M2 Upgrade Environmental Assessment

Volume 2 – Part 2: Technical Papers

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M2 UPGRADE - URBAN DESIGN + VISUAL ASSESSMENT REPORT

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EXECUTIVE SUMMARY

Hills Motorway are proposing to upgrade the capacity of the M2 Motorway. Urban and Landscape Design consultants HBO+EMTB and Tract Consultants have prepared an Urban Design and Visual Assessment Report, as a Technical Paper for the Environmental Assessment project approval process. The Report has been prepared as part of a collaborative design process with Hills Motorway, Leighton Contractors and AECOM.

The M2 Motorway is an important part of the Sydney Orbital Network connecting Sydney's north-west to the lower north shore and Sydney's CBD. Increased traffic volume on the motorway has resulted in the need to increase capacity and improve the level of service for users. The proposed M2 Upgrade project would include the following components:

- Widening and/or provision of a third lane along sections of the eastbound and westbound carriageways between Windsor Road and Lane Cove Road.
- Provision of new on/off ramps at Windsor Road and Herring Road.
- Widening and provision of a third lane in the Norfolk Road tunnel.
- A continuous shoulder which provides an emergency and cyclist lane.
- Upgrades to the Motorway's Operational Management and Control Systems.

A.1 Existing environment

An analysis of the physical context of the motorway was documented to assist in understanding the environment surrounding the motorway and the existing conditions of the natural and urban setting. This analysis took the form of field surveys and a desktop study and was used to establish the key attributes of the motorway which in turn determine the urban and landscape character precincts and specific site constraints and opportunities. These were used to generate objectives and principles which form the urban and landscape design framework for the upgrade works.

Both the Westlink M7 and the Lane Cove Tunnel, recent high quality additions to the Sydney Orbital Network, contrast strongly with the older M2 existing character which has a lower quality of urban and landscape design reflected not only in the appearance of the bridges, noise walls and retaining walls, but also in the vehicular travel experience due to the uneven road surface.

Existing M2 Motorway Character

The M2 Motorway passes through Hills Shire, Hornsby and Ryde Local Government Areas (LGAs) and is in close proximity to Blacktown and Parramatta LGAs. The M2 Motorway passes through the urban development of the north-western suburbs of Sydney and the expanding commercial area around Macquarie Shopping Centre, Macquarie University and Macquarie Business Park. The existing land uses along the edges of the Motorway corridor characterise the visual qualities of the corridor and its landscape setting.

Connectivity with existing public transport networks are key functional attributes of the corridor. The Northern Rail Line crosses the motorway east of the Beecroft Road Interchange. The Chatswood to Epping rail line, recently opened, carries additional passengers to and from Macquarie University, Macquarie Park and North Ryde.

The topography of the site varies as the road traverses both ridges and valleys as the route heads east towards the centre of Sydney. The current road alignment is generally not responsive to the landform through which it passes, slicing through the landscape, with cuttings, tunnels, high embankments, retaining walls and bridges used to achieve the road design requirements. This to some extent removes the road user from the contextual experience. Despite this there are a number of key topographical characteristics which remain evident and inform the user of their journeys progress.

The vegetation of the M2 Motorway corridor is a mix of re-vegetation works, undertaken as part of the original development, stands of remnant vegetation and weeds. The natural vegetation of the region is preserved in National Park or Reserves along with isolated remnant stands within the urban fabric of the adjoining residential areas.

The Motorway travels through a highly populated area of metropolitan Sydney with Motorway built elements, such as noisewalls, dominating most of the corridor. Along many lengths of the motorway the views are confined to the road corridor, opening up only occasionally. In most cases, the motorist is unaware of the residential housing outside the road corridor as noise walls interrupt the flow of the landscape and restrict views from the motorway. The noise walls, despite efforts to camouflage the structures by painting them green, are visually dominant along much of the route.

The six major intersections create decision points for the motorists. These intersections are defined by large bridge infrastructure overpasses crossing the motorway, with on and off-ramps and increased directional signage and road furniture, such as street lighting. The man-made built structures dominate, with large cuttings and/or retaining walls visually limiting the motorway views.

Towards Pennant Hills Road, the Motorway alignment descends into the low lying landform of the creek valley. Pennant Hills Road intersection is a strong, hard-edged built form. The motorway burrows beneath the wide bridge resulting in high vertical retaining walls. The walls are not well designed and finishes consist of shotcrete with exposed rock bolts. Planting on top of the bridge structure softens and greens the wide expanse of asphalt.

