Future-proofing container port supply chains using simulation

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Acknowledgement & respect

GHD & NSW Ports acknowledges Aboriginal and Torres Strait Islander peoples as the Traditional Custodians of the land, water and sky throughout Australia on which we do business. We recognise their strength, diversity, resilience and deep connections to Country. We pay our respects to Elders of the past, present and future, as they hold the memories, knowledges and spirit of Australia. GHD & NSW Ports is committed to learning from Aboriginal and Torres Strait Islander peoples in the work we do.

Port Botany

- Second largest container port in Australia handling 2.8m TEU P.A.

- 42% of all NSW household goods are imported through Port Botany

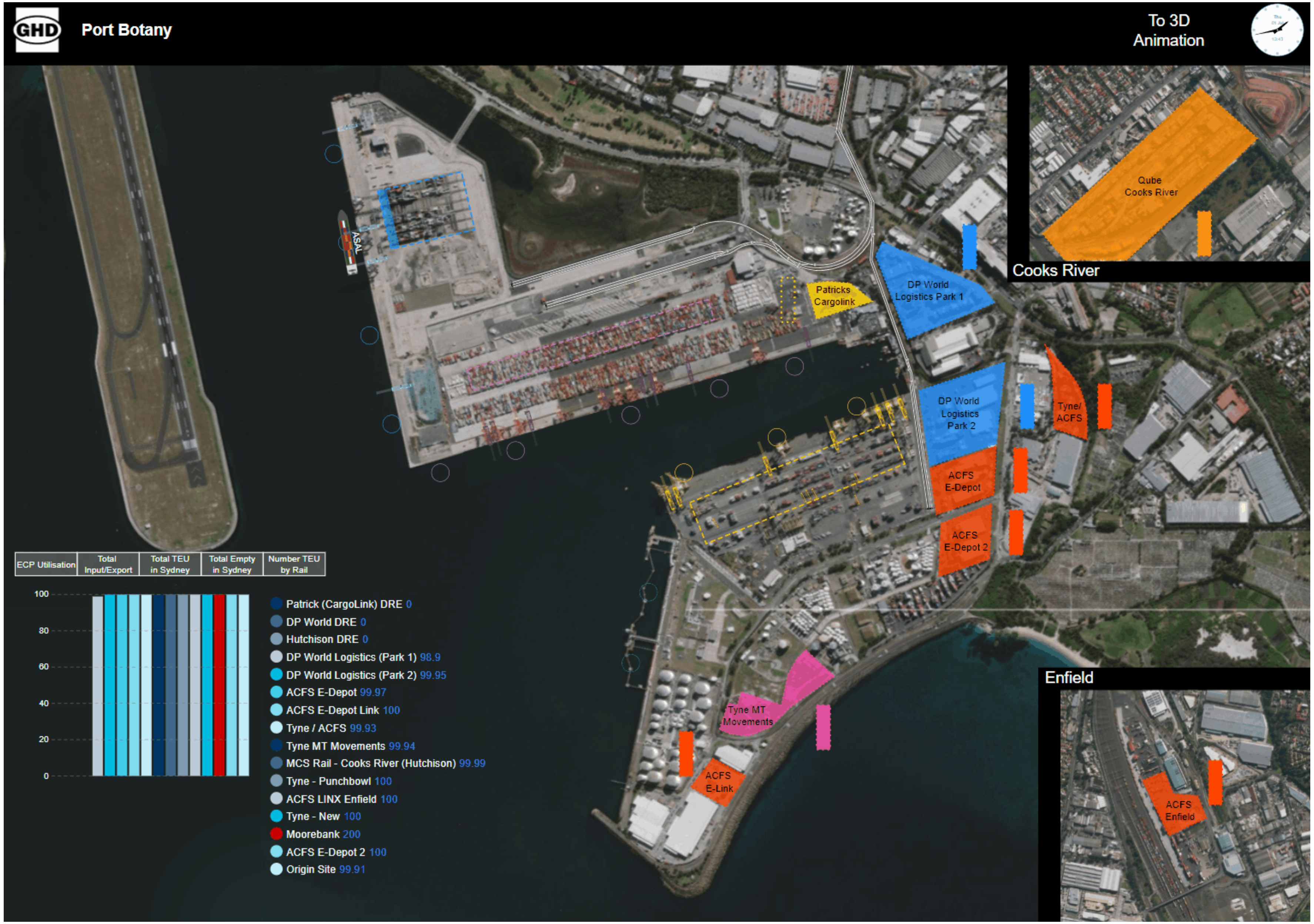
- Contributes $13.6bn to NSW Gross State Product

