



**Feasibility Report for Sealing the
Western Explorer**

Prepared for
Department of State Growth

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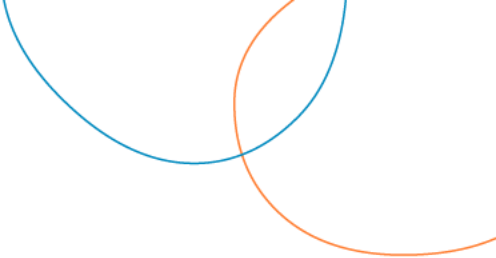
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Executive summary

The Western Explorer Road is a 74 kilometre long gravel road that connects Corinna on the West Coast some 90 kilometres north of Queenstown to the junction with Tarkine Drive. Tarkine Drive is located approximately 50 kilometres south of Smithton. The Western Explorer runs in a north south direction traversing ridges approximately 20 kilometres inland from the West Coast. The Department of State Growth has requested that pitt&sherry investigate the feasibility of sealing the Western Explorer as well as the 24 kilometre section of the Corinna Developmental Road from Savage River to Corinna.

The northern section of the Western Explorer from Lindsay River to Tarkine Drive is approximately 21 kilometres long and was designed and built to an 80 km/h design standard and can comfortably accommodate a sealed width of 5.5 metres which exceeds the minimum 5 metres specified by the Department of State Growth. The remaining 77 kilometres has a substandard alignment that in numerous places barely meets the requirements for a 40 km/h operating speed.

There are expected to be overall safety benefits and reduced maintenance costs from sealing of the Western Explorer, however these benefits come at a high capital cost. Existing traffic volumes on the road are very low and the lack of a specific tourist drawcard in the immediate environs suggests that any increase in visitor numbers on the road and visiting the west coast is likely to be small.

Approximately 40% of the length of the southern section of the Western Explorer and 90% of the Corinna Developmental Road are below the minimum 5 metre sealed width specified by the Department. Clearing of vegetation, and trees in forested areas, will be required to achieve the desired width. Large parts of the Western Explorer cross the Pieman Conservation Area and the Donaldson Nature Recreation Area and approvals to carry out road widening in these areas may be problematic.

Estimated outturn cost for the works at P50 and P90 levels based on a 7-year delivery timeframe are summarised in the table below. It has been assumed that pavement strengthening will be required. The road, however, carries very little traffic with trucks almost non-existent and further investigation may indicate strengthening is not necessary. On this basis options are presented without strengthening and, to mitigate environmental impact, without pavement widening.

Option	P50 Outturn Cost	P90 Outturn
Specified width with pavement strengthening	\$41,500,000	\$48,000,000
No pavement widening	\$36,300,000	\$42,800,000
No strengthening	\$34,400,000	\$40,700,000
No strengthening or widening	\$29,200,000	\$35,300,000

Expenditure at this level is difficult to justify given the very low traffic volumes on the Western Explorer which has average annual daily traffic of less than 60 vehicles. A high level assessment indicates future costs of maintaining a sealed surface in good condition of approximately \$350,000 per annum if the entire Western Explorer were to be sealed. This compares with current maintenance costs to keep the road in a serviceable condition of approximately \$300,000 per annum indicating that there is no long term cost saving for the Department in sealing the road. In summary there are many more roads in the State carrying much greater traffic volumes where significantly greater economic and safety benefits could be realised for this expenditure.

Whilst sealing of the Western Explorer Road is feasible from an engineering perspective, it is not considered to be economically viable at this time due to the high construction and maintenance costs and low traffic volumes. It is acknowledged that there are strategic tourism initiatives proposed for the North West Region and as such it is recommended that traffic volumes on the Western Explorer Road continue to be monitored with a view to identifying an appropriate future time to undertake a detailed economic assessment.

