Queensland Government

REPORT TO PARLIAMENT

OFFICIAL VISIT TO GERMANY, UNITED KINGDOM, NETHERLANDS AND ITALY
1-9 APRIL 2023

THE HONOURABLE MARK BAILEY MP
MINISTER FOR TRANSPORT AND MAIN ROADS

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PROGRAM

All times are in local times

SATURDAY | 1 APRIL

TIMING	PARTICULARS
9:00pm - 5.10am Sun	FLIGHT | Qantas QF8435 Brisbane to Dubai

SUNDAY | 2 APRIL

TIMING	PARTICULARS
8:50am – 1:15pm	FLIGHT | Qantas QF8049 Dubai to Munich
2:30pm	Travel Airport to Munich Hauptbahnhof train station
	ACCOMMODATION | Le Meridien Munich, Bayerstrasse 41 Munich 80335 Deu

MONDAY | 3 APRIL

TIMING	PARTICULARS
7:30am	Travel to factory
8.00 – 10.00am	TOUR| Siemens Locomotive Factory Munich
10:00am – 11.00am	BRIEFING| Siemens Locomotive Factory Munich
11:00am	Travel to Munich Hauptbahnhof train station
11:51am – 12.54pm	TRAIN | ICE 628 (Sprinter) Munich to Nuremberg
1.00pm	Travel to factory
1:30pm	TOUR| Siemens Traction Components Factory Nuremberg
3:00pm	BRIEFING | Siemens
4.15 – 4.30pm	Travel to Nuremberg Hauptbahnhof Train Station
4.36 – 4.49pm	Train to Nuremberg airport
7:05pm – 8:00pm	FLIGHT | Swiss LX1193 Nuremberg to Zurich
8:55pm – 9.45pm	FLIGHT | Swiss LX0340 Zurich to London
10.15pm	Travel Airport to accommodation
	ACCOMMODATION | Royal Lancaster London Lancaster Terrace, London W2 2TY

TUESDAY | 4 APRIL

TIMING	PARTICULARS
10:30am	TOUR | Paddington Station – Cross Rail Project
11:00am	TOUR | Central Operating Section | Train ride through the Central Operating Section to Romford
11:45am	TOUR | Romford Control Centre
12:15pm	BRIEFING | Cross Rail operations
12:45pm	Train to central London via Elizabeth Line
1:30pm	TOUR | Whitechapel Station
2:00pm	LUNCH & MEETING | Cross Rail Project
	ACCOMMODATION | Royal Lancaster London Lancaster Terrace, London W2 2TY

WEDNESDAY | 5 APRIL

TIMING	PARTICULARS
5:04am	Travel to London St Pancras Station
6.16am – 10.32am	TRAIN | Eurostar London to Rotterdam | London St Pancras to Rotterdam Centraal Station
11:00am – 12.00pm	TOUR & BRIEFING | Netherlands Railway - Rotterdam Central Railway Station
12:30pm	Travel Metrostation Stadhuis Tram station to World Port Center
1:00pm	BRIEFING| Rotterdam Port
2:30pm	Travel by water taxi to Rotterdam Port Innovation Campus RDM
3:00pm	TOUR | Rotterdam Port Innovation Campus RDM
4:30pm	Travel by water taxi to Rotterdam World Port Centre
	ACCOMMODATION | Hilton Rotterdam, Weena 10, Rotterdam 3012 CM

THURSDAY | 6 APRIL

TIMING	PARTICULARS
7:05am – 7.47am	Travel Rotterdam Centraal railway station to Utrecht Centraal railway station
7:50am – 8:15am	TOUR | Utrecht Centraal railway station
8:30am	MEETING | Dutch Cycling Embassy | Nicolaas Beetsstraat 2A, 3511 HE Utrecht, The Netherlands
9:30am	TOUR | Utrecht active & public transport with Dutch Cycling Ambassador
12:15pm	Travel Utrecht Centraal railway station to Amsterdam Schiphol Airport
2:25pm – 4.35pm	FLIGHT | KLM KL1603 Amsterdam to Rome (Fiumicino)\
5:30pm	Travel Airport to Roma Termini
7:30pm	MEETING & DINNER | Hitachi Senior Executives
	ACCOMMODATION | Leonardo Boutique Hotel Rome Termini, Via Marghera 47/a Rome 00185

FRIDAY | 7 APRIL

TIMING	PARTICULARS
9:00am	Roma Termini station
9:25am	TOUR | Train – Rome to Milan on ETCS fitted train
12:30pm	Travel from Centrale railway station to Milano Greco
1:00pm	TOUR | Milano Greco Pirelli railway station
1:30pm – 2:30pm	MEETING & LUNCH | Hitachi
6:00pm	Travel Milano Centrale to Milan Malpensa Airport T1
10:20pm – 6:25am Sat	FLIGHT | QANTAS QF8092 Milan (Malpensa) to Dubai

SATURDAY | 8 APRIL

TIMING	PARTICULARS
10:35am – 6:15am Sun	FLIGHT | QANTAS QF8434 Dubai to Brisbane

MINISTER'S OFFICIAL DELEGATION

The Honourable Mark Bailey MP	Minister for Transport and Main Roads
Alana Tibbitts	Chief of Staff | Office of the Minister for Main Roads
Graeme Newton	Chief Executive Officer | Cross River Rail Delivery Authority
Scott Cornish	Head of Regional | Queensland Rail

BRIEFING & TOURS | SIEMENS LOCOMOTIVE FACTORIES

Date: Monday 3 April | Location: Munich to Nuremberg, Germany

ATTENDEES

MINISTER'S DELEGATION

The Honourable Mark Bailey MP	Minister for Transport and Main Roads
Alana Tibbitts	Chief of Staff | Office of the Minister for Main Roads
Scott Cornish	Head of Regional | Queensland Rail

SIEMENS

Gordon Cumming	Business Development Director Queensland
Dr Lars Lowenstein	VP Technology Locomotives and Power Coaches
Mr. Josef Ebner	Head of Operational Excellence (RS Manufacturing)
Dr Andrea Estrada-Hein	EVP Components
Mr. Daniel Tuschen	Head of RS Components Offer & Bid Management
Mr. Geert Vanbeveren	Business Development Director – SW Portfolio Functions

BACKGROUND

Globally there is a significant focus on reducing the carbon footprint from transport operations. Siemens is a diversified and vertically integrated mobility company that has a focus on providing technical solutions that prioritise sustainability over the entire lifecycle of fleet and infrastructure investment. This approach provides transport operators with a robust baseline of low carbon emission equipment that can be leveraged with enhanced passenger experiences via connected mobility services to increase patronage and remove more individual automobile journeys from the roads.