- ~52,000 jobs supported by NSW Ports in the Sydney region

- Growing rail mode share is critical to optimising Port Botany's capacity and reducing road congestion in Sydney

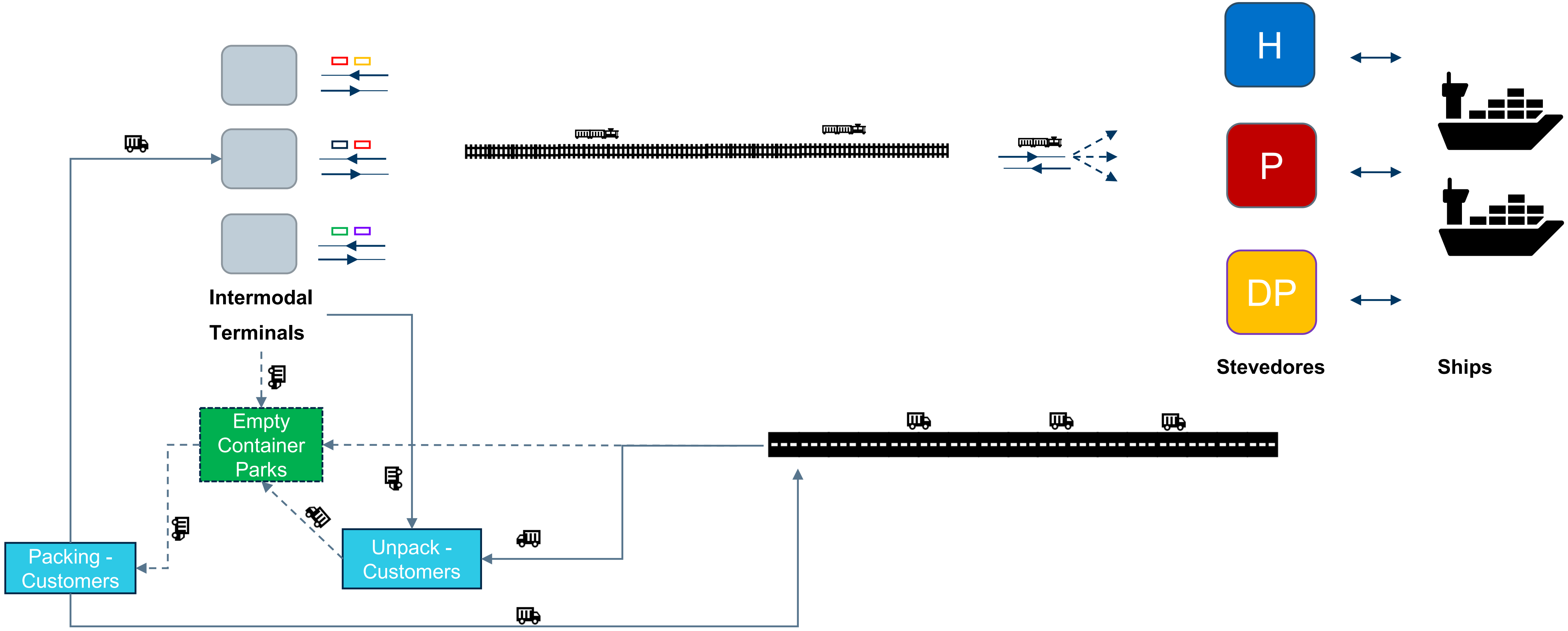
The future for Port Botany

- Target increase in rail mode share from 15% to 40%
- And sixfold increase in anticipated in port rail throughput
- Currently inflexible rail schedule and inefficient rail operations

