AUCKLAND EMUs

Technical Summary

Auckland Transport is procuring trains which will include the latest developments in railway technology to provide a reliable, comfortable and energy efficient mode of transport for the Auckland City.

Each train will be formed from three cars, one trailer car in the middle and a powered driving car at each end. This three car unit will operate in service as a single Unit or as two, three car Units coupled together.

Each car will have two doorways on each side, located approximately 1/3 and 2/3 along the length of the car. The doors will be a sliding plug type, proving a good weather and sound proof seal, and will have an open width of 1450mm to make sure that dwell times at stations are kept to a minimum and passengers flow freely onto and off the train. Doors are fitted with obstacle detection and will automatically open and re close if something is trapped in the door.

Each car with have capacity for around 120 passengers. A dedicated space will be identified for wheelchair users, with easy access from the train to the platform. Similarly, space will be provided for bicycles alongside an area designed specifically to suit people with restricted mobility, for example those with small children and push chairs as well as the elderly and the infirm.

The Units will comply with worldwide industry best practice for accessibility. This will include level boarding access on the centre car as well as the use of contrasting colour within the interior, tactile surfaces, audible and visual announcements, hearing loops, priority seating and wheelchair facilities.

The trains will be fitted with a state of the art Passenger Information System which will provide both visual and audible information to passengers. Displays in each car will show the next station and provide information about local events and happenings local to the stations. Audible announcements over the train's Public Address system will provide the same information.

All cars will be fitted with air conditioning to ensure that the train interior is at a comfortable temperature for passengers and crew through the whole range of weather conditions experienced in the Auckland area.

The trains will be manufactured from stainless steel and will meet the latest international standards for crashworthiness and bodyshell design, ensuring that the safety of passengers and crew is a key element in the overall train design. The bodyshell design will be heavily based on the Commonwealth Platform, a range of vehicles designed and built by CAF over the last 15 years.

The trains will be powered by the overhead 25kV supply, through a pantograph on the roof of each train. Each train will be fitted with regenerative braking, allowing energy to be produced by the train and fed back into the 25kV supply when the trains are braking. This provides a considerable improvement to the efficiency of the trains, allowing recovery of up to 20% of the energy used.

The 25kV supply avoids the need for diesel engines, making these trains very quiet both externally and internally. Additionally, the design of the trains will focus on reducing the noise levels External noise levels will be significantly lower than existing trains, a huge benefit for those working or living close to the rail corridors.

The train uses a state of the art propulsion system, using IGBT technology, to control the electric drive motors in the most efficient manner. On board computers control and monitor each of the systems and equipment and will provide real time information to the crew and to the maintenance depot about the status and health of the complete equipment on each train.

Passenger security is a key consideration in the design of the trains. An on-board CCTV system will operate continuously in all cars, providing images to the driver from any of the 16 cameras within a train. The images will be continuously recorded on-board and will be available for investigations following any incidents. Emergency call points are distributed through the train, providing the means for passengers to communicate directly with the train crew in the event of an emergency.

Technical Information

Maximum Acceleration Rate;	1m/s/s
Maximum Braking Rate	1m/s/s
Maximum Operating Speed	110km/hr
Weight of three cars, fully loaded	155tonnes
Overall length, three cars	70m
Power Supply	25kV ac Overhead Supply
Bodyshell material	Stainless steel
Doors	2 doors per side, 1450mm open width

Technical Notes

- Accelerates (and brakes) at 1m/s/s.
    - Twice as fast as the existing trains
    - A third as fast as a Jumbo Jet on full thrust
- 0 to 60km/hr. in 24 seconds compared with nearly 40 seconds for existing trains.
- Maximum Power of 2720kW
    - Existing trains are hauled by locomotives with a power of 1800kW
- Maximum Speed of 110km/hr.
    - The same as most of the existing trains, but with the increased power this speed will be achieved much more frequently
- Capable of 10 minutes faster from Britomart to Papakura than existing trains.
- Two air conditioning units in each car provide twice the air conditioning power of the existing trains
- Each car is three metres longer than the existing cars
- Each car will have 77 seats, compared with 66 seats on the existing cars
- Each three car Unit will have dedicated spaces for wheelchairs and bicycles with priority seating for the elderly and infirm.
- Doorways will be approximately 150mm wider to allow passengers to move freely onto and off the train
- With no diesel engine, the external noise levels will be a small fraction of the existing trains
- Maintenance costs will be half of the cost of the existing vehicles

Peak Capacity

	Current (2011)	Post electrification (2015)
No of carriages:		
SA	81	
SD	23	
ADL	20	8
ADK	18	
EMU	0	171
SX	6	
Total Fleet (carriages)	**148**	**179**