The focus of the delegations visit to Siemens was gain insight into current best practice locomotive design and manufacture, scalable alternate fuel technology opportunities, and mobility as a service in practical applications.

The briefings and factory tours demonstrated the manufacturing approach taken by Siemens, integration of components, and engagement with staff to attract and retain a skilled workforce. There are several lessons for Queensland to create a sustainable train manufacturing program.

MEETING SUMMARY - ROLLINGSTOCK

The first meeting was at the Siemens locomotive build and assembly plant in Munich. Key points regarding manufacture:

- Siemens engaged with electro mobility since 1879.
- Over 30,000 trains and locomotives in current operation globally
- Running in over 100 countries with 500 customers
- Greater than 1 billion passenger kilometres each day

Siemens manufacture all types of rollingstock from individual locomotives through to passenger consists, high speed to heavy haul. There is acknowledgement from Siemens regarding the desire from communities and rail operators to transition to cleaner fuel types. They currently manufacture vehicles built to utilise any fuel type or combinations of fuel types to suit the railway operator's current requirements, however, have considered the rapid pace of change away from fossil fuels in their design logic. As typical rollingstock service life can be up to 40 years the primary focus for the design is to have consistent train platform and component architecture that enables change over the life of the equipment rather than early retirement of fleet.

The consistent fleet "type" platforms do not seem to inhibit further optimisation with examples of updated aerodynamics included to improve performance and the use of small diesel auxiliaries to conduct movement requirements when the network changes.

Figure 1 demonstrates the current build types for a Mireo commuter train, electric, hydrogen, and an electric/battery combination, all capable of running at 140km/h. The diesel unit is currently the most popular variant and has the lowest capital investment required at purchase. However, using the current cost of electricity in Europe it clearly demonstrates that total cost of ownership of the train over its life is significantly lower for both alternate fuel types. Change of fuel types is scaleable over time and designed to be sequenced to major maintenance intervals.

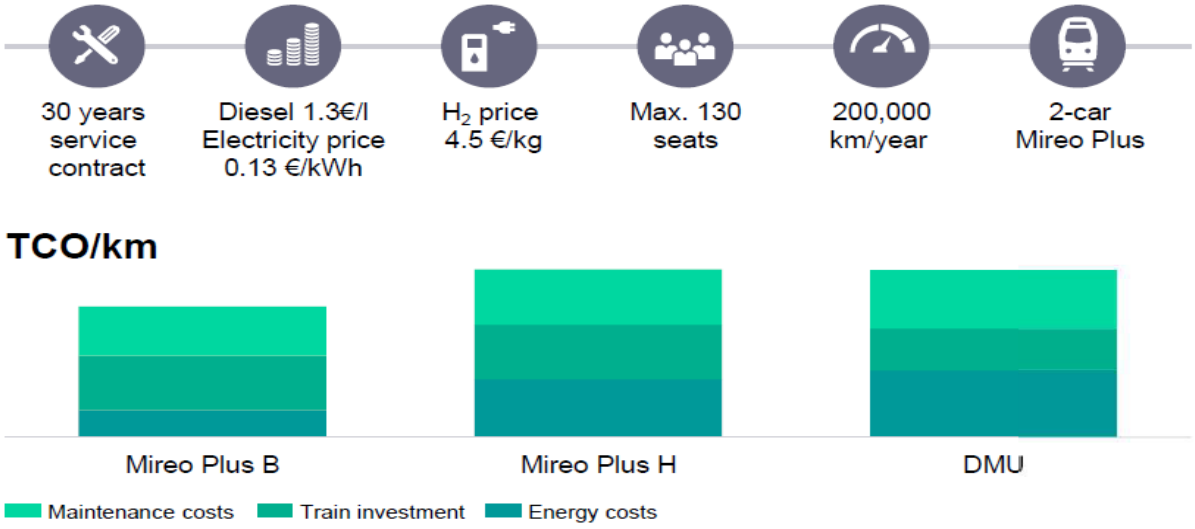

Fig 1 Build vs total cost comparison

The Siemens design philosophy can be integrated into any fleet specification regardless of the manufacturer and is an appropriate model for Queensland Rail to consider when purchasing future fleet.

The manufacturing process was largely non automated due to the intricate nature of component assembly and the number of concurrent activities in the process to optimise output. The locomotive build was conducted entirely at a single site on a 2 shift build cycle with a night shift to optimise the movement logistics and reallocation of components. The workforce had a good balance of diversity and a younger demograph than Australian manufacturing facilities. Siemens indicated that they have no current issues in recruiting and retaining staff for the facility and believe that the company's values in sustainability and the ability to for staff to develop additional skills are the main reasons.

The journey between the Siemens facilities was conducted on the Velaro high speed train that was fitted in a multiclass passenger configuration. The seating configuration was 2+1 on standard gauge track which gave accessible access to most areas of the train. The galley area was not fully accessible which is a similar position to the Queensland Rail long distance rollingstock. One learning that Siemens has deployed on new train builds is to include a starker difference in colour pallet to the corridors of the trains to allow visually impaired passengers better delineation of changes. The train was fitted with several private rooms available for booking and a children's playroom (Fig 2). Overnight and long-distance train journeys are gaining popularity in Europe and Siemens is partnering with operating railways to design accessible and customer friendly cabin options. An example in construction from Austrian railways (Fig 3) was shown where they are building a new class of carriages that will cater for the luxury traveller with a spacious day area that converts to a double bed. In the same carriage there will be smaller bunk beds that maximise space for families and individual travellers.