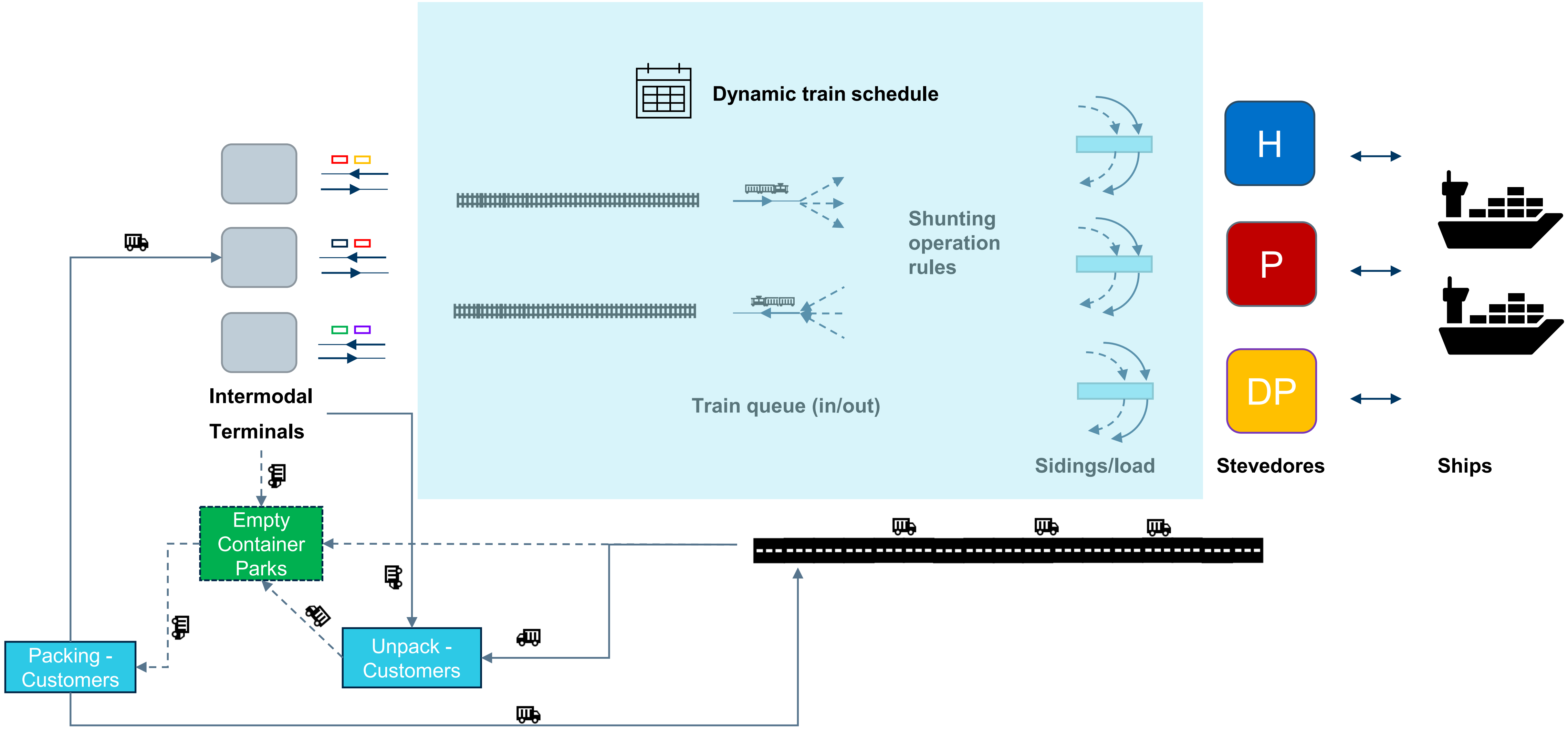


Port supply chains are complicated

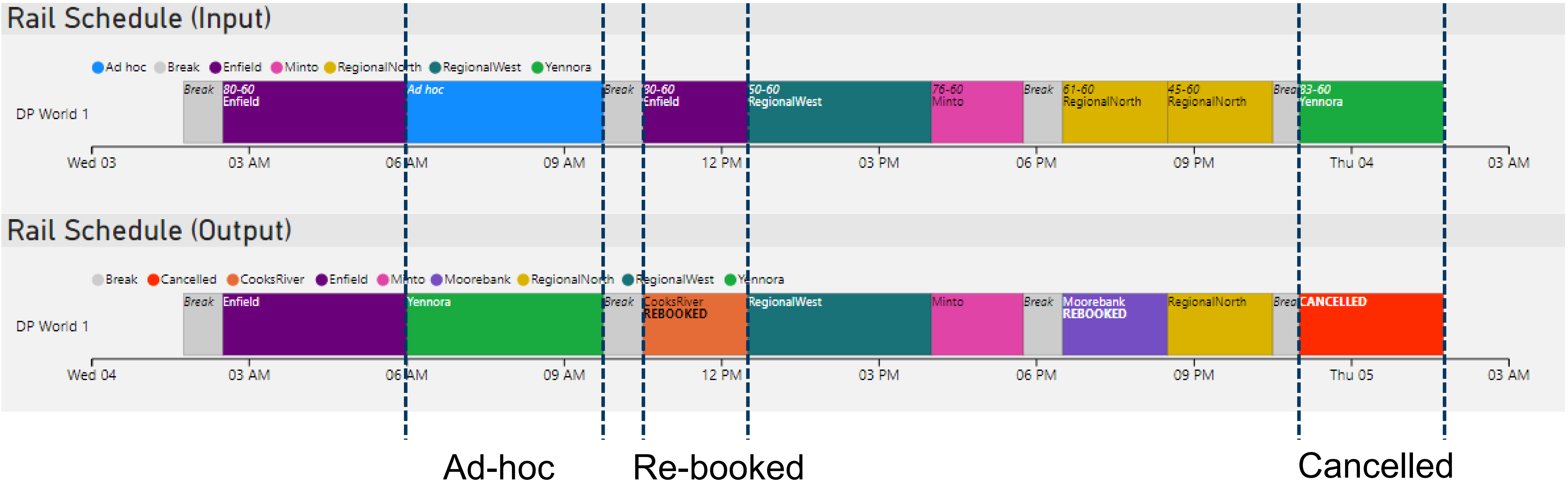
- Port Botany is a tightly integrated supply chain
- There are many stakeholders: 3 Stevedores + 20 shipping lines + State Government bodies
- Many ways to influence rail throughput including improving scheduling and operations



