



# X'TRAPOLIS 2.0 PROJECT

Design Engagement  
Conversation Summary



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# Department of Transport and Planning Chief Accessibility Advocate statement

I have a motto when it comes to accessibility in transport: if we fix it for people with disabilities, we fix it for everyone.

Accessibility has become a hot-button issue in transport, as it should, but that hasn't always been the case. Disability rights advocates have worked tirelessly in Australia and around the world to improve transport accessibility outcomes, and I feel privileged carrying on that work at the Department of Transport and Planning (DTP).

When speaking to those with disabilities about their experiences using public transport, one of the things I always hear is that they don't want to be an afterthought. When we design and build our rolling stock, we need to be building for all Victorians from the beginning.

Co-design is a vital part of that, and the X'Trapolis 2.0 public engagement was an exercise in true co-design for people with disabilities.

We had so many people with such a variety of accessibility needs able to provide input into the design process – from getting on and off the train, to how much room there was under a seat for an assistance animal.

Not all people with disabilities feel or think the same, and I heard first-hand how having the opportunity to provide feedback made those involved feel heard and included.

Seeing some of their feedback included in the final design is a testament to the way the teams at DTP and Alstom, along with our partners, are working together to listen to the community and come up with the best possible product.



## **Tricia Malowney is the Chief Accessibility Advocate to the Department of Transport and Planning.**

Her role is to amplify the voices of people with disabilities and to provide timely advice and support to DTP in relation to accessibility. Tricia has been instrumental in supporting people with disabilities during the development of the X'Trapolis 2.0 train.

# Welcome to the X'Trapolis 2.0

## Modern trains for a modern Melbourne

New Victorian-made X'Trapolis 2.0 trains will provide passengers on the Craigieburn, Upfield and Frankston lines with a more accessible and reliable journey.

We are investing \$986 million in 25 new energy-efficient trains and supporting infrastructure. These state-of-the-art trains, built by manufacturer Alstom, will help to gradually replace our long-serving Comeng fleet, making journeys more reliable, accessible, and safer across the network.

The trains are being built in Ballarat using at least 60 per cent local content, supporting up to 750 jobs across the supply chain.



### Passenger benefits



Space for about 1,225 passengers



Enhanced accessibility, with more mobility spaces, semi-automated boarding ramps, hearing loops and a continuous walkway



