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Development and delivery of major infrastructure in Australia: A major contractor's perspective

The Institution of Civil Engineers Annual AGM

15th March 2022

WHO WE ARE

Webuild (formerly known globally as Salini Impregilo) is a **global leader** in the construction of **large, complex infrastructure**.

OUR PLEDGE TO BUILD A MORE SUSTAINABLE FUTURE

Our activities are at the **heart of the challenges** facing today's world, as the **population grows**, cities become crowded, pollution intensifies, **natural resources** become scarce and the climate change impacts increase.

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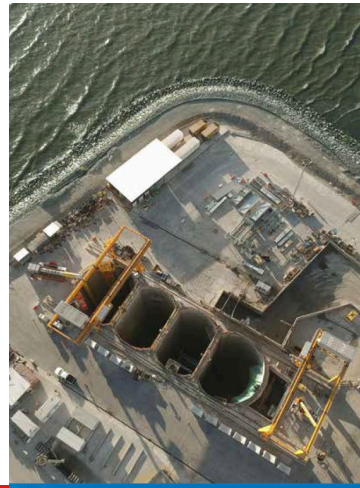
SUSTAINABLE MOBILITY

→ Metros
→ High Speed Railways
→ Railways
→ Roads & Motorways
→ Bridges & Viaducts
→ Ports & Sea works

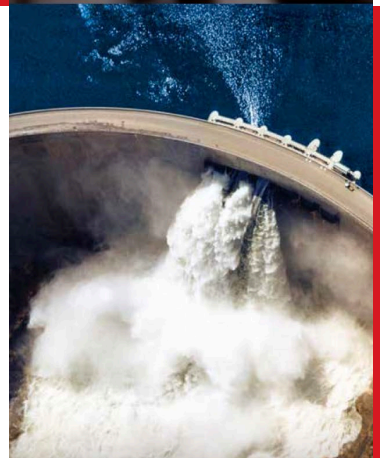
CLEAN WATER

→ Desalination & Water Treatment
→ Wastewater Management Plants
→ Hydraulic works
→ Irrigation Dams



CLEAN HYDRO ENERGY

→ Hydroelectric Dams & Plants
→ Pumped Storage



GREEN BUILDINGS

→ Civil & industrial buildings
→ Airports
→ Stadiums
→ Hospitals

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13,637 km
of railways and metros

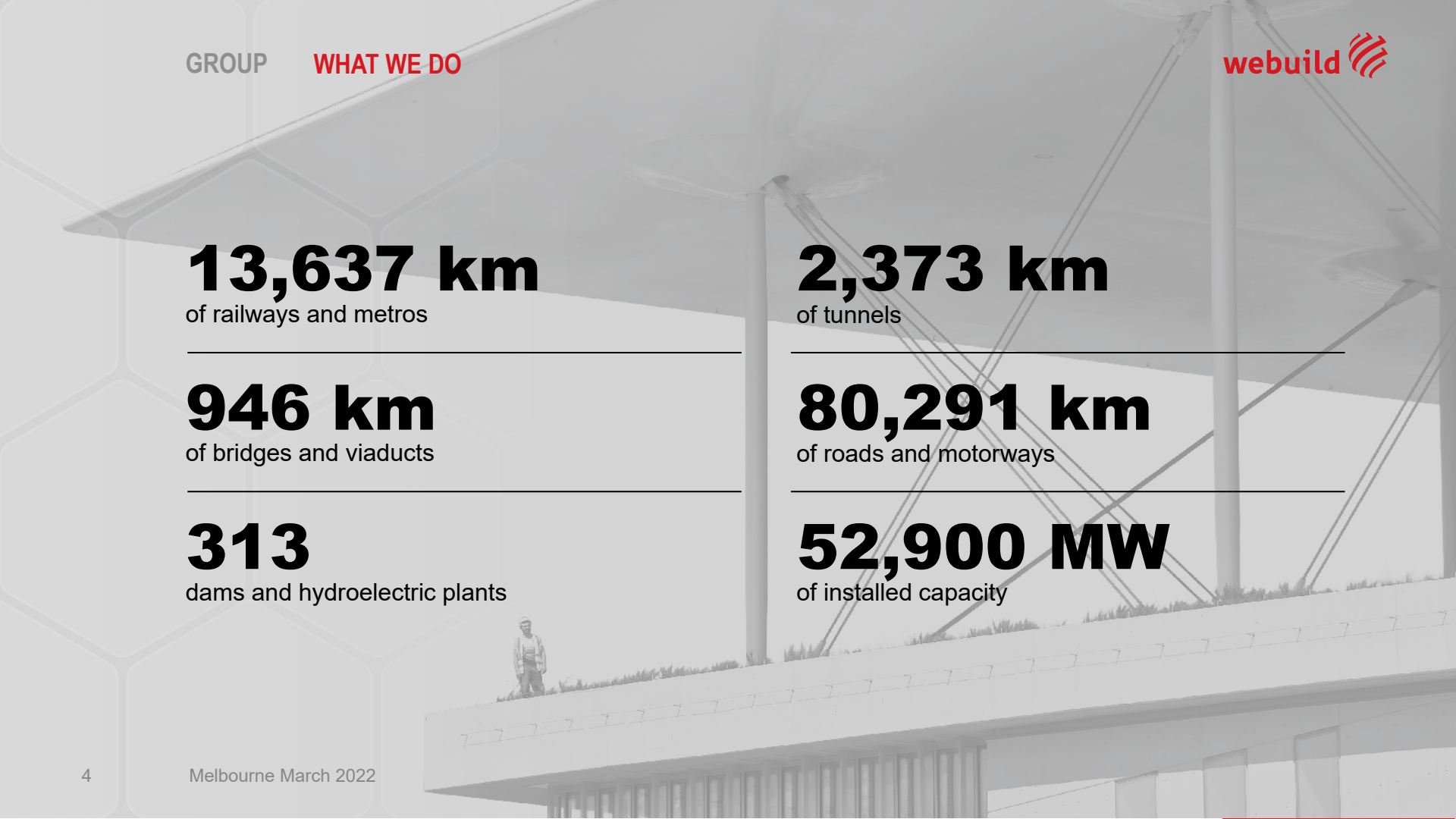
2,373 km
of tunnels

946 km
of bridges and viaducts

80,291 km
of roads and motorways

313
dams and hydroelectric plants

52,900 MW
of installed capacity



GLOBAL FOOTPRINT ONGOING PROJECTS

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~100 main ongoing projects

Countries where main ongoing projects are located

KEY FIGURES *

* aggregated data Webuild + Astaldi as at 31.12.2020 throughout the document unless otherwise indicated

