Pa Road - Kerikeri Footpath

Road Safety Audit
Design Stage

October 2020

NCC consulting engineers

NORTHLAND TRANSPORTATION ALLIANCE

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Document Status

Rev No.	Project No.	Author	Reviewer		Approved for Issue		
			Name	Signature	Name	Signature	Date
A		David Spoonley	Sandi Morris		David Spoonley		October 2020
B							
C							
D							
E							
F							

Contents

1. Introductory statement

1.1. Introduction

This report presents the findings of a design stage safety audit a footpath on Pa Road, Kerikeri between the intersection of Kerikeri Inlet Road and the point where the Te Araroa Trail leaves Pa Road

The works aim to improve pedestrian safety

The project design was developed by Haigh Workman for the Northland Transportation Alliance.

1.2. Brief description of the proposed works

The works comprise of a footpath on Pa Road between the intersection of Kerikeri Inlet Road and the point where the Te Araroa Trail leave Pa Road

1.3. Road environment

Pa Road serves as a secondary collector connecting Kerikeri Inlet Road with a small residential area.

Traffic volumes using Pa Road are estimated to be 363 AADT (2016), as measured by the Mobile Roads website. Heavy Commercial Vehicles is estimated at 10%.

1.4. Audit team

The audit team comprised of:

David Spoonley (Team Leader)	BEng, CEng, CIHT MICE Project Manager / Road Safety Engineer NCC – Consulting Engineers, Whangarei
Sandi Morris	Road Safety & Traffic Planning Engineer Far North District Council

1.5. Previous audit

No previous audits have been carried out on this project

1.6. Audit methodology

This audit has been carried out for Tom Adcock, Project Manager, Haigh Workman on behalf of Jaco Cronje, project manager of Far North District Council.

The audit follows the guidelines contained within the NZ Transport Agency document “Road Safety Audit Procedures for Projects, Guidelines, Interim Release, May 2013” and is complemented by the auditors’ experience with other audits.

This audit should not be regarded as a complete “quality check” of the project. It focuses essentially on safety issues that are considered significant in regard to the constructed works.

The auditors have identified road safety concerns and have made recommendations about corrective actions. Whilst these recommendations may indicate the nature or direction of a solution, they do not provide specific details of how to address or resolve that concern.

Responsibility for the solution of any safety issue identified in this audit remains with the designer.

1.7. Project documentation

Haigh Workman Ltd provided the drawings listed in **Figure 1** for the detailed design stage audit. These are included in **Appendix A**.

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P30	Location Plan
P31	Site Location Plan
P32	Site Location Plan
P33	Site Location Plan
P34	Site Location Plan
LS	Footpath (Timber Pole) Long Section
DE30	Detail Plan
DE31	Typical Cross Section Timber Pole Retaining
DE32	Typical Timber Wall Detail
DE33	NZS 4404:2010 CM-001
DE34	NZS 4404:2010 CM-002
DE35	Handrail Detail

Figure 1: Drawings provided for audit.

1.8. Briefing meeting

No briefing meeting was held for this audit.

1.9. Site visit

The audit team visited the site on 2nd October 2020, weather conditions were fine.

1.10. Crash History

NZTA's Crash Analysis System (CAS) for the period 2015-2019 indicates one non-injury crash on Pa Road. In this crash a vehicle drifted off the road and collided with a power pole.

1.11. Ranking system

The potential road safety problems identified have been ranked as follows:

The probable crash frequency is qualitatively assessed based on expected exposure (how many road users will be exposed to a safety issue) and the probability of a crash resulting from the presence of the issue. The likely severity of a crash outcome is qualitatively assessed based on factors such as expected speeds, type of collision, and type of users involved.

Reference to historic crash rates or other research for similar elements of projects, or projects as a whole; have been drawn on where appropriate to assist in understanding the likely crash types, frequency and likely severity that may result from a particular concern.

The frequency and severity ratings are used together to develop a combined qualitative ranking for each safety issue using the Concern Assessment Rating Matrix in **Table 1** below. The qualitative assessment requires professional judgement and a wide range of experience in projects of all sizes and locations.

