

APPENDIX A: CONCEPT DESIGN STANDARDS

A.1 INTRODUCTION

This chapter summarises the road and rail design standards used for the concept design. As the design requirements for rail require higher standards than for road (eg larger curve radii and flatter grades), the concept design for the transport corridor has been based around the rail requirements. The design standards reflect the need to anticipate future high passenger train speeds and much longer freight train operations.

It is important to note that if a road or rail facility is constructed within the corridor, the actual facility provided may vary in standard from that adopted for this concept design. In particular, an actually constructed corridor may have a different vertical alignment to that assumed in the concept design. This could result in the locations of cuts and fills and the location of overpasses and underpasses varying from those shown in this concept design. Additionally, arterial interchange locations have been allowed for, but it would be a decision for later decision-makers as to whether a particular arterial road interchange would be provided or not.

The concept design for the OMR Transport Corridor is based on the provision of:

- > An 8 lane freeway designed to allow for an expected speed limit of 100km/hr on through carriageways and 80km/h advisory speed limit on freeway to freeway ramp connections;
- > 4 rail tracks, with one pair providing for 130 km/hr freight operation and the other providing for 160 km/hr conventional passenger operation.

The design of the facility is on the basis that the rail line will be in the median of the freeway as far as possible.

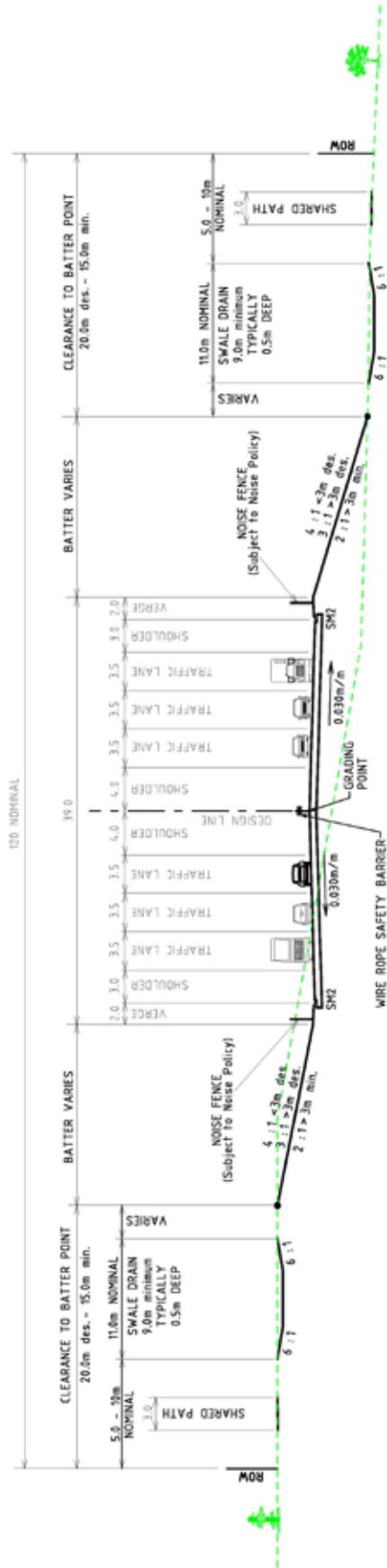
Figure 1 shows details of the elements provided within the cross section.

The design of the E6 and the East-West Deer Park Link Transport Corridor are based on the provision of:

- > A 6 lane freeway designed to allow for an expected speed limit of 100km/hr.

Figure 2 shows details of the elements provided within the cross section.

APPENDIX A: FIGURE 2



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| <p>vic roads</p> | |
| <p>PLANNING INVESTIGATIONS CONCEPT DRAWING For Information and Discussion Only DATE: MAY 2008</p> | <p>OMR/E6 TRANSPORT CORRIDOR E6 / DEER PARK EXTENSION TYPICAL CROSS SECTION</p> |
| <p>SCALE OF METRES HOR 0 4 8 VER 0 4 8</p> | <p>DATE: MAY 2008 PROJ: OMR Transport Corridor (2008) (a) FILE: 015-pid-a-1cs-19.dwg</p> |

A.2 CONCEPT DESIGN STANDARD REFERENCES

The design standards used in the concept design for this transport corridor include, but are not limited to:

A.2.1 RAIL DESIGN

- > National Code of Practice, with specific reference to Sections 5 and 7;
- > AS 5100 - 2004

A.2.2 ROAD DESIGN

- > Road Design Guidelines. VicRoads, with specific reference to Parts 1,2,3,5,7,9,10 & 11;
- > Guide to Traffic Engineering Practice. AustRoads, with specific reference to Parts 1,2,5,6,13, & 14;
- > Bridge Design Code. AustRoads;
- > Other References as listed in Work Instruction PID.DV.02-WI.02 Planning Design.

