

Table 6.2.2 Retaining Wall Schedule

NUMBER	AREA	WALL NUMBER	WALL CHAINAGE	STRUCTURE TYPE (REFER KEY)	LENGTH	MAX HEIGHT	WALL FINISH TYPE	MATERIAL AND FINISH
1	1 Windsor Road Ramps	RW-W-101	3579-4018	RSW	455	12.7	Type A	Concrete panels, vertical ribbing
2	1 Windsor Road Ramps	RW-W-102	3747-3999	RSW	252	8.7	Type A	Concrete panels, vertical ribbing
3	2 Windsor Road to tunnel	RW-W-201	6582-6614 6614-6614	RSW	32 3.5	11.2	Type B	Concrete panels, textured stripe
4	2 Windsor Road to tunnel	RW-W-202	6646-6685 6646-6646	RSW	39 3.5	11	Type B	Concrete panels, textured stripe
5	2 Windsor Road to tunnel	RW-W-203	6833-6905	RSW	72	3.2	Type B	Concrete panels, textured stripe
6	2 Windsor Road to tunnel	RW-W-212A	7143-7235	RSW	92	3.5	Type B	Concrete panels, textured stripe
7	2 Windsor Road to tunnel	RW-W-204	7571-7594	RSW	23	5.5	Type B	Concrete panels, textured stripe
8	2 Windsor Road to tunnel	RW-W-206	9610-9845 9844-9844	RSW	235 4.0	10.7	Type B	Concrete panels, textured stripe
9	2 Windsor Road to tunnel	RW-W-207	10313-10374	Various	60.5	5	Type A	Concrete panels, vertical ribbing
10	2 Windsor Road to tunnel	RW-W-208	10466-10487	PW	21	10.5	Type A	Concrete panels, vertical ribbing
11	2 Windsor Road to tunnel	RW-W-209A	10561-10582	G, RC arches, RSW	32.1	7.1	Type A	Concrete panels, vertical ribbing
		RW-W-209B	10582-10684	CD	102	5.6	Type A	Concrete panels, vertical ribbing
		RW-W-209B	10684-10711	CD	27	1.9	Type A	Concrete panels, vertical ribbing
		RW-W-209B	10711-10879	CD	168	6.3	Type A	Concrete panels, vertical ribbing
		RW-W-209C	10879-11089	Colonnade	210	4.7	Type A	Concrete panels, vertical ribbing
		RW-W-209D	11089-11144	Precast RC	62	7.5	Type A	Concrete panels, vertical ribbing
13.1	2 Windsor Road to tunnel	RW-W-212B	12100-12163	Precast Panels	63	4.6	Type B	Concrete panels, textured stripe
14	4 Tunnel to Culloden Road	RW-W-401	13494-13645 13430-13494	RSW BS	159 64	16.4 9	Type B	Concrete panels, textured stripe
15	6 Christie Road to Delhi Road	RW-W-601	16932-16977	RSW	45	2.5	Type B	Concrete panels, textured stripe
16	6 Christie Road to Delhi Road	RW-W-602	17007-17167	RSW	150	4.3	Type B	Concrete panels, textured stripe
17	6 Christie Road to Delhi Road	RW-W-603	16212-16226	RSW	14	1.2	Type B	Concrete panels, textured stripe
20	9 Herring Road Ramps	RW-W-903	16400-16660	RSW	260	11.4	Type B	Concrete panels, textured stripe
22	1 Windsor Road Ramps	RWE-101	3530-3908	RSW	385	9.5	Type A	Concrete panels, vertical ribbing

Key:

RSWReinforce Soil Wall

PWPiled Wall

GGabion

RCReinforced Concrete

CDCanfilevered Deck

BSBridge Structure

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Retaining Wall Locations (continued)

NUMBER	AREA	WALL NUMBER	WALL CHAINAGE	STRUCTURE TYPE (REFER KEY)	LENGTH	MAX HEIGHT	WALL TYPE	MATERIAL AND FINISH
23	1 Windsor Road Ramps	RWE-102	3707-3981	RSW	275	8.9	Type A	Concrete panels, vertical ribbing
24	2 Windsor Road to tunnel	RWE-201	4546-4567 4567-4567	RSW	21 3.5	7.5	Type B	Concrete panels, textured stripe
25	2 Windsor Road to tunnel	RWE-202	4725-4743 4725-4725	RSW	25 3.5	9.3	Type B	Concrete panels, textured stripe
26	2 Windsor Road to tunnel	RWE-203	4865-4929	RSW	78.7	7.7	Type B	Concrete panels, textured stripe
27	2 Windsor Road to tunnel	RWE-204	5146-5311	RSW	166	14.4	Type B	Concrete panels, textured stripe
27.1	2 Windsor Road to tunnel	RWE-207	10545-10547	N/A Local strengthening at top of wall	2	N/A	N/A	N/A
27.2	3 Tunnel	RWE-206	12280-12352	RSW	72	2.4	Type B	Concrete panels, textured stripe
28	4 Tunnel to Culloden Road	RWE-401	13552-13590	RSW	40	8.4	Type B	Concrete panels, textured stripe
29	4 Tunnel to Culloden Road	RWE-402	13653-13680 13680-13680	RSW	28 7.5	9	Type B	Concrete panels, textured stripe
30	4 Tunnel to Culloden Road	RWE-403	13842-13856 13842-13842	RC	19.9 10	12.5	Type B	Concrete panels, textured stripe
31	4 Tunnel to Culloden Road	RWE-404	14247-14559	RSW	312	4	Type B	Concrete panels, textured stripe
32	4 Tunnel to Culloden Road	RWE-405	14818-15054	RSW	236	3.5	Type B	Concrete panels, textured stripe
33	4 Tunnel to Culloden Road	RWE-601	16890-16960	RSW	70	1.3	Type B	Concrete panels, textured stripe
34	6 Christie Road to Delhi Road	RWE-602	17006-17061	RSW	55	0.6	Type B	Concrete panels, textured stripe
42	7 Local Roads	RWE-701	16100-16400	TBA	TBA	TBA	TBA	TBA

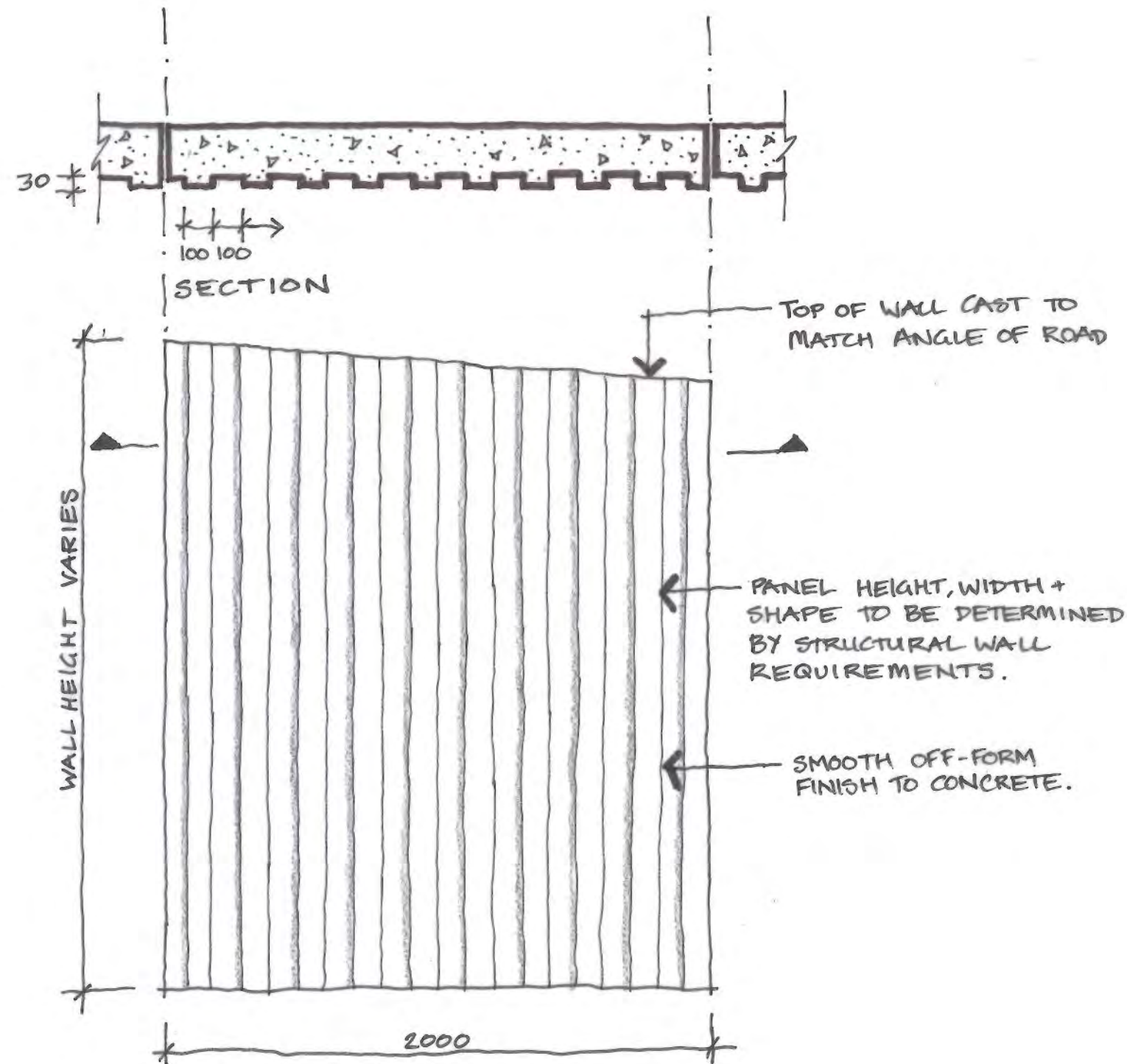


Figure 6.2.25 Type A Retaining Wall Section and Elevation Detail

TYPE A Walls Facing Motorway

Walls facing the motorway are often close to the edge of the main alignment shoulder and travel parallel to it. The proposed walls will be precast concrete with a fine vertical ribbed pattern similar to the ribbing used on existing sections of the motorway and to the walls recently constructed as part of the Lane Cove Tunnel project (refer to Photo 6.2.14).

The users of the road will be in close proximity to these walls and they must be tactile and of high quality. The size, visual prominence and the materiality of these walls is a major consideration. The detailing of these walls will be intentionally simplified. It is important that the monolithic quality of these walls is read without complicated detail distracting from their simplicity. This will assist in creating a streamlined appearance and smooth flowing lines.

Due to the complexity of existing walls facing the road neighbours at the Windsor Road interchange (refer to Photo 6.2.15 and Figures 6.2.26 to 6.2.27) and the requirements for new noise barriers, the vertical ribbed pattern will also be used on the retaining walls facing the residential neighbourhood in this location only. This will aid in the creation of a recognisable identity for this major intersection.

Planting will be located in front of retaining walls wherever possible to soften their appearance and create a greener road corridor.



