

18. FERRYMEAD BRIDGE LIFELINES PROJECT

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The purpose of this report is to seek Committee approval for the recommended option for the Ferrymead Bridge project.

CONTEXT AND BACKGROUND

Ferrymead Bridge carries approximately 30,000 vehicles per day and Ferry Road is the preferred route for two thirds of these vehicles. The bridge serves 11,000 people, 4,450 households, or about 3.5% of Christchurch residents, and carries water, pumped sewage mains, major Telecom, and minor power services.

There are existing traffic congestion and safety problems at the Ferry Road/Humphreys Drive intersection, growing congestion problems at St Andrews Hill and complaints about traffic congestion on Main Road to Sumner.

The 1994 'Lifelines' study identified the bridge as being susceptible to a seismic event. Subsequent investigation showed that the columns are an earthquake hazard, the bridge would be under threat from Tsunami, and that liquefaction is a major risk.

In March 1999 options for addressing the lifelines aspects of the bridge and the current and projected traffic problems were documented in the report entitled "Ferrymead Bridge - Lifelines Project, Draft Feasibility Report (Preliminary Assessment of Options)".

The contents of the report was adopted and consultation on the issues and options raised was carried out.

From the consultation process, responses were received from local businesses, interest groups, residents (local and elsewhere), local residents groups and Council Units. The report presented a range of options for resolving the bridge concerns, and the consultation and technical assessments resulted in two major options being pursued:

Option 1: New Bridge to the South.

Option 2: Widen and strengthen the existing bridge.

Diagrams of Options 1 and 2 are attached to this report.

TRAFFIC CONSIDERATIONS OF OPTIONS

The traffic considerations of the two options are:

Option 1: South Side Bridge: Provides safe traffic operation and minimal disruption during construction. No U-turns are required for Bridal Path Road traffic bound for Sumner. However, this option has limited growth capacity and is not a 'once only' solution - loss of the existing bridge in a seismic event would still require replacement of that bridge.

Option 2: Strengthening/Widening of existing bridge with 'half roundabout' at Bridal Path Road/St Andrews Hill Road: This option works best of all under all scenarios, however, the proposed construction method is complex and there is potential disruption during construction and a U-turn requirement.

Option 2 is preferred overall for day to day traffic performance.

TECHNICAL INVESTIGATION OF OPTIONS

Thorough geotechnical and structural investigation of both options has been carried out and the practicality of construction, particularly for Option 2 (strengthen/widen existing bridge) has been closely looked at. Site investigation resulted in the discovery that the existing bridge piles could in fact be founded on liquefiable material and hence the structural option to use these piles is not feasible.

Expert advice has confirmed the liquefaction risk.

New strengthening/widening options were prepared and peer reviewed. A 'frame' philosophy has now been adopted and construction methods are being further investigated.

Traffic effects during construction have been studied and delays are acceptable.

CAPITAL COSTS

The estimated capital costs for the options are as follows:

Item	Option 1	Option 2
Bridge Work	3,500,000	3,850,000
Roading Work	1,250,000	700,000
Total	4,800,000	4,550,000

Bridge work and roading work include a contingency of 20%.

COST - BENEFIT ANALYSIS

Up-front costs have been compared to the benefits derived from doing the work (security of access, services retention) and risk elements.

With Option 1, the existing bridge remains in place, and there is the probability of additional cost of replacing it in the event of its loss (\$3.85M at today's prices) and the traffic delays caused by the loss.

For Option 1 the structural net present value of benefits is \$5.5M and for Option 2 this is \$8.1M. The benefits of the options are relative to a do-nothing scenario ie avoiding total loss costs such as traffic delays, temporary bridge costs, demolition and reconstruction, and intangibles.

The preferred option, based on currently evaluated benefits and costs, and consideration of future costs, is Option 2 - widening/strengthening of the existing bridge.

The Council now has \$5.4M budgeted for the project and current estimates are in the range of \$4.5M-\$4.8M.

PROGRAMME

Details of the project were presented to members of the Sustainable Transport and Utilities Committee and Hagley/Ferrymead Community Board at the joint seminar on the Ferrymead Bridge on 15 July 2004.