A.3 ROUTE LENGTHS

A.3.1 RAIL LENGTH

Measured from the Geelong – Melbourne Railway line to the Sydney – Melbourne Railway Line the four track OMR railway line would be 75 km long, with a 3 km long connection to the east from the south to the Ballarat – Melbourne Railway Line.

A.3.2 ROAD LENGTH

Measured from the Princes Freeway West to the Hume Freeway the OMR Freeway would be 67 km long, with an 8.5 km East –West Deer Park Bypass Link. The project would include a future potential connection to Melbourne Airport that would be approximately 7 km long within the study area identified in Appendix B3-3 Links to OMR - OMR/E6 Transport Corridor.

The E6 corridor would commence from the Metropolitan Ring Road in the existing reservation and would be about 20 km long measured from this point to the Hume Freeway.

A.4 CROSS SECTION

The right of way boundary (ROW) for the OMR reservation between interchanges is nominally 240 metres wide. Within this ROW, the transport corridor would have the following features:

A.4.1 OMR RAIL CROSS SECTION

- > A nominal 60 metre wide reservation in the median of the freeway;
- > **Rail tracks.** The railway would consist of four railway tracks with 4.5 metres separation between the centreline of each pair. One pair would be designed for freight and the other for interregional/interstate passenger services. The separation between the pairs of tracks would be 7 metres;
- > **Access track.** Access for maintenance would be provided within a 6 metres wide clear zone either side of the pairs of rail tracks;
- > **Verge.** A 2 metre verge is allowed on the outside of the clear zone to accommodate drainage and geology;
- > **Containment Barrier.** A 3-metre minimum height barrier would be provided between the rail tracks and the freeway;
- > **Batter Slopes.** Batter slopes would vary depending on the ground conditions; Allowance has been made for between 1:1 and 3:1 (horizontal:vertical);
- > **Retaining walls** would be constructed where space is restricted, in order to limit the spread of batters;
- > **Electrification.** Provision would be made for possible future electrification repeater stations in appropriate locations approximately every 8 kilometres.

A.4.2 OMR ROAD CROSS SECTION

- > A nominal 90 metre wide reservation on each side of the rail reservation;
- > **Traffic Lanes.** The road on each side of the rail reservation would consist of up to four 3.5 metre traffic lanes with a 3.5 metre auxiliary lane for merging traffic where appropriate and 3 metre breakdown lanes on both sides of the carriageway;
- > **Median.** A 3-metre verge would be provided within which any barrier protection between the road and rail batters would be placed;

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- > **Batter Slopes.** A 2-metre verge for drainage would be provided on the outside of the breakdown lane followed by sufficient width for batter slopes between 4:1 and 2:1 (horizontal:vertical). Where cut or fill embankments exceed 10 metres in depth or height, a 5 metre wide horizontal bench would be provided at every 10 metre vertical interval;
 - > **Swale drains,** Nominal 15 metre wide drains would be provided to accommodate longitudinal drainage flows in accordance with current environmental guidelines;
 - > **Retaining walls** would be constructed where space is restricted, in order to limit the spread of embankments;
 - > **Noise attenuation.** Where appropriate, and in accordance with VicRoads Noise Policy, noise attenuation fencing or mounding may be provided;
 - > **Bicycles and Pedestrians.** A 3-metre shared path would be provided close to the ROW boundary on both sides of the freeway and linked to the bicycle network and recreational space as appropriate;
 - > **Buses.** Additional space has been provided at the top of interchange ramps for bus stops with DDA compliance. There are sufficient road lanes in the carriageways to provide a dedicated bus lane in the future, if required.

A.4.3 OMR BRIDGES

- > **Rail bridges.** These bridges would be 28 metres wide to allow for the, two sets of rail tracks and an access track on both sides of the bridge.
- > **Road bridges.** These bridges, either side of the rail bridge, would allow for four traffic lanes, an auxillary lane where required, shoulders and a shared footway on the outside. Each bridge would be a maximum of 27 metres wide.
- > The road bridges would be set apart from the rail bridge a maximum of 16.5 metres on each side, maintaining the 60 metres provision for the rail corridor.