Photo 6.2.14 Vertical ribbed pattern



Photo 6.2.15 Existing wall facing Junction Road

Urban Design Concept

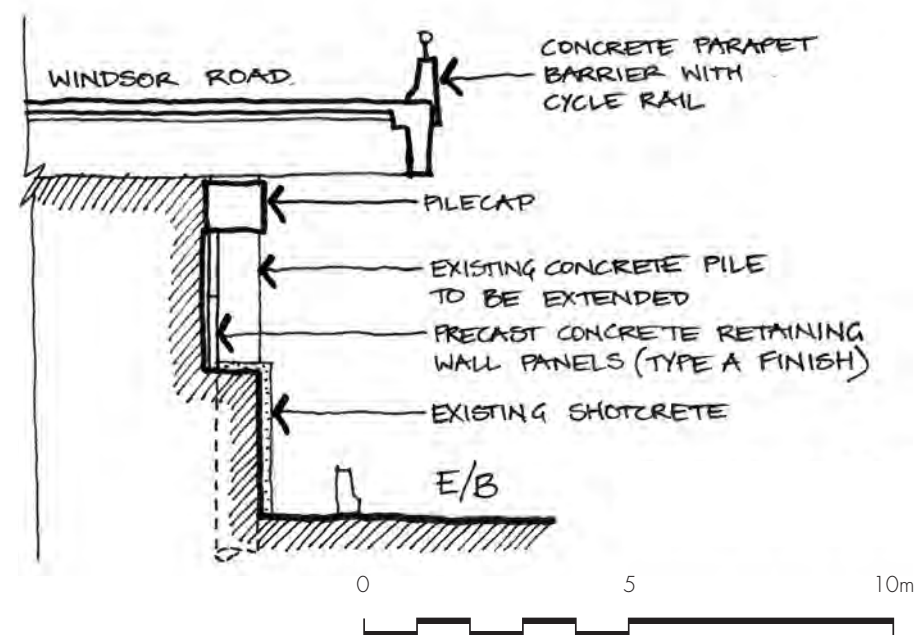
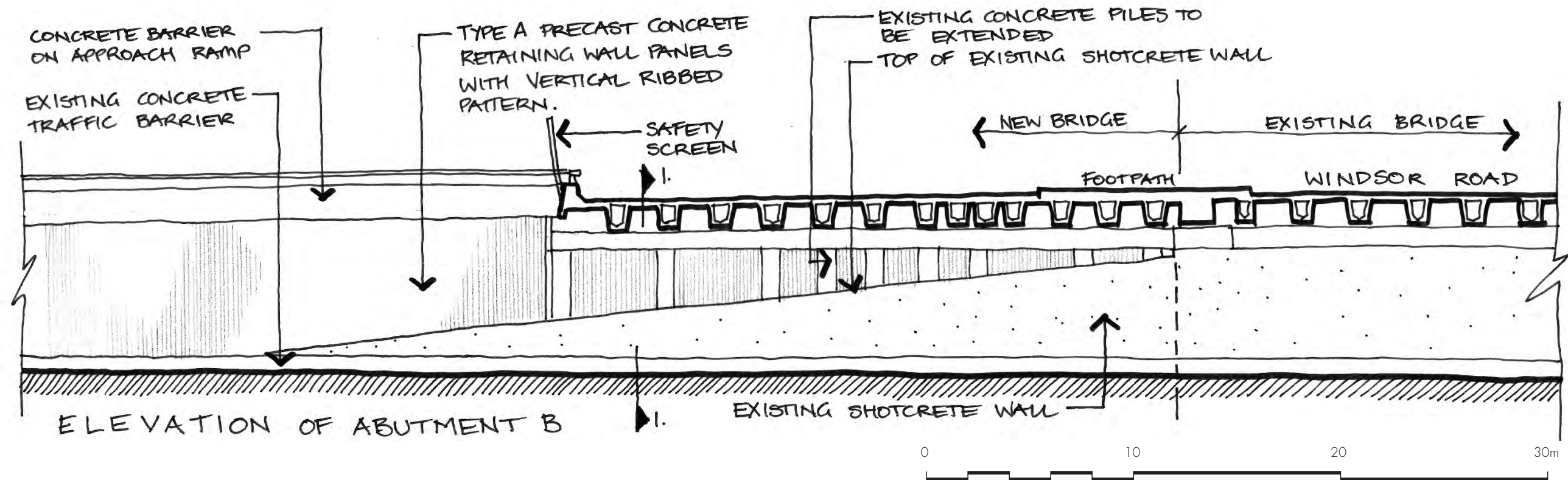


Figure 6.2.26 Type A Retaining Wall at Windsor Road Overbridge

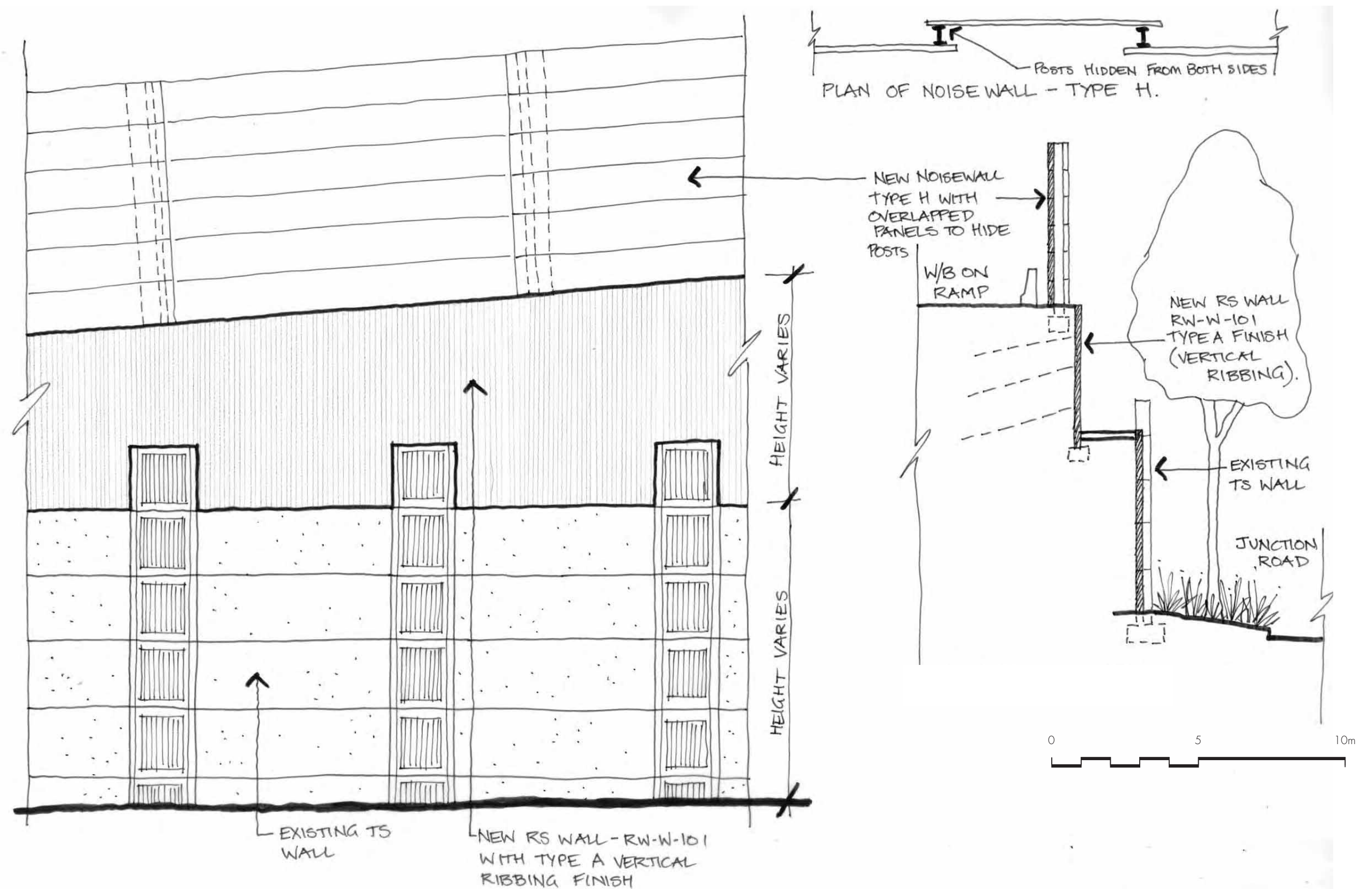


Figure 6.2.27 Type A Retaining Wall at Windsor Road Overbridge

Type B Walls Facing Away from the Motorway

- The retaining walls facing away from the motorway include:
- Abutment walls of bridges crossing creeks;
- Abutment walls of bridges crossing local roads;
- Walls of pedestrian bridges and underpasses; and
- Incidental walls facing residential areas.

Walls facing away from the motorway are often part of a bridge abutment or at the toe of a batter. The proposed walls will be precast concrete panels with a textured stripe pattern to match the pattern used on existing bridge abutments (refer to Figure 6.2.28 and Photos 6.2.16 and 6.2.17).

These walls are often highly visible and form the hard built edge of the motorway corridor and are the point of interaction with the neighbouring communities. The scale of the pattern, therefore, has been chosen as it is more suitable for use facing the bushland and residential neighbourhoods. It has a strong pattern and texture and the rough surface finish may discourage graffiti (refer to Photo 6.2.18).

Where walls are exposed to view, planting in front of these walls is important wherever possible to soften their appearance and reduce their visual impact.

Safety fencing may be required at the top of these walls to facilitate safe access for maintenance or to prevent unauthorised public access.

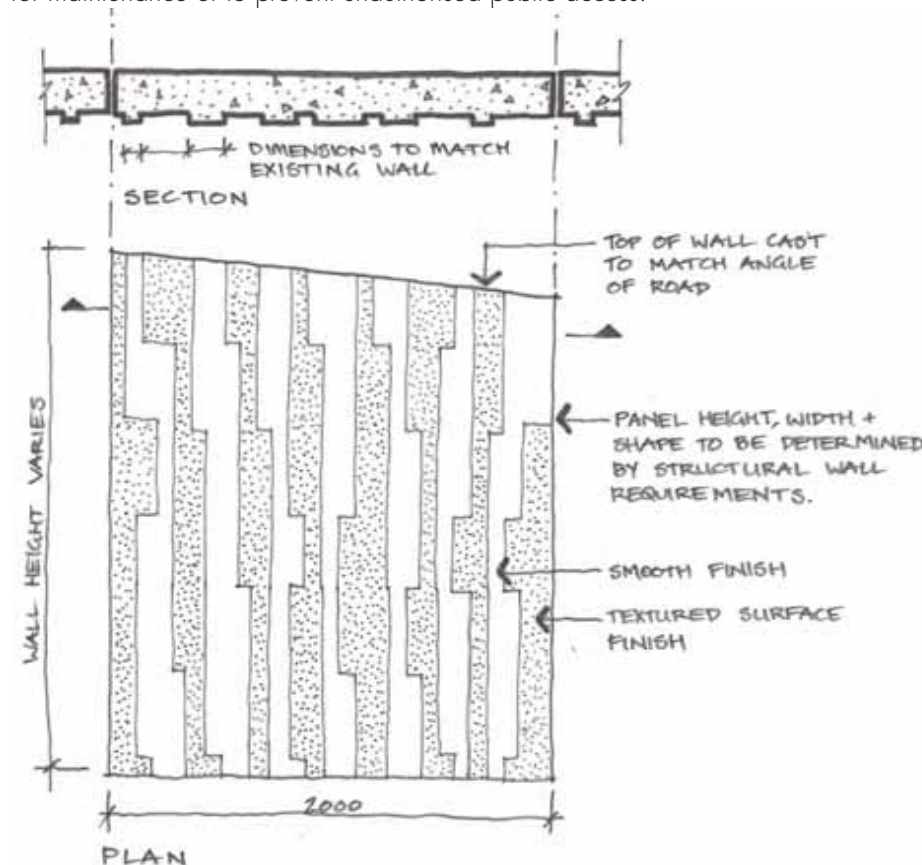


Figure 6.2.28 Retaining Wall Section and Elevation Detail



Photo 6.2.16 Wicks Road Bridge



Photo 6.2.17 Terrys Creek Bridge



Photo 6.2.18 Textured Stripe Pattern

TYPE C Walls at Overbridges

Refer to Figures 6.2.30 to 6.2.32

Lightweight compressed fibre cement panels will be used to clad discrete sections of vertical cutting at Culloden and Christie Road bridges. These overbridges act as important entry and exit structures at either side of the M2 Motorway toll plaza. No bridge widening is required however the spillthrough abutments are being removed and replaced by vertical walls/cuttings.

The lightweight compressed fibre cement cladding panels or precast concrete facing panels are to be applied to the area directly under the bridge to conceal any shotcrete stabilisation required and to improve the appearance of the bridge.

The cladding will extend 2 metres past the edge of the bridge and will have a vertical emphasis to relate directly to the upgrade retaining walls.