Improved reliability and energy efficiency

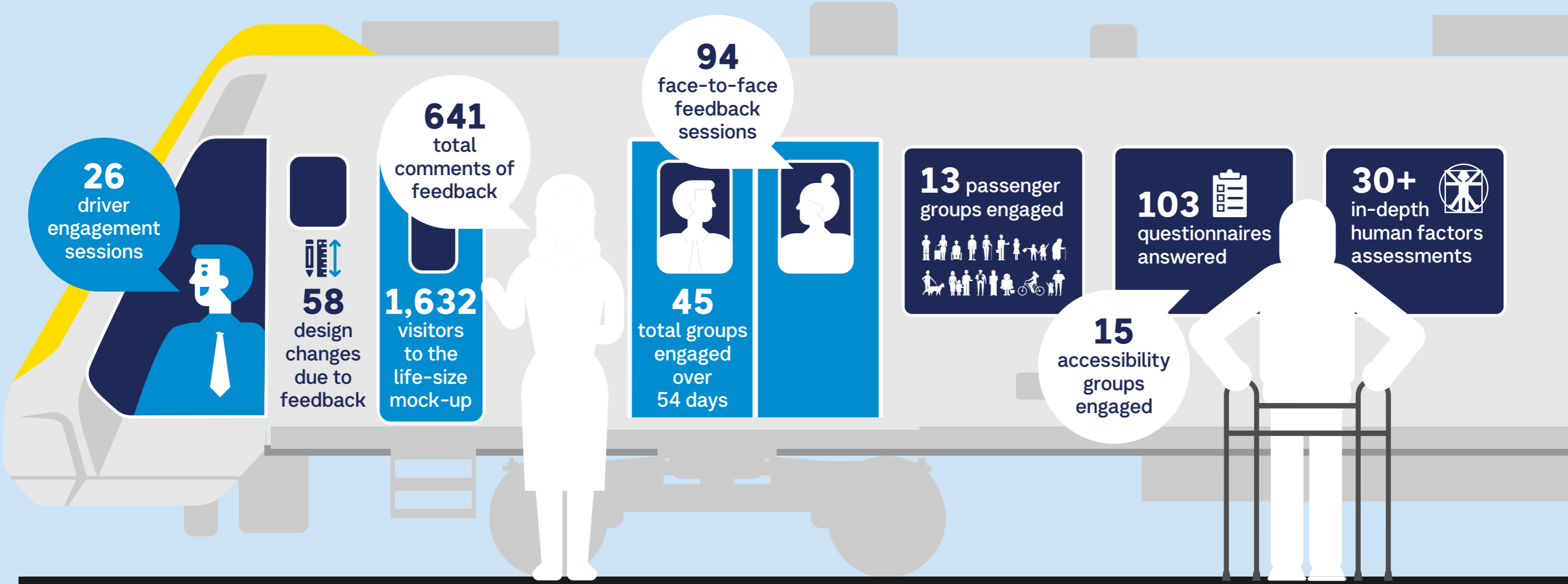


Mixed use spaces and live passenger information for a better travel experience



# Engaging with Victorians

## Engagement snapshot



\*Accurate at time of publication

## Designing Melbourne's newest metropolitan train

To produce the best new train for Melbourne, DTP and Alstom have undertaken an extensive design process.

Alstom's X'Trapolis product family of trains were first built in the late 1990s and have been used on rail networks across the world, including Australia, France, Chile, and South Africa. The X'Trapolis 2.0 builds on this proven platform, and has been customised to meet the unique needs of Melbourne's suburban train network.

This bespoke approach will help ensure these new trains meet our needs, leading to an improved and more reliable passenger service.

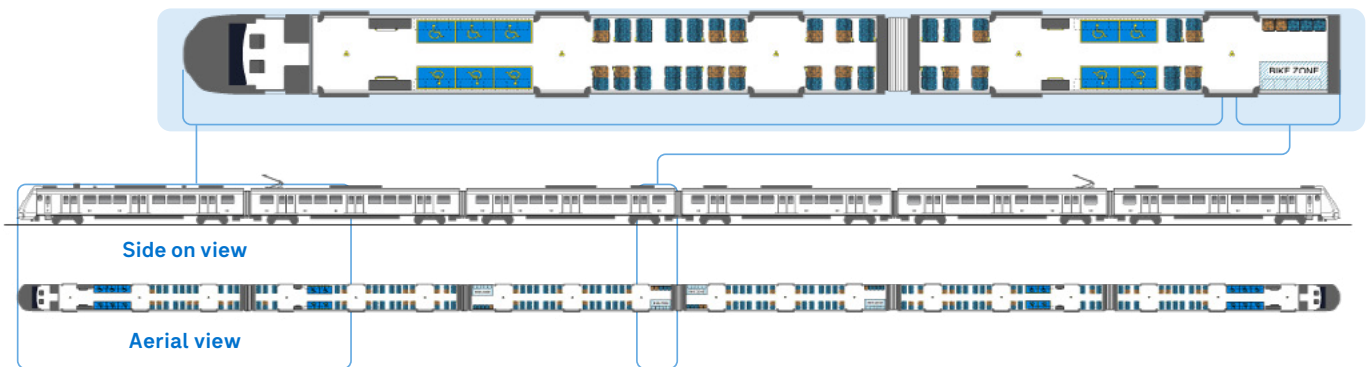


Figure 1: Features of the X'Trapolis 2.0 train design. The bottom diagram shows aerial and side on views of the train design, including all six carriages, while the top diagram shows the schematic for the train mock-up, showing one-and-a-half carriages of the full train.



## Phases of engagement

As part of the design process, DTP and Alstom undertook a four-phase approach to engaging with Victorians between 2022 and 2023 to make sure this train will meet the needs of Melburnians.

During early phases of engagement, we spoke to key accessibility stakeholder groups and specialist Metro Trains Melbourne (MTM) user groups to get feedback on the design. We used 2D and 3D renders of the train, a low-fidelity driver cab mock-up, as well as a 360° virtual reality tour designed by Alstom to give an immersive experience of the train.

Feedback gathered from these sessions was used to inform early design options and the look and feel of the mock-up.