1. Introduction

The Western Explorer Road is a 74 kilometre long gravel road that runs from just north of Corinna to the junction with Tarkine Drive. The road runs in a general north south direction traversing ridges approximately 20 kilometres inland from the West Coast. At the southern end the Western Explorer is reached via either Corinna or Waratah and Savage River. At its northern end the Western Explorer is reached via Tarkine Drive. Access to Tarkine Drive at the western end is via Smithton, Marrawah and Arthur River and at the eastern end via Smithton and Roger River. A location plan is shown in Figure 1 below.

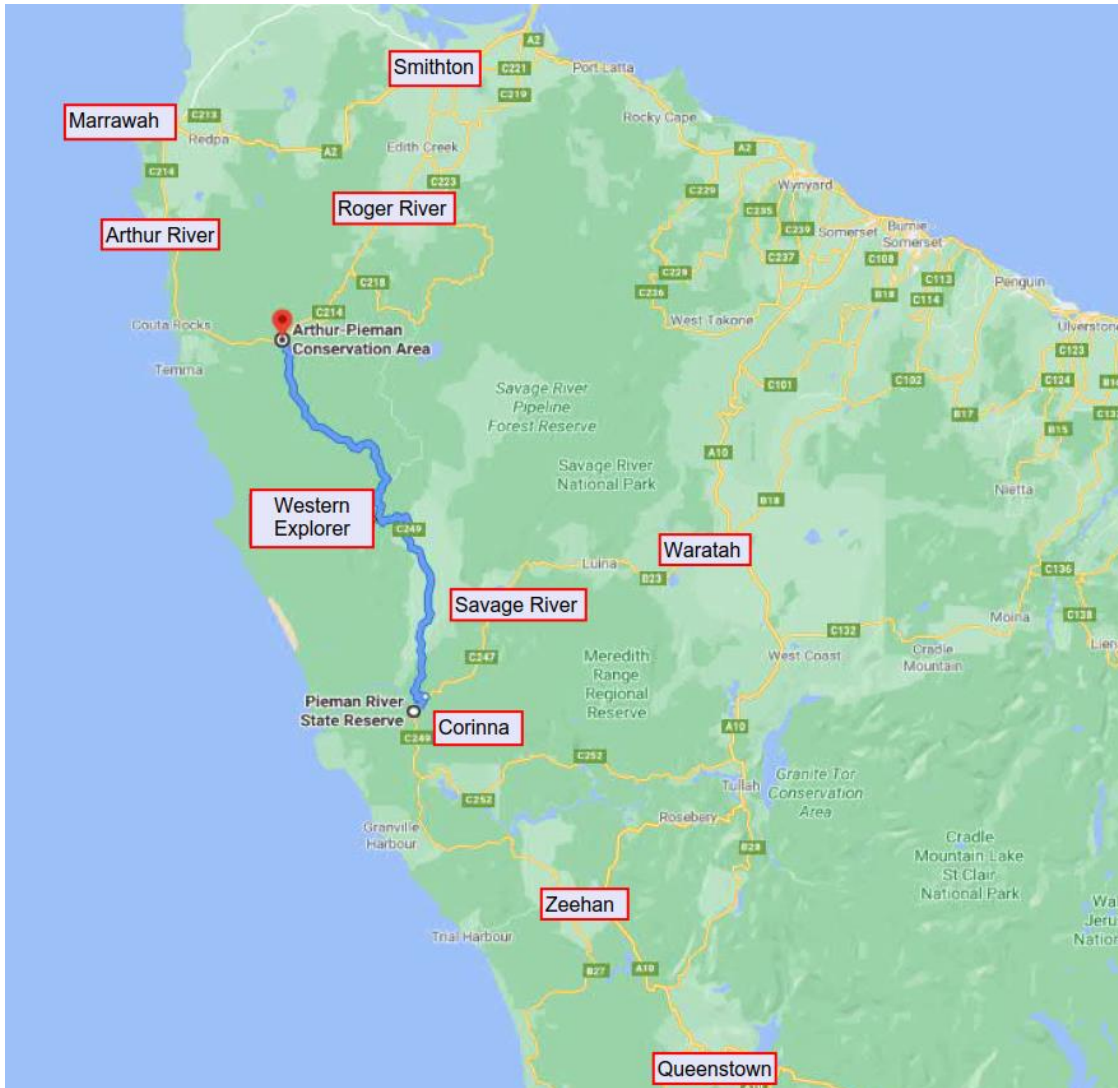


Figure 1: Location plan

Construction of the road was commenced in the early 1980s with the first section being from Tarkine Drive to the Lindsay River. The purpose of the road was to promote tourism. The section to Lindsay River was designed and built to an 80 km/h design speed and work was halted at the Lindsay River for a number of years because of the high cost of continuing the works to the same standard. Work was resumed in the 1990s and the road was built to a much lower standard. The resultant road alignment is characterised by some extremely tight corners and short crest curves that make it a challenging drive.

The difference in standard between the northern and southern sections is clearly seen in the aerial image in figure 2 below.



Figure 2: Comparison of alignments in vicinity of Lindsay River

The section of the Corinna Developmental Road from Savage River to Corinna has similar characteristics to the southern section of the Western Explorer

2. Existing conditions

2.1 Western explorer

2.1.1 Southern section

The southern section of the Western Explorer from the junction with the Corinna Developmental Road to the Lindsay River is approximately 53.5 kilometres long. Measured width, other than at single lane bridge approaches, varied from 4.1 metres to 7.6 metres. The minimum width required to provide a 5 metre wide seal is 5.5 metres and approximately 40% of the road does not have this width. As is typical of many gravel roads, cross fall and superelevation are excessive with slopes as high as 13% being measured. Numerous curves have a crown with adverse crossfall on the outside of the curve. Apart from some short steep sections, the overall the longitudinal gradient is quite moderate.