Photo 6.2.19 Compressed Fibre Cement Cladding Panels

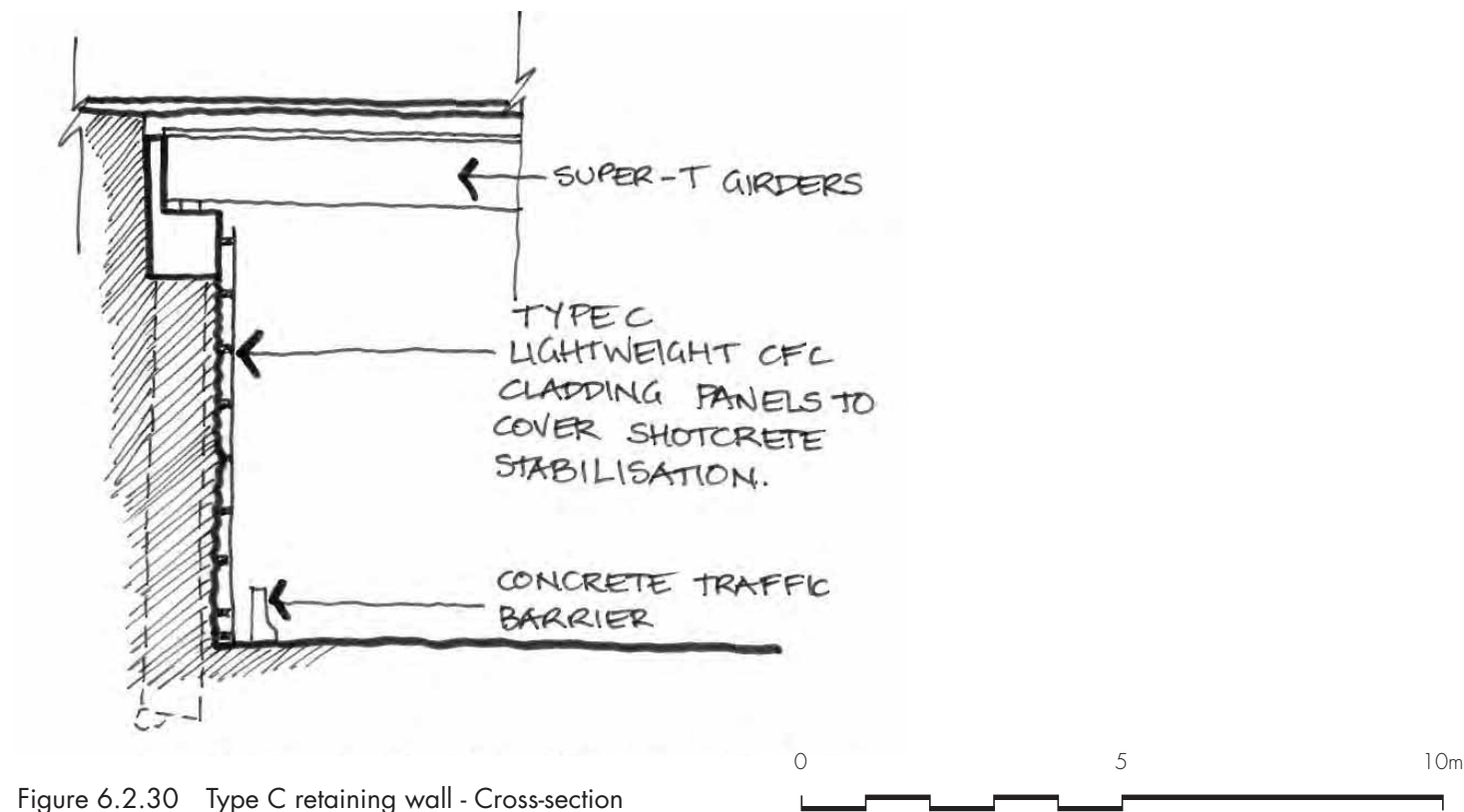


Figure 6.2.30 Type C retaining wall - Cross-section

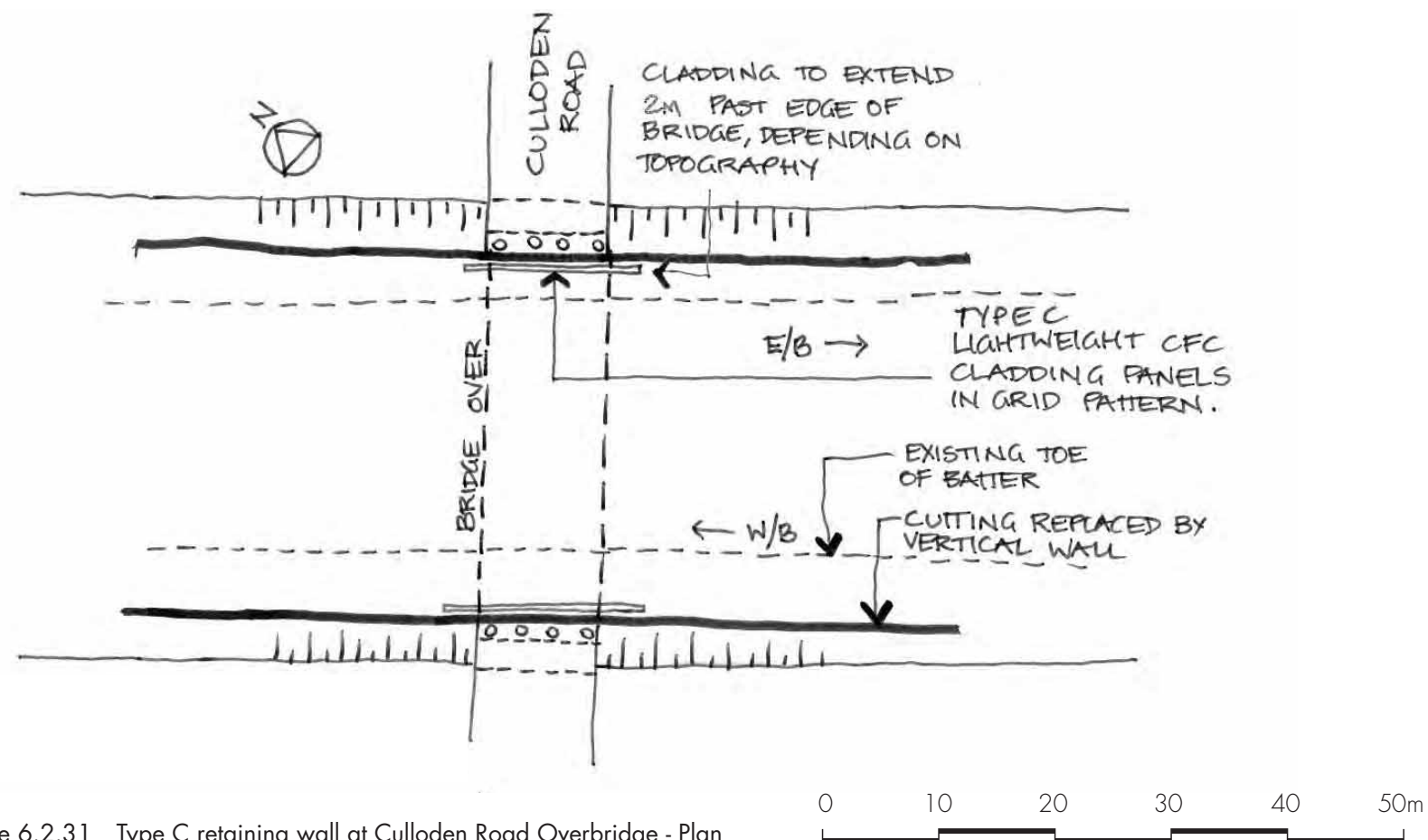


Figure 6.2.31 Type C retaining wall at Culloden Road Overbridge - Plan

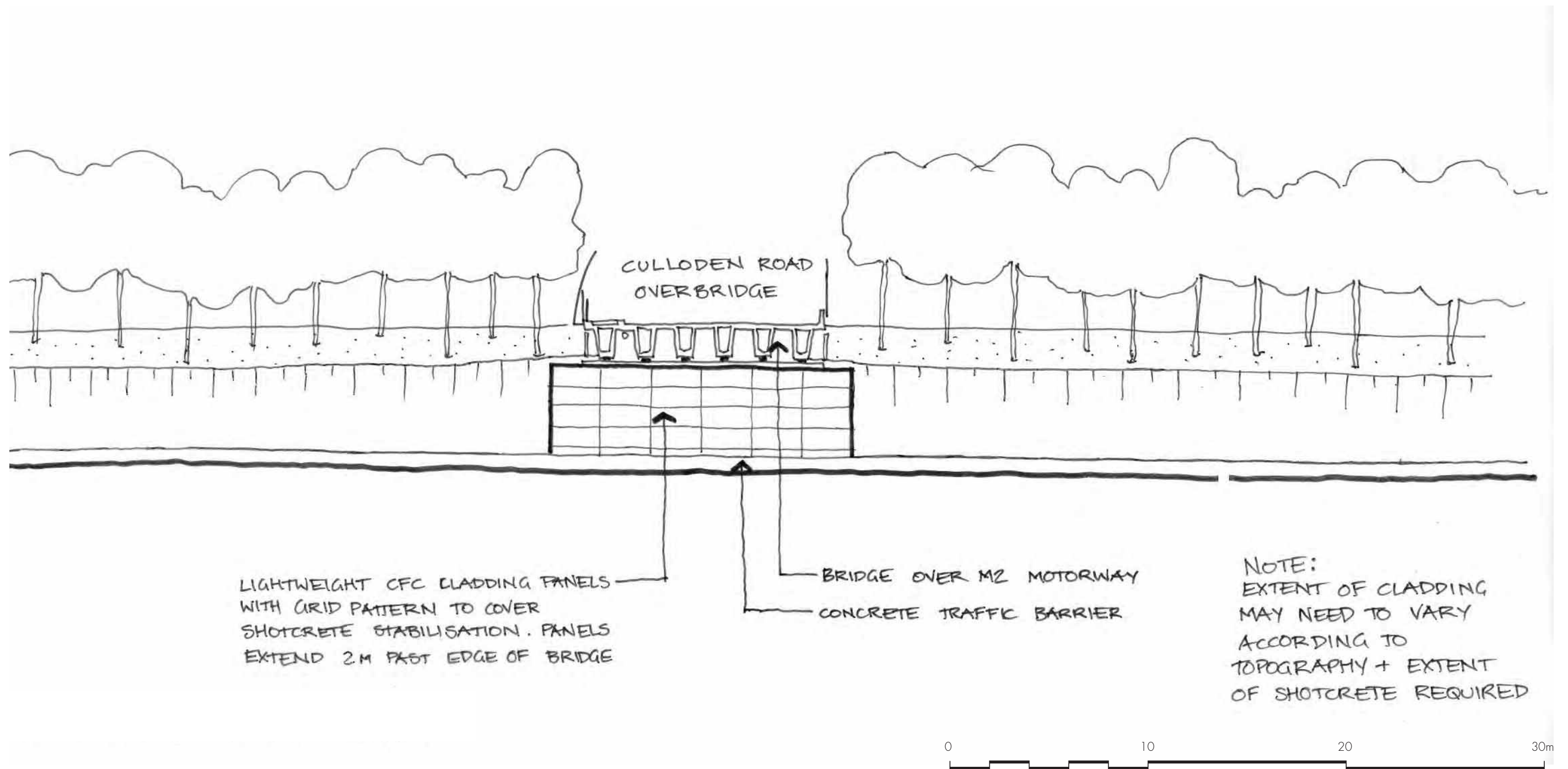


Figure 6.2.32 Type C retaining walls - Compressed Fibre Cement Cladding Panels at Culloiden and Christie Road Overbridges

Type D Cast In-situ Concrete Walls

Small incidental walls may be constructed of cast in-situ reinforced concrete. If facing away from the motorway, these walls will have a widely spaced vertical ribbed pattern to match existing cast in-situ concrete walls within the motorway corridor.



Photo 6.2.20 Pennant Hills Road Interchange



Photo 6.2.21 In-situ concrete wall at pedestrian overpass at Kent Street

Rock Cuttings and Shotcrete Stabilisation

On many sections of the Motorway, rock cuttings through sandstone create a memorable experience however space constraints, poor quality sandstone and deep loose soil on top of the solid rock have resulted in cuttings being required to be stabilised by the use of shotcrete.

Every effort will be made to achieve batter stabilisation without the use of shotcrete. If its use cannot be avoided, shotcrete will comply with RTA Shotcrete Design Guidelines (June 2005). The following principles apply if the use of shotcrete cannot be avoided:

- The extent of shotcrete will be minimised;
- The edges of the shotcrete will be masked to avoid overspray;
- The colour and texture of the shotcrete will match the colour and texture of the adjacent rock (test panels will be provided);
- Shotcrete will be screened by plantings; and
- No shotcrete will be visible around the abutments of bridges.



