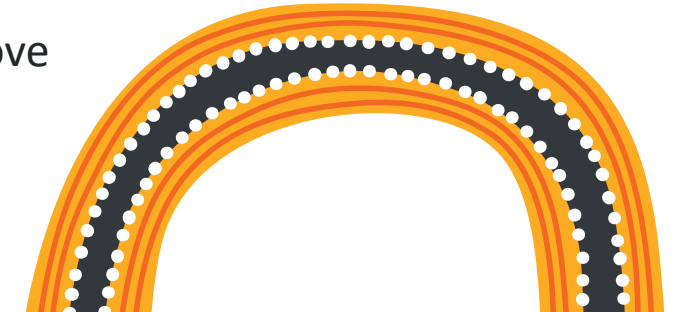
Launch caverns

Rose Street, Birchgrove





- We expect to be excavating the underground launch caverns around mid-2025.
- The launch caverns will be located in Birchgrove between Rose Street and Birchgrove Oval, at around 43 metres underground.



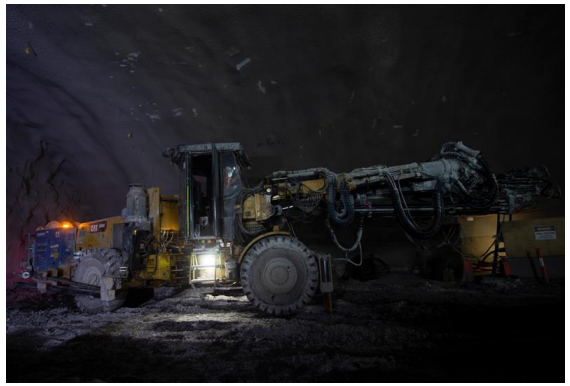
Launch caverns

Excavation methodology

1 - EXCAVATE
ROADHEADERS


2 – SPOIL REMOVAL
DUMP TRUCKS

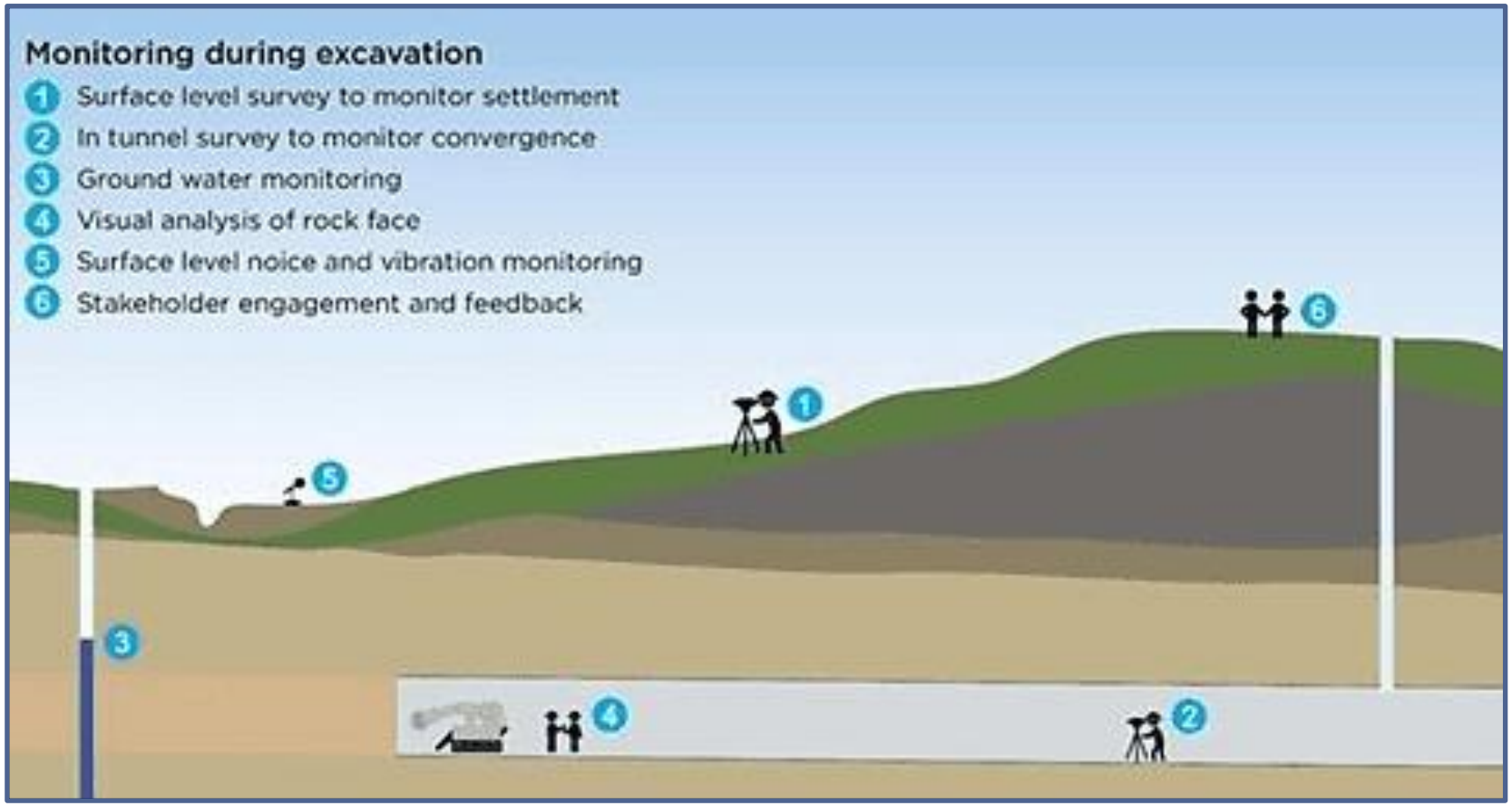

3 – SUPPORT (ROCKBOLTS)
ROBODRILL BOLTING RIG




4 – SUPPORT (SHOTCRETE)
SHOTCRETE RIG

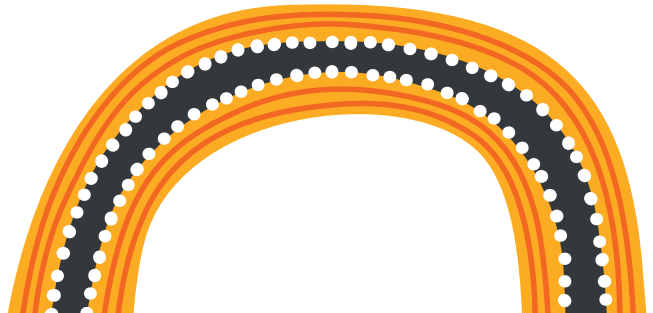

Launch caverns

Monitoring ground movement during excavation



WHT Stage 2 has a team dedicated to monitoring and measuring the ground inside the tunnel and on the surface as excavation progresses.

This is done to ensure any ground movement remains within the limits outlined in the project's Conditions of Approval.



Property

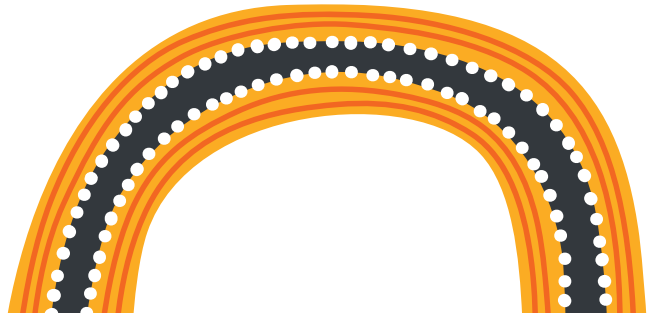
Subsurface acquisition and property condition surveys

Transport for NSW has started the process of subsurface acquisition for Western Harbour Tunnel Stage 2. This is a staged approach in line with how tunnelling will progress.

To see if your property will be impacted visit the tunnel tool on the Western Harbour Tunnel website.

ACCIONA will offer a free property condition survey (PCS) to all properties within 50 metres of the Stage 2 tunnel alignment three months before tunnelling starts in the area.

To find out if you are eligible for a PCS, use our tunnel tool or contact our property team on **wht@acciona.com**



Staying informed

- Opt-in to weekly email updates
- Use our interactive tunnel tool online to search tunnel depth near your property
- Work notifications (email or letterbox)
- Frequently Asked Questions online
- Quarterly Community Updates

Stage 1 Tunnelling – Rozelle, Balmain and Birchgrove.

The Western Harbour Tunnel is being delivered in two stages. The southern section of the tunnel, Stage 1, is being delivered by John Holland CPB Contractors (JHCPB) and includes the excavation of 1.7km of the tunnel between Emily Street in Rozelle to Cove Street in Birchgrove. This stage is excavation only and does not include tunnel fit-out activities.