A.4.4 E6 CORRIDOR AND EAST-WEST DEER PARK BYPASS LINK ROAD CROSS SECTION

The right of way boundary (ROW) for the E6 and East-West Deer Park Bypass Link reservation between interchanges is nominally 120 metres wide. Within this ROW the corridors would have the following features:

- > **Traffic Lanes.** The road would consist of three 3.5 metre traffic lanes 3 metre breakdown lanes on the outside and 4 metre breakdown lanes on the side median, A wire range barrier would be provided between the widened breakdown lanes;

- > **Median.** A 19 metre median within which any barrier protection could be placed;
- > **Batter Slopes.** A 2 metre verge for drainage would be provided on the outside of the breakdown lane followed by sufficient width for batter slopes between 4:1 and 2:1 (horizontal:vertical). Where the cut or fill embankments exceed 10 metres in depth or height, a 5 metre wide horizontal bench would be provided at every 10 metre vertical interval;
- > **Swale drains,** Nominal 15 metre wide drains would be provided to accommodate longitudinal drainage flows in accordance with current environmental guidelines;
- > **Retaining walls** would be constructed where space is restricted, in order to limit the spread of embankments;
- > **Noise attenuation.** Where appropriate, and in accordance with VicRoads Noise Policy, noise fencing or mounding may be provided;
- > **Bicycles and Pedestrians.** A 3 metre shared path would be provided close to the ROW boundary on both sides of the freeway and linked to the bicycle network and recreational space as appropriate;
- > **Buses.** Additional space has been provided at the top of interchange ramps for bus stops with DDA compliance.

A.4.5 CROSS ROADS

Provision has been made for roads crossing over or under the controlled access transport corridors. The proposed cross sections have been based on the anticipated future need for two, four or six traffic lanes. Any future road widening outside of the OMR/E6 proposal would be the subject of separate studies and would reflect the future development plans within the *Melbourne @ 5 Million* Investigation Areas.

- > Within a road reservation of 30 metres, undivided roads with two traffic lanes would have two 3.5 metre traffic lanes, and could allow for a 2.5 metre bike lane on either side and 2.0 metre footpath;
- > Within a road reservation of 35 metres, undivided roads with four traffic lanes would have four 3.5 metre traffic lanes, and could allow for a 2.5 metre bike lane on either side and 2.0 metre footpaths;
- > Within a road reservation of 40 metres, four lane divided roads would have four 3.5 metre traffic lanes, a median of 6.5 metres, provision for a 3.5 metre right hand turn lane and could allow for a 2.5 metre bike lane on either side and a 2.0 metre footpath;

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- > Within a road reservation of 50 metres, six lane divided roads would have six 3.5 metre traffic lanes, a median of 6.5 metres, provision for a 3.5 metres right hand turn lane and could allow for a 2.5 metre bike lane on either side and 2.0 metre footpaths.

A.5 CURVE RADII

A.5.1 RAIL CURVES

The desirable minimum curve radius is 2600 metres for the main OMR line including where it would connect to the Geelong – Melbourne Railway Line and to the Melbourne – Sydney Railway Line. Where rail would connect the OMR and the Ballarat – Melbourne Railway Line, the curve radius adopted is 1300m, as this section of line is proposed for freight operations only.

Where the railway is within the median of the OMR, the railway curve requirements govern the curve radius requirements for the road carriageways.

A.5.2 ROAD CURVES

The desirable minimum curve radius for the OMR road sections without rail and for the E6 and East West Deer Park Bypass Link is 1500 metres.

A.6 GAUGE

The ROW provision is sufficient to accommodate either standard or broad gauge tracks.

A.7 GRADES

A.7.1 RAIL GRADES

An absolute maximum grade of 1% and a minimum grade of 0% have been adopted for both the main rail lines and the connecting lines.

A.7.2 ROAD GRADES

Road grades are proposed to be:

- > **Freeway carriageways.** Desirable maximum grade 3% and absolute maximum grade 5%;
- > **Freeway turning roadways.** Desirable maximum grade 3% and absolute maximum grade 6%;
- > **Freeway ramps.** Desirable maximum grade 3% and absolute maximum grade 8%.

A.8 VERTICAL CLEARANCES

The vertical clearances for rail and road crossings are proposed to be:

- > Over Rail Lines. 7.1 metres vertical clearance for 3 metres each side of rail tracks;
- > Over Freeway/ Highway. 5.9 metres vertical clearance between outer edges of shoulders;
- > Over other Arterial Roads. 5.4 metres vertical clearance between outer edges of shoulders;
- > Over Secondary Roads. 4.7 metres vertical clearance between outer edges of shoulders.

The normal allowance for the structural depth of bridge structures for both road and rail is 2.6 metres.

A.9 FLOOD PROTECTION

Detailed hydrological studies will be carried out prior to construction to ensure that the level of protection required under the Railway National Code of Practice and VicRoads Design Guidelines are met.

The treatment of stormwater before discharge into receiving waterways would be subject to detailed design, which would require the approval of the relevant Catchment Management Authorities.

A.10 GEOTECHNICAL ISSUES

The study has obtained expert geotechnical advice. From a geotechnical standpoint, for the OMR Transport Corridor “no major impediments exist apart from the presence of possible challenging foundation conditions at some major structure sites and the presence of high to extremely high strength “non rippable” basalt”. Likewise for the E6 Transport Corridor “no major impediments exist in regard to the construction of the E6 Transport Corridor, apart from the common presence of near surface, high to very high strength, basalt (including basalt boulders)”.