Fig 2 Children's room

Fig 3 bed options

MEETING SUMMARY - COMPONENTS

Nuremberg Factory Components Tour

The Nuremberg centre is the global headquarters and benchmark factory for all Siemens traction systems. Key points:

- Manufacturing in 10 countries
- 1000 staff locally and over 3000 globally for traction systems.
- Traction covers all components from power supply, motors, and drive to the wheels.

The Nuremburg facility is Siemens centre for engineering excellence and testing for all traction related components globally. The facility also conducts research and development for product improvement and new technology such as battery and hydrogen alternative power sources. The drive components are designed to the same philosophy as the rollingstock with standard offerings that are fully interchangeable into the future.

Siemens has established component manufacturing in different regions such as India, China, and the USA to ensure that the supply chains are close to the end users and that they can develop a global talent pool of employees. The typical approach discussed was for a strong "head office contingent supported by the Nuremburg team at initialisation of an overseas location with a targeted end state of full local employment and leadership. This approach appears to have been utilised and successful in the case study of US and Indian operations and is a model that can be utilised for the Queensland train manufacture.

The factory covers a large geographic area and is divided into a series of campuses for the manufacture and testing of different components. There is also an in-house research and design area equipped with robotics and 3D printing machinery to fast-track internal development. The production itself is like the locomotive manufacturing in that there is very little automation and heavily dependent on skilled workers. In addition to staff development the site also encourages and involves students in the development and innovation process.

The delegation had the opportunity to review all facets of the end-to-end component build process. With the product standardisation all processes were able to be designed very efficiently and integrated with final testing and dispatch. The factory is experiencing the same supply chain pressures experienced globally post COVID and the lack of several low-cost components was hindering the production efficiency. There was no electronic system developed to manage the process however a strong use of visual display boards by the factory workforce created clarity and priority to manage production.

The facility also houses an internal test bed for the final certification of component performance. The simulation program was capable to testing the dynamic output to the product specification in addition to the specific characteristics of a nominated route to demonstrate in operation expected performance. The test facility is also used to measure the output of future fuel uses for railway traction. The delegation observed the output of both battery and hydrogen cells under test and had the opportunity for a close inspection of a hydrogen fuel test rig. The hydrogen test

rig (Fig 4) developed by Siemens is close in design to what Queensland Rail will be conducting research in conjunction with Central Queensland University on the practical application.

Fig 4 H2 cell and cooling fan

BRIEFING SUMMARY – MOBILITY AS A SERVICE

Siemens is a global provider of Mobility as a service (MaaS) system, key points:

- Delivered over 100 systems worldwide.
- 100 million app users per day
- I app has +30 million downloads / +4 Mio. daily requests

MaaS is a service offering that utilises a joint digital channel which enables users to plan, book, and pay for multiple types of mobility services. The platform moves away from individual transport providers and operated modes of transportation to a connected end to end journey with mobility provided as the service.

Travel planning typically begins in a journey planner. For example, a trip planner can show that the user can get from one destination to another by using any combination. The user can make their trip preferences within the system to allow the selection to be made based on their choice of alternatives for travel based on cost, time, and convenience. At that point, any necessary bookings such as calling a taxi, reserving seat on a long-distance train, and bike share to complete the travel would be performed as a unit.

Nearly every European state railway and capital bus operator has a Maas variant of different maturity in use with the main differentiator being the number of other transport offerings included. Figure 5 highlights the penetration and type of services in use.

Nationwide door to door solutions

- Germany – Deutsche Bahn AG
- Switzerland - SBB
- Austria – ÖBB & VAO
- Poland – PKP
- Luxemburg – CFL & CdT
- Denmark – Rejseplanen
- Sweden – Samtrafiken
- Norway – NSB & NRI
- Belgium – SNCB
- Netherlands – NS

Railway solutions

- SNCF, NS, DB
- SBB, ÖBB, PKP, CFL
- SNCB, NSB, Irish Rail
- Eurostar, ADIF, UIC
- Network Rail, UK train operators

Other public transport operators

- USA, Great Britain, Ireland
- Germany, Austria, Switzerland
- Italy, Luxembourg, Denmark
- Norway, Sweden, Finland
- Israel, Colombia

Fig 5 MaaS systems in use

The systems continue to mature and are including many other features such as live tracking and weather conditions. This is especially useful for passengers who have a set route but limited shelter to wait for the service. Push notifications are also used to inform travelers about individual trips and frequent commuters benefit from information about potential problems without the need to actively check the trip planner. With disruption messages edited by users spread all over the network and integrated by the system. Several case studies were demonstrated including Rejseplannen in Denmark as one of the longer use systems that has matured with an outcome of the technical enhancement of the app over the years, the number of mobile trip requests increased to 60% of the overall request numbers.

Renfre in Spain uses a consistent back-end process however the system allows individual operators to have individual customer facing apps for their brand. Further customization can be taken down to an individual level such as the Berlin example (Fig 6) where for children, parents can put all the standard locations such as school, sport, and grandparents into the app. When the child travels the app selects the best method and alerts the parents of the trip and status of phone battery.