€6.4 bn**
revenues

** Pro-forma including Astaldi's Contribution for twelve months of 2020

€41.7 bn
total backlog

115
years of engineering and construction

€33.3 bn
construction backlog

70,000
average direct and indirect global workforce in 2020

63%
construction backlog from low carbon projects

>100
nationalities

89%
construction backlog from projects that contribute to the achievement of the United Nations Sustainable Development Goals

Northwest Rail Link – Sydney Metro

Forrestfield Airport Link

FAL – the Joint Venture

Webuild (former Salini Impregilo)

- Joint Venture Leader
- 80% share

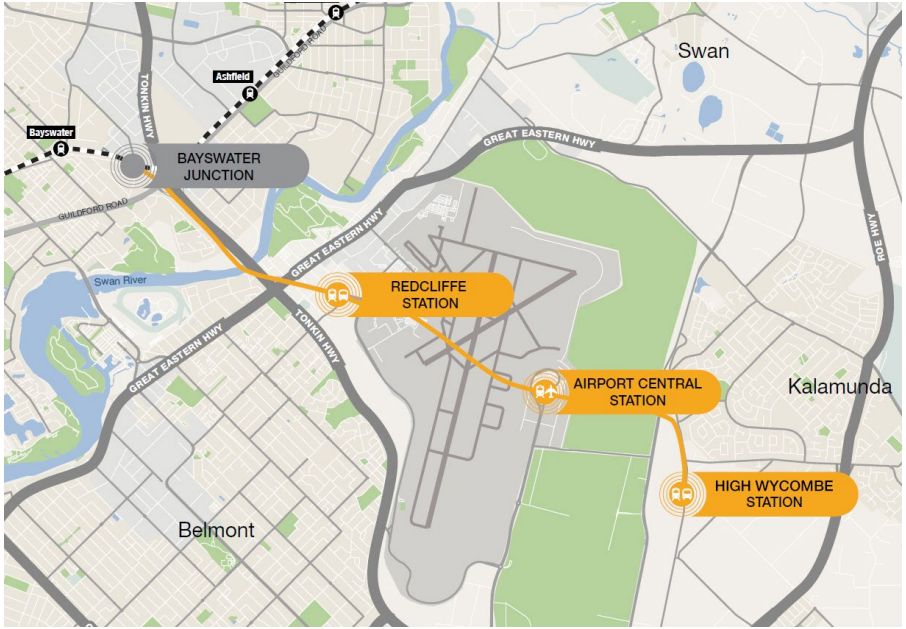
NRW Civil & Mining

- Joint Venture Partner
- 20% share

Contract scope

Design and construction of:

- Two 7.5km tunnels of 7.2m diameter
- 1km of dive ramp structures
- Three train stations
- Two portal buildings
- Three egress shafts
- 12 tunnel cross passages
- Trackwork
- Traction power and OLE
- SCADA
- Signalling and communication systems
- 10 years maintenance



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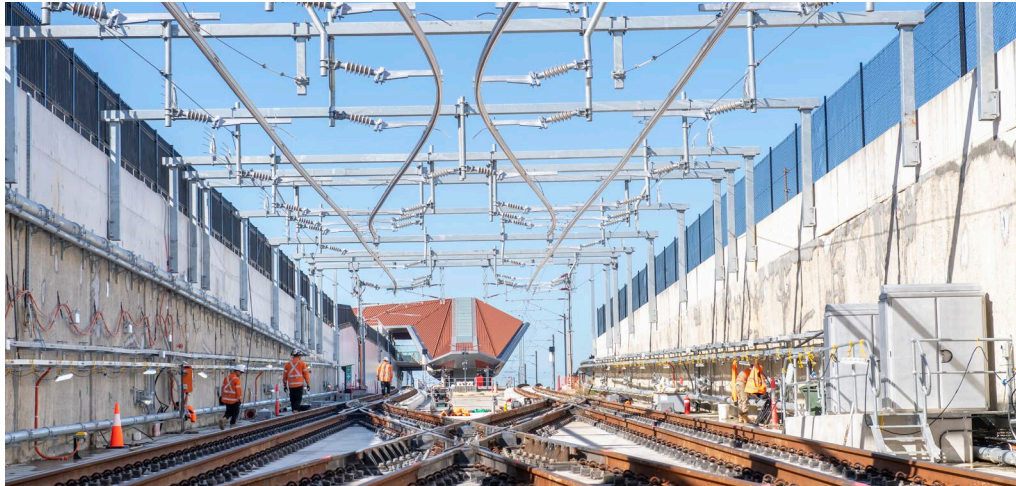
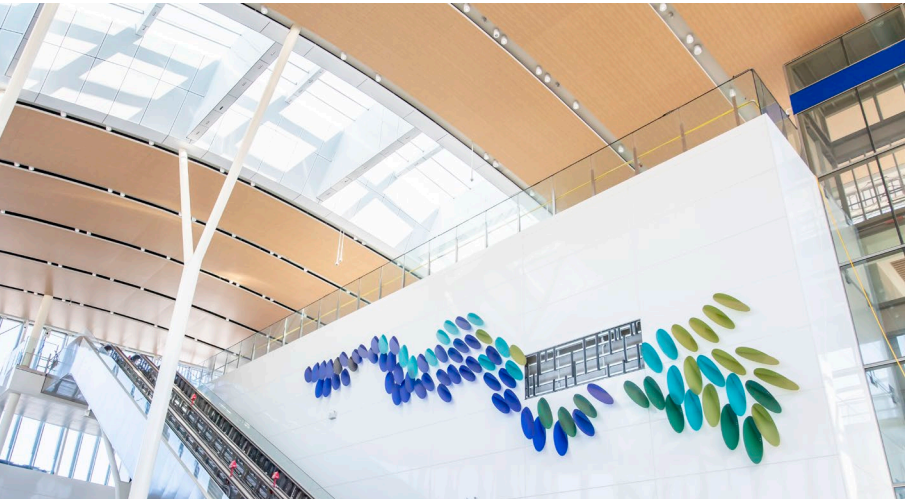
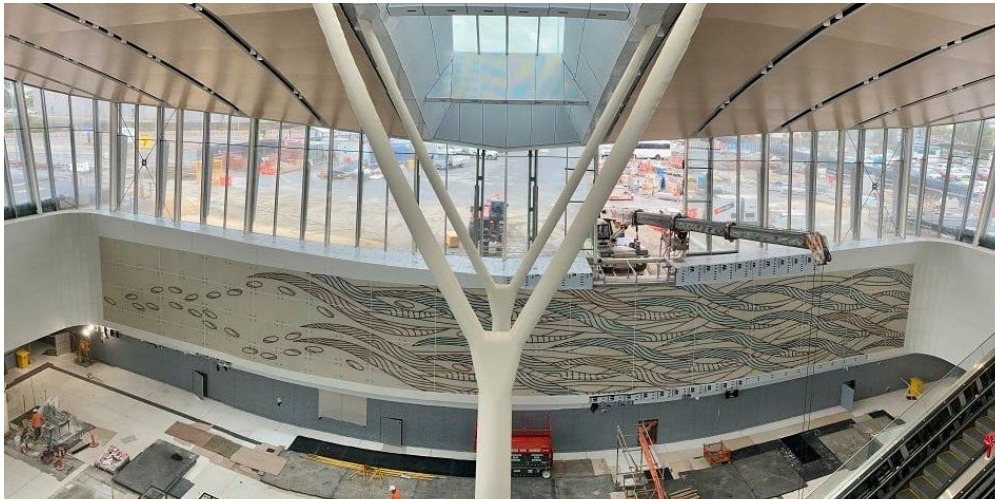
High Wycombe Station