Photo 6.2.22 Existing poor quality shotcrete at abutment of Barclay Road Overbridge



Photo 6.2.23 Better quality finish of coloured shotcrete used at Abbott Road Bridge

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6.2.3 Noise Walls

Introduction

The existing noise walls lack consistency in colour, alignment and height contributing to a messy and unappealing composition. The same Hebel panel wall design with 4 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 was obviously 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 end result is one in which the walls are unattractive and visually dominating.

As part of the upgrade works, not all noise walls along the corridor need replacement. The following situations exist:

- Existing noise walls that require no change;
- Existing noise walls that require an increase in height;
- Existing noise walls that require relocation and an increase in height; and
- New noise walls.

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 the existing noise walls, and also a strong focus on high quality urban design for the new noise walls. The new walls are the most visible and continuous built form elements on the motorway and provide one of the few opportunities to create a recognisable identity for the M2 Motorway. 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.

Transparent noise walls on bridges have not been used due to vandalism considerations, design continuity issues (sometimes only one side is upgraded and they have not been used previously) and cost issues.

Design Objectives

The following design objectives for noise barriers are drawn from a number of sources, including the RTA's "Noise Wall Design Guidelines" (November 2006). The primary aim in the design of noise mitigation measures is to ensure that noise impacts on the motorway's neighbours are minimised as far as reasonably possible:

- Ensure that the design of noise barriers meets all applicable acoustic engineering requirements.
- In general, make barriers as visually unobtrusive as possible to minimise the effect of cutting off the Motorway from its surroundings.
- Relate walls to their context – where appropriate, use noise walls to make road users aware of the presence, and possibly the nature of, uses or activities beyond the walls.
- Design noise walls to be aesthetically pleasing for both road users and road neighbours.
- Design walls to be robust, durable and low maintenance so that they maintain an acceptable standard of appearance over time.

Design Principles

The noise barrier designs described below embody the following principles derived from the RTA Guidelines and the overall urban and landscape design philosophy established for the project. Quotations are from the RTA's "Noise Wall Design Guidelines":

- Integrate the design of noise barriers into the overall urban and landscape design, including the integration of existing noise walls with new noise walls and noise walls with retaining walls;
- Develop a design for walls which achieves a linear identity and continuity without excessive repetition;
- Walls are to be streamlined in plan. Except where road earthworks, corridor topography and/or boundary conditions require special positioning, make horizontal alignment of noise walls parallel to the outside edge of the adjoining carriageway. All transitions away from the edge of the road are to be smoothed off to create soft sinuous curves;
- Walls are to have a smooth top edge and to avoid stepped tops: "where the tops of noise walls run parallel to the road surface they are generally much more visually acceptable than the stepped variety";
- Walls heights to be rationalised to avoid random height changes. Subject to acoustic engineering requirements, make vertical alignment of noise walls parallel with the vertical alignment of the carriageways;
- If stepping on steep slopes is necessary, heights must be consistent and co-ordinated with urban design pattern treatment and colour;
- Walls are to have considered terminations and transitions. Avoid abrupt terminations by tapering noise walls down at their ends;
- Where walls are visible from outside the corridor, give equal weight to the design of both sides: "any noise wall has two sides with radically opposed design requirements and this might well become the basis of a design methodology";
- Where appropriate, use planting to soften the visual impact of barriers; and
- All supports and fixings are to be fully concealed.

Table 6.2.3 Noise Wall Schedule

WALL NO	CHAINAGE	HEIGHT (from Acoustic Engineer)	TOTAL LENGTH	WALL TYPE	WALL COLOUR
NW-E-1001	3500 - 3680	Varies	415	Type L	Dulux Juvenile (PG1E7)
	3680 - 3900	2.4-4.2m		Type H	Dulux Silkworth (PG2C2)
NW-E-1002	5100 - 5380	Varies	849	Type L	Dulux Juvenile (PG1E7)
	5380 - 5950	4.2-4.8m		Type B	Dulux Maximus (PG1E9)
NW-E-1003	7600-7700	4.2m	132	Type L	Dulux Juvenile (PG1E7)
NW-E-2001	10700-10800	Varies 2.4-4.2m	92	Type B	Dulux Maximus (PG1E9)
NW-E-2002	12350-12500	Varies 4.8-5.4m	134	Type H	Dulux Silkworth (PG2C2)
NW-E-2003	13300 - 13900	Varies 3.2-6m	606	Type H	Dulux Silkworth (PG2C2)
NW-E-3001	14850 - 15050	1.8m	208	Type U	Dulux Loveday (PG1C5)
NW-E-3002	16700-17100	Varies 3-4.2m	399	Type U	Dulux Loveday (PG1C5)
NW-E-3003	17450 - 17600	2.4m	170	Type U	Dulux Loveday (PG1C5)

WALL NO	CHAINAGE	HEIGHT (from Acoustic Engineer)	TOTAL LENGTH	WALL TYPE	WALL COLOUR
NW-W-1001	3500 - 3680	Varies	491	Type L	Dulux Juvenile (PG1E7)
	3680 - 4000	2.4-4.2m		Type H	Dulux Silkworth (PG2C2)
NW-W-1002	5900 - 6115	4.2m	287	Type L	Dulux Juvenile (PG1E7)
	6115 - 6200			Type B	Dulux Maximus (PG1E9)
NW-W-1003	6450 - 6490	Varies	264	Type B	Dulux Maximus (PG1E9)
	6490 - 6500	3-5.4m		Type L	Dulux Juvenile (PG1E7)
	6500 - 6700			Type B	Dulux Maximus (PG1E9)
NW-W-1004	6750 - 6800	Varies	207	Type B	Dulux Maximus (PG1E9)
	6800 - 6810	6-7.2m		Type H	Dulux Silkworth (PG2C2)
	6810 - 6950			Type B	Dulux Maximus (PG1E9)
NW-W-1005	7000 - 7200	7.2m	245	Type B	Dulux Maximus (PG1E9)
NW-W-1006	7526 - 7645	5.4m	120	Type L	Dulux Juvenile (PG1E7)
NW-W-2001	9600 - 10150	Varies 3.6-4.2m	560	Type H	Dulux Silkworth (PG2C2)
NW-W-2002	10440 - 10450	6m	16	Type B	Dulux Maximus (PG1E9)

WALL NO	CHAINAGE	HEIGHT (from Acoustic Engineer)	TOTAL LENGTH	WALL TYPE	WALL COLOUR
NW-W-2003	10550 - 11150	Varies 4.2-6m	634	Type L	Dulux Juvenile (PG1E7)
NW-W-2004	11300 - 11350	6m	76	Type H	Dulux Silkworth (PG2C2)
NW-W-2005	12350 - 12500	5.4m	144	Type H	Dulux Silkworth (PG2C2)
NW-W-2006	13250 - 13650	Varies 4.8-6m	417	Type H	Dulux Silkworth (PG2C2)
NW-W-3001	14250 - 14400	3m	140	Type H	Dulux Silkworth (PG2C2)
NW-W-3002	15250 - 15350	2.4m	110	Type B	Dulux Maximus (PG1E9)
NW-W-3003	15700 - 16050	2.4m	368	Type B	Dulux Maximus (PG1E9)

Note: Noise wall types and locations subject to refinement in detailed design.



Figure 6.2.33 Perspective showing insertion of new Type H wall with existing noise walls.

Proposed Design

Refer to Figures 6.2.34 to 6.2.42.

The locations, types and colour of new noise barriers are listed in Table 6.2.3 Noise Wall Schedule.

The plans in Section 6.1 also show the position of the new and existing noise walls together with the retaining walls in the project, so that the relationships between all walls can be readily understood.

The existing walls along the M2 Motorway consist of lightweight aerated concrete (Hebel) 4 metre long panels. The walls vary dramatically in height and the exposed posts result in accentuating the verticality of the walls while also creating a repetitive rhythm as you travel down the road (refer to Photo 6.2.24). One of the fundamental design principles for the new noise walls is that the emphasis is horizontal and not vertical so the visual movement down the road is more directive and fluid. This horizontal focus also articulates the contrast with and accentuates the tall bushland surrounds. Refer to Photo 6.2.26 and colour palette overleaf.

All the walls will be constructed using light-weight aerated concrete panels (Hebel, or similar).

The new patterned walls create a foreground theme close to the road, behind which the existing walls become a background, effectively creating a continuous linear identity for the motorway. Refer to Figure 6.2.41.

The subdued, yet sophisticated, colour palette is responsive to the multiple existing green tones used for the walls and draws inspiration from the subtle blues and greys found in the surrounding bushland. Refer to Photo 6.2.26 and Figure 6.2.34.

The design features four different noise wall designs (Type B, Type L, Type H, 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 (refer to Figure 6.2.35).



Photo 6.2.24 Existing green Hebel walls are inconsistent in colour and height



Photo 6.2.25 Photos showing existing bushland vegetation alongside the M2 Motorway. The proposed design is sympathetic to the bushland surrounds.



Photo 6.2.26 Photos showing colours in local Eucalypt barks which inspired the colour palette shown opposite



Photo 6.2.27 Hebel wall with horizontal pattern

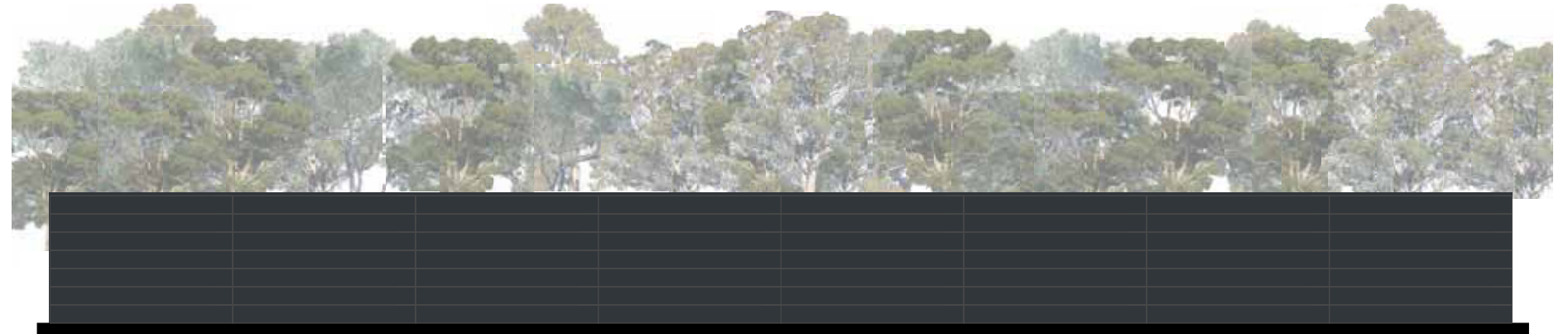
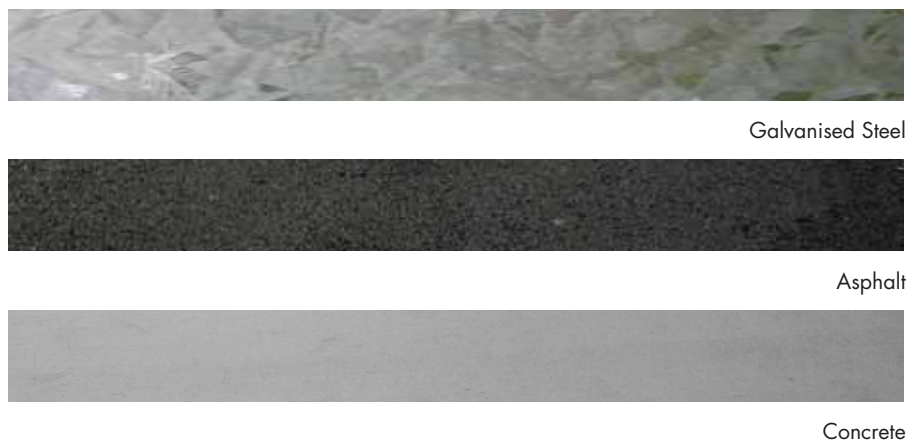
EXISTING WALL PALETTE