Fig 6 Family customisation Berlin

BRIEFING & TOUR | CROSS RAIL – ELIZABETH LINE

Date: Tuesday 4 April | Location: London

ATTENDEES

MINISTER'S DELEGATION

The Honourable Mark Bailey MP	Minister for Transport and Main Roads
Alana Tibbitts	Chief of Staff | Office of the Minister for Main Roads
Graeme Newton	Chief Executive Officer | Cross River Rail Delivery Authority
Scott Cornish	Head of Regional | Queensland Rail

CROSS RAIL

Colin Brown	Ex Cross Rail Integration Director
Howard Smith	Managing Director Elizabeth Line
Danny Fox	Deputy Operations Director Elizabeth Line

BACKGROUND

Crossrail is a railway project that provides an east-west connection between to two existing major railway lines that previously terminated in London. The project was approved in 2007 with construction beginning in 2009. It runs for over 100km and includes 42km of new tunnels under London with passenger services beginning in May 2022 and full capacity planned to be introduced in May 2023.

The project was incredibly complex with the tunnel component built a depth between 25-40m and construction of 20 vertical structures in a congested setting. Three different signalling systems were required to integrated to allow for trains to operate. Significant delays and cost increases were experienced by the project prior to completion. Despite the challenges the Elizabeth line is increased passenger utilisation and carries 10% of London commuters and become the busiest rail line in the United Kingdom.

MEETING SUMMARY

The managing Director of the Elizabeth line lead a tour of the stations, operational control, and connected infrastructure for the delegation. Key points:

- 600,000 passengers on weekdays
- 1 in 6 rail passenger trips in the UK
- Step free access to all stations
- 85,000 workers over the life of the project

The Elizabeth Line consists of 41 stations with 10 of these newly built for the project, with accessibility a main design requirement. The delegation inspected both station types during the visit which provided some comparison to the current Queensland Cross River Rail project. The new stations have been built to integrate into the character of the existing surrounds and each have a different character. All the new stations have direct step free access and in one location due to capacity constraints that had to be accomplished by building a funicular (Fig 7).

At a platform level underground, they have a common design incorporating seating, signage, level boarding, and full height platform screen doors (Fig 8). The design seems simple and creates a feeling of spaciousness even during peak periods. The customer information displays are easily visible and available at all sections of the station to provide accurate information to customers. The platform screen doors operated effectively and observations during the visit and again at peak times demonstrated that the public was comfortable and used to the operation with minimal issues occurring for the operation. Accessible boarding is capable at all train carriages however signs noting that disembarkation at the legacy surface stations may not be fully independent are displayed at the platform screen door.

A number of key focuses for the commissioning team were shared:

- Entry/Egress around the stations and trains
- Interaction and movement around the platform screen doors
- Emergency response and connection with other external agencies
- Evacuation of the facilities and trains in tunnels

Members of the public were enrolled to support these operations.

The inspection moved to the legacy above ground stations that comprise ¾ of the network. Upgrades have been made to all including the addition of lifts, platform lengthening, and refurbishment of facilities. These upgrades extended to areas outside the stations to enable the facilities to be used effectively as a transport interchange as a component of the passenger journey. At several stations, it was not possible to provide level boarding to the trains and these stations are always staffed the trains are operating to support customers that require assistance by deploying boarding ramps. This is like the current Queensland Rail operating model for NGR rains. The stations have hearing induction loops at platforms and the passenger information displays repeat key announcements in text format.

Fig 7 – Funicular lift

Fig 8 – Platform Screen Doors

The central control centre is located at Romford adjacent the station and is co located with a Network Rail control centre. The control team operate the system in a similar manner to the Queensland Rail centre with the key difference of interface with Network Rail for the outer network linkages and the train staffing which is operated by a third-party concession holder. This adds to the complexity of managing altered running however appeared to be integrated and running efficiently. The signalling system manages the different component systems and is sized so that it has the potential future capacity of up to 30 trains per hour. A feature of the new track section was the addition of a turning loop built as a component of the upgrade to enable train positing that is efficient and allows for the schedule to be maintained at peak services. The train repositioning is designed as a driverless operation to allow the driver to reposition and refresh prior to continuation of passenger services. This feature was being tested during the site tour as the final step prior to in field use.

Cross Rail is fully fenced for the inner-city section however they still have a significant self-harm issue on external networks and at the Elizabeth line stations. This is more prevalent where express trains are running through stations and one method used to minimise was demonstrated. At the Romford station express trains are routed through a consistent line with access to the platform restricted until just prior to a stopping passenger train at the platform. This has been implemented by having a single gate entry point (Fig 9) which works operationally to allow boarding to meet timetable and has resulted in no self-harm incidents since installation.

Fig 9 – Access gate and platform fencing

The project procured 70 new rollingstock to operate services on the Elizabeth line. These operate in a 9 car consist and can carry up to 1500 passengers. Wheelchair and mobility is provided via dedicated spaces in the centre car (5) with multiuse spaces that can also be used for buggies and luggage in the other cars. To enable efficient boarding/exit the trains have three sets of double doors per carriage. Wi-Fi is available on all trains and platforms in addition to audio and visual information in each carriage.

BRIEFING & TOUR | ROTTERDAM CENTRAAL RAILWAY STATION

Date: Wednesday 5 April | Location: Rotterdam

ATTENDEES

MINISTER'S DELEGATION

The Honourable Mark Bailey MP	Minister for Transport and Main Roads
Alana Tibbitts	Chief of Staff | Office of the Minister for Main Roads

NEDERLANDSE SPOORWEGEN (DUTCH NATIONAL RAILWAY COMPANY)

Mirjam Schokker	Manager Stations | Utrecht Centraal en Rotterdam Centraal
Peter de Jong	Assistant Station Manager | Rotterdam Centraal

BACKGROUND

Rotterdam Centraal Railway Station has 110,000 passengers pass through its doors every day, to use a bus, tram, metro, or train service. Following extensive renovations, Rotterdam Centraal reopened fully in 2014 with a big list of improvements directed to sustainability and customer experience. The number of platforms was increased to 13, and a new bicycle parking facility was opened.