Approximately 4.2 kilometres of this section has been sealed in eight short sections up to 1 kilometre in length. The width of the seal is generally 5 metres or less and no attempt has been made to apply a geometric shape to these sections. The seal is on steeper sections of the road where traction problems were experienced and maintenance tasks to keep a tight surface on the pavement were becoming excessive. Photographs showing the typical conditions on this section of the road are provided in Figures 3 to 7 below



Figure 3: Ch 9.1 km



Figure 4: Ch 10.8 km



Figure 5: Ch 11.2 km Sealed section



Figure 6: Ch 32.8 km



Figure 7: Ch 44.2 km typical short crest

2.1.2 Northern section

The 20-kilometre-long section north of the Lindsay River has a much better alignment than the southern section. It was designed with the intention of ultimately providing a 6.7 metre formed width and 2 x 2.75 m lanes with 0.6 m wide shoulders. Refer Figure 8.



Figure 8: Ch 55.3 km 80 km/h alignment looking north

2.2 Savage River to Corinna

This section of the Corinna Developmental Road is similar to the southern section of the Western Explorer but is narrower and has a tighter alignment. Its construction predates the Western Explorer by many years and parts of it may have been the original road to Corinna.

Measured width varied from 4.2 metres to 6.7 metres. Approximately 80 % of the length of the road does not have the minimum width of 5.5 metres required to provide a 5 metre wide seal. Cross fall and superelevation are excessive with slopes as high as 15% being measured. Mostly the road has a slight downhill grade ranging up to about 6% with about 5% of its length exceeding 10%. The road is used by heavy vehicles including B Doubles which cart silica from a quarry near Corinna to the Savage River Mine.

The road contains more forested sections than the Western Explorer and generally has steeper side slopes. Typical conditions on this section of the road are provided in Figures 9 and 10 below. The figures are looking south, and chainages run from Savage River.