PROPOSED WALL PALETTE



MATERIALS PALETTE



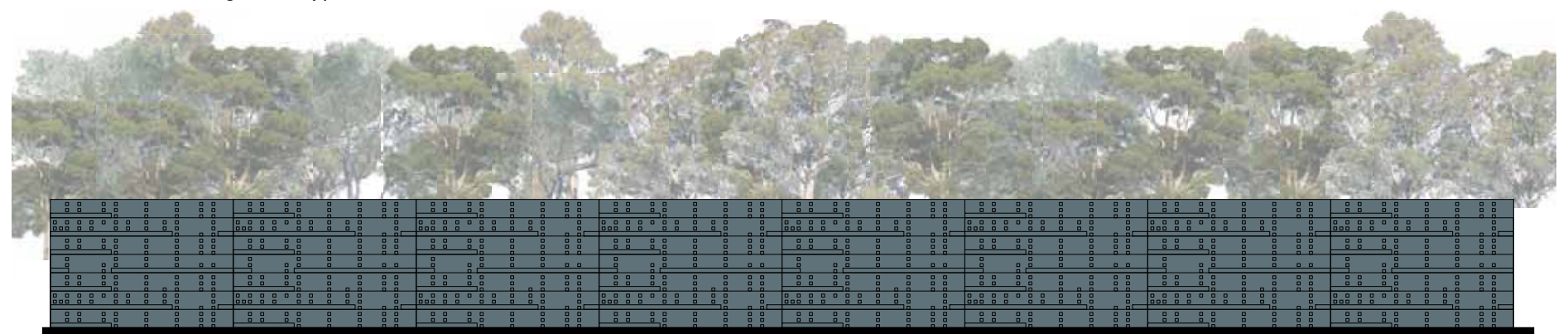
Wall elevation showing Panel Type B in Dulux Maximus



Wall elevation showing Panel Type L in Dulux Juvenile



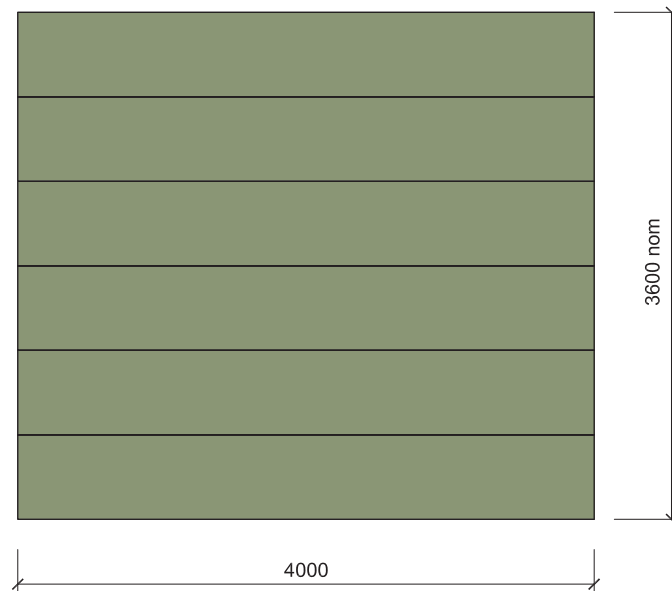
Wall elevation showing Panel Type H in Dulux Silkworth



Wall elevation showing Panel Type U in Dulux Loveday

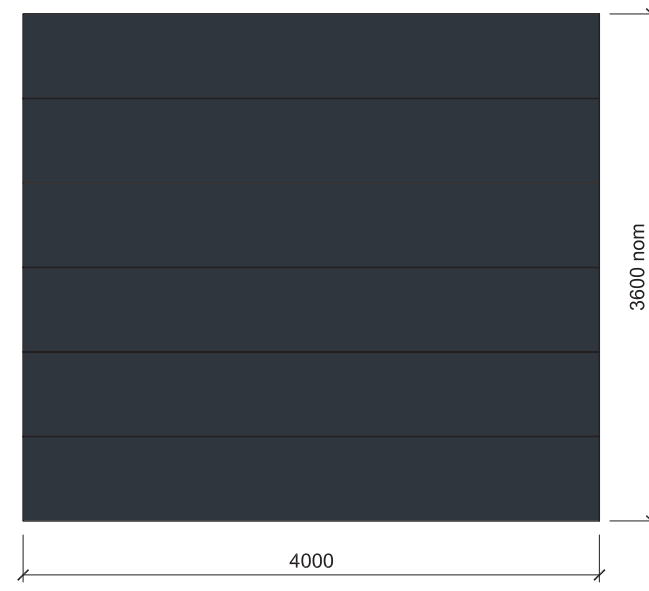
Figure 6.2.34 Colour Palettes and Elevations

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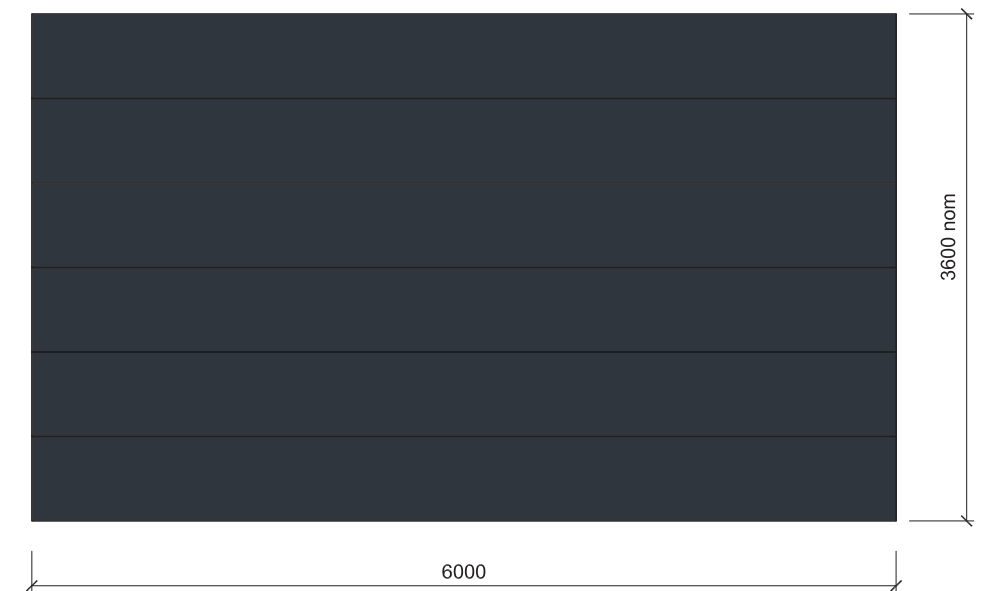
Existing Hebel Wall (E)

Colour: Various shades of green.
Existing hebel walls remain unchanged and existing colour is retained in the short term. In the longer term, the new colour palette is to be introduced as part of the maintenance regime.



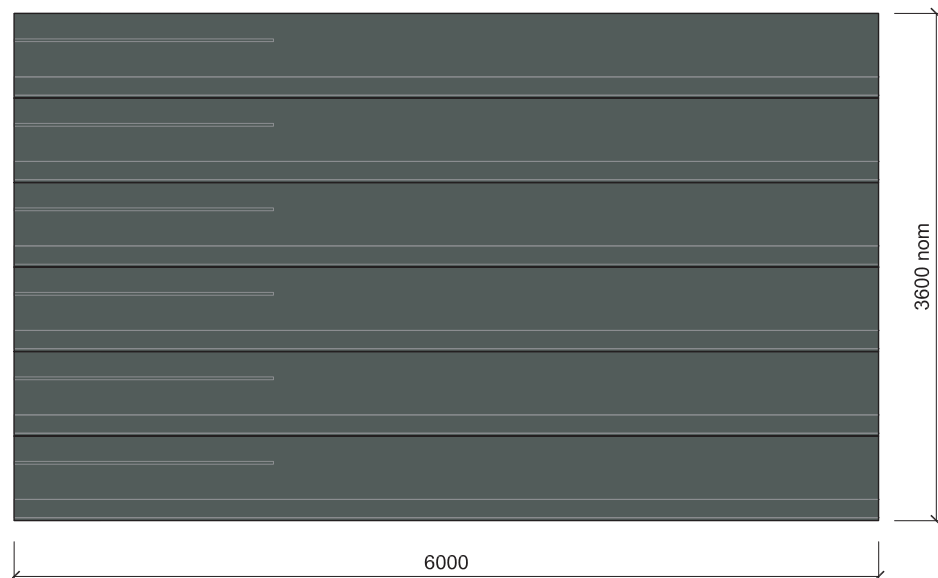
Basic Hebel Wall (B4)

Colour: Dulux Maximus
See SK-021 for details.
Used in all precincts where walls move away from edge of road and are on top of cuttings. 4000mm panels required where this wall connects into existing hebel walls.



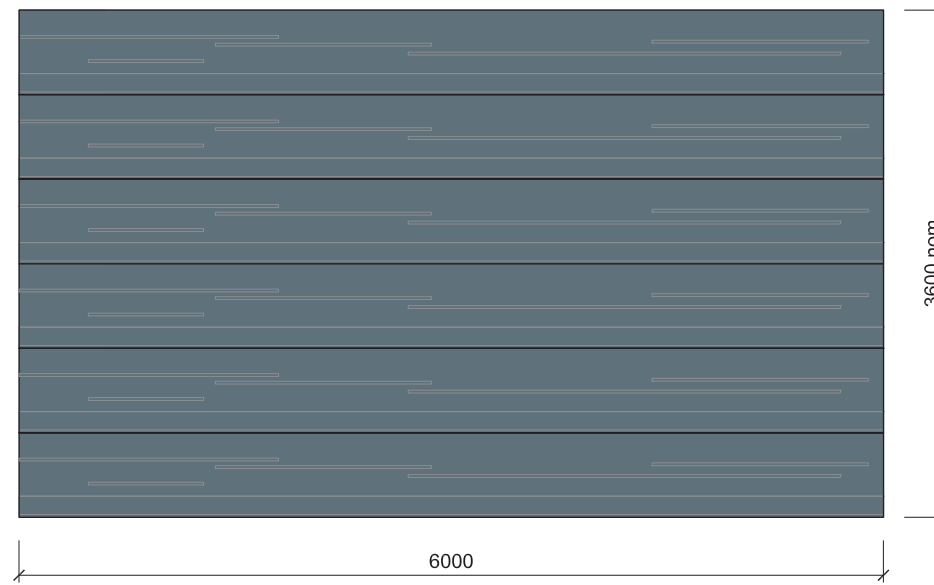
Basic Hebel Wall (B6)

Colour: Dulux Maximus
See SK-021 for details.
Used in all precincts where walls move away from edge of road and are on top of cuttings. 6000mm spacing required where this wall connects into new type L, H or U walls.



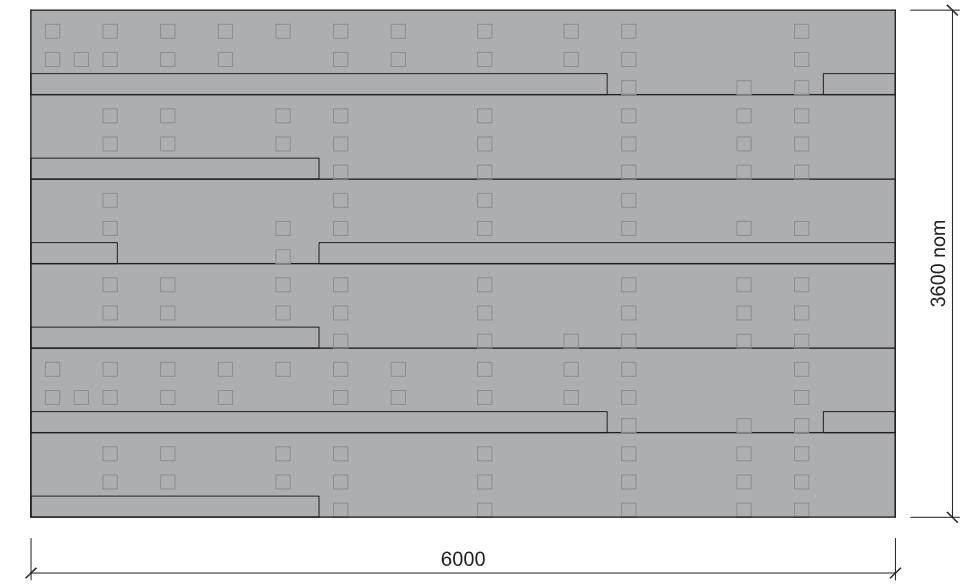
Light Stripe Hebel Wall (L)

Colour: Dulux Juvenile
See SK-022 for details.
Used predominantly in precinct 2.