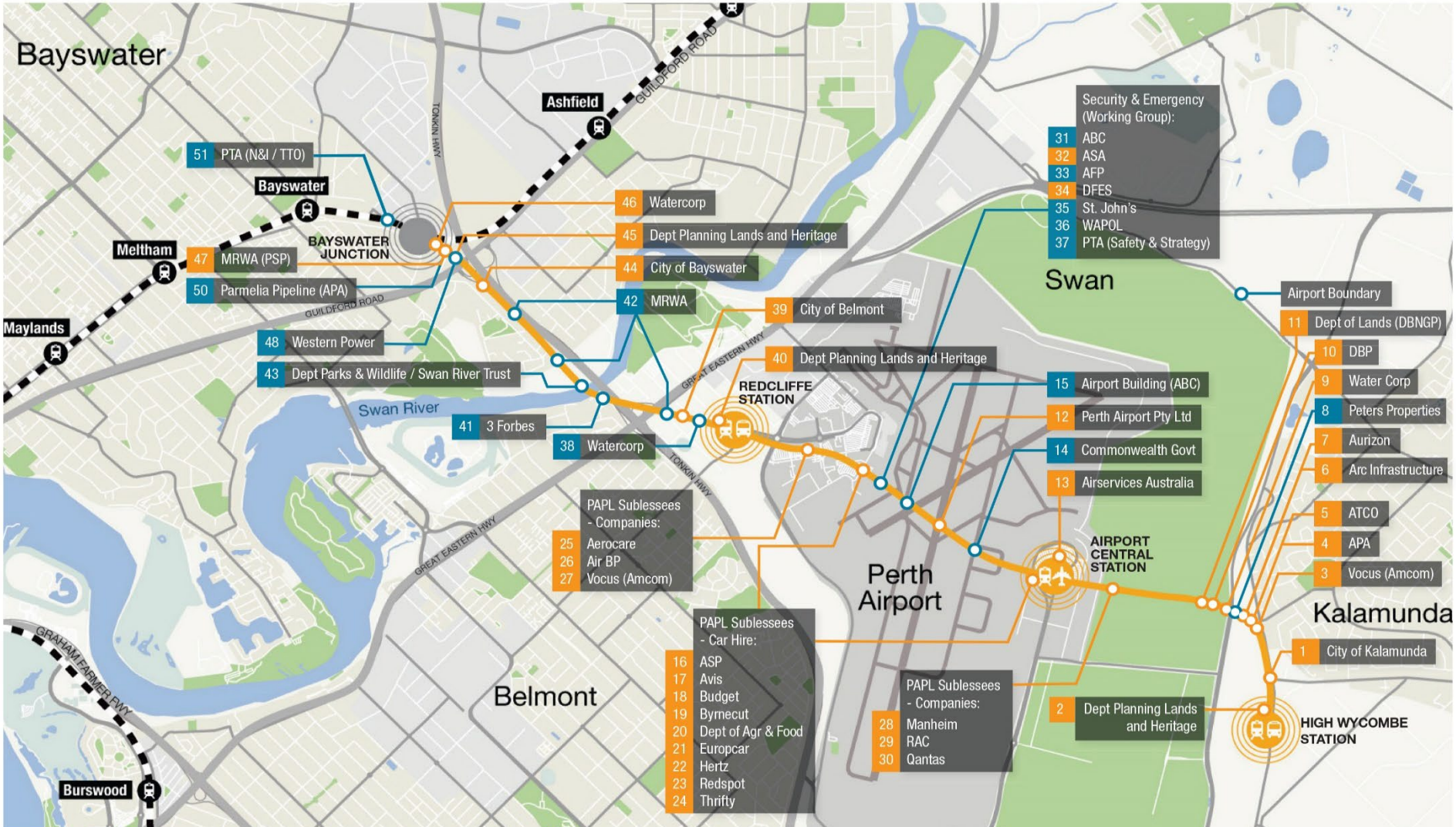
Airport Central Station






Redcliffe Station


Redcliffe Station


Bayswater
Ashfield
GUILDFORD ROAD
TONKIN HWY
51 PTA (N&I / TTO)
Bayswater
BAYSWATER JUNCTION
Meltham
47 MRWA (PSP)
50 Parmelia Pipeline (APA)
GUILDFORD ROAD
Maylands
48 Western Power
43 Dept Parks & Wildlife / Swan River Trust
Swan River
41 3 Forbes
38 Watercorp
46 Watercorp
45 Dept Planning Lands and Heritage
44 City of Bayswater
42 MRWA
39 City of Belmont
40 Dept Planning Lands and Heritage
GREAT EASTERN HWY
REDCLIFFE STATION
TONKIN HWY
GREAT EASTERN HWY
PAPL Sublessees - Companies:
25 Aerocare
26 Air BP
27 Vocus (Amcom)
PAPL Sublessees - Car Hire:
16 ASP
17 Avis
18 Budget
19 Byrnecut
20 Dept of Agr & Food
21 Europcar
22 Hertz
23 Redspot
24 Thrifty
Belmont
GRAHAM FARMER FWY
Burswood
Security & Emergency (Working Group):
31 ABC
32 ASA
33 AFP
34 DFES
35 St. John's
36 WAPOL
37 PTA (Safety & Strategy)
Swan
15 Airport Building (ABC)
12 Perth Airport Pty Ltd
14 Commonwealth Govt
13 Airservices Australia
AIRPORT CENTRAL STATION