### CONCEPT DESIGN ENGAGEMENT – TRAIN DRIVERS April-May 2022

One-on-one sessions were conducted with the MTM Driver User Group to seek feedback on an early prototype of the driver cab. This mock-up allowed us to test a simple physical version of the design with our drivers before developing a more detailed mock-up cab.

Drivers were able to provide extensive feedback, leading to a number of changes and refinements to the cab.



### CONCEPT DESIGN ENGAGEMENT – ACCESSIBILITY GROUPS August 2022

Online workshops with the Accessible Transport Advisory Committee (ATAC) and MTM Accessibility Reference Group to seek feedback on the train's features using 2D and 3D renders to help refine the proposed train design.

With accessibility as a focus for the train, these workshops used a specially designed 360° virtual walkthrough of the train to get initial feedback on the proposed design and explain what to expect once they were able to experience the real-life mock-up.

These sessions were vital for understanding any obvious accessibility flaws in the proposed design, and for allowing accessibility experts a chance to provide insights early in the design process.



### VIRTUAL REALITY WORKSHOP SESSIONS October 2022

Facilitated sessions with technical, passenger and accessibility stakeholders to give people a first-hand experience of the proposed train design. Virtual reality modelling of the train allowed users to experience a virtual tour of the train design as it was at the time.

Users could test the general design and explore different features of the new train.



### PHYSICAL MOCK-UP ENGAGEMENT SESSIONS May-July 2023

Face-to-face group sessions with stakeholders to get feedback on the life-size mock-up of the train. Visitors were able to experience the X'Trapolis 2.0 mock-up, allowing them to get a feel for the features of the train.

Everything from the actual seats that will be used on the real train, to grab poles, accessibility ramps and electronic displays was available for a truly interactive experience.



## Refining our design

Early engagement with stakeholders allowed us to refine proposed design concepts.

Our online workshops and 360° virtual tours allowed experts and passenger groups to get a feel for the train before manufacturing had begun and helped to identify several accessibility improvements early in the design process.

In May 2023, DTP and Alstom delivered a life-size physical mock-up of the new train as part of the train design process.

The mock-up was one-and-a-half carriages long and reflected the layout of the train at the time, including a driver's cab, seats, mobility spaces, shared use spaces, and an accessibility ramp.

The X'Trapolis 2.0 project team worked with Alstom and partners to host hundreds of stakeholders over an intensive two months of engagement between May and July 2023.

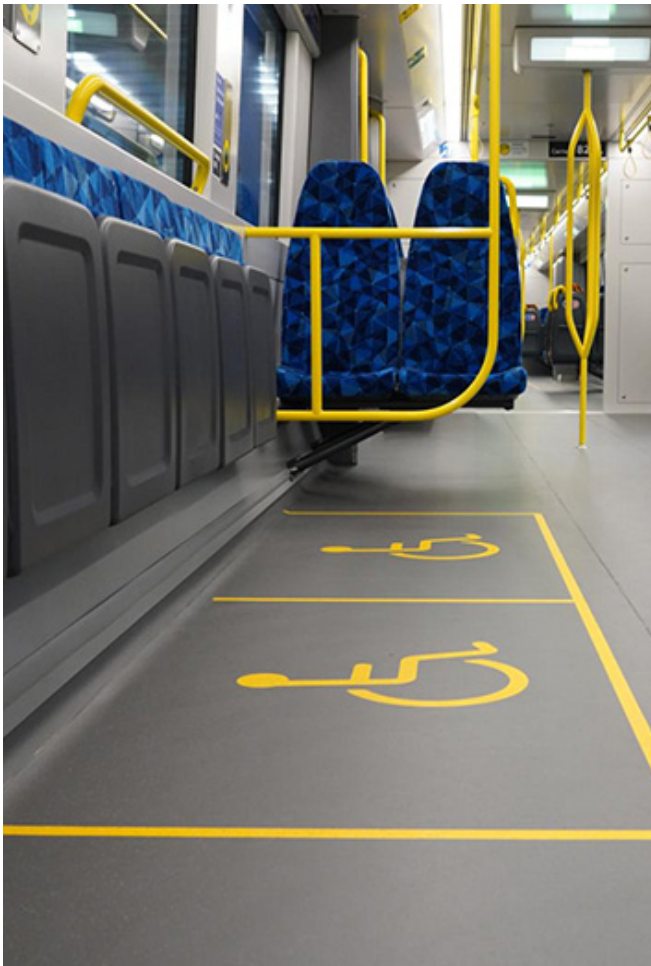
Visitors were able to view and interact with the mock-up, exploring different features of the design and providing their feedback.