GHD expanded NSW Ports model to assess infrastructure and operational changes

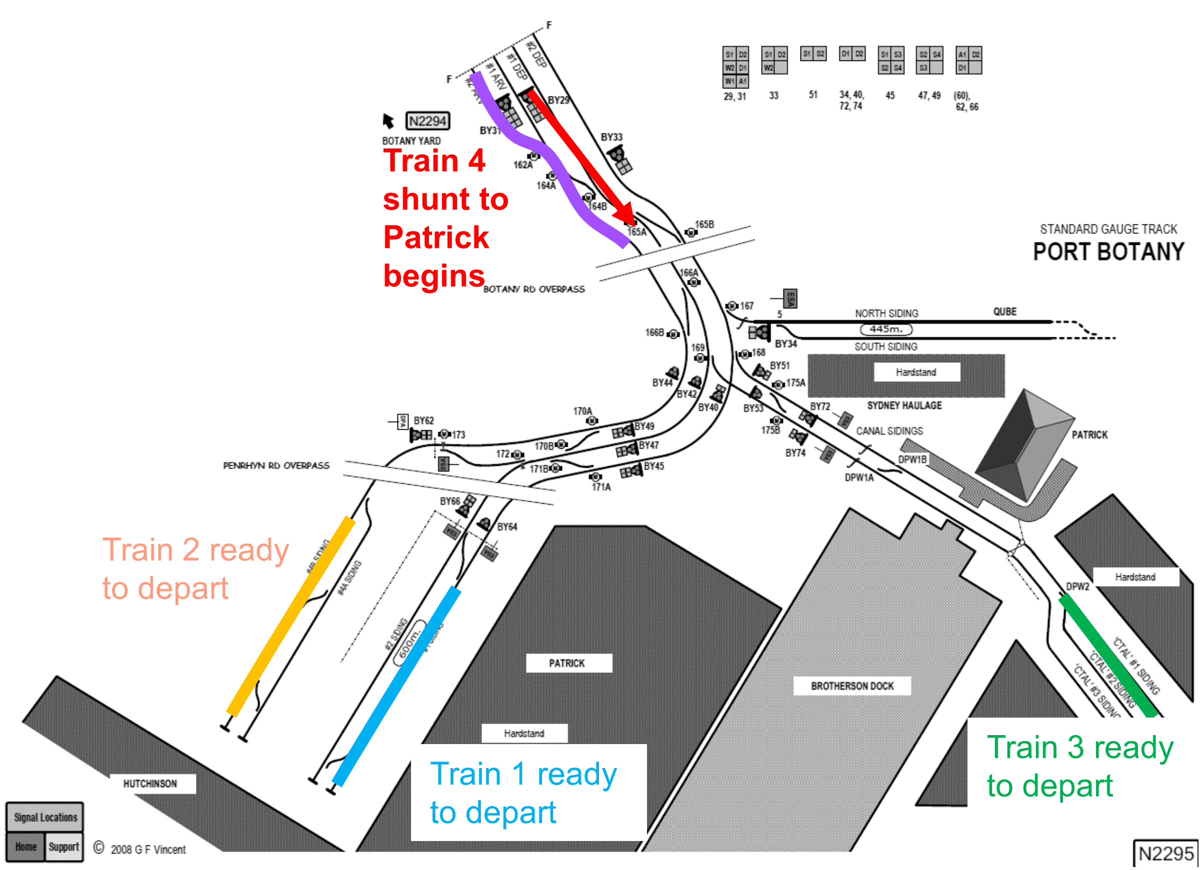