Table 1: Assessment matrix

Likelihood of Fatality or Serious Injury	Probability of a Crash Occurring			
	Frequent	Common	Occasional	Infrequent
Very Likely	Serious	Serious	Significant	Moderate
Likely	Serious	Significant	Moderate	Moderate
Unlikely	Significant	Moderate	Minor	Minor
Very Unlikely	Moderate	Minor	Minor	Minor

While all safety concerns should be considered for action, the client or nominated project manager will make the decision as to what course of action will be adopted based on the guidance given in this ranking process with consideration to factors other than safety alone. As a guide, a suggested action for each concern category is given in **Table 2** below.

Table 2: Categories of concern

CONCERN	Suggested action
Serious	Serious concern that must be addressed and requires changes to avoid serious safety consequences.
Significant	Significant concern that should be addressed and requires changes to avoid serious safety consequences.
Moderate	Moderate concern that should be addressed to improve safety
Minor	Minor concern that should be addressed where practical to improve safety.

In addition to the ranked safety issues, it is appropriate for the safety audit team to provide additional comments with respect to items that may have a safety implication but lie outside the scope of the safety audit. A comment may include items where the safety implications are not yet clear due to insufficient detail for the stage of the project, items outside the scope of the audit such as existing issues not impacted by the project or an opportunity for improved safety but not necessarily linked to the project itself. While typically comments do not require a specific recommendation, in some instances the auditors may give suggestions.

1.12. Decision tracking process

Decision tracking is an important part of the road safety audit process. A decision tracking table is embedded into the report format at the end of each set of recommendations to be completed by the designer, safety engineer and client for each issue documenting the designer response, client decision (and asset manager's comments in the case where the client and asset manager are not one and the same) and action taken.

A copy of the report including the designer's response to the client and the client's decision on each recommendation shall be given to the road safety audit team leader as part of the important feedback loop. The road safety audit team leader will disseminate this to team members.

1.13. Disclaimer

The findings and recommendations in this report are based on an examination of available relevant plans, the specified road and its environs, and the opinions of the audit team. However, it must be recognised that eliminating safety concerns cannot be guaranteed since no road can be regarded as absolutely safe and no warranty is implied that all safety issues have been identified in this report. Safety audits do not constitute a design review or an assessment of standards with respect to engineering or planning documents. Readers are urged to seek specific technical advice on matters raised and not rely solely on the report.

While every effort has been made to ensure the accuracy of the report, it is made available on the basis that anyone relying on it does so at their own risk without any liability to the safety audit team or their organisations.

1.14. Project Chainages

The project chainages referred to in this report are RAMM displacements obtained from the Mobile Roads website. The datum for these chainages is the intersection of Pa Road and Kerikeri Inlet Road.

2. Safety audit findings and recommendations

2.1. Footpath Location Ch 0 - 110

There is a footpath on the northern side of Kerikeri Inlet Road that extends in both directions from the intersection with Pa Road. The proposed footpath on Pa Road starts on the west side of Pa Road and after approximately 100m crosses to the east side of the road where it remains for the remainder of its length. This arrangement necessities there being two points where pedestrians would cross Pa Road, at the intersection for users of the footpath on Kerikeri Inlet Road and 100m from the intersection for users of the footpath on Pa Road. If the Pa Road footpath were to connect to the Kerikeri Inlet Road footpath at the east side of the Pa Road intersection only one crossing point would be necessary.