Figure 9: Corinna Developmental Road at Savage River looking south



Figure 10: Ch 16.2 Forest section with tight left hand curve

2.3 Road safety considerations

Due to the constrained alignment, the Western Explorer does have some operational safety issues. Typically, crash rates and severity have been low with excessive speed, inattentiveness and inexperience listed as the main causes of crashes. Intuitively it could be expected that sealing of the road would provide some safety benefits through a reduction in loss of control crashes. The Austroads Technical Report AP-T150/10 Review of Crashes on Unsealed Roads, however, states in Section 2.5 with respect to sealing of previously unsealed roads "...no statistically significant change (increase or decrease) in crash rates associated with this treatment." Notwithstanding this view, the Department's Traffic Engineering Section anticipates that there may be a modest safety improvement, but the reduced crash costs would come nowhere near to justifying the expense of sealing the road.

Apart from the section north of the Lindsay River, the Western Explorer including the Corinna Developmental Road presents a challenging drive and it is difficult to maintain an average speed of 50 km/h for long periods. The remoteness of the road and the lack of mobile telephone coverage along its length mean that response times rely on assistance from the next passing vehicle and the time taken for that vehicle to reach an area where mobile phone coverage is available. Under this scenario it could be several hours from the time of a crash until the requisite assistance is provided. Lack of mobile telephone coverage may deter some visitors from using the road, however improved mobile telephone coverage of itself is unlikely to lead to increased use of the road.

3. Scope of road sealing task

3.1 Pavement widening

The Department's brief calls for a 5-metre-wide seal with localised widening as required at low sight distance locations and tight curves. It has been estimated that approximately 40% of the Western Explorer and 90% of the Corinna Developmental Road do not have sufficient width to provide a 5-metre-wide seal. These width restrictions indicate that clearing and excavation, albeit of a narrow strip, will be necessary over much of the length of both roads to provide the additional width to achieve the desired cross section. The section of the Western Explorer north of Lindsay River has adequate width to provide a 5.5-metre-wide seal over its entire length.

3.2 Pavement strengthening and shape correction

As indicated above much of the pavement has excessive crossfall and superelevation and normal practice is to correct these shape deficiencies when the road is sealed. It has been assumed that pavement shape correction would be applied over the whole length of road under any proposed sealing program.

The majority of the Western Explorer and Corinna Developmental Road cross button grass plains and the soil conditions comprise peat of thickness up to about 1 metre overlying gravelly quartz. After stripping of the peat, the quartz provides a very strong subgrade. The road appears to be in good structural condition, and this is to be expected given the light traffic loading and good subgrade. The shape correction process does provide additional pavement thickness but not uniformly over the whole pavement. The existing pavement material is predominantly quartz gravels that would have been won from adjacent borrow pits or road excavation. These materials tend to have excessive fines and are generally not suitable for sealing. Recognising these deficiencies, a further overlay of a nominal 100 mm thickness has been included over the entire 98 kilometres of the Western Explorer and the Corinna Developmental Road..

3.3 Drainage

Throughout the Western Explorer and Corinna Developmental Road drains are in poor condition or non-existent. It is likely that when the roads were built drains were included but, over time, maintenance grading has resulted in the drains being filled with gravel. Allowance has been made for excavation of new table drains through the length of the site.

3.4 Seal

A two coat seal is proposed on all sections that are currently unsealed. No remedial work is proposed for existing sealed sections and it is assumed that a reseal will be applied to these sections.

3.5 Traffic facilities

Safety barrier has been provided on the existing roads at most of the higher embankments where the need exists. Improved barriers would be provided on the approaches to the 6 timber bridges on the site.

Current road signs are limited to some direction and advisory signs. Additional signs should be provided to augment existing signs and these would include curve advisory signs, chevron alignment markers and guide posts. It is also recommended that a number of specific purpose signs be erected at regular intervals along the road to remind drivers to be aware of the road hazards, particularly tight curves.

3.6 Project management

A simplified investigation and design methodology could be adopted that would include feature survey, pavement investigation and environmental investigations. If pavement widening can be avoided i.e. the road is sealed to the widths available, then the environmental response may be able to be limited to construction management regimes. Irrespective, the site crosses large parts of the Arthur Pieman Conservation Area and the Donaldson Nature Recreation Area.