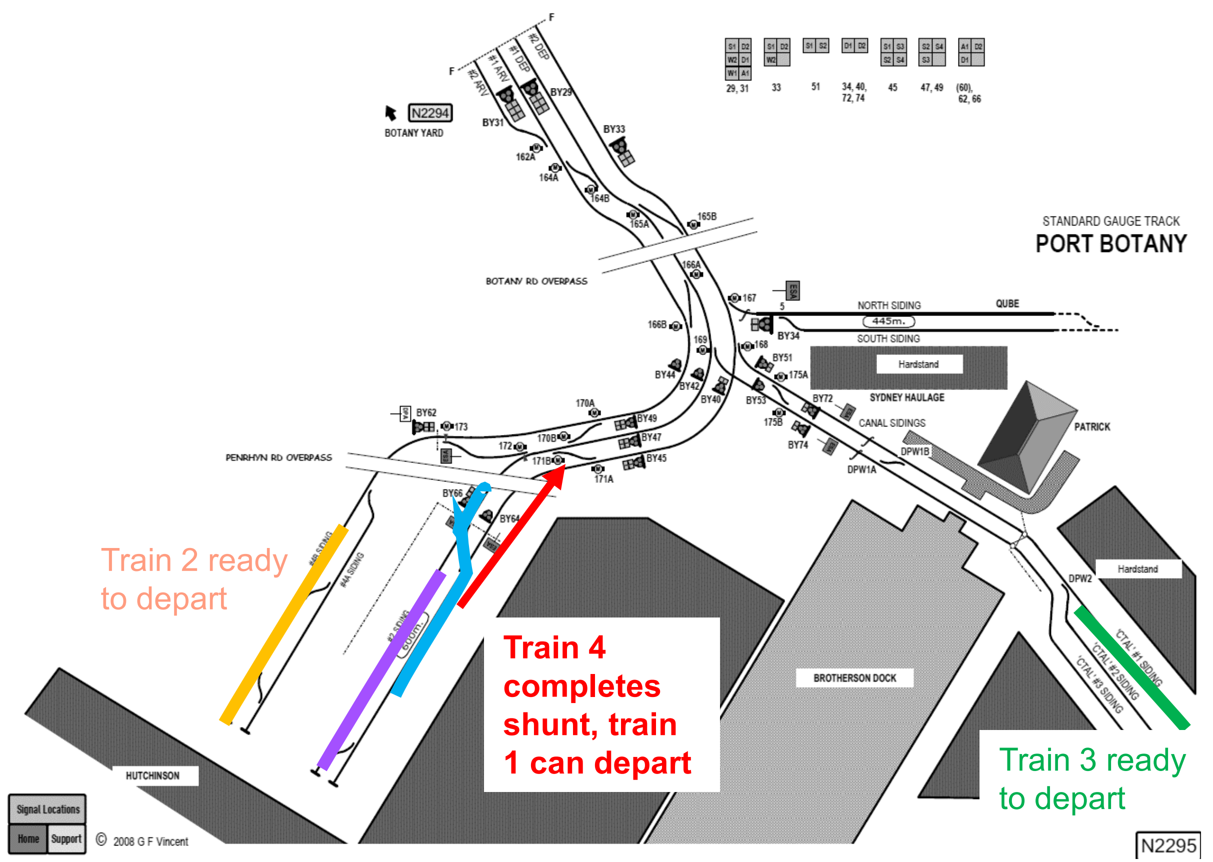
Simulation played out the alternative train schedule and rebooking rules