Furthermore, if the radius turning into Pa Road were to be reduced and a throat island provided this crossing point could be provided with lesser walk distances and pedestrian having to cross only one traffic flow at a time. **Figure 2** illustrates these issues and **Figure 3** indicates possible improvements at the intersection

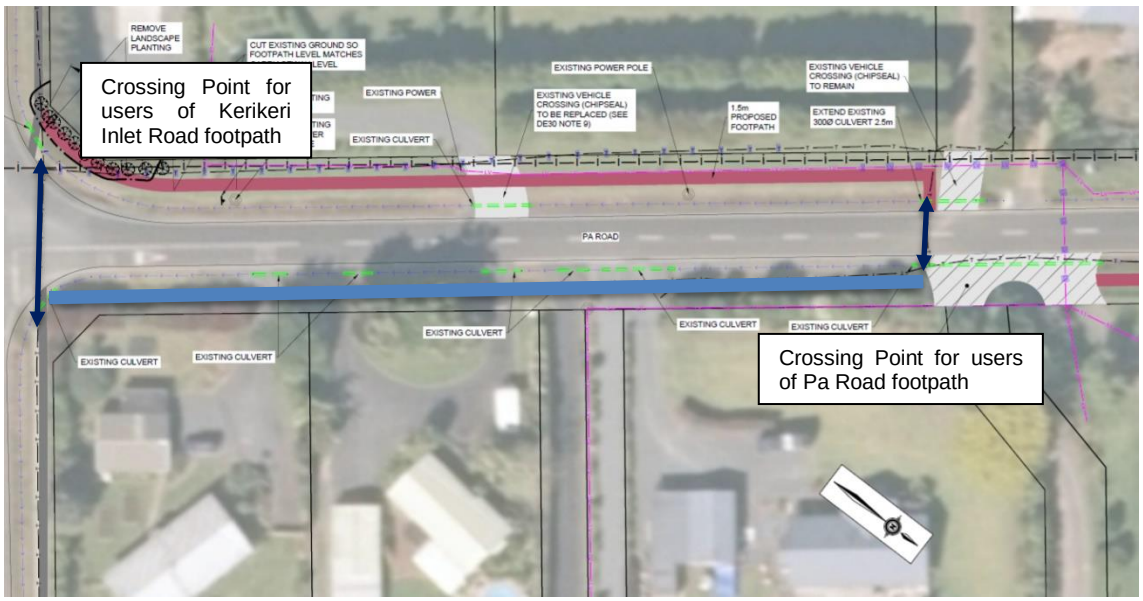

Figure 2: Proposed realignment of footpath along east side of Pa Road to reduce crossing points by one