Participants were given the opportunity to ask questions of the design teams and to let us know what they liked and didn't like about the train.

Participants also answered a questionnaire at the end of their tour, covering their experience of the mock-up as well as specific questions about how they felt about certain elements of the train.

The sessions had a particular focus on accessibility and driver feedback. Many passenger groups were invited to participate and provide feedback on the proposed design. Feedback was recorded by DTP and Alstom and considered in the final design.

DTP, Alstom and our partners have since held an extensive consultation and review period, making sure we deliver the most comfortable and accessible journeys possible.





# Who we engaged with

We engaged with a wide range of Victorians as part of the stakeholder engagement program.

## Stakeholders



### Passenger and accessibility groups

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All Aboard

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Accessible Transport Advisory Committee (ATAC)

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AMAZE

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Aus Cycling

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Bicycle Network

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Blind Citizens Australia

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Deaf Victoria

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Deafblind Victoria

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Disability Resource Centre

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Guide Dogs Victoria

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Merri-bek Bicycle User Groups

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Merri-bek Multicultural Senior Group

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Metro Trains Accessibility Reference Group

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MSK (MOVE)

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Nightingale Housing

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Parents with prams

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Public transport enthusiasts

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Public Transport Users Association (PTUA)

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Scope

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Spina Bifida Foundation Victoria

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TaPABILITY

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Victorian Advocacy League for Individuals with Disability (VALiD)

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Vision Australia

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Yooralla

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### Technical, operational and safety stakeholders

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Ambulance Victoria

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Fire Rescue Victoria

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Level Crossing Removal Authority

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Melbourne Metropolitan Rail Authority

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Metropolitan Fire Brigade

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Metro Trains Melbourne

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Office of the National Rail Safety Regulator

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Protective Services Officers

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Public Transport Victoria

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Relevant Unions

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VicTrack

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Victoria Police

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Victoria State Emergency Service

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V/Line

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### Councils

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Kingston Council

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Merri-bek Council

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# What we heard

This feedback includes insights from the early engagement sessions, as well as stakeholder groups that were invited to the life-size mock-up.

We wanted to make sure we are making a train that meets the needs of drivers and passengers alike.

By engaging across the breadth of the design process, we have been able to identify issues and improvements through every stage. Drivers were able to provide extensive feedback during the early stages of design consultation, which led to a number of changes and refinements to the cab, such as CCTV and improvements to the ergonomics of the driver's desk.

The online workshops and real-life mock-up sessions allowed experts and every day Victorians to familiarise themselves with the train and suggest improvements to its design.

This valuable feedback was then used to inform the final design of the train.



**“Great session and great to see my feedback being taken seriously.”**

*- Engagement participant*

Participants told us they were excited to experience the X'Trapolis 2.0 mock-up. Overall they were positive about the engagement process and showed curiosity about the train design process. Participants expressed a strong desire to contribute to similar engagements in the future.

Some of the standout features for participants (over 90 per cent positive feedback):

- Amount of space to enter the train and move around.
- Easy access to seats.
- Good lighting.
- Passenger safety functions.
- Information displays.
- Emergency response functions.

Some of the features that participants wanted to see improvements on:

- Wheelchair ramp design.
- High visibility strips around the doors.
- Identification of priority seating.
- Additional hanging straps.
- Space for bike storage, with more straps, brackets or allowance to use wheelchair space when appropriate.
- Positioning of the central grab pole (three-in-one pole).



**“We’ve been hearing from people how much they appreciate being listened to, and it’s been fantastic seeing our team really engage with people’s suggestions to make sure we’re building the best train possible.”**

*- Project Director, Chris Hurley*



# Passenger amenities feedback

## Getting on and off the train

- Participants liked the multiple ramps throughout the carriages of the train.
- Several participants praised the door design and the ease of entering and exiting the train.
- Participants provided feedback on the new semi-automatic ramp feature, which is designed to make getting on and off the train easier for those with accessibility needs. Some found the ramp easy to navigate, while others found it too narrow and steep to accommodate different-sized mobility devices.
- Some participants requested changes to guidance light and tactile marking placements to make doors easier to find, including flashing lights and contrast stickers on the door frames.
- Participants using mobility aids suggested replicating wayfinding signage at the eye level of a wheelchair user on both the outside and inside of the train.