Simulation played out train shunting and cargo loading process

For example: Limitations on trains that can enter and leave port



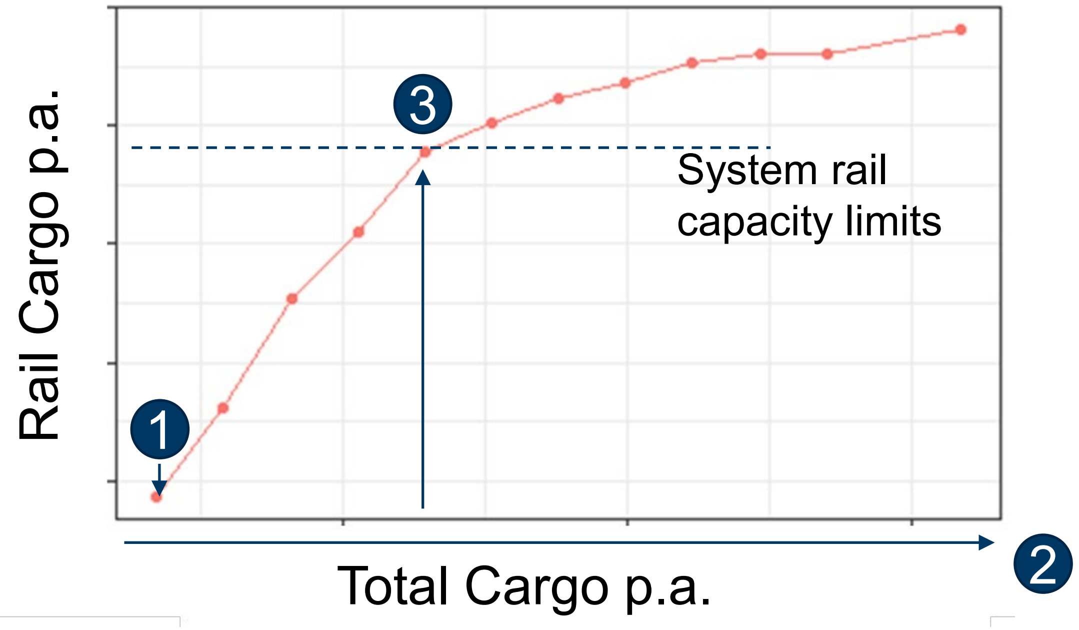


This is how the rail capacity limits were tested with the model

1. Set up scenario with test scheduling, operational and infrastructure

2. Run multiple scenarios with scaled up imports and exports

3. Rail capacity reached when:
   - Rail throughput stops increasing
   - Long cargo dwell times
   - Imports/Exports build up at Stevedores/IMT's