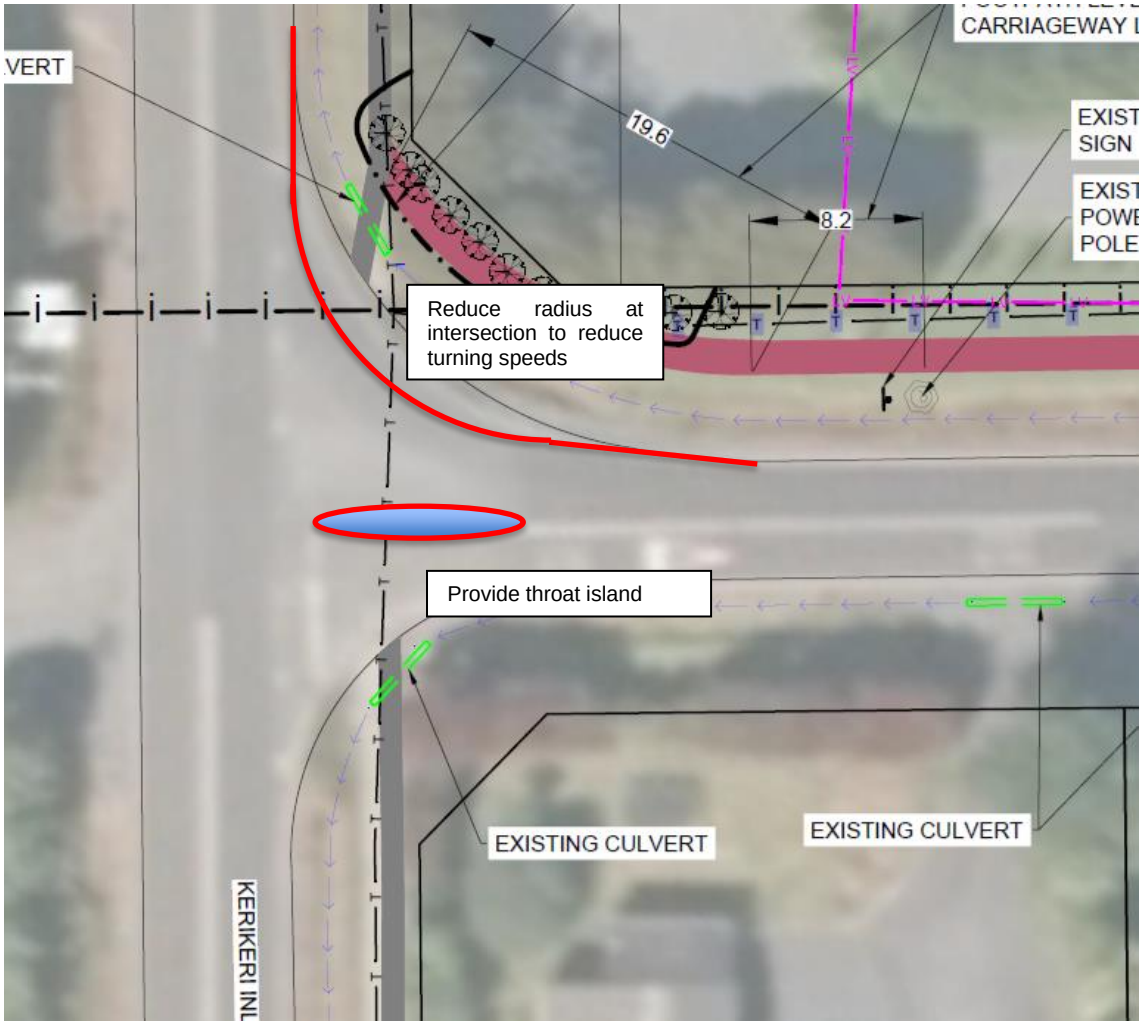

Figure 3: Possible improvements at the intersection .

Recommendations

1. Relocate the footpath to the east side of Pa Road.

Overall Rating: Moderate	
Frequency Rating: Occasional	**Severity Rating: Likely**
Designer Response: Accepted	
Safety Engineer: Agree with both auditors and designer. This is outside scope, but should either be included or created as a follow up project for future annual plan.	
Client Decision: Agree with the designer	
Action Taken: Design revised and footpath to be relocated to the eastern side.	

2. Reduce the radius turning into Pa Road.

Overall Rating: Moderate	
Frequency Rating: Occasional	**Severity Rating: Likely**
Designer Response: Not accepted – intersection improvements not part of scope	
Safety Engineer: Agree with both auditors and designer. This is outside scope but should either be included or created as a follow up project for future annual plan.	
Client Decision: Agree with designer and safety engineer.	
Action Taken: Intersection improvement will be recommended to the safety/Asset management team for inclusion in the annual/LTP as a separate project.	

3. Provide a Pedestrian Island 'throat island' at the intersection of Pa Road and Kerikeri Inlet Road of a type shown below.

Overall Rating: Moderate	
Frequency Rating: Occasional	**Severity Rating: Likely**
Designer Response: Not accepted – intersection improvements not part of scope	
Safety Engineer: Agree with both auditors and designer. This is outside scope, but should either be included or created as a follow up project for future annual plan.	
Client Decision: Agree with both the designer and safety engineer	
Action Taken: No action required at this stage but recommendation will be given to the safety/Asset management team to consider intersection improvement as a separate project in the annual plan/LTP.	