Perth Airport
PAPL Sublessees - Companies:
28 Manheim
29 RAC
30 Qantas
2 Dept Planning Lands and Heritage
Airport Boundary
11 Dept of Lands (DBNGP)
10 DBP
9 Water Corp
8 Peters Properties
7 Aurizon
6 Arc Infrastructure
5 ATCO
4 APA
3 Vocus (Amcom)
Kalamunda
1 City of Kalamunda
HIGH WYCOMBE STATION

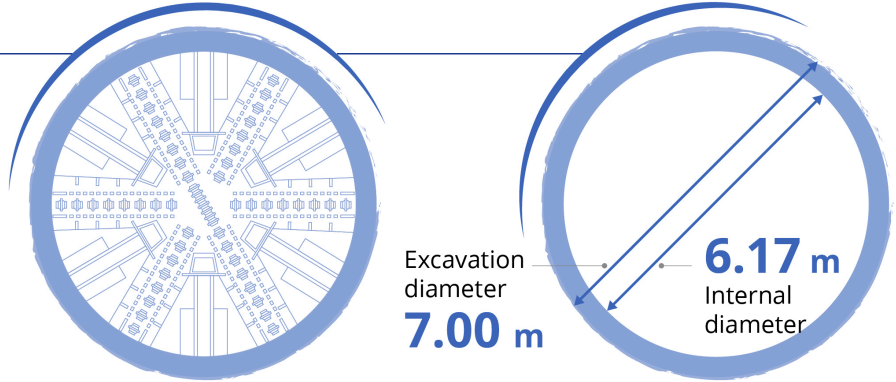

TUNNEL ACCESS CONTROL
PLACE PERSONAL ACCESS TAG ACCORDINGLY AT THE TALLYBOARD (IN-OUT) # SELF RESCUER SHALL BE CARRIED DURING ACCESS / EGRESS TO / FROM TUNNEL AND TBM
PLACE SELF RESCUER AT DESIGNATED CABINET WHILE AT TBM (GANTRY #9), KEEP SELF RESCUER NEARBY AT ALL TIMES DURING OTHER WORKS ALONG THE TUNNEL
ACCESS TAG
salini impregilo
NRW
TBM 2 Sandy Up Main
SUPERVISOR:
EMERGENCY:
OUT
IN
TBM Crew
TUNNEL CAPACITY 25 Persons
Tunnel / Maintenance Works
CONDITIONS OF ENTRY
SELF RESCUER LOCATED IN THE BACK
Works
TBM 1 Grace Down Main
SUPERVISOR
OUT

Tunnelling

Twin Tunnels

Twin tunnels

The project comprises the design, construction and maintenance for ten years of the Forrestfield-Airport Link.

