

**Western Highway Duplication
Rethinking Section 2B
Buangor – Ararat**

An Occasional Paper on Smarter Infrastructure

Paper No. 6
Is the Northern Option superior?
Engineering considerations



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An Occasional Paper on Smarter Infrastructure
15 August 2026

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1. About KORS Inc.

KORS Inc. (Keep the Original Route Supporters) is a community-based organisation, and comprises environmental advocates, local Victorian residents and affected landholders. Since 2015, we have supported completion of the Section 2 of the Western Highway Duplication but have advocated reconsideration of the approved southern deviation between Buangor and Ararat. We propose an alternative route for half of this stage.

2. Summary

Option 1: an Invasive route.

We are concerned about the planned route of Section 2B of the Western Highway duplication (Buangor to Ararat), because it includes a deviation into hilly farmland and remnant bush. The deviation is or was:

- destructive, disruptive, and overly expensive and it does not have to be.
- chosen on incorrect information (Endnote i¹).

The deviation, on the southern option (the approved “Option 1” or the planned route):

- requires two new carriageways,
- requires four major bridge structures,
- requires extensive earthworks and
- requires borrow pits and drainage blankets.
- penetrates a new valley

The Northern Option: a better route.

The Northern Option under our proposal:

- uses existing road infrastructure,
- is flatter and drier
- has one fewer bridge, **reduced earthworks, faster, safer and cheaper construction**, lower emissions.

Environmentally, the Northern Option:

- does not cut through natural corridors,
- avoids the cutting and linear-narrowing of Hillside Road, and
- avoids Spring soaks, scattered large trees, rare habitat and critically endangered remnant vegetation and a significant Aboriginal cultural place.
- has a **footprint one quarter the size**,

This paper shows that the Northern Option is:

- well-researched,
- a realistic option as a lower impact route.

Effective design work.

Impacts on the **Northern Option** can be reduced by design work. By contrast, Option 1 has a greater range of impact types, and some unavoidable impacts like fragmentation and cutting natural corridors, impacts that cannot be reduced much by design work. These are avoided on the Northern Option. Work to minimise the impacts on the Northern Option is more effective, producing a longer list of benefits that include avoiding corridor cutting and fragmentation. Design work that reduces extensive on-ground works pays for itself.

Techniques to reduce impact

There is a number of standard road-design items available to reduce the impact-width, such as curb and channel drainage and wire rope barriers, listed in the endnotes.

Can it be done?

Three highly experienced independent engineers say renovating the existing highway and adding a new carriageway with a maximum disturbance width of 16 metres on each carriageway on most of the 5.2 kilometres **can be done**.

With a disturbance width of mostly 16 metres, the Northern Option will cause significantly less overall destruction of native vegetation and habitat and it **will avoid a large “fresh cut”**¹ in the landscape. Even at 20 metres wide, it is superior environmentally. It will also be quicker to build, cheaper and safer.

VIDA’s opinion based on misleading 2016 report

VIDA’s says that the Northern Option cannot be built with the low impact we have calculated. This opinion stems from a misleading 2016 VicRoads report that:

¹ Separate to the extent of destruction of native vegetation, fresh cuts are a different kind of damage. Fragmentation divides remnant bush into smaller pieces by adding barriers into the landscape. These degrade the patches’ capacity to support life.

- overstates the necessary width on the Northern Option by around 2-fold (tree impact then jumps around 5-fold);
- includes irrelevant tree and habitat impacts; and
- understates the impact Option 1 by using deficient native vegetation data for that route.

Our request

Please contact the Premier, the Honourable Benn Carroll, at:
ben.carroll@parliament.vic.gov.au or on phone (03) 9651 5000,

and

the Roads Minister, the Honourable Paul Hamer, at:
reception.hamer@parliament.vic.gov.au or on phone 03 9898 6606

Suggest that the fastest way to: finish this project, and

- better protect and avoid the significant Aboriginal area on the east end,
- the Golden Sun moth habitat,
- the hills,
- the critically endangered grassland community and
- a suite of threatened species on Hillside Road and the farmland

is to adopt the Northern Option, designed to have 16 metres of disturbance-width.

3. Introduction

The Southern Option (the approved “Option 1” or planned route) route for widening Western Highway between Buangor and Ararat is described as:

- “**Intrusive**” in the Government’s February 2013 Planning Panel report recommending it;
- “**brutal**”² in a letter to a former Roads Minister.

