

Appendix 6: s53(2)(a) Fast Track Approvals Act 2024, Technical Advice – River Engineering

Date	
To	Joanne Mitten, Principal Consents Planner, Environment Canterbury
From	Minke Unwin, River Engineer, Rivers, Environment Canterbury
Project advice provided for	NZTA – Woodend Bypass Project
Documents referred to	2D Proposed Resource Consent Conditions 2H Resource consent requirements 3A Construction Methodology Statement 3B Design Statement 3L Stormwater and Flooding Assessment
Qualifications	BEng(Hons) from the University of Canterbury. River Engineer at Environment Canterbury and currently Technical Lead for the Cam River Stopbank Upgrades.
Code of Conduct	I confirm that I have read and agree to comply with the Code of Conduct for Expert Witnesses contained in the Environment Court Practice Note 2023. This technical report has been prepared in accordance with that Code. In particular, unless I state otherwise, the opinions I express are within my area of expertise, and I have not omitted to consider material facts that might alter or detract from the opinions that I express.

Executive summary/overview

1. The finished design and use of the proposed Woodend Bypass has negligible effects on the Canterbury Regional Council flood protection scheme on the Cam River.
2. There are several concerns with maintaining the capacity of the existing waterway, and maintaining the efficacy of the existing flood protection scheme during construction. These are outlined below in the relevant sections.

Agreement with the Applicant

3. In general, I agree with the Applicant that the addition of the new span on the Kaiapoi River Bridge should not have adverse affects on the River, as it does not involving piling or access from the river.
4. In general, I agree with the Applicant that the new Cam River Bridges be constructed on the East side of the existing bridge. This is positive for managing the existing flood protection scheme during construction.

Benefits of the project

5. N/a

Outstanding areas of contention and significance of these

Discussions with Applicant

6. N/A

Outstanding areas of contention

7. The changes proposed to the Cam River Bridge do not have details of the changed reduced levels of the soffit, nor details on the placement of the new abutments. It is recommended that the capacity of the waterway is maintained and not encroached upon. It is recommended that when available, these designs be shared with Environment Canterbury for review prior to finalising my technical review.
8. In relation to the above point, it is unclear if the height of the proposed bridge soffit gives sufficient space for pedestrian access, which is necessary for access to flood protection structures. It is recommended that the final design of the soffit height takes this into account and should be provided to Environment Canterbury for review prior to finalising my technical review.
9. The discharge of stormwater to the Cam River from the main alignment and ramps north of the Cam Bridge, and a portion of Williams Street has been proposed. It is recommended that a comparison of current flows/volumes/timing of stormwater discharge is compared with proposed discharge, so the effects on the Cam River Flood Protection Scheme might be analysed. It is recommended that this is provided to Environment Canterbury for review prior to finalising my technical review.
10. It is recommended the stormwater outlet into the Cam River is designed so as to minimise erosive effects on the waterway. It is recommended that this design is provided to Environment Canterbury for review prior to finalising my technical review.

Table 2: Solutions

Issue	Solution	Condition wording	Consideration against FTAA
There are no details provided on the soffit R.L or abutment location for the proposed Cam River Bridge. We need these to determine whether the proposed bridge will encroach on the waterway capacity or cause hydraulic effects within the flooded waterway. The soffit level should also allow for pedestrian access underneath the bridges.	C2.9 does provide for assurances on waterway capacity, however this capacity is also limited by the stopbank heights, so a higher bridge cannot compensate for too much encroachment. An acceptable location for the abutments is in line with the existing bridge abutments. Addressed by C2.6 consent conditions, Document 2D		
The details of stormwater discharge into the Cam River are not clear. The proposed changes to flow and timing should be outlined so an assessment on the effects on the flood	Please provide details of current vs proposed stormwater discharges into the Cam River due to the changes. If these are significant, it is possible to discuss this with the River Engineering team at ECan as the stopbanks downstream of this location are planned for upgrade over the next few years.		

capacity of the waterway can be conducted.	From Doc 2H: The discharge may increase the flow in the receiving waterbody at the point of discharge of more than 1% of a flood event with an Annual Exceedance Probability of 20%. The concern stands. The capacity of the Cam River is 34cumecs, so we need to see discharge volumes and timings for smaller events 10year, 20year (most important) and 50 year ARI.		
There is no estimate of changes in stormwater quantities discharging to waterways due to the Project. This should be combined with approximate existing normal and storm flows. This is important information for the assessment of effects on the flood carrying capacity of the waterways.	Flooded area in a 100 and 200 year ARI are considered, but we are also concerned about stormwater quantities discharging into the current water bodies in smaller events eg 10 year, 20 year and 50 year ARI. Approx volume changes and timing should be identified. We cannot confirm that the effects are less than minor without comparing these to existing flows and flood peaks.		
There is no mention of construction phase stormwater estimates to	Stated that the activity complies with this in Document 2H		

show the discharge will be less than 1% of a 1 in 5 year event (CLWRPs 15.5.94 A/B)			
There is a concern about erosion at stormwater discharge points in all drains and waterways. It is unclear if the proposed riprap mitigations will be applied to all discharge points. (Acknowledging that Condition C4.5 applies to construction phase)	Covered by C4.5 and MP.10 in Schedule 2 for Construction Phase. Addressed in Doc 3L p34		
Native vegetation has been proposed along the banks of the waterways. Waterways can become choked by plants if not correctly planned, reducing flood capacity.	Environment Canterbury has developed guides for planting in and around waterways with flood functioning in mind. Contact the River Engineering team for further guidance on species and spacings which are appropriate in different waterways.		
Cut off drains have been proposed and have been designed to an acceptable flow. It is unclear where the discharge locations of	From Doc 2H: The discharge may increase the flow in the receiving waterbody at the point of discharge of more than 1% of a flood event with an Annual Exceedance Probability of 20%.		