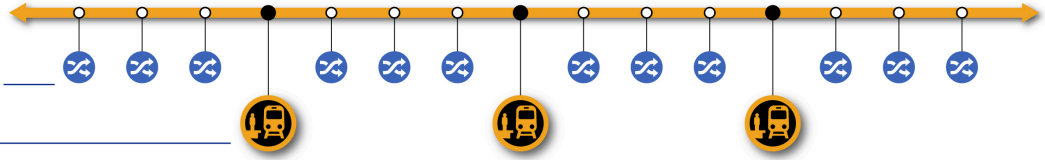


THE PROJECT INCLUDES

8 km
total length of each tunnel

12 cross-passages

3 stations



Data at November 30, 2020

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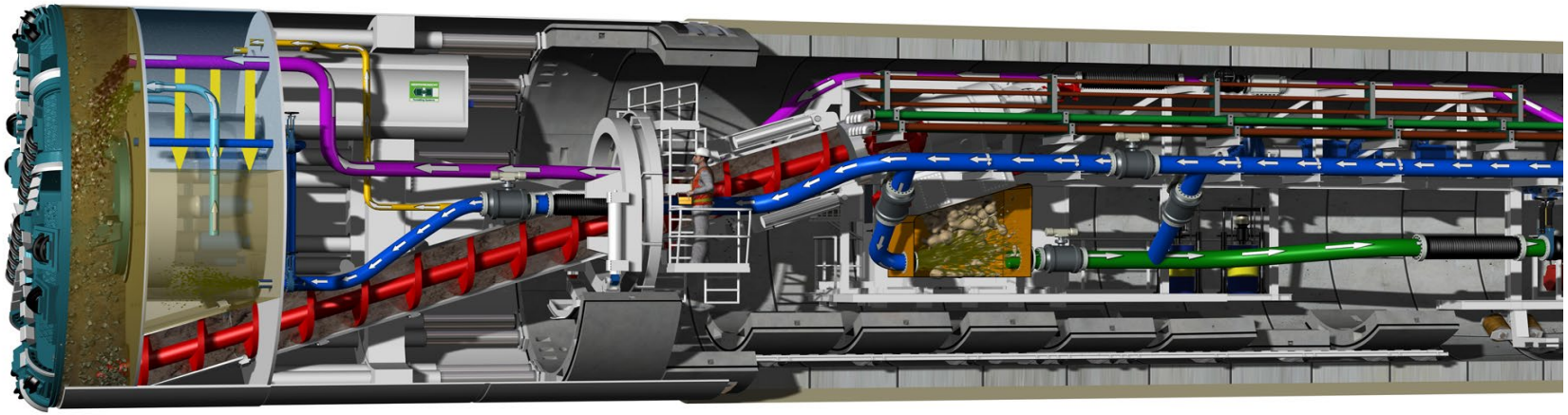
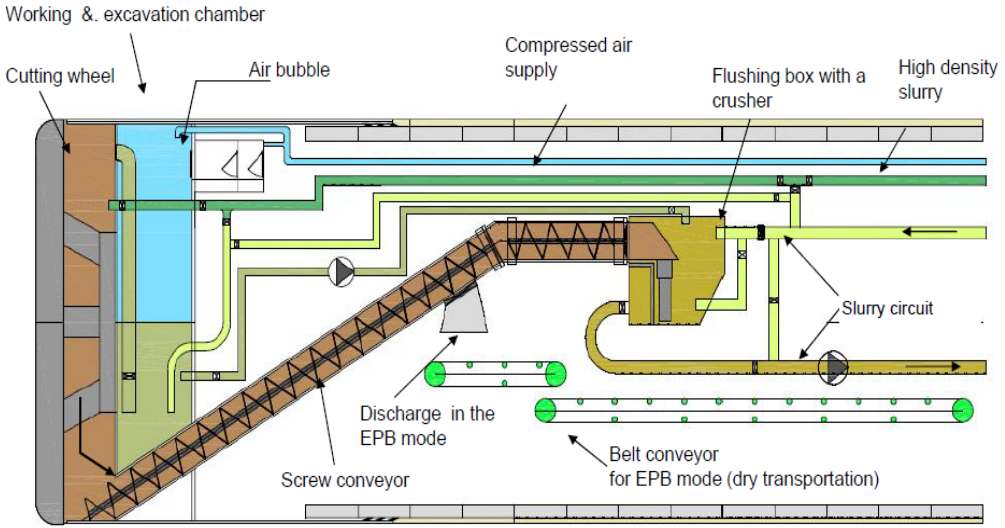
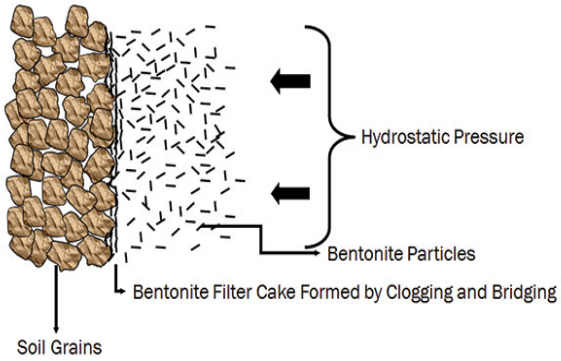




Variable Density TBM



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Tunnelling challenges

- Unexpectedly high clogging of cutterhead and sizer box
- Irregular flow of material through pipeline, blockages at booster pumps, overflow of material on slurry treatment plant's coarse screens
- Resulted in increased frequency and length of interventions
- Modifications performed on TBMs

Clogging at sizer box (rotary crusher)

Tunnelling – lessons learned

- **Theory vs. Actual** – performance of the entire excavation ‘system’ only truly known once it is exposed to the actual geotechnical conditions.
- **Slurry** - slurry characteristics must be constantly reviewed and adjusted in order to respond to sudden changes in ground conditions.
- **Process plant** - the entire excavation process is effectively a process plant, and must be designed and operated as such.
- **Flexibility of plants** - the excavation ‘system’ should be designed with inbuilt potential flexibility (if not redundancy) to enable modification to manage encountered conditions.

Innovations, challenges and learnings

Sustainability initiatives

- Materials reduction through use of a Triple Blend Concrete and concrete batching on site
- 2.2% reduction in energy use
- TBM water recycling - saved 2740ML of water, the equivalent of more than 1000 Olympic-sized swimming pools.
- 278kW solar panel system - 35,903.7 tCO2e to be saved over the 120-year design life

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Challenges

- Mining under operating runways and rail
- Extensive real time instrumentation and monitoring
- Tunnelling in soil types never mined before
- 120 year design life
- Interfaces
- Working in close proximity to services
- Tunnelling logistics (confined space for working, spoil management)

Learnings

- Must be flexible
- The more preparation works, better all round
- Managing media

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KIRSTEN
snowy
renewabl
Snowy 2.0

Snowy 2.0 – the Future Generation Joint Venture

Webuild (former Salini Impregilo)

- Joint Venture Leader
- 55% share

Clough Limited

- Joint Venture Partner
- 35% share

Lane Construction

- Joint Venture Partner
- 10% share

Lane Construction Corporation is a US company 100% controlled by Webuild S.p.A

Snowy Hydro Limited

- Client

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Contract Scope

- Snowy 2.0 involves the construction of civil engineering and electromechanical works for the expansion of a network of hydro power stations in the Snowy Mountains Hydro-electric Scheme, helping underpin Australia's renewable energy future
- The project will increase by 2,000 megawatts (MW) the generating capacity of the Hydro-electric Scheme, which currently stands at 4,100

MAT – Portal, Snowy 2.0 October 2021

- The aim of the project will be to link the existing Tantangara and Talbingo dams by excavating a series of lined tunnels for a total length of 29 km of 9.8m diameter, excavated n.3 TBM and building a hydroelectric power station with pumping facilities located nearly one kilometer underground. The six 340 MW units can work both as generators when producing or as motors when pumping.