Heavy Stripe Hebel Wall (H)

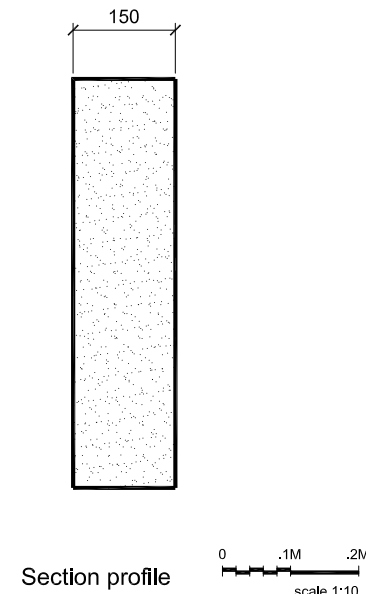
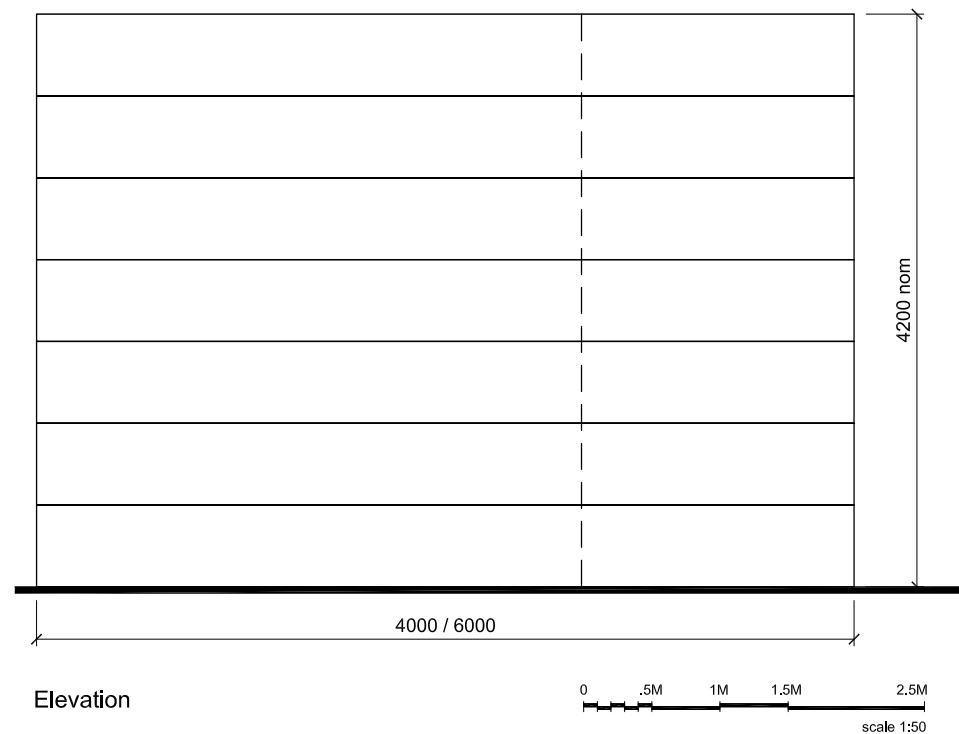
Colour: Dulux Silkworth
See SK-023 for details.
Used predominantly in precincts 3 and 4.



Heavy Stripe Hebel Wall (U)

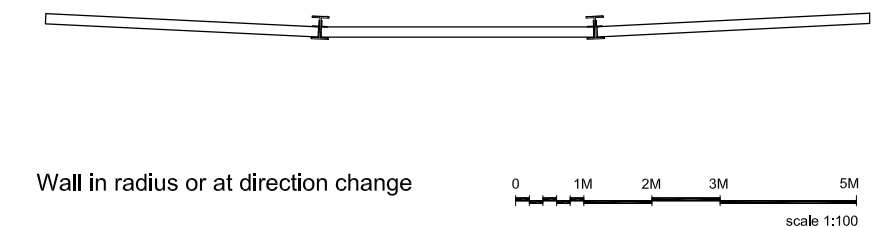
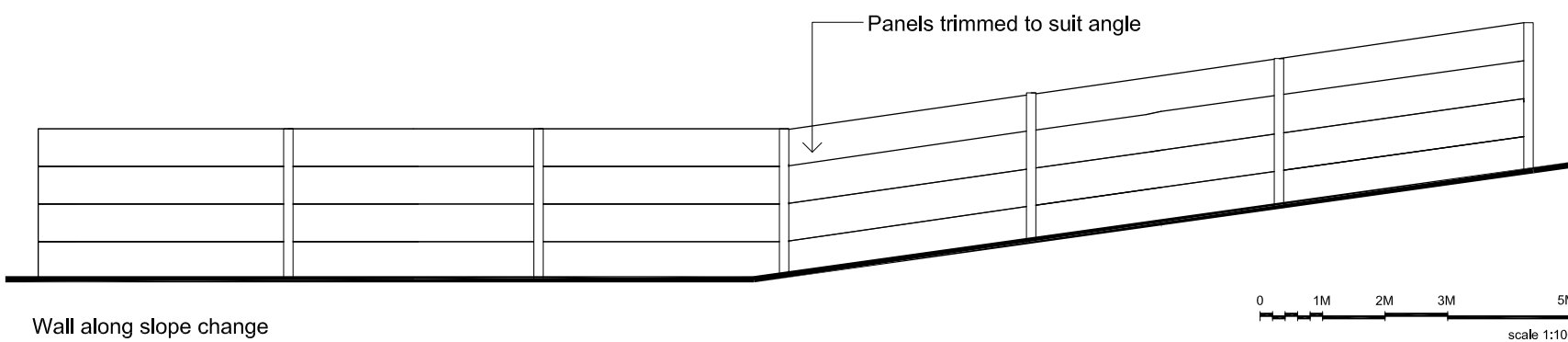
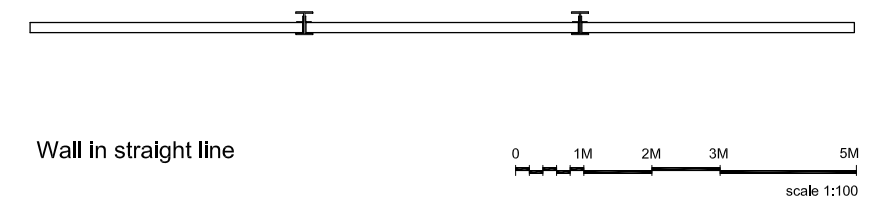
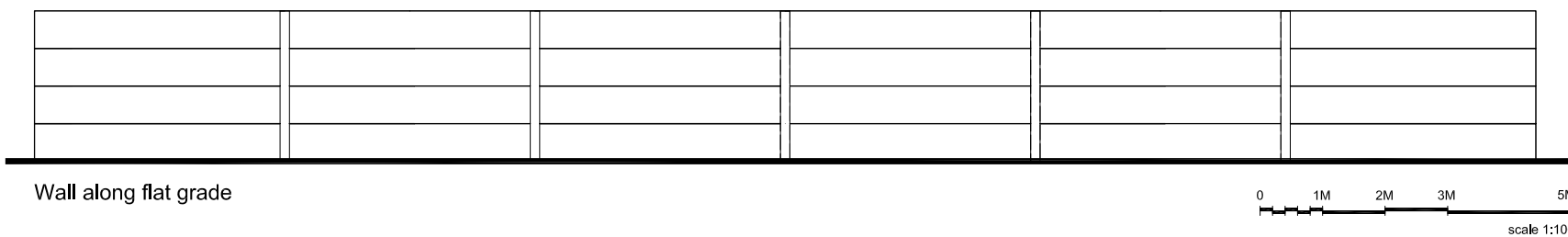
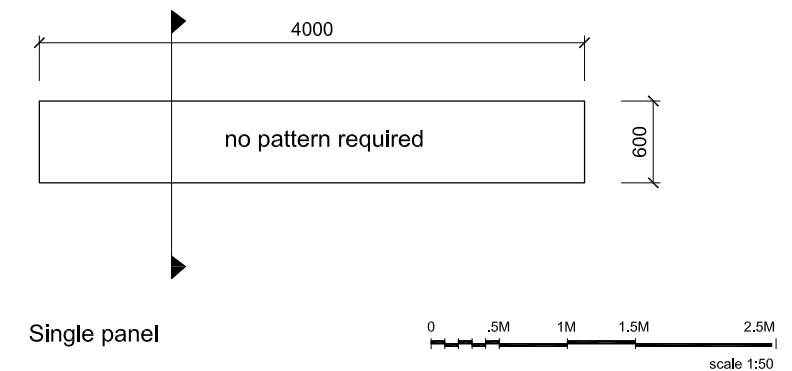
Colour: Dulux Loveday
See SK-024 for details.
Used predominantly in precinct 5.

Figure 6.2.35 SK-020 Noise Wall Panel Types



Panel Type B

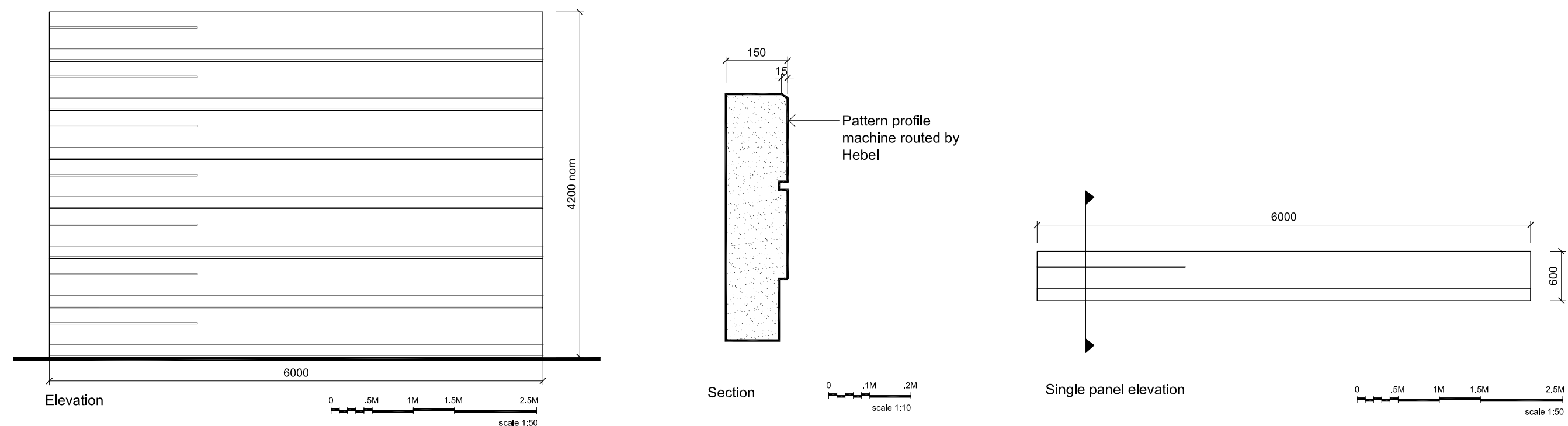
Type B (basic) wall is a simple wall with a horizontal emphasis created by the joins in the Hebel panels and is painted a very deep midnight grey/blue. These walls are intended for use when the walls move away from the road and follow tops of cuttings as well as to compliment and extend existing walls. These walls are designed in both 4 metre and 6 metre panel sizes.



Basic Hebel Wall (B)

A simple wall with horizontal emphasis. These walls are intended to form an uncomplicated recessive background in combination with existing walls. They are used where walls move away from the road edge and follow tops of cuttings. Used to extend existing walls and replace sections of walls where patterned panels are not being used.

Figure 6.2.36 SK-021 Noise Wall Panel Type B



Panel Type L

Type L (light stripe) walls are used predominantly in Precinct 2 and consist of a repeated horizontal stripe pattern which is machine routed into the panel surface. The panel is designed to retain horizontal continuity if topography necessitates stepping at regular intervals. These walls are to be painted a rich olive green and are used increasingly in conjunction with the heavily striped walls as Precinct 3 approaches.