A report on the project was presented to the Hagley/Ferrymead Community Board on 4 August 2004 seeking comment and support for Option 2 - strengthening/widening the existing bridge - for consultation. Comments follow later in this report.

After approval by the Sustainable Transport and Utilities Committee the intended programme is:

- Decision ratified by the Council on 23 September 2004.
- Consultation/Resource Consent process October 2004 to July 2005.
- Design completed by October 2005.
- Tender approved/accepted by April 2006.
- Construction May 2006 to November 2007.

ASSOCIATED PROJECTS

There are three projects also in progress around the Ferrymead Bridge, in differing stages of progress.

- Ferry Road/Humphreys Drive Intersection

Negotiations are continuing for land required for implementation of the approved signalised intersection scheme at the intersection of Ferry Road and Humphreys Drive. Consultation, design/tender and construction dates are all dependent upon completion of the property purchase.

- Main Road

A feasibility study is underway for the three-laning of Main Road from the Ferrymead Bridge to the west end of the causeway. The purpose of the three-laning proposal (two lanes toward the City, one toward Sumner) is to alleviate the congestion concerns for city-bound traffic at peak hours.

The position and geometry of the three-lane proposal gives potential constraints/opportunities for the bridge project in the Scott Park area. These are addressed later in this report.

The feasibility study is due to be completed in August 2004. No budget is currently allocated for this work.

- Ferrymead Retail Area

An investigation is about to commence for this area which will look at a range of scenarios including full retailing, zoning, plot-ratio limits etc.

FURTHER CONSIDERATIONS

The bridge redevelopment and proposed three-laning projects presents an opportunity to resite the historic building known as Cob Cottage. The current location jammed hard against the road embankment leaves the cottage unseen and unappreciated and is far from satisfactory.

The building is in a precarious state, with large cracks, which will make removal and resiting difficult and expensive, however, a new cottage reusing as much of the existing materials as possible could be constructed relatively cheaply at another location. Various locations have been considered in the past and this could be looked at again.

Removal of the cottage is not vital to the preferred bridge option, nor the possible future three-laning of Main Road, however, there are benefits to both projects if it occurs. Provision for future three-laning from the bridge east to the causeway is desirable and retention of Cob Cottage at its present location compromises traffic engineering standards. If the cottage was moved or replaced then a better alignment could be achieved for three-laning. Further, if the cottage is moved, there are added benefits for the bridge project (eg increased separation at the St Andrews Hill Road intersection). Moving the cottage also creates opportunities for redevelopment of Scott Park.

If Cob Cottage is going to be moved, the optimum time will be in conjunction with the roading projects.

A brief outline of the statutory and historical context of Cob Cottage is provided as Appendix 1 of this report.

HAGLEY/FERRYMEAD COMMUNITY BOARD COMMENT

A report on the project was presented to the Hagley/Ferrymead Community Board on 4 August 2004 seeking comment and support for Option 2 - strengthening/widening the existing bridge - for consultation. Comments follow later in this report.

The Board decided:

1. *To receive the information.*
2. *To support Option 2 (strengthening/widening the existing bridge) for consultation.*
3. *To recommend that options for the resiting/replacement of Cob Cottage be investigated as a separate project and coordinated with the bridge if possible.*
4. *That Option 2 be modified to allow for an on-demand right turn for motorists and cyclists out of Bridle Path Road on to Main Road.*

5. *That the need for widening Bridle Path Road to improve pedestrian and cyclist amenity along the riverside be investigated in conjunction with this process."*

Recommendations 1, 2 and 3 were those put forward by staff and recommendations 4 and 5 were added by the Board.

Staff Comment on Recommendations 4 and 5

Recommendation 4 was to modify Option 2 to allow for an on-demand right turn for motorists and cyclists out of Bridle Path Road, onto Main Road.

This on-demand right turn has been considered in-depth by officers. In particular, the issues of safety, delays, level of demand and intersection layout have been considered:

Safety: If a right-turn signal phase is installed, there will be conflict between the right-turn vehicles and pedestrians crossing during the right-turn phase. To eliminate the conflict would require the pedestrians and right-turn vehicles to have separate phases, which would add delays to Main Road Sumner bound traffic.