The overbridge structures along the Motorway are generally poorly resolved with the overall structural form and pier/headstock detailing creating a solid and overly bulky visual impression. At Beecroft Road intersection, visual complexity is created with the additional crossing of the Northern Rail Line, the overpass structure for buses and a series of messy, complicated noise walls and cuttings.

Large sandstone cuttings run parallel to the Motorway, where the road is lower than the surrounding topography. The natural sandstone is attractive and warmly coloured enriching the visual travel experience. The cuttings also create a hard edge contributing to restricting the motorist views of the Motorway. In multiple locations the cuttings have been stabilised with shotcrete creating a dull, colourless vertical or near-vertical wall. Often vegetation is visible at the top of the cuttings, softening the overall effect.

The distribution and frequency of key visual qualities, built elements and vegetation along the corridor define the different character experiences. When combined with the adjoining land uses these form distinct precincts with specific visual qualities. The following five precincts have been identified through the contextual analysis:

- Precinct 1: Old Windsor Road to Windsor Road Interchange – Cumberland Plain
- Precinct 2: Windsor Road to Pennant Hills Road – Bushland Interface
- Precinct 3: Pennant Hills Road to Beecroft Road / Devlins Creek – Suburban Forest Interface
- Precinct 4: Beecroft Road /Devlins Creek to Terrys Creek – Suburban Bushland Interface
- Precinct 5: Crimea Road to Delhi Road – Urban Bushland Interface

A.2 Impact assessment

Visual Assessment

The undertaking of the visual assessment and landscape and urban design concept involved an iterative process in which preliminary information was provided to highlight key issues and constraints and potential ways of handling critical issues which were then integrated into the engineering design. This process enables the basic aims of designing to reduce the impact of the built roadway to be adopted in the development of the design proposal thereby minimizing the potential visual impact.

Key considerations in terms of design for mitigation are to visually screen the built form entirely where possible and otherwise to whatever extent practicable; to reduce the apparent scale of the motorways structures, especially its noise barriers; to add landscape elements where possible to assist the process of reducing noise impact and to obscure or reduce views to the traffic stream. As the motorway already exists, its impact in a visual sense, beyond its immediate neighbours, is limited. That is its visual impacts are primarily to the immediate neighbours of the motorway where the scale of change is most significant, due to the facility being an upgrade rather than new infrastructure element.

The context in which the road sits is one which has been associated with natural communities, be that the Lane Cove National Park, Devlins Creek Valley or the Darling Mills Creek Valley. The suburban development adjacent to the corridor is also an environment in which trees are dominant (be they natural/indigenous or exotic). The upgrade nature of this project means that to some extent the ability to substantially influence the degree of change is minimal as the general alignment is a given, the primary impacts are already experienced, and the extents to which modifications can occur are limited.

Visual impacts are assessed in terms of both the road viewer – the corridors neighbours and the road user - those travelling along the road. The road viewer has been the primary consideration in terms of the assessment due to the permanent nature of the impacts experienced by this viewer. Visual impacts experienced as a result of the proposal are associated with the following areas:

- construction and/or realignment of noise walls, resulting in potential increases in scale, visual bulk of the structures when viewed from both within and outside the corridor;
- changes to cutting profiles and their treatment;
- changes to bridges involving the widening of existing structures and the support structures needed to facilitate this;
- widening of pavement extents increase the expanse of road pavement, visible primarily from with in the corridor by the road user;
- construction of retaining walls to fill embankments - minimizing vegetation loss but introducing a built element; and
- Loss of vegetation cover, potentially revealing more of the road and its structures to the adjoining residences which have become accustom to the vegetative buffer.

In addition to these direct impacts there are short term indirect impacts caused by the need for construction compounds both within and or adjoining the road corridor. Site compounds include the construction of temporary site sheds and amenities, provision of lay down areas for storage of structures such as bridge girders, culverts etc; car parking etc.

Visual impacts associated with such facilities include:

- clearing of lands of existing screening vegetation; and
- Construction of temporary structures with potential to overlook or be overlooked by adjacent properties.

The report covers a review of the key changes and there impacts. Space is a critical element both in terms of impacts and proposals but also in terms of the potential for mitigation. Some impacts will be unavoidable and the only means of addressing these changes will be through the architectural design of this element so that its detailing is simple and refined and the material qualities of texture, colour, and so on address the critical concerns of the adjacent use.