Five rare and endangered fauna species including the Tasmanian Devil may be present in the area and a significant impact assessment may be required and a referral under the EPBC Act. As a minimum any works in the Conservation and Recreation areas would require a Reserves Activity Assessment (RAA) through the Parks and Wildlife Service. A likely timeframe for an RAA is 12 months.

4. Cost estimate and risks

4.1 Estimate

A summary of estimated costs is presented in Table 1 below.

Table 1: Estimate summary

Item	Cost
Client Management & Oversight Costs	
Scoping	\$63,000
Design and Investigation	\$1,235,000
Project Management	\$2,376,000
Contract Administration	\$480,000
Insurance	\$143,000
Construction Costs	
Environmental Works	\$259,000
Traffic management & temporary works	\$297,000
Public Utilities Adjustments	\$11,000
Bulk Earthworks	\$3,549,000
Drainage	\$1,937,000
Pavements	\$24,409,000
Finishing Works	\$1,877,000
Traffic Signage, Signals and Controls	\$489,000
Base estimate	\$37,125,000
P50 Estimate	\$40,586,000
P90 estimate	\$46,923,000
Cost escalation on P50	\$909,000
Cost escalation on P90	\$1,051,000
P50 Outturn cost	\$41,500,000
P 90 Outturn cost	\$48,000,000

Costs have been based on a 5 to 7 year project life, assuming 2 years for project development and approvals and up to 5 years for construction.

4.2 Risks

A high-level assessment of development and delivery risks has identified the risks listed in Table 2 below.

Table 2: Risk assessment

Risk	Risk Description	Mitigation
Additional overlay thickness	Additional pavement overlay required because of inadequate existing pavement quality or depth	Pavement investigation, allowance included in contingent risk cost estimate
Adverse weather conditions	High rainfall area with short summer season leading to additional construction costs	Risk will be priced by contractor, allowance included in contingent risk cost estimate
Fluctuation in bitumen price	Bitumen is approximately 10% of project cost	Current specification provides for price adjustment, allowance included in contingent risk estimate
Project delivery time frame	Additional costs of approximately \$1M per year if project delivery takes longer than estimated	Allowance included in contingent risk estimate
Market risk	Predicted work levels over a 5 year horizon are predicted to be high	Allowance included in contingent risk estimate
Approval risk	Environmental approvals may be difficult to obtain	Consider options that do not require clearing

4.3 Opportunities

The road carries very little traffic and even volumes at three or four times current levels are still in the domain of light traffic. The road also carries very few trucks and is subject to a load limit. Notwithstanding the risk item identified above of additional overlay being required, there is a counter view that the overlay could be eliminated subject to investigation of the existing pavement strength and composition. The amount of shape correction could also be reduced by adopting a cross fall of 4% instead of the usual 3%.

The sealed width that the Department has requested is 5 metres increasing to 5.5 metres on curves. A decision could be made to seal the road at its current width noting that this has been the approach adopted for the existing sealed sections. This change in scope would result in a road of varying width with some sealed sections being only 4 metres wide. Clearing and earthworks to provide the wider cross section would be eliminated and this would most likely make the environmental approvals much more straightforward. Operationally the road functions with these narrower sections now and signs could be provided to alert drivers. It is estimated that approximately 16% of the Western Explorer is narrower than 5 metres.

The cost reductions represented by these opportunities are summarised in Table 3 below.

Table 3: Cost options

Option	P50 Outturn Cost	P90 Outturn
No pavement widening	\$36,300,000	\$42,800,000
No overlay	\$34,400,000	\$40,700,000
No overlay or widening	\$29,200,000	\$35,300,000

5. Cost benefit assessment

Any significant capital investment intended to seal an unsealed road should represent value for money and such a proposal would need to be justified by a thorough cost benefit analysis (CBA) based on whole of life cost considerations to confirm the merits of the upgrade. CBA provides a rigorous method to assess whether a project's expected benefits exceed expected costs using measures such as Benefit Cost Ratio and Net Present Value. The aim is to minimise whole of life costs represented by road user costs and road agency costs by comparing the unsealed road (base case) option with the road sealing option.