VicRoads staff on the Highway duplication team agreed the planned route is very invasive, presumably because:

- it requires **heavy earthworks, borrow pits, four major bridge structures and drainage blankets**.
- it **severs** farmland;
- it **penetrates** a new valley;
- it runs high up on **the side of a ridge**, so it is very visible for around 15 kilometres to the south;
- the ridge will act as **noise reflector**, rather than as a useful barrier as at present.
- **headlights** will sweep over the land at night, as vehicles turn on hillsides.

² Experienced independent traffic engineer Jim Higgs described the southern deviation on the approved alignment (Option 1), as “brutal”, in a 2016 letter to the Roads Minister Luke Donnellan.

In contrast, the Northern Option has:

- a footprint **one quarter** the size, by using the existing highway and the flatter land.
- **simpler bridge works:** One new bridge – one new structure, one upgraded structure.
- **reduced earthworks:** much flatter terrain, therefore far less excavation, fill, and rock cutting. Better balance of cut and fill.
- **faster and cheaper build:** Reduced construction time and material needs.
- **safer and cleaner delivery:** Fewer machinery movements, lower emissions, and reduced worker exposure to construction- and traffic-risk.
- **avoids wet areas,** no drainage blankets needed.

4. Can the Northern Option be built as proposed?

If equivalent transport outcomes could be achieved faster, more cheaply and with significantly less environmental and cultural damage on an alternative route, then that option deserves proper consideration. There is time to give this consideration.

Our proposal is based on expert advice

We rely in these papers on advice from independent industry experts – three engineers, three environmental assessors, a traffic planner, a cultural heritage assessor and an economist, all with at least 30 years' experience, and one with international experience. Around half the documents and opinions received were provided to us with no incentive other than improving public process.

It can be done

A construction engineer and two traffic engineers have supported 16 metres³ as a feasible target maximum width.

A slimmer worksite and a minimum final facility width:

- is not as convenient for roadbuilders, but
- is commonly done where there is no other choice, as in cities, where the necessity of a slimmer worksite is accepted and
- can be safely built as much of the new roadway is not close to traffic.

³ The engineers have advised KORS that in this situation, with a relatively flat and straight piece of road, it is feasible to build a high-speed highway with no disturbed ground beyond the edges of the road, stopping lane and its drainage. The guiding philosophy of "context sensitive design" allows engineers to vary from the usual buffer widths. The traffic lanes (7 metres), stopping lane (3 - 4 metres), wire-rope stretch-zone or drainage batter (2 metres), and righthand shoulder (1 metre) and righthand stretch-zone or drainage batter (2 metres) take up 15 or 16 metres. We have allowed an average of 17 metres, mostly at 16 metres.

One of the engineers, independent civil engineer David Clark, has given his opinion in a 2016 affidavit to the Supreme Court.

Design effort is justified on Northern option

Extra Northern Option design effort is well worth it, financially and ecologically.

Impacts on the **Northern Option** can be reduced by design work. By contrast, Option 1 has a greater range of impact types and some unavoidable impacts like fragmentation and cutting natural corridors, impacts that cannot be reduced much by design work. These are avoided on the Northern Option. Design-work to minimise the impacts on the Northern Option is more effective, producing a longer list of benefits that include avoiding corridor cutting and fragmentation. Design work that reduces extensive on-ground works pays for itself.

VicRoads has reduced the width of works on the planned Option 1 route. However, this design effort is not well used because Option 1, when slimmed:

- still does not avoid all the natural assets that are avoided on a slimmed Northern Option,
- is still a “fresh cut”, fragmenting the landscape.

Keeping the Northern Option slim

- Design-work can minimise impact from the Northern Option by at least six standard design itemsⁱⁱ including **curb and channel drainage, wire rope barriers** and increasing “**crossfall**” on the road. See Endnote iii for a more detailed list.
- The public trusts road authorities to do minimum harm. Many people are not aware there is usually scope to reduce impact. Figure 1. shows people who were aware of this scope.



Fig 1. At the edge of the Western Highway, Buangor, a child holds a sign calling for a slimmer road, to be fitted in with less damage. Existing roads have successfully been put on “diets” in some American cities.

How We Estimated Environmental Impact

To calculate vegetation impacts, experienced vegetation assessor Lincoln Kern⁴ used:

- a carriageway centreline designed⁵ by traffic engineer Higgs⁶, for 110 kph traffic
- the disturbance width (16 metres) advised by construction engineer David Clark and
- maps of the native vegetation cover along the route

Kern showed that this alignment can carry 110 kph traffic with environmental impacts significantly lower than on the planned route. The report is available on request.