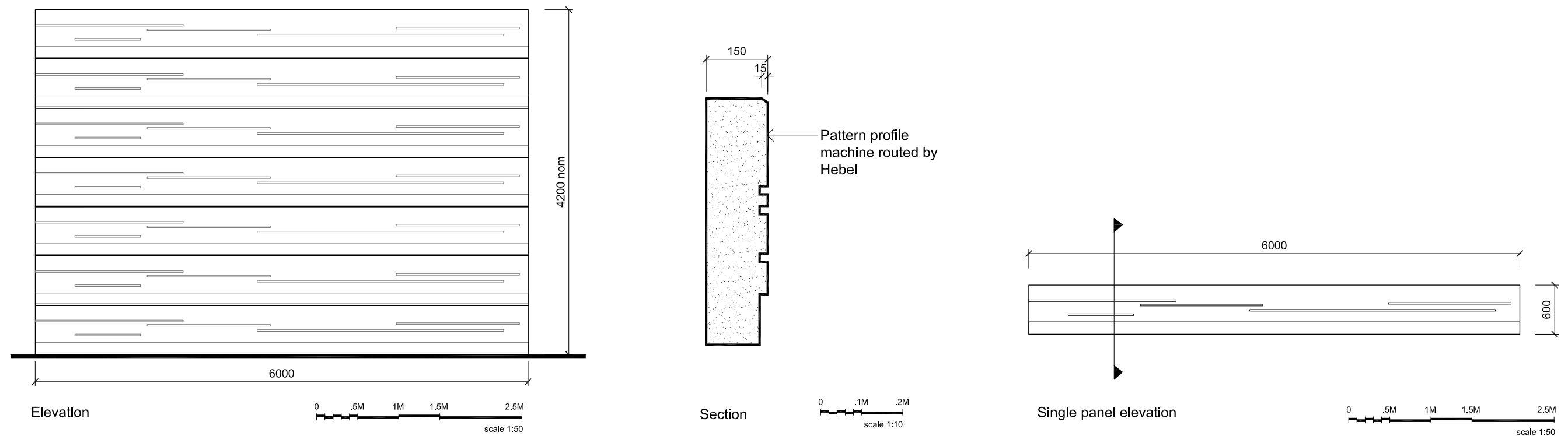
Light Horizontal Stripe Panel (Type L)

An elegant wall with repetitive horizontal elements. Simple horizontal pattern based on one 6000 x 600mm Hebel panel with machine routed banding. Used in areas close to edge of motorway and predominantly in Precinct 2. To ensure continuation of horizontal pattern, panels must be stepped 430mm or multiples of.

Figure 6.2.37 SK-022 Noise Wall Panel Type L

Panel Type H

Type H (heavy stripe) wall is featured in Precincts 3 and 4 and is a visually interesting striped pattern which is machine routed into the panel surface. These walls are to be painted a light grey. Continuation of the pattern is also achieved with this panel when stepped at regular intervals. This wall compliments Type L and Type U walls and is often used in adjoining circumstances.

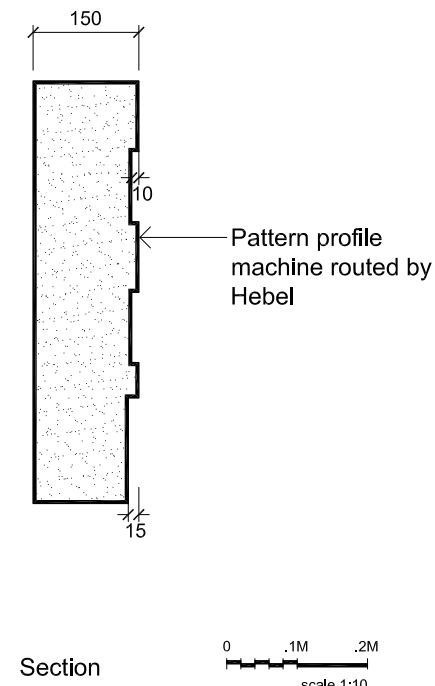
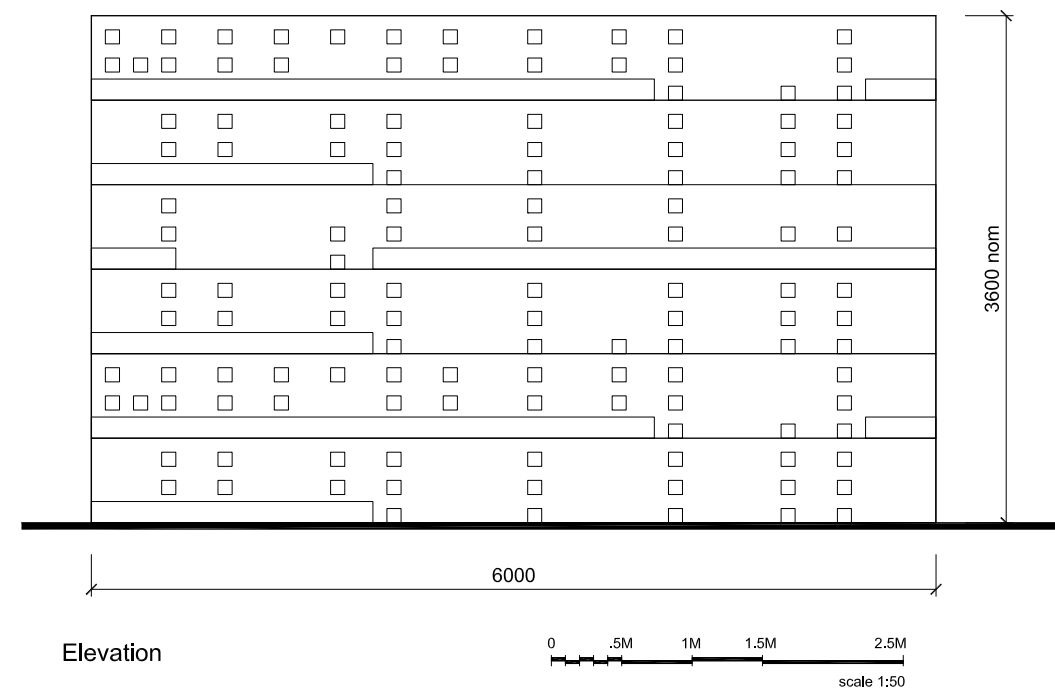


Heavy Horizontal Stripe Panel (Type H)

Visually interesting wall with more complex horizontal emphasis. A development of horizontal panel L, this pattern is a repetition of a 6000 x 600mm Hebel panel with machine routed banding. Used in areas close to edge of motorway and predominantly in Precincts 3 and 4. To ensure continuation of horizontal pattern, panels must be stepped 200mm or multiples of.

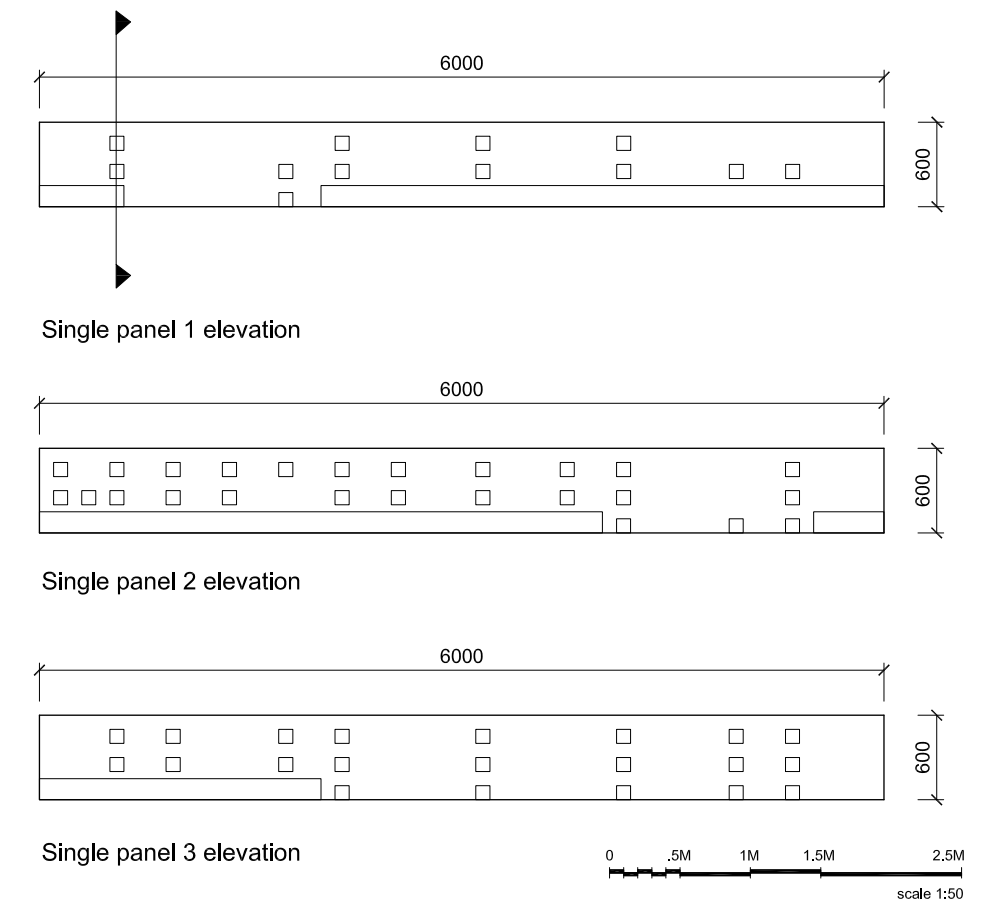
Figure 6.2.38 SK-023 Noise Wall Panel Type H

Urban Design Concept



Panel Type U

Type U (urban stripe) is used in Precinct 5 and introduces a vertical element into the horizontal pattern resulting in a more complex repetitive pattern. This highlights the increased urbanisation of this precinct. This panel is designed to be painted a steel blue colour.



Urban Pattern Hebel Panel (Type U)

A visually interesting wall with horizontal and vertical emphasis. The more complex pattern is appropriate in more urban environments. A 6000 x 600mm Hebel panel with machine routed banding. Stepped panels will be at regular intervals of 600mm to ensure continuation of horizontal pattern.