**“The staff were very open-minded and willing to consider our feedback without pushing back on what was possible or needed.”**

*- Engagement participant*



## Moving around inside the train

- Most participants requested more hanging straps throughout the train.
- Some users requested additional handrails and grab poles throughout the carriage.
- Participants rated the ease of movement in and around the train very highly and felt the interior of the train was clean and inviting.
- Some participants requested position changes for grab poles and handholds to make it easier to move through the carriage.
- Emergency services told us that the carriage was spacious enough to manoeuvre a stretcher and access passengers in need.
- Most bike users agreed the train was designed adequately to meet the needs of cyclists.
- Some bike users reflected that one bike strap per bike zone is insufficient, and suggested including more straps on other handrails or the ability to store their bikes vertically.
- Handrails and straps being provided at various heights was well-received for accommodating different heights.
- The fold-up seats were easy to use but many found the seat spacing too tight, particularly on the tip-up seats in the accessibility area.
- Sitting and standing up from the forward-facing seats was done with ease for the majority of participants and the seats provided sufficient support.
- Many participants reported liking the high-backed passenger seats.
- Anti-slip material between carriages could be extended further into the carriage.
- Some guide dog users found the multi-use area allowed more space for their dogs as the space under the passenger seats was too narrow for bigger dogs to lay underneath.

## Communications and passenger experience feedback

- Some participants felt the location of the emergency and communication buttons may be hard to access during peak times as passengers may crowd or block buttons.
- Participants welcomed the help point buttons and some participants suggested there should be text displays to let them know the driver is able to see them and will assist them.
- The height of the help points near the doors could be lowered for people using mobility aids.
- Emergency exit buttons ideally should have braille signs and the exit button should have a raised tactile ring for those with vision impairment.
- Information displays inside the train were easy to locate and read.
- Colour-coding for train lines on digital displays within the train was well received by participants as an improved wayfinding feature.
- The new feature on the information displays that indicates the side of the train the doors will open before arrival was well received.
- It was suggested that the signage on the interior of the train could be matte-finished, as opposed to gloss, to reduce glare from the lights.
- Wi-Fi connection on the trains to help people connect to emergency interpretation apps was discussed as a possibility.
- Participants with prams suggested signage in the mixed-use spaces to indicate where to place prams.



**“Really enjoyed the time and to get to see the train. Questions about the signs and the seats were good.”**

*- Engagement participant*

## Other feedback

Participants also provided feedback about a range of broader network issues.

Although some of this feedback was outside the scope of the X'Trapolis 2.0 train project, we took this feedback on board and have passed it onto the relevant operators and DTP divisions for consideration.



**“So many past consultative events trials and errors have clearly been learnt from, thought about and formed the outcome that we touched and inspected. Thank you for the opportunity.”**

*- Engagement participant*





## Driver features

DTP and Alstom engaged extensively with MTM drivers across all stages of the design process. A Driver User Group was created early on in design development. We tested a low-fidelity mock-up of the driver's cab to get vital input from experienced drivers on the design.

During engagement on the life-size mock-up, drivers from across MTM were engaged across 11 sessions during which 18 in-depth human factors assessments were conducted, allowing drivers to get valuable time in a high-fidelity version of the driver's cab. These sessions were invaluable for finalising the design of the cab, making sure we meet the needs of drivers with an ergonomic, intuitive, and user-friendly driving experience.

### Driver cab feedback

- Exterior cab door handrails need to be lengthened to make it easier and safer for the driver to get in and out of the driver's cab.
- An internal handrail was preferred to make three points of contact to exit the cab.
- Drivers requested more depth on the top and bottom driver step to provide more secure footing when entering and exiting the cab.
- Position changes identified for some driver's desk mounted equipment such as the handheld radio to aid ease-of-movement in the cab.
- Potential glare issue caused by gaps in the door window blinds.