The Western Explorer has the following use characteristics:

- Very low strategic importance in the context of the remainder of the State road network
- No significant freight movements
- Very low traffic, and
- assumed modest future traffic increases

On this basis it was decided by the project team that a comprehensive CBA would not be pursued.

The cost savings obtained through reduced vehicle operating costs and travel time savings associated with sealing the road would be very low in the context of the large capital investment. Accordingly, road agency costs are likely to be the dominant consideration in a life-cycle cost analysis. Road agency costs combine initial construction costs (eg \$41.5 M P50 cost) with discounted future investment costs. These latter costs include the following items:

- Routine and periodic maintenance; and
- Pavement rehabilitation – assume beyond the life cycle analysis period for both options and therefore not considered.

In this instance a comparison of the capital cost and future maintenance cost of the sealed option with the future maintenance cost for the base case applies.

Base Case Option

No initial major upgrade investment required.

Traffic usage warrants a relatively lower level of service for the existing unsealed road than for the majority of the State Road Network. This allows existing pavement maintenance expenditure to be kept reasonably low. Expenditure involves the regular routine maintenance of pothole repairs and grading operations and the more expensive periodic activity of gravel resheeting to restore surfacing gravel. A detailed assessment of maintenance costs would be required. In the absence of this assessment an upper limit annualised order of cost of \$3,000 per kilometre (approximately \$300,000 for the entire Western Explorer) provides some indication.

Road Upgrade Option

Initial major upgrade investment required.

Pavement routine maintenance is likely to be relatively low for a well constructed pavement, especially in the initial 20 to 30 years. Periodic maintenance, specifically pavement resealing is likely to be required at nominal 20 year intervals at a significant periodic capital investment of approximately \$70,000 per kilometre or on an annualised basis \$3,500 per kilometre (\$350,000 for the entire Western Explorer).

Indications are that a negative NPV (or a BCR that is below one) would apply to a road upgrade whereby costs would be higher than the expected benefits.

Whilst traffic usage remains very low, there is no economic viability in upgrading the road to a sealed pavement at this time. i.e. total transport costs are much higher for the upgrade option due primarily to the high initial capital investment and secondly to the potentially higher future maintenance costs.

6. Visitor growth potential

Advice from Tourism Tasmania Research provided the following summarised visitor information over the past 5 years. The figures quoted are the annual average.

Table 4: Visitor summary

Visitor category	Number or %
Average visitors to Corinna	28,000
Percentage of total West Coast visitors	15%
Visitors that passed through without staying overnight	7,300
Visitors that passed through without stopping	10,600

By inference, if there are 28,000 visitors per year to Corinna and 17,900 don't stay overnight or don't stop, then approximately 10,000 visitors stay overnight. Previous data which has been captured on interstate visitors only covers a small sample of 22 visitors and so is not statistically valid. This data loosely indicates that tourist users of the Western Explorer are Australians on long trips to Tasmania who arrived on the Spirit of Tasmania and were travelling with their partner. The Tasmanian Visitor Survey does measure visitation to towns and places in the area, but it does not capture routes taken between places (including via the Western Explorer). In relation to future policy influencing any changes of visitors to this location there has not been any forecasting or modelling of possible changes in visitor use of the Western Explorer or in visitor type if the road were to be sealed. It is reasonable to assume, however, that any increase in the quality of infrastructure would encourage additional use, but in the short to medium term this increase would likely be relatively small.