Figure 6.2.39 SK-024 Noise Wall Panel Type U

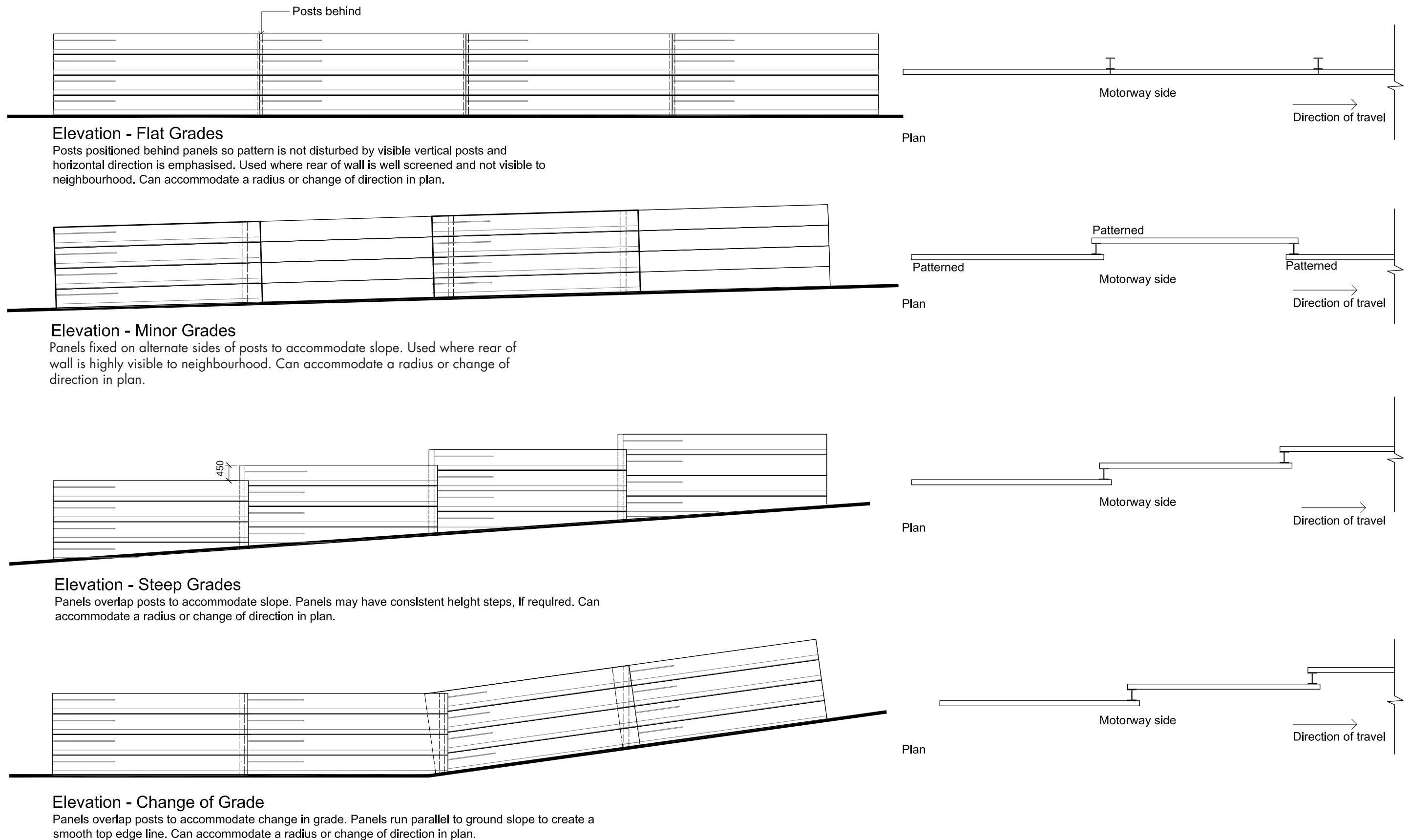


Figure 6.2.40 SK-026 Patterned Noise Wall Panels At Slope Changes

Urban Design Concept

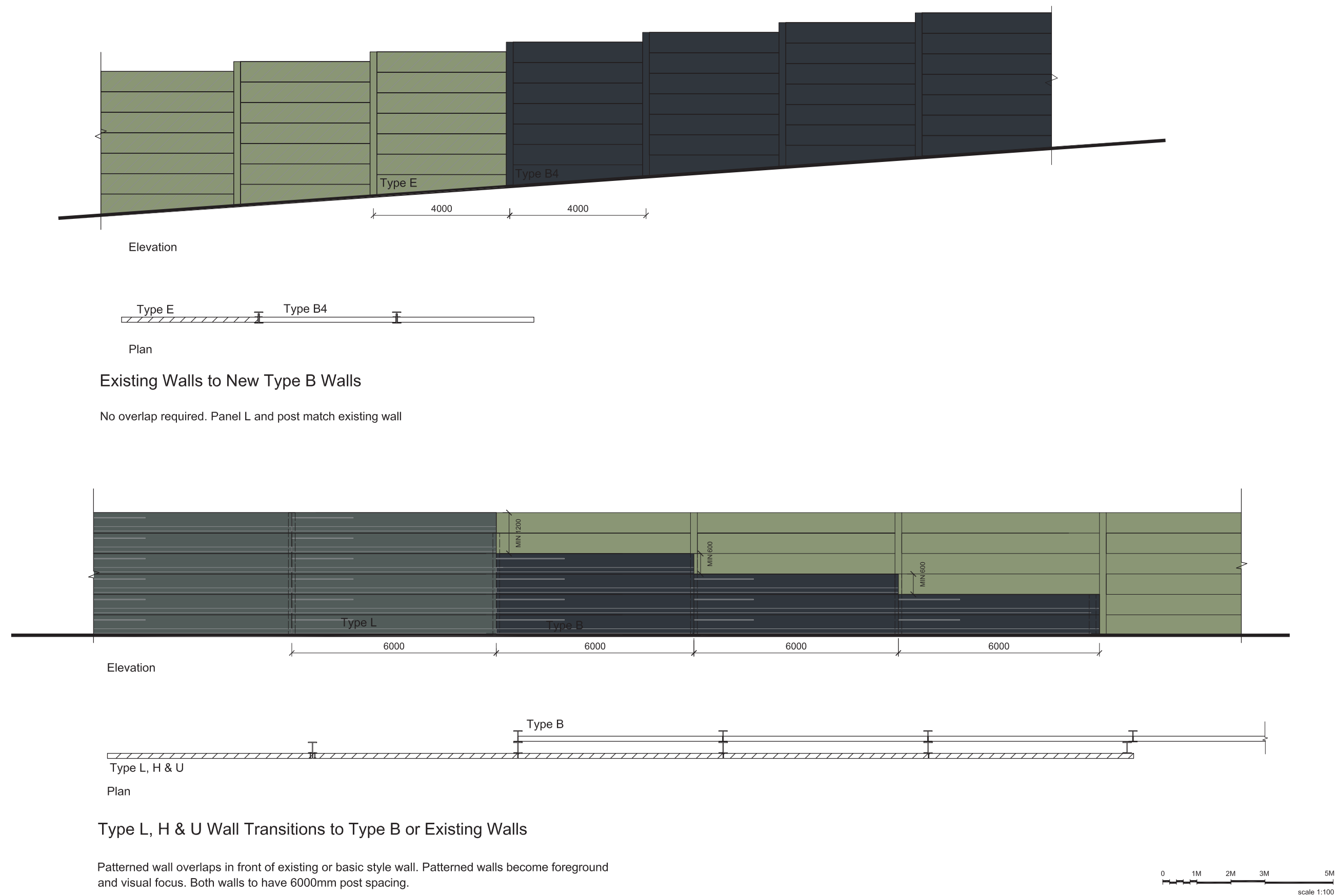
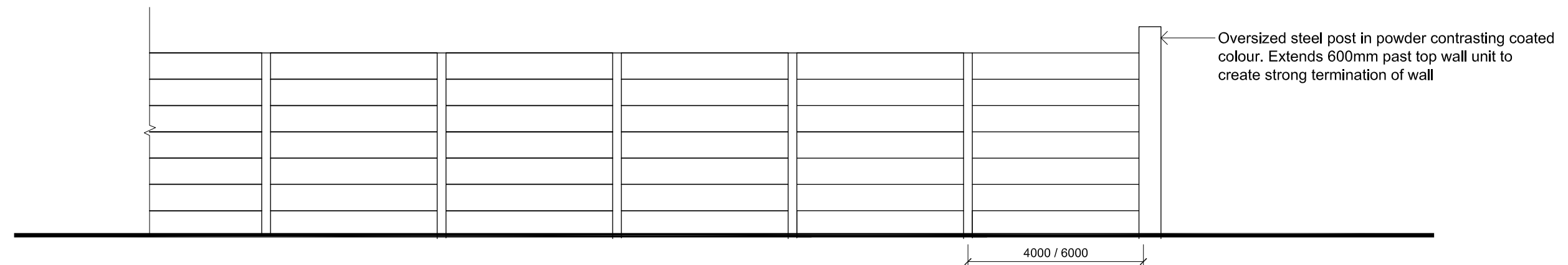
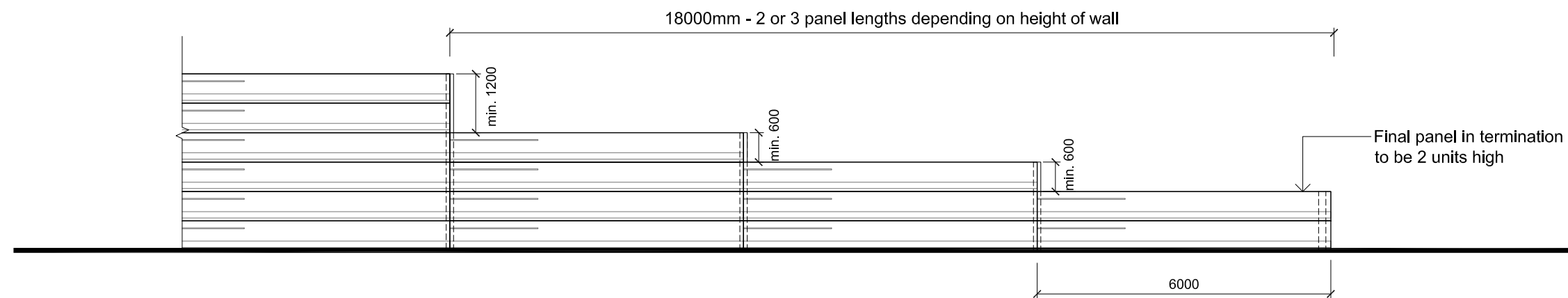


Figure 6.2.41 SK-027 Noise Wall Transitions



Type B Basic Wall Termination

Post termination ends wall in a strong visual composition.



Type L, H and U Patterned Wall Termination

To be used where space allows. Stepped 2 or 3 panel termination brings wall visually back to ground plane.

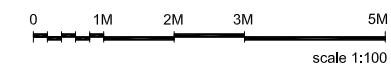


Figure 6.2.42 SK-028 Noise Wall Terminations

Urban Design Concept

6.2.4 Road Furniture

In general, items of road furniture will be selected from manufacturers' existing product ranges. Selected items will be closely integrated with the overall design philosophy and character of the urban design scheme and are seen as essential design components.

Lighting

All lighting will conform to the Scope of Works and Technical Criteria and will minimise light spillage into sensitive areas, including Lane Cove National Park, Bidjigal Reserve and residential areas. The location of light poles is detailed in the engineering drawings.

Motorway

Motorway lighting is required at various locations along the route including on and off-ramps. The selected light pole is a galvanised steel tapered circular hollow section with a curved outreach arm to match existing light poles currently used on the M2 Motorway.

Local roads

Lighting will be provided on local roads at interchanges and intersections with the highway. The design and installation of lighting will be compatible with existing lighting systems and standards on adjacent roadways, walkways and public spaces and will comply generally with the requirements of the relevant Authorities and Councils. Where existing street lighting is modified, the final lighting will not result in a standard of lighting less than that existing prior to the modifications.

Bridges

Where required, street lighting on bridges will be fully integrated into the parapet and rail design. Lighting installed on the underside of bridges, if required, will be fully integrated into the soffit of the deck or girder or mounted on piers.

Pedestrian Underpasses

At Vimiera Road underpass (which is being lengthened) provision of light fittings will be vandal proof or housed in vandal proof enclosures, but not so that the enclosures will affect the lighting performance of the luminaires. The light fixture will be mounted on the bridge piers or underpass soffit, and located to ensure that light will wash the underside of the bridge, maximising the apparent height.

Signage

The graphic design of highway signs is an important element of road consistency. The design of all signage required for road safety and directional signage will be based on the RTA road sign standards and located according to their guidelines. The location of regulatory signs will be detailed in the engineering drawings. Wherever possible, signs will be located to minimise impacts on important views from the highway and to eliminate the use of excessive or unnecessary signage.

Safety Barriers

The selection of safety barriers will be carefully designed in regards to urban design, traffic safety, sightlines, context and consistency.

The urban design objectives for the safety barriers are:

- Consistency with existing barrier types used on the M2 Motorway or on local roads;
- Minimisation of types across the length of the project;
- Maintaining views and vistas by using transparent barrier types; and
- Importance of a smooth top edge for concrete barriers, as it is this that catches the eye

In addition to bridge parapets described in an earlier section of this report, barriers used in the project comprise wire rope safety barriers (Refer Photo 6.2.4.1), Type F concrete barriers (Refer Photo 6.2.4.2), G4 guard rails (Refer Photos 6.2.4.3) and thrie beam barriers (Refer Photo 6.2.4.4) at bridge approaches. In general, wire rope barriers should be used wherever possible because they are less visually intrusive than the other types and less disruptive of views from the motorway. Where bridges are being extended, the bridge parapet will match into the existing safety barrier on the local road.

Toll Gantries

Additional electronic toll gantries will be located at entry and exit points to the M2 Motorway. The style of gantry will be similar to that of the existing used on the motorway and the location will be carefully co-ordinated with retaining walls, noise walls, safety lighting and other built elements.



Photo 6.2.4.1 Wire Rope Barrier

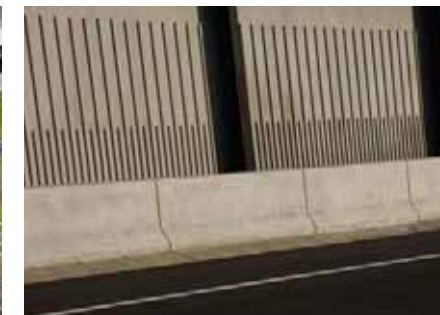


Photo 6.2.4.2 F Type Barrier



Photo 6.2.4.3 G4 Barrier



Photo 6.2.4.4 Thrie Beam Barrier