MEETING SUMMARY

The new Rotterdam Centraal was designed so that the entire station would be under one roof. This has resulted in a spacious, modern look, with easily navigable access to platforms and facilities. The main southern entrance has a large pedestrian square, with the tram connection point outside along the side. Once entering the station, it is possible to see the whole station from end to end (Fig. 10). Escalators and elevators lead up to each platform (Fig. 11), so the view of the station, and where a commuter would find their platform, is not obscured by trains sitting at the station.

Fig. 10 – view from station entrance

Fig. 11 – Escalators/elevator up to platform above

Along with a modern and international architectural design of steel and glass, solar panels partly cover the roof, with a high level of transparency (Fig. 12). This allows for light to still pass and not dim the natural lighting in the station itself. 130,000 solar cells covering an area of 10,000m^2 puts it among the largest rooftop solar projects in Europe and represents an 8% reduction in the station's CO2 emissions.

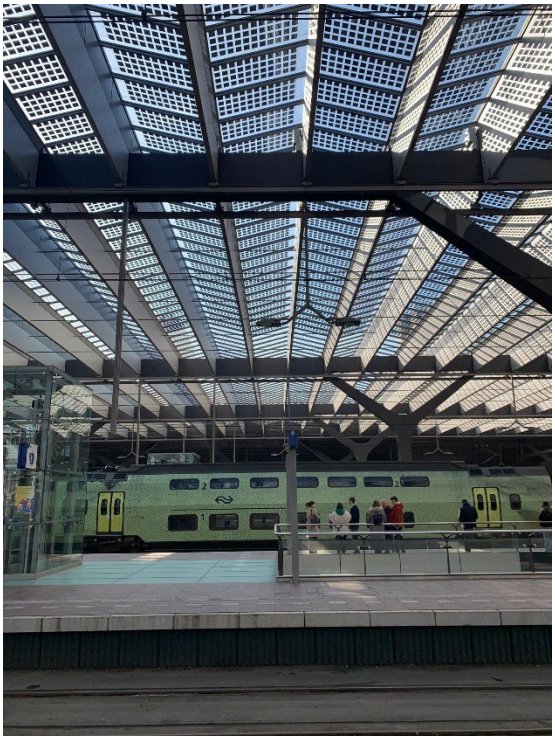

Fig. 12 – View of the platform with semi-transparent solar panels forming the glass roof.

There is a direct escalator connection to the station and the underground bike park (fig. 13), leading to double set of vertical racks (fig. 14). The racks use gas springs to aid in lifting the bicycle to the upper level. The parking area has a capacity of 5,190 bikes. Each walkway is numbered, and the floors are colour coded to make it easier to find your bike. 7The yellow bikes in the lower left corner of fig. 14 show the OV-fiet bikes, which can be rented with a tap of their Go Card equivalent.

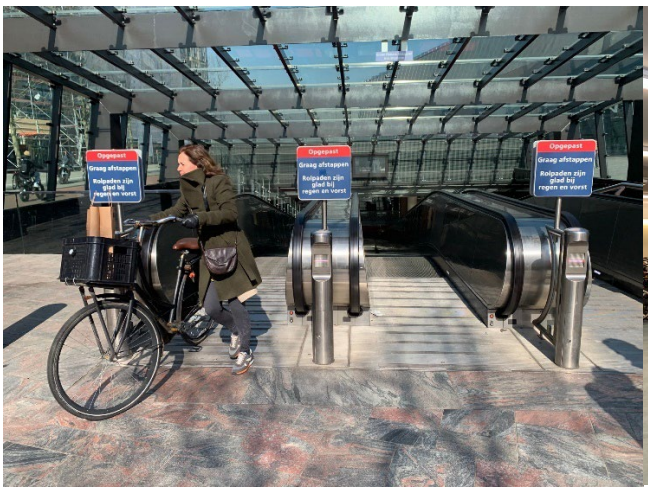

Fig. 13 – bicycle parking connection

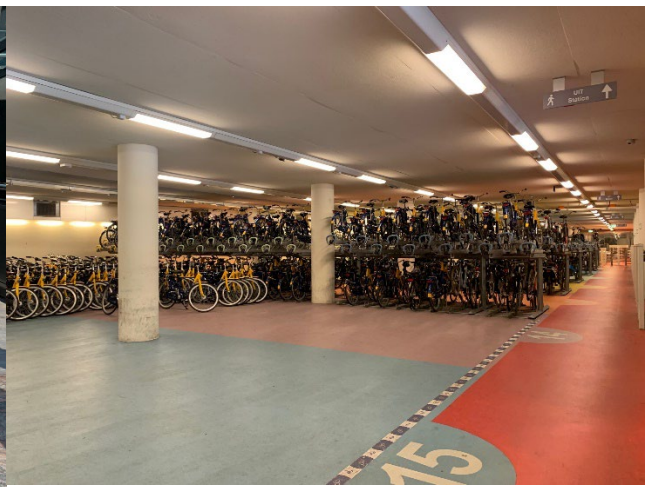

Fig. 14 – Bicycle parking centre

BRIEFING & TOUR | ROTTERDAM PORT

Date: Wednesday 5 April | Location: Rotterdam

ATTENDEES

MINISTER'S DELEGATION

The Honourable Mark Bailey MP	Minister for Transport and Main Roads
Alana Tibbitts	Chief of Staff | Office of the Minister for Main Roads

ROTTERDAM PORT

René van der Plas	Director International, Port of Rotterdam
Corné Hulst	Commercial Manager International
Huibert van Rossum	Program Manager Energy Transition External Affairs

BACKGROUND

Port of Rotterdam Authority

The Port of Rotterdam is the largest port in Europe at 42 km along its length. Its proximity to the North Sea and the complex river system it was built against, right at the mouth of the river Rhine, provides ultimate accessibility as the prime connector in Europe. It has an annual turnover of approximately €825 million (1.3 billion AUD). The main streams of revenue are rental income and port dues, leasing sites to storage companies and petrochemical industries. The Port of Rotterdam Authority, with 1,300 employees, is committed to its core ambitions of sustainable development and maintaining safe and smooth handling of shipping. It has committed to 49% CO2 emissions reduction by 2030, and carbon neutral by 2050.