Delay: The on-demand option has been modelled by the Transport and City Streets Unit using SIDRA - computer analysis. The addition of this one movement (less than 1% of the traffic) requires an extra phase in the proposed two-phase sequence. This will add unacceptable delays to all of the main road traffic as both streams will have to be stopped to allow the right turn movement. This causes the B/C to become negative for the intersection.

Demand: The right-turn movement is currently not favoured by regular users of the intersection, because of delays and safety concerns. The current practise for many vehicles is to left turn towards the city then U-turn at Tidal View or use the Tidal View loop. If a right turn was designed into this intersection, it would make it much easier to use the intersection. Hence, it would be expected that more vehicles would choose to use the right-turn. The growth in right-turning traffic would exacerbate the delays and safety concerns mentioned above.

Geometry: The current (proposed) geometric configuration of this intersection will only accommodate queuing for two right turn vehicles. Significant additional intersection realignment work would be necessary to ensure adequate queuing spaces, which would detrimentally affect the overall intersection operation, particularly vehicles leaving St Andrews Hill.

Overall, due to safety and delay concerns, the Transport and City Streets Unit strongly recommend against imposing an on-demand right-turn at this intersection. However, it should be noted that the need for a right-turn (equivalent) manoeuvre has been specifically designed into this project. Provision has been made for vehicles to U-turn, once they cross the bridge, at the Tidal View intersection - a sheltered right-turn/U-turn lane is provided for east-bound traffic wishing to turn, and the island at the throat of Tidal View is contoured to allow a large U-turn turning arc. This manoeuvre will offer considerable safety improvements over the existing U-turn practise.

Further, if drivers do not wish to use this U-turn, they can continue, as at present, to use the Tidal View 'loop'. The concern for right-turning cyclists has also been intensively considered by the Transport and City Streets Unit. Provision of a right-turn phase exclusively for cyclists would require extensive re-design of the intersection, adding a further level of complexity to the existing geometry and operation. Right-turn cycle provision has, however, been specifically considered - cyclists will be permitted to share the path linkages from Bridle Path to the signalised crossing facility to allow them the protection of a signalised crossing.

It is recognised that a lack of dedicated cycle or vehicle right-turn treatments will not offer as smooth nor or continuous a passage as dedicated signals, however, given the balance needed between delays, functionality and particularly safety, the designed approach is seen as providing the optimum solution for the users. The disadvantages of dedicated signals will significantly outweigh the benefits for which this project has been aiming.

The staff response to recommendation 5 is that the investigation of Bridle Path Road be referred to the Transport and City Streets Planning Team to be treated as a separate project and coordinated with the bridge if possible.

Bridle Path Road is a minor arterial road that is under-standard and its whole length needs development not just at the bridge.

SUMMARY AND RECOMMENDATIONS

The Ferry/Humphreys project is progressing, and will be reported at the appropriate times once property issues are resolved.

The Transport and City Streets Unit recommends Option 2 - widening/strengthening existing bridge - as the most effective and economical bridge replacement option (from traffic, technical and benefit/costs perspective).

Three scenarios have been looked at for the traffic layout at the east end of the bridge:

Scenario	Cottage	Three-laning
1.	Stays	Not provided for
2.	Stays	Compromised
3.	Moved/replaced	Optimum

The Transport and City Streets Unit recommends further investigation/consultation of the scenario to move/replace Cob Cottage to allow the ideal situation of provision for optimum three-laning of Main Road. This could be pursued as a separate project and subsequently coordinated with the bridge project if the timings make this possible.

Staff

- Recommendation:**
1. That this information be received.
 2. That the Council approve Option 2 - strengthening/widening the existing bridge - for consultation.
 3. That options for the resiting/replacement of Cob Cottage be investigated as a separate project and coordinated with the bridge if possible.

Chairman's

- Recommendation:**
1. That the above recommendation be adopted.
 2. That the standard of service for motor vehicles using Bridle Path Road, with special reference to cyclists and pedestrians, be further investigated as a separate project.