A number of areas are identified as having potential for significant visual change, these include:

- At the Windsor Road Interchange, the addition of on and off ramps to the west will mean higher visual impacts due to the increased height of noise and retaining walls and loss of screen planting. Mitigation measures will include design treatment of noise and retaining walls with texture and colour to reduce bulk and scale, and screen planting of properties.
- The historic villa at 266 Windsor Road will lose several metres from its frontage. Property adjustment works will be required to both address the loss of curtilage and to provide a buffer between house and road. Key to this will be the establishment of screen planting to the front and the retention in some form of the side drive and turn-a- round.
- At Woodvale Road, North Epping, the new road alignment will require noise walls to be relocated closer to properties (existing is 10 metres, proposed is 3 metres). Mitigation measures will include noise wall architectural design and screen planting.
- The proposed removal of the bus bridge, east of Beecroft Road, reflects the changes in the public transport system over the last decade and the implementation of better bus priority connections within the M2 corridor as a result of this proposal. The removal of the bridge will provide an enhanced visual outcome with the loss of part of the visual clutter created within this zone by a range of elevated structures.

A.3 Mitigation measures

The current M2 Motorway design does not take full advantage of its distinctive contextual setting. There is an opportunity through the functional upgrade of the motorway to capitalise on the bushland setting, through which the route passes, to improve the visual experience and provide a consistent and recognisable identity. Design solutions address the character of the existing Motorway built elements and provide solutions which compliment and improve the visual outcome of the Motorway built form.

In responding to the visual impacts, mitigation measures have been directed towards achieving an integrated and well considered design solution. To do this a desired future character (Vision) for the M2 Motorway Upgrade has been proposed:

The M2 Motorway upgrade should reflect the corridor's role as an important north-west route linking Ryde and Blacktown, and the M7. Its design should be simple, well considered, elegant, refined, robust, reflect the natural and cultural qualities of the region through which it passes and establish a clear and recognisable identity for the motorway.

This desired character (vision) will be applied to all future developments of the motorway and implemented gradually. This limited upgrade provides the opportunity to commence the process of improving the presentation of the Motorway but it is not within the scope of this project to improve the whole of the Motorway. It is envisaged that as the road is developed and maintained, as part of the concession period, this design vision and its objectives and principles will be progressively implemented.

A.4 Urban Design

The urban design concept for the alignment is one which builds on the existing natural assets of the alignment. In particular it strengthens the connection with the natural environment through the exposure of sandstone cuttings and strengthening of the vegetated back drop of the alignment. Built elements are handled with care so that details are simple and subtle.

The following elements have been identified as key in enhancing the current road corridor character and providing a new higher quality character and identity for the M2 Motorway.

A.4.1 Noise Walls

The existing noise walls lack consistency in colour, alignment and height. The same Hebel panel wall design with four metre post spacings is used for the entire length of the M2 Motorway showing no consideration of the adjacent context - the walls used in the bushland precincts are the same as those used in the more urban precinct. The green colour seems to have been chosen in an attempt to camouflage the walls against the natural bush setting however the reality is that the walls actually contrast with the bushland.

The new walls will be the most visible and continuous built form elements on the motorway and provide one of the few opportunities to create a recognizable identity for the M2 Motorway. The urban design noise wall strategy has assumed that apart from the existing walls that will remain unchanged in both form and colour, all other situations will result in the construction of new noise walls.

The noise wall strategy therefore has an emphasis on both sensitivity towards integrating with the existing noise walls and also a strong focus on high quality urban design for the new noise walls. All the new walls will be constructed using light-weight aerated concrete panels (Hebel, or similar). The design features four different noise wall designs (Type B, Type L, Type H, and Type U).

Each of the identified character precincts has a predominant panel pattern that is carefully designed to reflect and be sympathetic to the surrounding environment. With form and alignment playing a major role, a secondary layer of information in the form of patterning and colour on the new noise walls will reveal the changing environment for the motorway user. A better colour palette will complement the existing green walls, reference the surrounding bushland context and visually recede into the context.