The result: Northern Option impact

The groundcover impact area is calculated from an average disturbance width of **17 metres** for the whole 5.2 kilometres on the Northern Option. **The width** used for calculating most of the route was 16 metres (with a short length at 20 metres wide). See endnotesⁱⁱⁱ for impacts if the disturbance is wider than 17 metres.

At **17 metres** average (mostly 16 metres):

- the groundcover impact is around 15% lower than the impact on the planned route.
- all other measures of environmental impact are around:
four-fold better than the planned route.

5. Government position based on inaccurate report

Senior VIDA (formerly VicRoads) staff say the Northern Option drawn by traffic engineer Jim Higgs could not be built within the 16-metre disturbance-width we have used in calculations.

VIDA staff take the Northern Option impacts from a 2016 report about **VicRoads' version of the Northern Option**. But this version is **misleading and overstates the impact** because it:

- has a **wider-than-necessary disturbance** width of around 38 metres per carriageway and so overstates tree loss. (In environmentally sensitive areas, VIDA's preferred width is 25 metres, though this has not been implemented here.)
- is **300 metres longer** than the Northern Option - this covers an area of Golden Sun Moth habitat that is **unaffected by the Northern Option**, and
- makes an **unnecessary side-road alteration** through bush, further increasing apparent Golden Sun Moth and tree impacts.

The VicRoads report :

- **uses outdated vegetation data** on Option 1, and so
- **understates** Option 1 impact on Golden Sun Moth habitat, and native vegetation – both better on the Northern Option (up to 18 metres, for native vegetation)

The report does not consider:

⁴ Principal at Practical Ecology (consultants), Preston

⁵ The drawing is only 2D, but we are advised that since the Northern Option is mainly on relatively flat ground, 3D data is not essential.

⁶ As in his affidavit lodged with Supreme Court October 2016

- **fragmentation, patches of critically endangered grassy woodland, Spring soaks, or natural corridors**, - all better on the Northern Option

In addition, the Northern Option is better on:

- **Large Old Trees**, farm severance, Aboriginal heritage, construction financial cost, construction time, construction safety, noise and light pollution and greenhouse gas emissions.

Further, the selection committee, which lacked ecological expertise, was influenced by the idea that “connectivity” was better on Option 1 but:

- this misconstrues the idea of landscape **connectivity**, which **is degraded by adding a barrier** to the landscape
- it overlooks the extra **landscape barrier added under Option 1** and the highway-fringing vegetation, beneficial for connectivity, along the Northern Option carriageways. Only one carriageway is added under the Northern Option and the barrier width added is much less.

6. Local access and Powerlines

Three local access points on the north of the highway:

- can be accommodated with a **“U turn” facility** at either end of the relevant stretch on the duplication. (U turns have been **used on earlier stages of the duplication** and are permitted on this type of road.)
- for extra safety, **flashing lights** could be used, if considered necessary, as on the Hume freeway, when a vehicle enters the highway from a side road or is making a U turn.

The powerlines, which have been shifted all along the duplication so far, could go:

- **where Option 1 is planned** to go, or
- in a **cleared strip through a bushblock** next to the highway, or
- beside the railway line where there is a **vehicle track** or
- a combination of close to where it **currently runs** and short sections of **undergrounding**

7. Photographs comparing earthworks

The following photographs, Figures 2-4, give an idea of the earthworks currently planned on Section 2B.



Fig. 2. This photo shows *part* of the Box's Cutting near Beaufort. The total excavation here is around the same size as what is planned on the Buangor to Ararat section of the duplication, as established by Figure 4.



Fig. 3. This is the part of the landscape where the earthworks would be imposed.