MEETING SUMMARY

A briefing was provided on the Port of Rotterdam's energy transition, based on 4 pillars, to achieve its aims of being the world's smartest, cleanest port.

Pillar 1: Efficiency and infrastructure – this involves using industry to innovate, using residual heat for homes and offices, and capturing carbon under the North Sea. These projects will involve huge amounts of infrastructure to be developed.

Pillar 2: A new energy system – this involves moving from oil and gas for auxiliary power, to electricity and hydrogen produced by solar and wind.

Pillar 3: A new raw materials and fuel system – this involves the transition of energy for transport, away from oil, gas and coal.

Pillar 4: Sustainable transport – this final pillar is for achieving sustainable transport of freight to, in, and from the port. One of the one of the most appealing and feasible options deployable in the short term is their shore-based power system.

Shore Power

One key initiative for sustainable development and management by the Port Authority is shore-based power. Vessels moored at other ports still use their – predominantly diesel based – generators for their energy needs. For the largest port in Europe, this translates to 600,000 tons of CO2 and 8,000 tons of nitrogen emitted in the port. As such, the Port Authority are developing their shore power, where moored ships can plug directly into the port, allowing vessels to shut down their onboard generators.

Once fully rolled out by 2030, 90% of ship visits in the urban quays and 50% of the largest container vessels will be supplied with shore power, resulting in in major carbon reductions, reduced noise in the area, and reduced air pollution.

Innovation Campus RDM

To drive innovation in the Rotterdam Port, a former set of drydocks has been retrofitted for a new life in innovation. Formally the site of the Rotterdamsche Droogdok Maatschappij, "RDM" has taken on the new meaning of Research, Design and Manufacturing. The buildings were retrofitted in the mid-2000s as a collaborative effort with Rotterdam University, the vocational school Albeda College and the Port Authority (fig. 15). The former head office of the RDM drydock is now home to offices, educational facilities, studios, conference rooms, as well as a restaurant.

The area is split for students and businesses, and both work together to research transport industry solutions. About 20 businesses work with students simultaneously on a range of innovations. Once a concept is market- and production ready, the company must leave the campus or start a new project.

Fig. 15 – Inside views of the Innovation Campus

The tour afforded a view of a number of innovations being worked on in the transport sector. Fig. 16 shows a training vessel used by maritime students of the STC Group. The ship is used for training students wanting to join the maritime industry, but also doubles as a lab for testing new concepts. The ship had previously been equipped with solar panels for partial energy generation, but it had also only recently been installed with a 50kW hydrogen fuel system.

Fig. 16 – The STC Group's Ab Initio *vessel*

TOUR | UTRECHT CENTRAAL RAILWAY STATION

Date: Thursday 6 April | Location: Utrecht

ATTENDEES

MINISTER'S DELEGATION

The Honourable Mark Bailey MP	Minister for Transport and Main Roads
Alana Tibbitts	Chief of Staff | Office of the Minister for Main Roads
Scott Cornish	Head of Regional | Queensland Rail

NEDERLANDSE SPOORWEGEN (DUTCH NATIONAL RAILWAY COMPANY)

Mirjam Schokker	Manager Stations | Utrecht Centraal en Rotterdam Centraal

BACKGROUND

Utrecht Centraal is the busiest train station in the Netherlands, with over 200,000 daily passengers. It is also home to the world's largest bicycle parking station, opened in 2019. It is also the site of the largest bus station in the Netherlands and has two connecting tram stops. It has undergone several renovations over the past 10 years to accommodate growing demand for services, and to solve bicycle storage needs for commuters.

MEETING SUMMARY

Mirjam Schokker, station manager for Utrecht Centraal as well as Rotterdam Centraal, provided a tour of the station's bicycle parking hub. Built underground, the park is three storeys high and holds 12,500 bicycles. It connects to a pedestrianised commercial area along the bounds of Utrecht Centraal (fig. 17). The park also makes use of the double racks for bikes. A one-way path for cyclists connects the two entrances, and there is a digital system that guides cyclists to available spaces (fig. 18 and 19). There is a service point for repairs, maintenance, parts, and accessories (fig. 20). Parking is free for the first 24 hours, meaning that the daily cycle for commuters is without cost. Once commuters disembark at the next station, they can use their chip card to rent a bike for the final leg of their journey.

Fig. 17 – Parking entrance at commercial hub

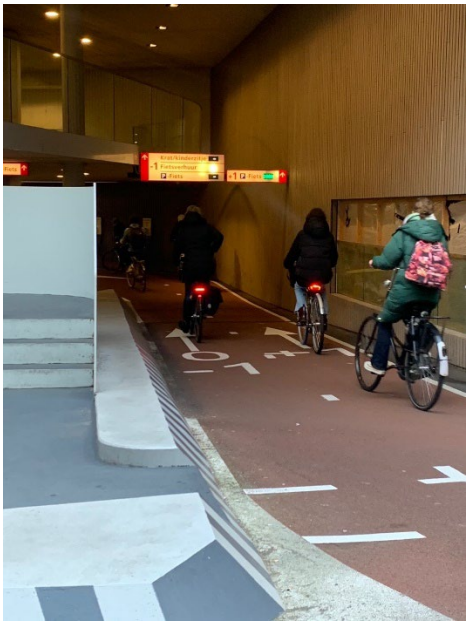

Fig. 18 – cycling entrance showing hire bikes available

Fig. 19 – signage of available parks

Fig. 20 – service point

BRIEFING & TOUR | DUTCH CYCLING EMBASSY

Date: Thursday 6 April | Location: Utrecht

ATTENDEES

MINISTER'S DELEGATION

The Honourable Mark Bailey MP	Minister for Transport and Main Roads
Alana Tibbitts	Chief of Staff | Office of the Minister for Main Roads
Scott Cornish	Head of Regional | Queensland Rail

DUTCH CYCLING EMBASSY

Lucas Harms PhD	Director | Dutch Cycling Embassy
Chris Bruntlett	Marketing & Communication Manager | Dutch Cycling Embassy
Mark Wagenbuur	Dutch Cycling Ambassador

BACKGROUND

The Dutch Cycling Embassy is based in Utrecht and is a knowledge base that acts as an intermediary to provide expertise and learnings form the Dutch experience to interested parties. It is funded by the Government and 100 partner companies and connected organisations. The organisation promotes sustainable bicycle use that is inclusive of mobility.