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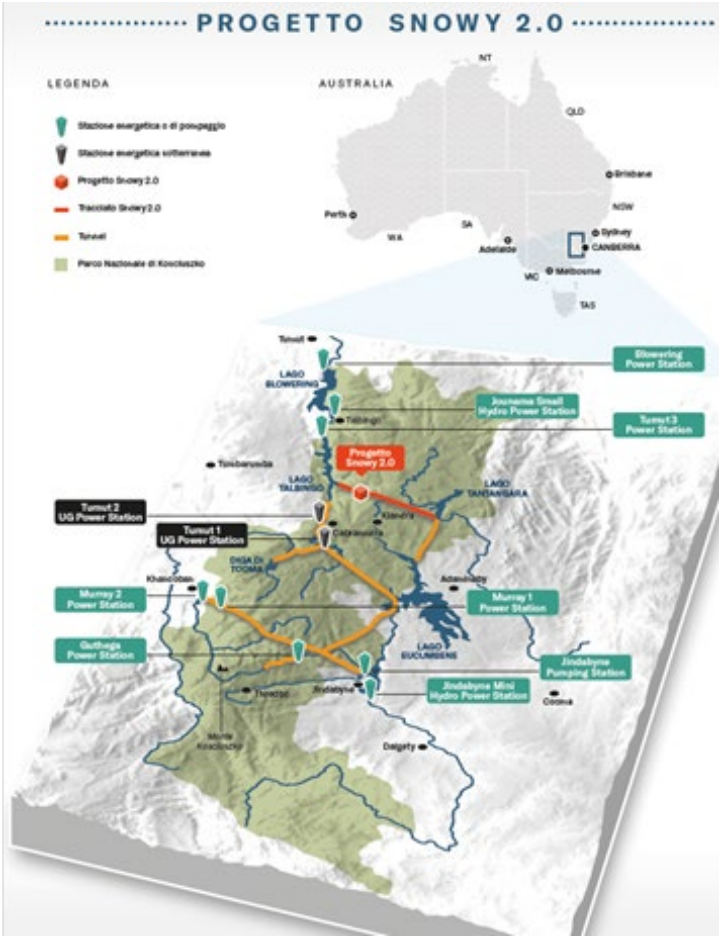
Contract scope



Main quantities:

- Underground excavations with TBM 29 km
- Powerhouse excavations 485,000 m3
- Earthwork 3,000,000 m3

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ECVT Portal

MAT Portal
TBM Lady Eileen Hudson


Ventiflex

Tantangara


snowy hydro

Tantangara Adit Portal – TBM Florence

Talbingo

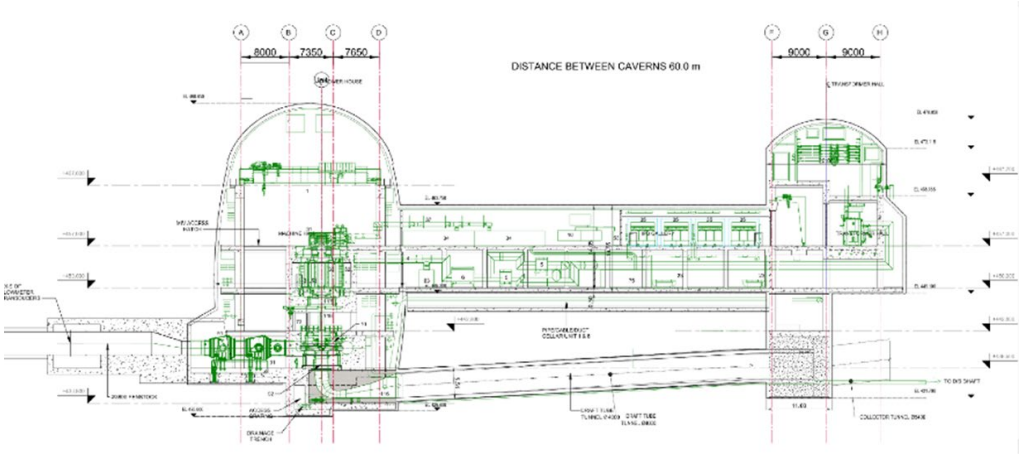
Main Yard

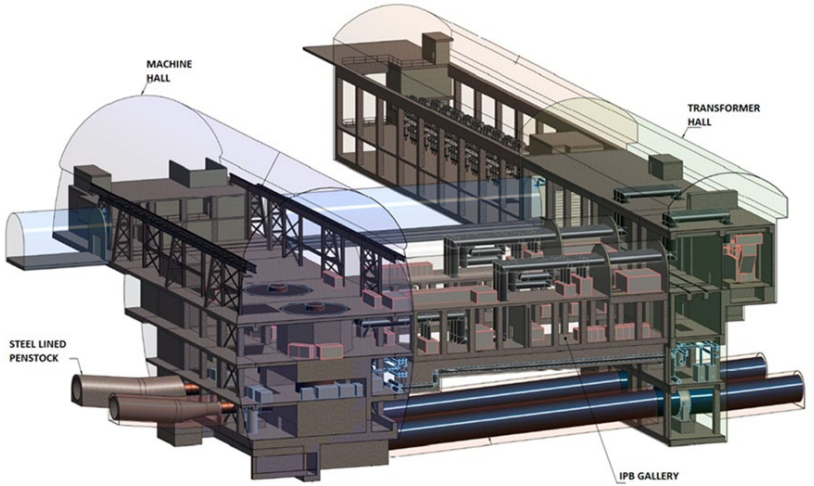
Main Camp

Machine Hall

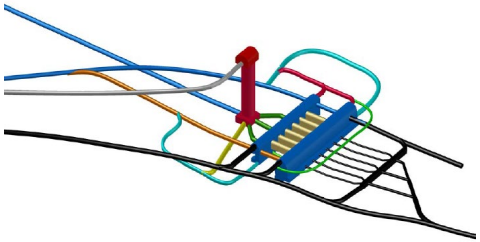
- The Machine Hall will house the six pump-turbine and motor-generator units. Double MIVs will be provided on the six upstream penstocks within the machine hall. Isolating draft tube valves will be in the draft tube tunnels beneath the transformer hall.

- Machine Hall details are as follows:
  - Cavern Walls will be curved (egg-shaped)
  - Cavern span is about 33.5m with a length of 251m above El.457.00.