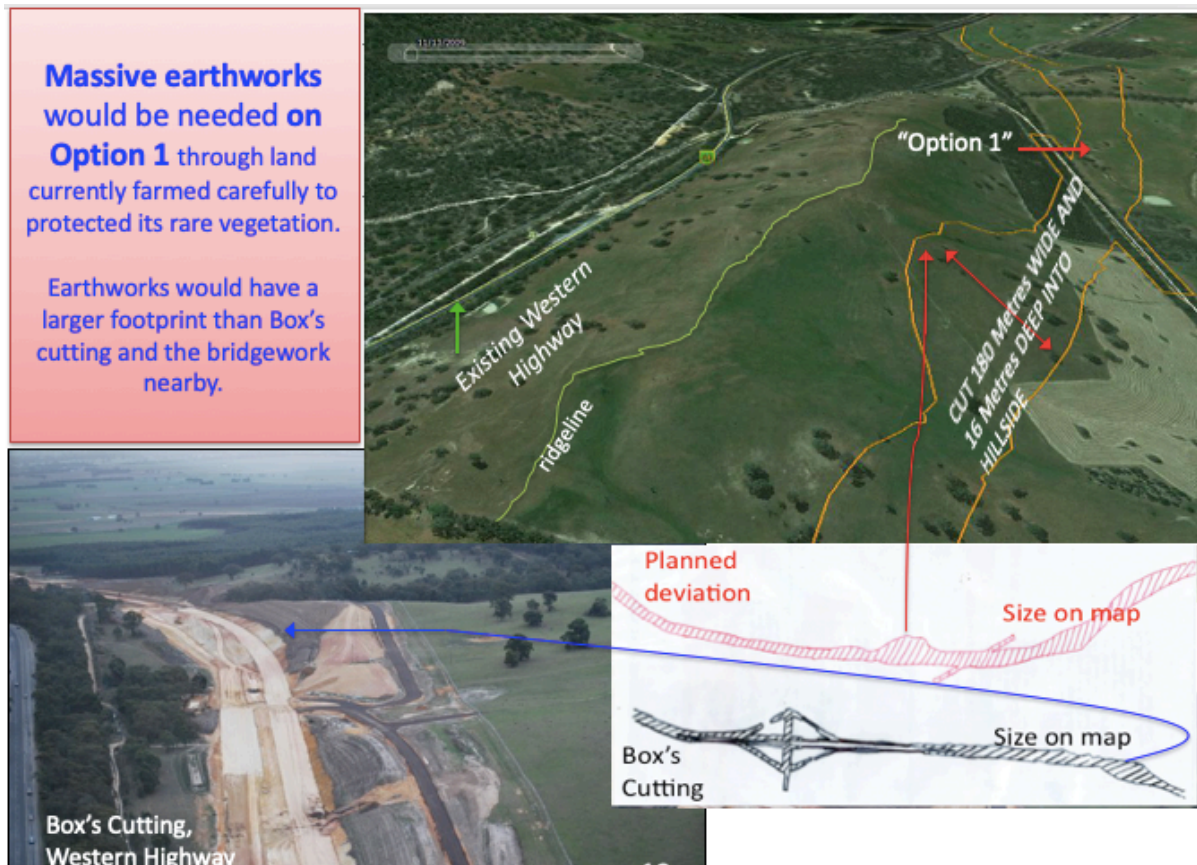


Fig. 4. The inset in this diagram shows that the plan-area of earthworks shown here for Option 1's deviation (in red) is larger than for Box's Cutting (in black).

8. Our Message to You

Please contact the Premier, the Honourable Benn Carroll, at:

ben.carroll@parliament.vic.gov.au

or on phone (03) 9651 5000.

and the Roads Minister, the Honourable Paul Hamer, at

reception.hamer@parliament.vic.gov.au

or on phone 03 9898 6606

Just a quick email to:

- ask the Minister to get it right before proceeding further with the project. Remember, avoidable impacts on Option 1 have held the road up for years.
- ask why the Government is still planning to waste over \$60 million on unnecessary and damaging earthworks on Section 2B of the Western Highway duplication.
- suggest the fastest way to finish this project and better protect the significant Aboriginal area on the east end, the Golden Sun Moth habitat, the hills, the critically endangered grassland community is to adopt the alternative route, at 16 metres, with lower overall impact and faster construction as a bonus.

ENDNOTES

ⁱA review from Biosis, commissioned by VicRoads, and a second independent review, from Ecology Australia, of the EES' environmental chapter found the chapter was, unfortunately:

1. Not accurate enough to use for route-selection,
2. Incomplete and
3. Not compliant with legal requirements.

At least seven government-funded reports significantly revise aspects of the environmental and cultural heritage impact. Here is a list of reports **commissioned or paid for by VicRoads/Major Road Projects Victoria**, reporting errors in:

"Ecology and Heritage Partners, 2012, Western Highway Project: Section 2, Beaufort to Ararat, Victoria, EES, Chapter 13 and Appendix H Biodiversity and Habitat Impact Assessment Report – Flora, Fauna and Ecological Communities. Prepared for: VicRoads."