MEETING SUMMARY

The visit began on arrival at Utrecht station which is the central hub of the Dutch railway network. The railway station has been redeveloped and is an integrated transit hub that connects bus, tram, railway, and bicycle commuters. The station houses the largest bicycle parking station in the world with three levels and capacity for 50,000 bikes. Key points:

- Modal transport split, 1/3 car, 1/3public transport, 1/3 bicycle.
- 37,000 km segregated cycle path in the Netherlands, 25,000 km of cycle paths installed in the last 25 years.
- 23 million bikes for 17 million population
- 5 billion bike trips per year

Cycling as a transport option has been increasing in the Netherlands since the mid 1970's where the twin effects of the OPEC oil embargo and a high road death toll galvanised public opinion and action. The Dutch began the transition to a more sustainable, equitable, and efficient traffic design. A key design consideration was the understanding of the integration of cycling and vehicles to destinations to create the best mobility outcome for the public. This approach led to the development of the Delft plan that creates a blueprint approach to design within a city. Roads within the Dutch cities are developed in a hierarchy that differentiates local and through traffic removing vehicles from economic and residential areas. In Utrecht the network follows this model connecting all areas in and around the city with an emphasis of the railway station as a central hub (Fig 21). NS the Dutch railway operator has made substantial investment in bike parking, service, and bike rental. This has been a deliberate strategy to provide seamless door to door mobility for the customer and has led to an increase in patronage with 50% of train trips utilising bicycles for the start/end of journey.

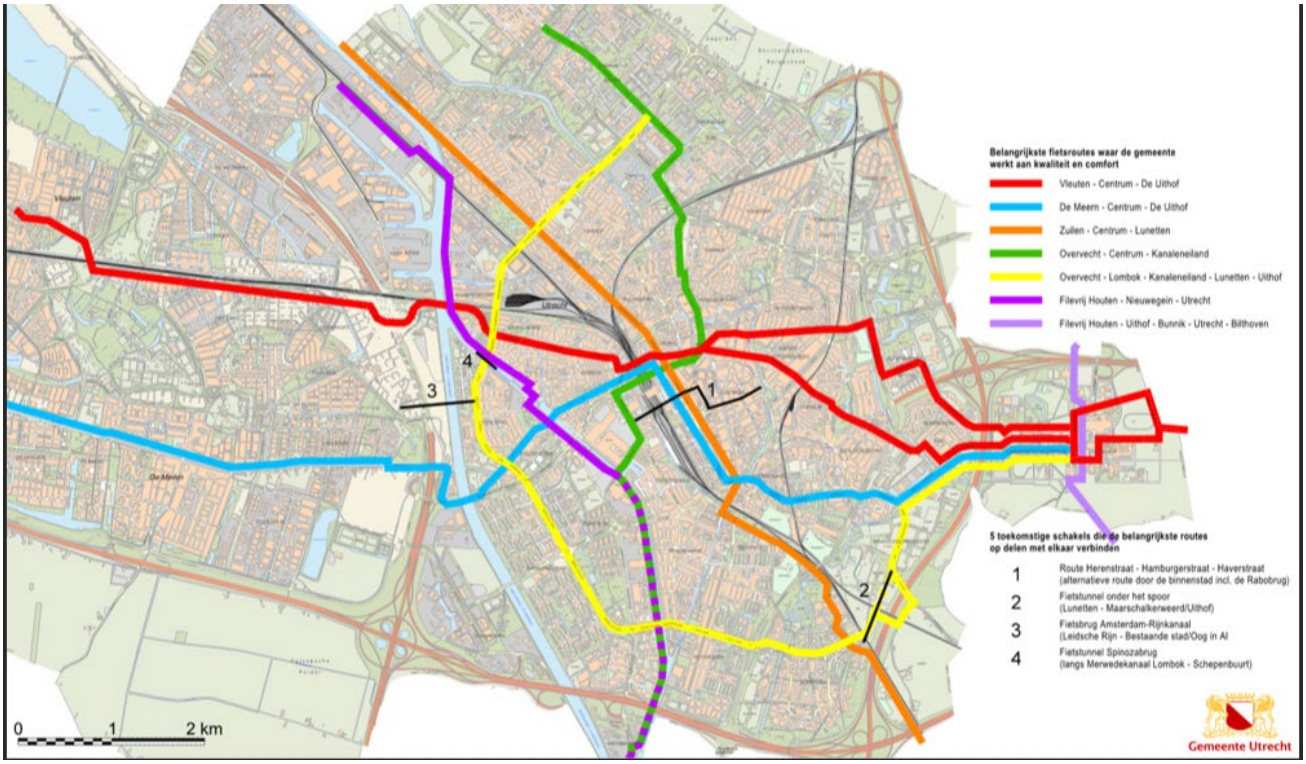

Fig. 21 – Utrecht cycle path map

The traffic management infrastructure is designed to provide separation between modes where practical via dedicated cycle lanes and by using other physical methods such as road narrowing, textures, and chicanes (Fig 22). A number of roads have cyclists as the priority with cars required to give way in all circumstances. The improvements to the safety of the cycle framework have seen an improvement in deaths within the Netherlands which are the lowest in the world. The use of cycle as a transport option is high among the population which supports a lower mortality rate at a population level and Dutch children being ranked regularly as the happiest in the world. The approach to modal traffic design has also had a positive effect on drivers with the Netherlands named as the best place to be a driver in the World. There has also been a change to the Utrecht cityscape and a re gentrification with several roads removed and restored to their original use. One example is a canal that was converted to a highway and now has been changed back to the original waterway.