**“After seeing it in person up and close, the photos truly don't capture the true scale and just how exciting the XT2 is! Looking forward to seeing this out on the network in the coming years!”**

*- Train driver*

- Electric footrest preferred to ensure it was easily operable by drivers of all sizes.
- Suggestions to lengthen the levers of frequently accessed controls based on ergonomics assessments.
- The activation angle of the hand pilot valve on the master controller was found to be uncomfortable for most participants.
- Sightline issues were reported due to the reflections from the forward-facing cameras mounted on the driver's desk.



**“It was such a great experience to be involved with the XT2 team and to have an input on the new train, which we will see in the near future. It was a great experience to be a part of the next generation of rolling stock fleet.”**

*- Engagement participant*

# What we changed

Over 58 significant design changes have been implemented from feedback we received during the mock-up engagement.

Some of the major changes for passengers and drivers are:

## For passengers

- We have redesigned the semi-automatic wheelchair ramp to make it easier for wheelchair users to get on and off the train.
- We have optimised the exterior design of the train to reduce the likelihood of train surfing and ensure the safety of our network.
- We lowered the help point buttons next to the train doors to make it easier to call for assistance.



A total of 11 design changes were made to the accessibility ramp based on direct participant feedback.

- We reduced the depth of the wheelchair ramp box to increase aisle width and improve mobility aid manoeuvrability.
- We optimised the placement of handrails and strap hangers to help shorter passengers and wheelchair and mobility aid users stay safe while travelling.
- We installed flashing lights on the doors and additional audio tones to signal opening and closing.
- We added additional yellow contrasting stickers to the external door frame to help blind or low-vision passengers.
- We added additional white photoluminescent strips to the internal door frame to help blind or low-vision passengers exit the train.
- We spaced the tip-up seats further apart to improve comfort for passengers.
- We moved the supporting bracket under the seat to give guide dogs and support animals more room.
- We made all priority seats easily identifiable by adding braille and tactile markings.

## For drivers

- We increased the depth of the top step into the driver's cab to improve safety and ease of access.
- We increased the height of the driver's cab external handrails and added an additional internal cab handrail.
- We repositioned the handheld radio to make it easier to get around the cab.
- We redesigned the semi-automatic boarding ramp by introducing a gas spring, which reduces strain on the driver while deploying and returning the ramp.
- We included an audio alert when help points are pressed to ensure the driver is aware of requests for assistance.
- We changed the driver footrest to electric to improve usability.
- We changed the activation angle of the hand pilot valve to improve ease-of-use.
- We eliminated glare issues for drivers by improving the blind mountings in the cab.
- We eliminated reflection issues by improving the position of the forward-facing cameras.



# Sharing the excitement



The X'Trapolis 2.0 mock-up has gained a lot of attention through mainstream media, social media platforms and blogs.

Both internal and external stakeholders shared photos and videos of the train, and some of these posts have reached over 50k views.

These posts aren't just about the train's new look; they're also shedding light on its many new features, sparking conversations and curiosity among the online community.



“Overall, it looks like a pretty good design. Internally it very much has a similar feel to the High Capacity Metro Train fleet, with the passenger features one would expect in 2023... being able to walk right through the carriages helps make the train feel quite spacious.”