A.4.2 Bridges

Between Windsor Road and Delhi Road there are a total of 21 existing bridges and one tunnel. In order to accommodate the additional traffic lanes, the project includes the widening of 8 of the bridges plus the lengthening of 2 of the vehicular overbridges, 1 pedestrian overbridge and 1 pedestrian underpass. Bridge widening requires adjustment to the edges of some bridges. This will require modifications to throw screens, and a general expansion of the footprint. From the motorway the changes are most evident in the structures associated with the bridge including, abutment walls, bridge girders and parapets. To minimise the impact of these elements they shall be designed to present a slim consistent profile that relates to the existing structure.

Most overbridges on the current M2 Motorway are Super-T girder structures. The strategy for the bridge design, where widening or lengthening of the bridge occurs, is to match existing construction methods as closely as possible and to match the existing detailing of parapets, piers, girder type and bridge furniture. Although, the project is unable to change the appearance of such bridges, it is intended that where the existing bridge has been poorly designed some consideration will be given to improving the appearance of the bridge. New bridges will be designed to improve upon the appearance of the existing bridges.

A.4.3 Retaining Walls

Retaining walls are proposed in locations where the motorway is on fill. The proposed use of retaining walls minimises the extent of disturbance to existing vegetation cover and consequently on views from adjacent properties. The design of new retaining walls should consider the use of colour and texture to minimise their impact. Reinstatement of the vegetation cover to the disturbed footprint will assist in mitigating against the impact of the walls.

The existing retaining walls lack a consistent appearance along the length of the existing M2 Motorway. In many locations where ground stabilisation was required, rock anchors and shotcrete were used. A mix of cast in-situ concrete walls and shotcrete surfaces face the motorway, while walls facing away from the corridor range from patterned precast concrete panels to stacked sandstone boulders with no real distinction made between bushland and urban areas. The end result is one in which the walls, particularly those facing the motorway, are unattractive and visually dominating.

As part of the upgrade works, the widening of the corridor results in further cuttings, new or extended walls facing the motorway and new or extended walls facing outside the corridor, towards the bushland or residential neighbourhoods. The urban design retaining wall strategy has assumed that apart from the existing walls that will remain unchanged in both form and colour, all other situations will result in the construction of new retaining walls. The strategy therefore has an emphasis on both sensitivity towards the existing retaining walls, and also a strong focus on high quality urban design for the new walls. Because of the variable topography of the motorway alignment, there are a significant number of retaining walls in this project. The longest wall stretches for approximately 455 metres and some are over 10 metres high. With the intention of minimizing their perceived impacts, the proposed design seeks not to treat them all the same, but to differentiate them on the basis of their location, orientation, role and consistency with existing M2 Motorway walls. With form and alignment playing a major role, a secondary layer of information in the form of patterning and finish on the new retaining walls will create some linear identity for the motorway. Planting will be located in front of retaining walls wherever possible to soften their appearance and create a greener road corridor.

A.4.4 Temporary Structures

Site compounds, while temporary structures still have the potential to have significant impacts on the visual character of the corridor in the short term. The location of these elements therefore needs to consider the existing vegetated address and seek to limit the scale of visual change. Planting to the perimeter of the proposed site should be preserved, where possible, to maintain a level of screening from the adjoining land uses. Where this is not possible the re-establishment of vegetation cover should be prioritised.

A.4.5 Landscape

The landscape response is an integral element of the mitigation strategy. Landscape areas have focused on achieving vegetated buffers between motorway structures and over looking residential properties in order to enhance both visual screening and the sense of a bushland corridor. In terms of the road user landscape has been used only in front of walls where a substantial space is available to achieve long lasting, minimal maintenance landscape outcomes. Visual quality for the road user is enhanced by improved design quality of structures and enhanced back drop rather than attempts to soften the road appearance between carriageway and structure.

The key elements of the landscape design comprise:

- Use of a landscape palette which is responsive to the differing vegetation communities through which the corridor passes;
- Strengthening of the bushland character to reinforce the perception of the Motorway being in a bushland corridor and to provide a sense of separation from adjacent properties;
- Screening of noise and retaining walls where practicable, particularly where residences are in close proximity;
- Use of landscape only in zones where it can be established, maintained and make a meaningful contribution to the visual presentation of the corridor.
- Use of vegetation to enhance environmental outcomes of the project.

The above considered approach to the design of the new urban and landscape elements for the M2 Motorway Upgrade will result in a presentation that is consistent with the existing character and through the integration of new higher standard design elements will provide a new desired character and identity for the M2 Motorway. In doing so the visual impacts of the proposed upgrade are reduced.

Executve Summary

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