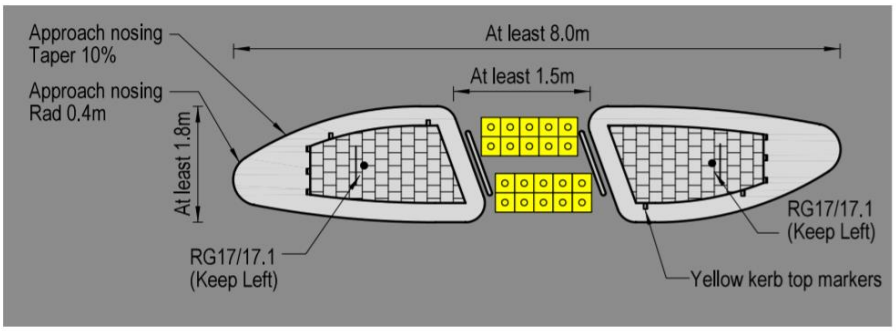

Figure 15.6 – Example of a compliant pedestrian island

2.2. Curve, Ch 400

At this location the footpath is located on the outside of the curve and at a lower level than the road. The drawings indicate that a timber pole wall is proposed to support the slope above the footpath. Should a vehicle lose control and leave the road at this location it is possible that the errant vehicle could fall onto the footpath and should there be a pedestrian at this location when it occurs this could result in death or serious injury. **Figure 4** shows this curve.

Figure 4: Curve at Ch 400.

Recommendations

1. Consider providing a guardrail at this location to prevent errant vehicles from landing on the footpath located below the road level.

Overall Rating: Moderate	
Frequency Rating: Occasional	**Severity Rating: Likely**
Designer Response: Not accepted – the probability of an errant vehicle occurring is infrequent, this combined with the very unlikely chance of a pedestrian being on the path at the same point gives a minor risk rating using the Table 1 assessment matrix.	
Safety Engineer: Agree with Designer, value for money we would put guardrail on other higher risk curves ahead of this.	
Client Decision: Agree with both the designer and safety engineer	
Action Taken: No action required	

2. Remove fence and relocate to road boundary to enable a suitable setback (berm) to be placed between back of guardrail and proposed footpath.

Overall Rating: Moderate	
Frequency Rating: Occasional	**Severity Rating: Likely**
Designer Response: Agreed	
Safety Engineer: agree with designer	
Client Decision: Agree with designer and safety engineer	
Action Taken: Changes effected as per client decision.	

2.3. Driveway, Ch 290

The driveway at Ch290 is lined with trees that drop very hard round seed heads. These seed heads are such that they may cause users to either slide on them or roll their ankles resulting in possible injury. They have very sharp pointy spikes that can penetrate into bare skin. **Figure 5** shows these seed heads.

Figure 5 : Seedheads off trees, Driveway Ch 290.

Recommendation

In consultation with the landowner consider removing the end tree nearest the footpath to minimise the number of these seed heads landing on the footpath.

Overall Rating: Minor	
Frequency Rating: Occasional	**Severity Rating: Unlikely**
Designer Response: Not accepted – Engineer notes that these same trees line Queen Street in Auckland and outside the Kerikeri Police Station.	
Safety Engineer: Agree with Designer	
Client Decision: Agree with both designer and safety engineer.	
Action Taken: No action required.	

2.4. Culvert, Ch 475

At Ch 475 there is a cross culvert under Pa Road that appears to outfall above the timber pile retaining wall. Unless this culvert is extended down the rear of the retaining wall and under the footpath the footpath will be wet from the water in the culvert and may with time become slippery.

Recommendation

Extend the culvert down the rear of the retaining wall and under the footpath in order that the water passes under the footpath.

Overall Rating: Minor	
Frequency Rating: Occasional	**Severity Rating: Very Unlikely**
Designer Response: Accepted – culvert crossing at Ch. 105 Drawing P 33 - route culvert outfall safely under footpath	
Safety Engineer: Agree.	
Client Decision: Agree with both designer and safety engineer	
Action Taken: Revised design to indicate culvert routed under footpath.	

2.5. Tree Stumps, Ch 550

The design drawings indicate that these stumps are to remain and that the footpath is to be deviated around them. These stumps are a roadside hazard and should be removed, **Figure 6** shows these stumps.

Figure 6 : Tree stumps Ch 550.

Recommendation

Remove stumps. Straighten the footpath alignment to avoid bringing it closer to the sealed carriageway.