3D Render of Powerhouse Complex – Snowy 2.0



Powerhouse– Snowy 2.0

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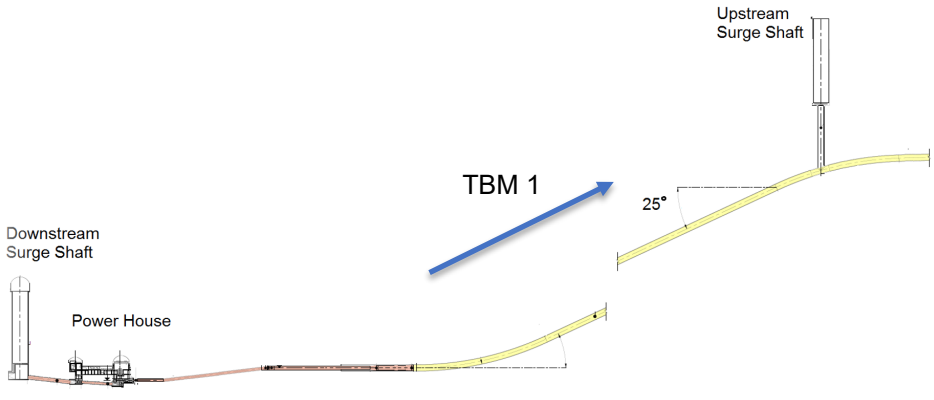
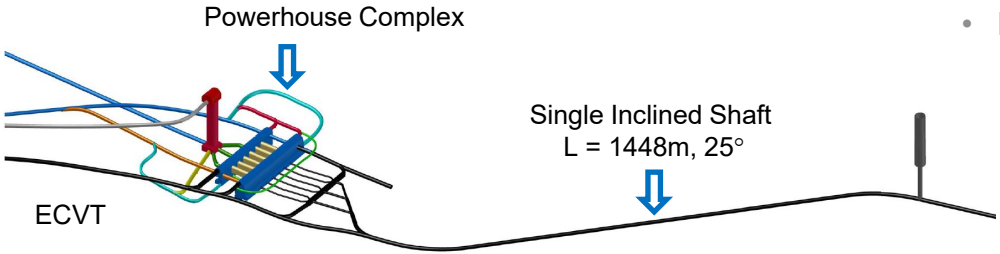
Technical Challenges





Powerhouse and IPS– Snowy 2.0

- The **most difficult operation** will be the excavation of the single inclined shaft in tunnel boring machine, with a gradient of 25 degrees and a length of 1600m; there are few similar examples of such constructions in the world.
- TBM1 will commence works at the ECVT portal and will complete the ECVT tunnel up to the base of Inclined Pressure Shaft. Here the TBM1 will change configuration and then it will continue through IPS and up to Ch.15+400 of HRT after which it will be dismantled and removed.
- Main Data TBM1 Tunnel:
  - TBM Diameter = 11m
  - 9 Precast Segments per Ring
  - Internal Diameter Ring = 9.9m

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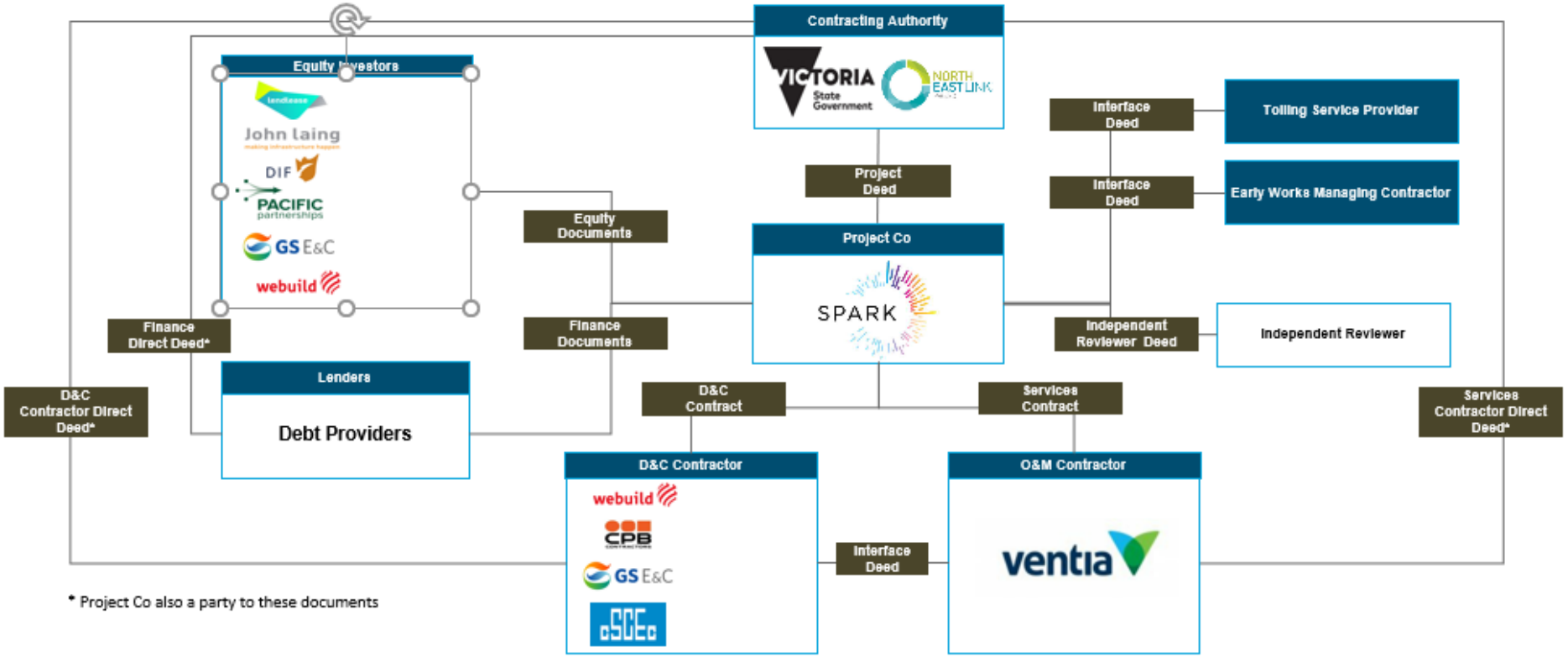
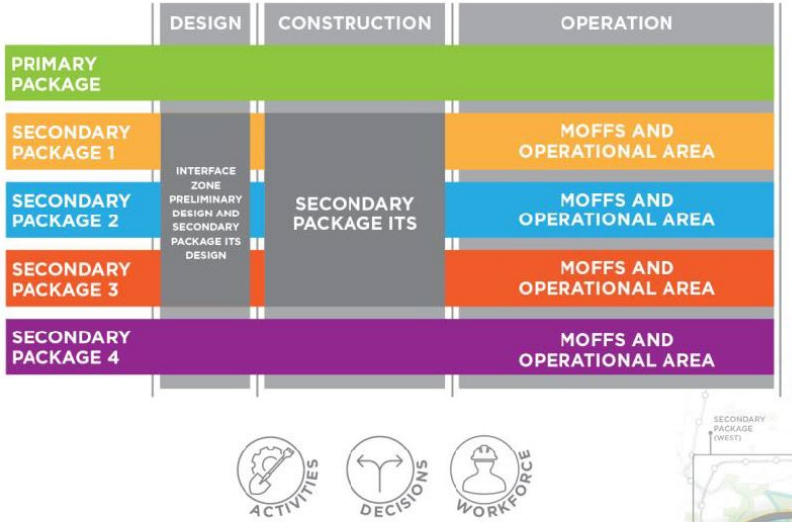
North East Link Project – Central Package