It is clear, however, that a substantial increase in visitors, particularly overnight stays would be required to justify the investment of over \$40 million. In simplistic terms, and ignoring multiplier effects, overnight stays would need to be at least three times current levels and sustained over a time frame of around 20 years, without loss of expenditure in other West Coast towns, to generate economic activity to match the level of investment. The Western Explorer is a unique driving experience and there is a certain attraction in the remoteness and undisturbed (other than the road itself) environment. These values are somewhat subjective and may not have wide appeal and, putting them aside, there is no other particular feature or highlight that might attract additional visitors if the road is sealed.

Tourism Tasmania's publication, *Reimagining our Regions: Tasmania's Far North West* which was initiated from the T21 2015-2020 Tasmanian Visitor Economy Strategy, promotes improved dispersal of visitors to regional communities and highlights the need for bold tourism innovation and new product development, whilst the Tasmania Parks & Wildlife Service Tourism Master Plan for the Tasmanian World Heritage Area recognises the need for legitimate tourism development and the management and conservation of the cultural and natural values of the Tasmanian Wilderness World Heritage Area (TWWHA). The publication *Reimagining our Regions* publication highlights priority tourism concepts from a list of 61 product development ideas. The top priority concepts include:

- Reinvigoration of the Tarkine;
- Experiences associated with the Robbins Island Wagyu Cattle Muster;
- New marketing and management of coastal shacks;
- New agritourism experiences and farm she rustic accommodation;
- Improved experience at Table Cape; and
- Development of a marine based touring product from Stanley.

Whilst these initiatives and the 55 others outlined in the *Reimagining our Regions* publication combined with sustainable tourism development in the TWWHA have potential to increase vehicle usage of the Western Explorer Road, given the timeframe for implementation of the initiatives and uncertainty around the resultant traffic increase on the Western Explorer Road, combined with the very low existing traffic volumes and high costs associated with upgrading and maintaining the road, it is not considered that sealing of the Western Explorer Road should be undertaken in the short term. However, traffic volumes using the Western Explorer Road should continue to be monitored in conjunction with implementation of tourism initiatives with the objective of identifying an appropriate future time to reassess the economic viability of sealing the Western Explorer Road.

7. Conclusions

Sealing of the Western Explorer and the Corinna Developmental Road has a P50 estimated cost of \$41.5 million and a P90 estimated cost of \$48 million and is expected to extend over a 7 year timeframe because of approvals and the limitations of seasonal conditions. Expenditure at this level is difficult to justify given the very low traffic volumes on these roads which have average annual daily traffic of less than 60 vehicles. Some life cycle cost savings would for road maintenance, however there are many more roads in the state carrying much greater traffic volumes where significantly greater economic and safety benefits could be realised for this expenditure.

Of the 98 kilometres of road that is proposed for sealing, 78 kilometres is of a very low geometric standard characterised by tight radius horizontal curves and short vertical crest curves that have an operating speed of no better than 40 km/h. It is estimated that there are over 100 horizontal curves in this category. These inherent deficiencies in the geometric alignment cannot be addressed by sealing the road and can only be remedied by substantial realignment. In most cases when a road of this standard is considered for upgrading the outcome would be to select a completely new alignment. Sealing of the road will lead to improved control and stopping ability for drivers and a smoother and more consistent pavement surface that is free from hazards such as potholes. The overall safety of the road, however, may be no better because of the substandard geometry, the likelihood that speeds will increase and the possibility of attracting drivers, particularly tourists, who are not accustomed to driving on road such as this.

The purpose of sealing the road is understood to be to attract additional tourists to the area. Given the remote location and the lack of any particular iconic natural feature, other than the beauty of the relatively untouched natural landscape, it is difficult to see that the sealing of the road will of itself attract additional visitors to the area. It is recognised that there are tourism initiatives being considered for North West Tasmania and it is recommended that traffic volumes on the Western Explorer Road continue to be monitored in parallel with implementation of tourism initiatives to identify an appropriate future time to reassess the economic viability of sealing the Western Explorer Road.



Feasibility Report for Sealing the Western Explorer

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