Fig. 22 – Priority cycle use sign and bike separation

BRIEFING & TOUR | HITACHI

Date: Thursday 6 - Friday 7 April | Location: Rome to Milan, Italy

ATTENDEES

MINISTER'S DELEGATION

The Honourable Mark Bailey MP	Minister for Transport and Main Roads
Alana Tibbitts	Chief of Staff | Office of the Minister for Main Roads
Graeme Newton	Chief Executive Officer | Cross River Rail Delivery Authority
Scott Cornish	Head of Regional | Queensland Rail

HITACHI RAIL

Giuseppe Marino	Group CEO
Andi Christian	Head of Rail Control
Michele Fracchiolla	Executive Officer Sales and Projects, Europe, UK, Middle East, Africa, Australia
Stanislao Borriello	Head of Wayside Applications and Competence Centre Italy
Domenico Reale	Head of on Board Delivery Signalling

FERROVIE DELLO STATO (FS)

Francesca Bartoli	Head of International Integration and Relations
Peter Meleka	International and Institutional Affairs

BACKGROUND

The Cross River Rail (CRR) project is Queensland's largest infrastructure project and will transform the way Queensland's rail network operates and how customers will travel.

The project will also introduce a range of innovations that have never been delivered in Queensland before, including a new signalling system – the European Train Control System (ETCS) – which is being delivered under an alliance model by Hitachi Rail together with Queensland Rail (QR) and the Cross River Rail Delivery Authority.

ETCS is a well-proven, advanced signalling system, already operating in cities around the world, that relays continuous information between the train and central Rail Management Centre via a radio system, trackside technology and onboard equipment. This information reports the position, direction and speed of each train and enables the system to calculate safe, maximum running speeds.

On 31 October 2019, the contract to deliver ETCS was awarded to Hitachi STS for its Australian workforce to provide specialised installation, integration, and ongoing maintenance services for ETCS.

Following an independent review of the progress of the ETCS program, the scope of the ETCS project was reset and, the Sequence Alliance was established between QR, Hitachi STS and the Delivery Authority on 31 January 2022.

Hitachi Rail

Hitachi is a global engineering company which has been an active participant in the Australian rail industry for more than 40 years.

Hitachi has provided traction, electrical and tilt train systems for Rockhampton and Cairns Tilt Trains for Queensland Rail and provides ongoing service and support.

Hitachi has a current rail signalling business in Western Australia across multiple mining sites and has had some involvement in the metropolitan Perth signalling works.

Ferrovie dello Stato Italiene (FS)

The FS Group includes:

1. Infrastructure - design, construction, operation and maintenance of domestic and international rail, road and motorway transport infrastructure networks
2. Passenger - supervision of domestic and international passenger transport sector
3. Logistics - supervision of the domestic and international logistics and freight transport sector
4. Urban - real estate and urban redevelopment, as well as intermodal and logistics solutions in urban area

Trenitalia, a subsidiary of FS, is the primary train operator in Italy. Trenitalia was established in 2000 following a European Union directive on the deregulation of rail transport.

MEETING SUMMARY

The meetings and site visits with Hitachi Rail (ETCS contractor) and FS (the rail operator) provided the opportunity to experience firsthand the ETCS technology in operation and to reinforce the delivery requirements of ETCS in Queensland through meetings with Hitachi senior executives. It was also an opportunity to elicit Hitachi's renewed commitment to the CRR project for priority resourcing in Queensland.

A series of meetings with senior executives and the CEO of Hitachi Rail were held to discuss Hitachi's commitment in South East Queensland and the requirement for resource allocation to support the successful implementation of ETCS on Cross River Rail. This meeting successfully elicited an acknowledgment and renewed commitment from Hitachi to the successful delivery of ETCS in Queensland.

The incoming CEO, Guiseppe Marino, reinforced the need for a strong commitment by Hitachi on the East Coast of Australia and the allocation of resources to support this commitment.

Fig 23 – High speed train at Milan station

On 7 April, the delegation travelled over 470 kilometres from Rome Termini to Milan Centrale on a Freece fast train (Fig 23), which is an ETCS-enabled train. The FS Group has some of the world's most advanced safety systems, and, according to a study by the International Union of Railways, FS Italiane is now the safest in Europe, with the lowest accident rate in Europe and one of the lowest in the world.

The trip on the Freece train from Rome to Milan provided an opportunity to view the technology that will be used on Cross River Rail in situ.

During the commute the delegation inspected the driver cabin and witnessed the train successfully and safely transition at high-speed (300 kilometres per hour) from conventional signalling to ETCS Level 2 live operations. This included various interfaces between balises, trackside technology, the Operations Control Centre and the train driver, guard and other train crew.

Upon arrival in Milan, the delegation travelled from Milan Centrale train station to the Operations Control Centre to discuss the project impacts and lessons learned from the rail operator and customer perspectives.

The Operations Control Centre in Milan coordinates all fast rail across the north of Italy to ensure that rail traffic runs safely across the network. The centre also integrates communications and supervision systems for stations on the network, covering escalators, lifts, lighting, and ventilation as well as traction power supplies.

The computer system allows operator functions to be assigned dynamically depending on the time of day and traffic situation, and operators can monitor traffic flow, surveillance and security systems, passenger communications systems and diagnostic reports in real-time.

Learnings from the visit to the Milan Operations Control Centre will be directly applicable to the Queensland Rail Management Centre (RMC), QR's train control hub, which will be responsible for integrating and managing both conventional signalling and the new ETCS signalling system when Cross River Rail becomes operational.