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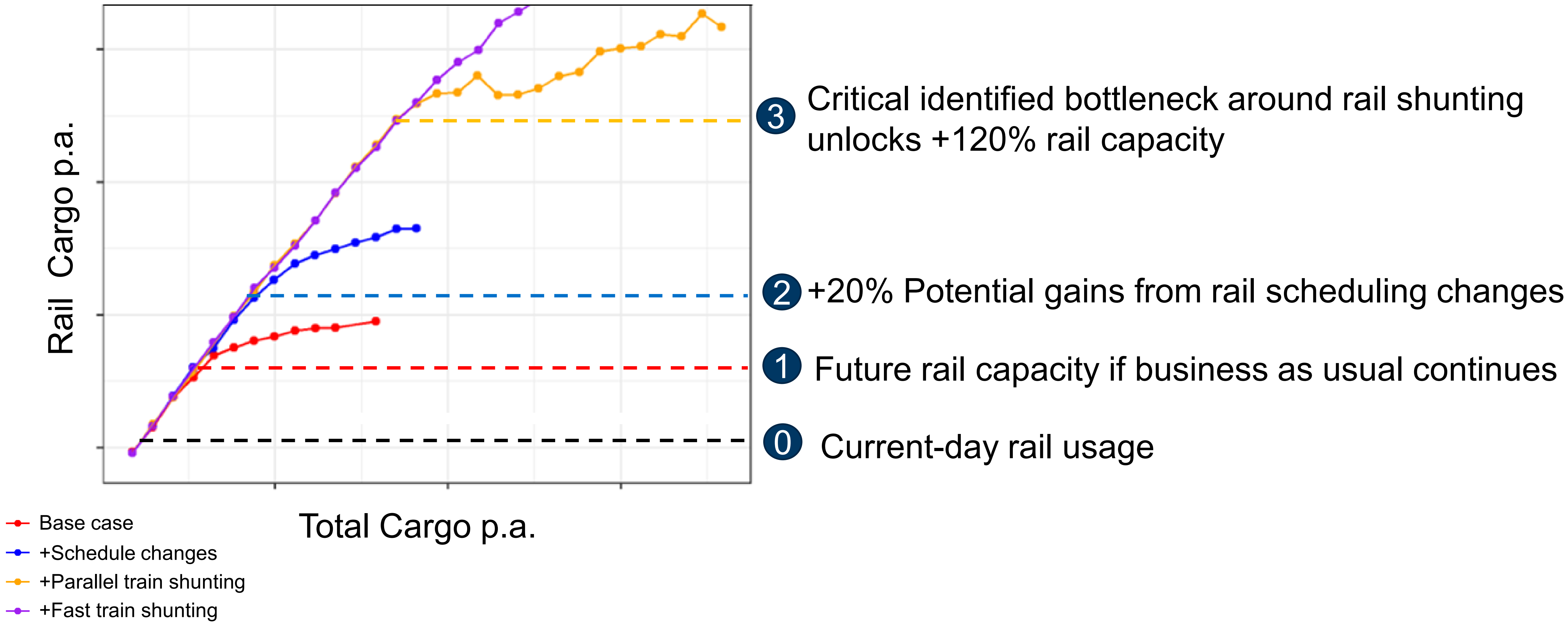
A staged infrastructure upgrade pathway was identified