these will be, and if they are discharging to different waterways. There is concern about whether the downstream drains or waterways are able to accommodate the extra flow.	The concern stands		
There is no comment on the continued geomorphic processes for the proposed culverts. For those that are wet, the applicant could outline how the new culvert allows the passage of sediment and debris.	Addressed in Document 3L p17 And C2.7 Consent condition, Document 2D		
Culverts are often undersized and cause problems for surface water flooding. Not all of the culverts proposed mention the nominal size of the culverts in relation to AEP flows, and therefore no way to determine if these culverts are undersized for flooding.	Addressed in Doc 3L p16		

The flood assessment did not include the proposed works south of the proposed Cam River Bridge. There are proposed cut-off drains and culverts in this area.	If the reason for this is negligible differences due to extensive surface water flooding in the current scenario, it could be made clear. This also relates to the above point about culvert sizing. Addressed to Acceptable detail: The new alignment follows the old and no material changes are likely to the flood assessment.		
It is unclear how the proposed scour protection at the Cam River Bridges will interact with the existing flood infrastructure (stopbanks). Tying in the rock to the stopbank may damage the integrity of the bank. The installation of rock work also creates a higher risk of erosion at the soft/hard interface.	Coordinate with river engineers to determine if there are any unintended effects on the stopbanks due to the installation of scour protection. Addressed in Document 2H, written approval will be sought from ECan prior to disturbance		
The proposed re-alignment of Taranaki Stream is less than ideal where it cuts back at an angle of less than	There may be a possibility to lessen this angle, but would potentially require land purchase. Otherwise appropriate erosion control might be		

90degrees. This is of concern to erosion within the waterway during higher flow events	considered depending on expected velocities. Addressed in Doc 3L		
There is no detail about temporary structures in the riverbed (Cam) as proposed in Document 2H.	Addressed in Doc 2H		
The likely requirement of temporary bunding or coffer dam for the new bridge abutments should not interfere with the minimum channel volume during a design flood event.	Designed so that the water surface does not exceed 2.55m R.L (NZVD16) at 34cumecs in the main channel. A large flow event is possible (though less likely) at any time, and design consideration should be given to whether the site must/can remain dry in a large flood.		
Temporary structures for the Cam River Crossing have been mentioned in in Document 2H, but no details have been given as to what that might look like or how that will interact with the flood capacity of the river.	If there are ideas on construction methodology and the possibility of temporary structures in the riverbed, it would be good to share this early so we can work out problems. Partially addressed in Doc 2H. Same solution as above point.		

There is no detail on the construction methodology in the area of the stopbank on the Cam River. This is an important flood protection structure and there will need to be consideration given to maintaining the existing level of protection during construction.	Several options are possible for maintaining a level of service during construction and should be discussed with river engineers: -Abutment construction occurs behind the bank and the bank is only pulled down when the abutment is performing this function -Alternate protection is in place for the duration of the construction -If the construction duration is short, it can be treated like a stopbank upgrade, and the section of the bank can be pulled down and built back up as the abutment. In all cases, the weather should be closely monitored, and protection up to design height should be implemented in anticipation of a high rainfall event. Addressed in Document 2H, written approval will be sought from ECan prior to disturbance		
Similar to the above point, the existing stopbank must be tied into the bridge abutment	Addressed in Document 2H, written approval will be sought from ECan prior to disturbance		

on both sides of the bridge. The bridge abutment will act as a continuation of the stopbank for flood protection.			
Any damage to flood protection assets caused by the Project must be repaired as soon as practicable, and in anticipation of a high rainfall event.			
Machinery use in the river area	Removed from within banks in anticipation of high rainfall		
Proposed works intersecting with CRC's flood protection and drainage infrastructure	In accordance with the Canterbury Flood Protection and Drainage Bylaw 2013, made under the Local Government Act 2002, written authorisation from the Council is required to undertake the proposed works at the Cam River bridge site. For the Kaiapoi Bridge site, while the current design is not anticipated to trigger the need for Bylaw authority, the construction methodology—particularly if it involves temporary works, access, or machinery operating near flood protection assets—may require further		

	assessment. Engagement with Council staff during the detailed design and construction planning phases is recommended to confirm whether Bylaw authorisation will be necessary. This requirement is separate from and in addition to any approvals granted under the Fast-track Approvals Act 2024. <i>Addressed in 2A Section 6.5.2.2</i>		
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(I cannot provide comment on the CLWRP s13 5.6 lake beds as this is outside my area of expertise)