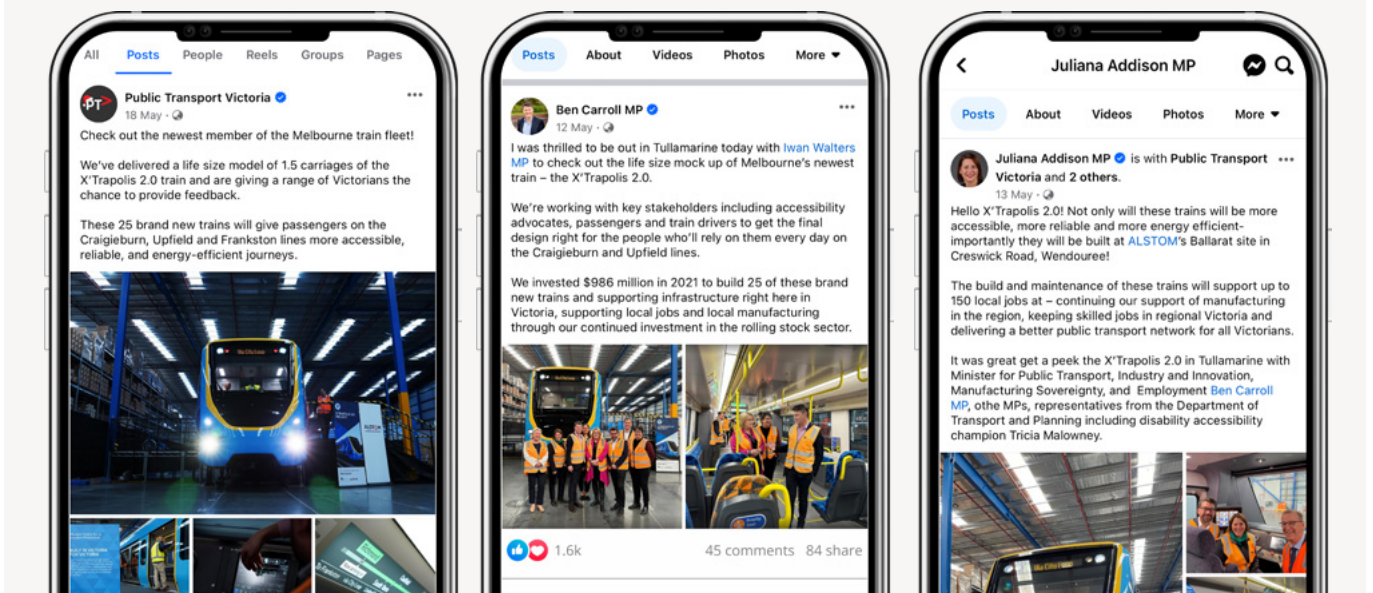
- Train driver



More than **130,000** views of our X'Trapolis 2.0 engagement videos



Nearly **400,000** people reached through our X'Trapolis 2.0 posts



# Next steps

## Built in Victoria for Victorians

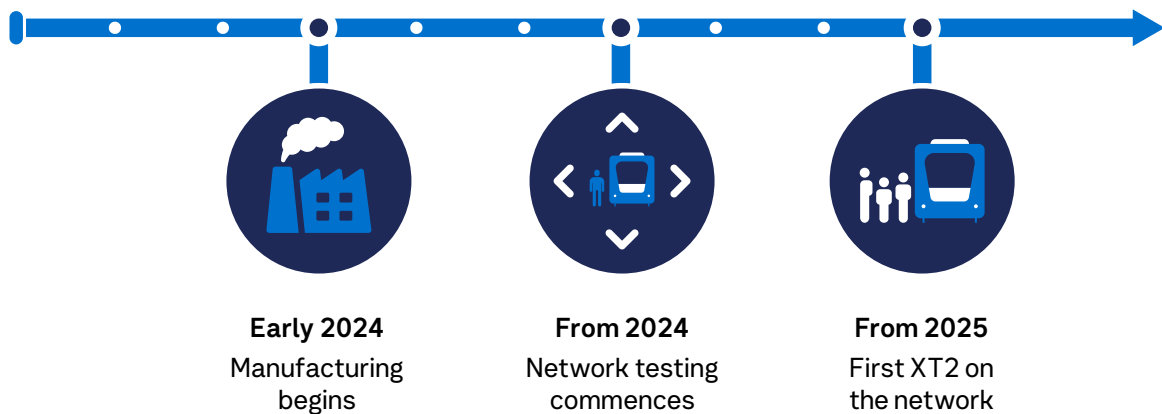
Thanks to everyone who came along to the extensive consultation and review of the X'Trapolis 2.0 design.


Following intensive reviews between DTP, Alstom and MTM, a design for the X'Trapolis 2.0 has been finalised. Manufacturing is set to begin in Ballarat in early 2024, supporting up to 150 jobs in the local area and up to 750 jobs across the local supply chain.

We can expect to see X'Trapolis 2.0 trains testing on the network from 2025. This is a vital piece of the puzzle as we ensure that our trains are running safely and reliably before they start accepting passengers.

The trains will be gradually introduced on the Craigieburn, Upfield and Frankston lines as we retire our long-serving Comeng fleet.

We'll be working with some of our stakeholders to validate our design before we start taking passengers.



 **Find out more**

You can get further information and take a virtual tour of the X'Trapolis 2.0 to familiarise yourself with the design at [X'Trapolis 2.0 - modern trains for a modern Melbourne | Department of Transport and Planning](#)