- A. VicRoads Media Release, "Tree Discrepancy Investigation Complete" 15 November 2015, *conceding that the Route selection Panel was told number of large old trees threatened was 221, when in fact it was 1645. After the planned tree-loss was publicised, more design effort reduced the total threatened from 1645 to 1148 on the whole of Section 2, with 263 Large Old Trees of them planned to be destroyed on Section 2B.*
- B. VicRoads, March 2015. "Western Highway Duplication Section 2 Beaufort to Ararat: **Underestimation of Large Old Trees** within the Environment Effects Statement, Review of native vegetation accounting and environmental planning to identify key learnings and improvement opportunities, Prepared by VicRoads senior environmental and heritage advisor Matt Mooney." *The number of Large Old Trees expected to be killed on the whole of Section 2 was reported to the route selectors to be 221 but this rose to 1645 in 2015. This error, checkable on an aerial photograph, was indicative of many other errors.*
- C. Biosis, dated April 2016, "Western Highway Project Stage 2B Independent Review" Project no. 21603, (commissioned by VicRoads December 2015, first draft complete January 2016, released June 2016) – *Concludes that the environmental chapter of the EES was not compliant with Victorian assessment protocols due to incompleteness, misclassification and data errors, and was not suitable to use for route selection.*
- D. Ecology and Heritage Partners, letter, 12 April 2016, "Assessment of Degraded Treeless Vegetation for the Western Highway Project, Section 2", reference 7919.- *Concedes that vegetation discounted as "Degraded Treeless Vegetation" was in fact native vegetation, adding a balance-shifting 2-3 hectares to the total along the deviation of Option 1.*
- E. Ecology and Heritage Partners, 29 May 2017, Ecological Assessment: Western Highway Project, Section 2B, prepared for VicRoads, Project Number 9237 – *Reports some of the additional 28.73 hectares of GSM habitat overlooked on Option 1's deviation (with an extra 32.34 hectares permitted to be cleared). It also indirectly reports an additional 6.11 hectares of native vegetation on Option 1. This includes what had been dismissed as degraded Treeless vegetation. The area of native vegetation rose from 10.61 hectares at route selection in 2013 to 31.85 hectares in 2018. Another 15.13 hectares were reported by Blue Devi Consulting in 2015 (10.61 + 15.13 + 6.11 = 31.85).*

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- F. On Country Heritage and Consulting, 7 December 2018, Sponsor: Eastern Maar Aboriginal Corporation, “Community consultation on two culturally significant trees along the proposed Western Highway Duplication, between Buangor and Ararat, Victoria”, (paid for by VicRoads/MRPV).- *States that **scarred trees and birthing trees were not reported in 2012 EES.***
- G. DCCEEW, 13 January 2021, “Variation of Conditions attached to Approval Western Highway Project Section 2- Beaufort to Ararat, Victoria (EPBC 2010/5741)”. *Maps **an additional 28.73 hectares of Golden Sun Moth habitat** on the deviation. Half a hectare is enough to trigger EPBC processes in other situations.*

In addition, we have another three reports from environmental assessors, two expert witness statements from ecologists, a desktop study from a cultural heritage assessor, affidavits from construction engineer David Clark, and from traffic engineer Jim Higgs, and engineering drawings from traffic engineers Jim Higgs and Andrew O’Brien. All these specialists are independent.

ii Some design items that can be used to reduce the width of disturbance on the Northern Option:

- using **curb-and-channel drainage** with frequent small-cross drains under the road – no table drains;
- using **rigid safety barriers or wire rope barriers** instead of clear zones, with steeper, reinforced batters and closer uprights on the wire rope barrier, if necessary,
- increasing the **road’s slope** from side to side on curves to make slightly lower radius curves safe – within specifications for high-speed roads of course. This scope has not been used in the Higgs drawing.
- **importing around 5% of the earth volume** to be cut on Option 1 to raise the level of the Northern Option. This would reduce the width of the cut needed to construct drainage.
- using as much of the **existing road area** and disturbed roadside area as possible;
- a **3-metre stopping lane**, rather than a 4-metre one, as done on some earlier stretches of the duplication.

iii At **18 metres** average (mostly 17 metres):

- the Northern Option is superior environmentally, though the groundcover impact is then similar to Option 1’s.

At **19 metres** average (mostly 18 metres):

- groundcover loss is slightly greater than Option 1, except if you take account of Option 1’s **unrecorded but planned clearing of several hectares of critically endangered vegetation** along Hillside Road, to accommodate the two-way truck-traffic arising from the planned interchange. (No trucks currently use Hillside Road)

At **20 metres** average (mostly 19 metres), the Northern Option remains superior on:

- **fragmentation, · Large Old Trees, · Golden Sun Moth habitat, · patches of critically endangered grassy woodland, · Spring soaks, · natural corridors, · farm severance, · Aboriginal heritage, · construction financial cost, · construction time, · construction safety, · noise and light pollution and · greenhouse gas emissions.**