Tunnelling started on 29 June 2022 underneath Emily Street, Rozelle and has now crossed under Victoria Road. Tunnelling will continue under the suburb of Balmain around mid-2023 and under Birchgrove in 2024.

If your property is located within 50 metres of the outer edge of the tunnels, you will be offered a **Property Condition Survey** (PCS) before any tunnelling starts near you. The survey is free of charge and will provide you with a clear record of your property's condition. Eligible residents will be sent an offer for a PCS about 8-12 weeks prior to tunnelling.

If you are curious about **how we manage noise and vibration,** we've developed a handy factsheet that provides some in depth information about ground movement and vibration, including what causes it, how we manage it and the claim process in the unlikely event of any property damage. Find out more **here.**

Project information sessions will be held again in 2023. We will have information session coming to Balmain in Q2 2023 where you will be able to speak to our experienced project team face to face. We'll continue to hold information sessions as we progress with excavation along the tunnel alignment and separate information sessions will be held for each suburb to ensure you get relevant information about timings, ground conditions and tunnel design for your area.

Click on any of the links below to access further information about Western Harbour Tunnel Stage 1 tunnelling.

Stage 2, which includes connections from Stage 1 at Cove Street, Birchgrove, to the Warringah Freeway near North Sydney, and complete tunnel fit-out. More information on Stage 2 can be found **here**.

Information sessions

Register and find out more about our upcoming Balmain information sessions

Tunnelling notification map

To view our current tunnelling activities, and the three month look ahead, click here.

Tunnel Tool (location and depth of tunnels) →

View the final design and depth of the tunnel and where it is in relation to your property.

Property condition survey →

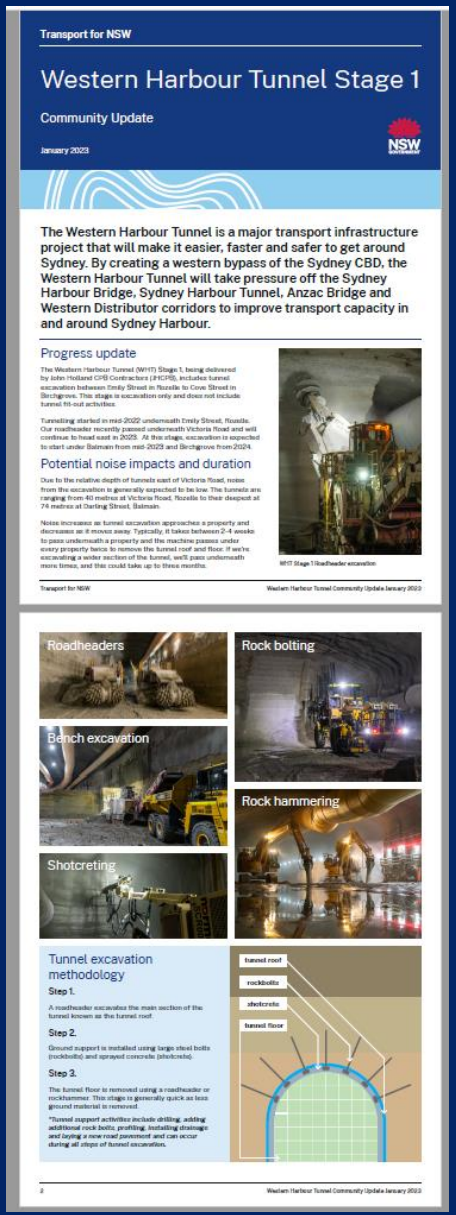
Learn how we conduct Property Condition Surveys

Tunnelling FAQs →

Read the Tunnelling Frequently Asked Questions (FAQs) for answers to some common questions people ask

Subscribe →

Subscribe here to receive project updates



Transport for NSW

Western Harbour Tunnel Stage 1

Community Update

January 2023

The Western Harbour Tunnel is a major transport infrastructure project that will make it easier, faster and safer to get around Sydney. By creating a western bypass of the Sydney CBD, the Western Harbour Tunnel will take pressure off the Sydney Harbour Bridge, Sydney Harbour Tunnel, Anzac Bridge and Western Distributor corridors to improve transport capacity in and around Sydney Harbour.

Progress update

Potential noise impacts and duration

Roadheaders

Rock bolting

Bench excavation

Rock hammering

Shotcreting

Tunnel excavation methodology

Step 1.

Step 2.

Step 3.

Q&A