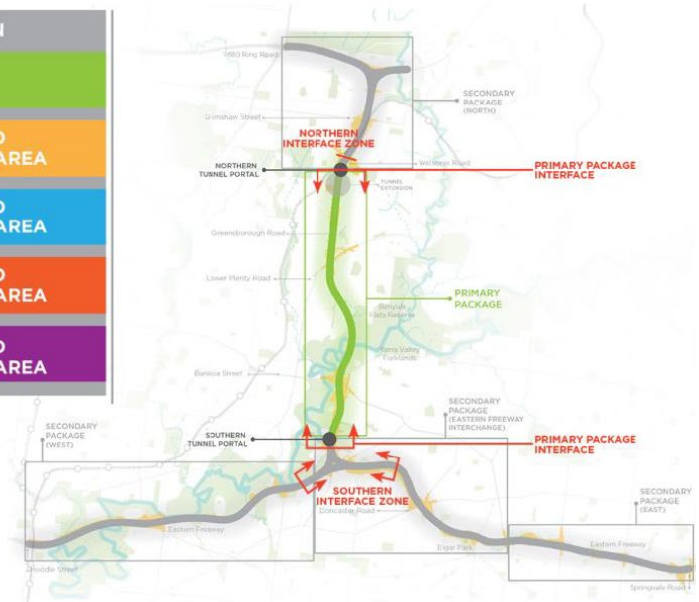
NEL - Structure of SPARK Consortium



* Project Co also a party to these documents

Contract scope

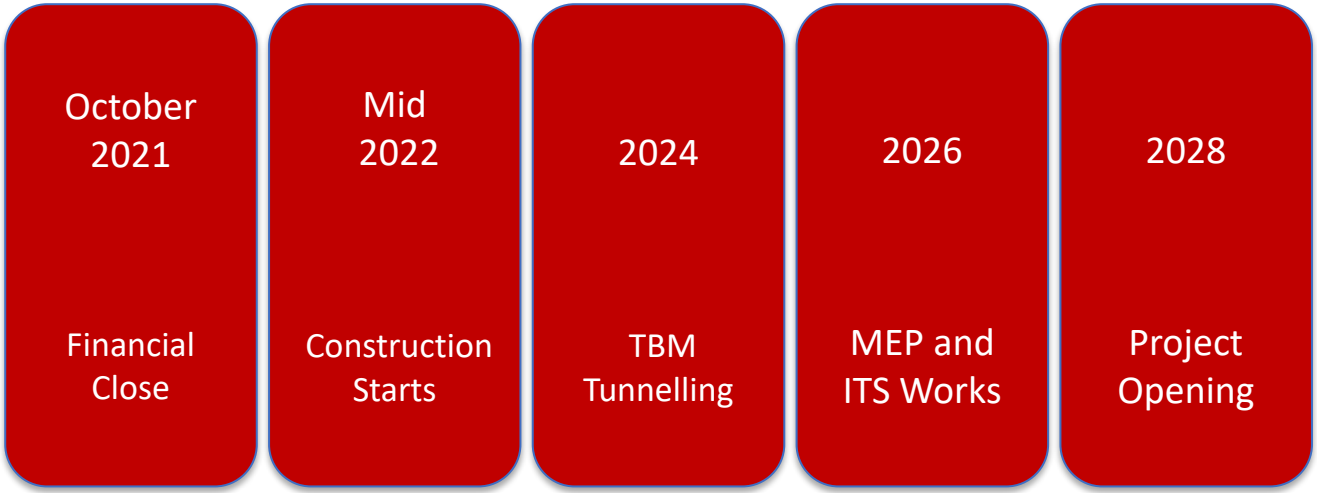




The Project in Numbers

- Type of **Contract**: **PPP** - Design, Construction and Operation
- Total Project **Length**: **6.9Km**
- Construction of two 3 lane **TBM Tunnels**: **4.8Km** long
- **TBM**s' External Diameter: **15.61m**
- Construction of two 4 lane **SEM** (Sequential Excavation Method) **Tunnels**: **431m** long
- **3 Cut & Cover** Structures, one **Open Trench** and **Access Ramps**
- **2** Tunnel **Ventilation Structures**
- **MCC** (Motorway Control Centre)
- **Surface Works, UDLA** and integration with surroundings

Program


October 2021
Financial Close
Mid 2022
Construction Starts
2024
TBM Tunnelling
2026
MEP and ITS Works
2028
Project Opening

Technical Challenges & Solutions

- At RFP Phase, SPARK reduced the lengths of C&C Structures and extended TBM Works
- Reduction on construction footprint and accelerated program because of TBMs
- Traffic optimization (4 lanes from Manningham), with possible better revenue
- Further optimizations undertaken at RAC (Revise and Confirm) Phase

Visuals: Simpsons Barracks ventilation stack

NEL - Simpsons Barracks ventilation stack

Visuals: Greensborough Boulevard

NEL – Contract Close visual of the Greensborough Boulevard, Northern end

Visuals: Southern Portal & Land Bridge

NEL – Contract Close visuals of the Southern Portal: Ventilation Stack and Land Bridge

Visuals: Southern Land Bridge

NEL – Contract Close visual of Southern Land Bridge