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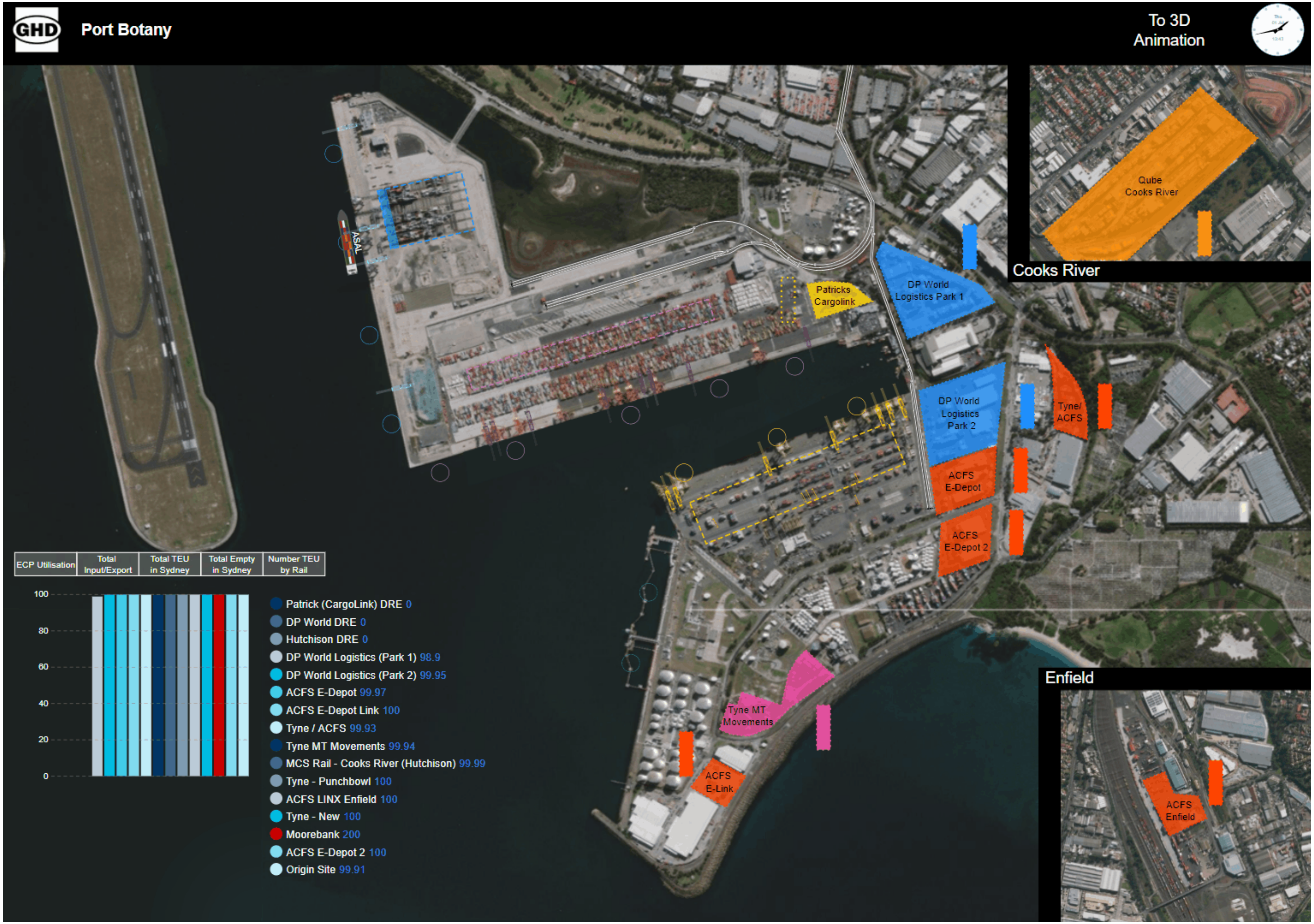
Simulation has helped address port planning challenges

Potential +20% growth in rail throughput capacity identified from operational changes alone

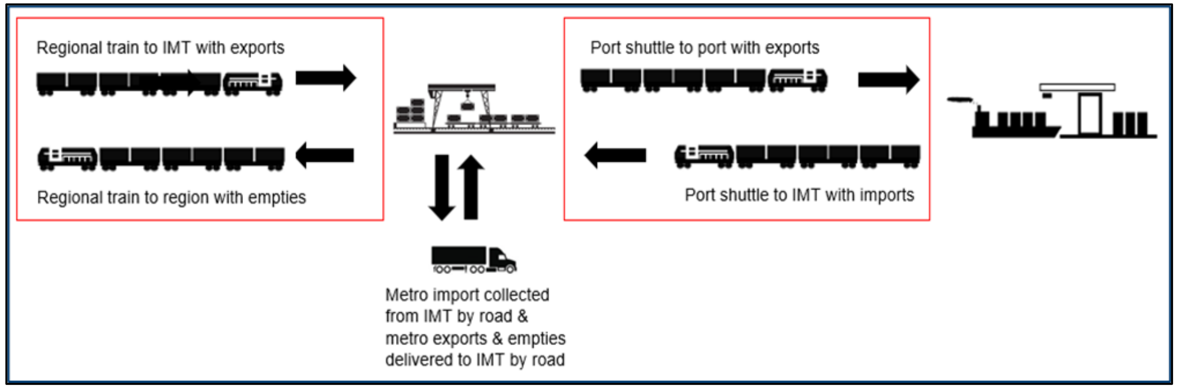
Critical infrastructure bottleneck for next decade of rail throughput growth identified

Modular model for future expansion, including total cargo costs and emissions impacts



NSW Ports are using the model to …

- Develop a rail strategy to optimize rail operations and maximise use of rail capacity
- Advocate for changes in government policy to support increased use of rail
- Assess environmental benefits of rail
- Support business cases for investment in rail infrastructure



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→ ghd.com/advisory

Appendix