Overall Rating: Minor	
Frequency Rating: Infrequent	**Severity Rating: Unlikely**
Designer Response: Accepted – however stump removal may require heavy or specialist plant. Decision to remove to be based on affordability of contractor rates for doing the work.	
Safety Engineer: Agree with Auditors, remove stump is preferred option	
Client Decision: Agree with both designer and safety engineer	
Action Taken: Revised drawings to show stump removal as provisional item to be confirmed by engineer.	

2.6. Curve, Ch 650 - 700

In order to gain space to fit the footpath past the pinch point caused by the boundary corner it is proposed to culvert two 10m section of the roadside water table and provide a handrail on the footpath at the pinch point. This leaves approximately 20m of water table between this culverting and the cross culvert under Pa Road. The short remaining lengths of open drain and the handrail are roadside hazards that could be eliminated by culverting the roadside water table for about 50m from the cross culvert. **Figure 7** shows the existing situation and **Figure 8** shows the features described above.

Figure 7 : Curve Ch 650- 700.

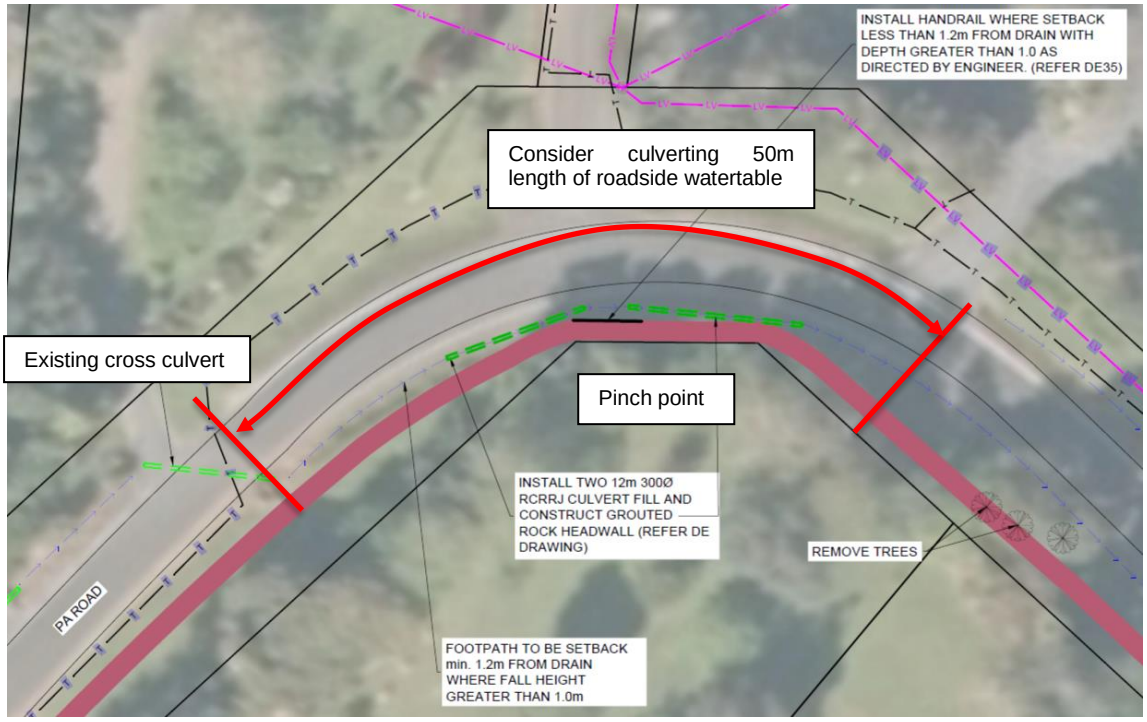

Figure 8 : Curve Ch 650- 700.

Recommendation

Consider pipe culverting approximately 50m of roadside water table to remove short lengths of steep open roadside drain and remove the necessity for a handrail.

Overall Rating: Minor	
Frequency Rating: Infrequent	**Severity Rating Unlikely**
Designer Response: Not accepted – the proposed culvert arrangement avoids the need for manholes at change in direction and provides the most cost-effective solution. The road is un-kerbed and open roadside drainage is a common feature. The open drain hazard is an existing feature which is not exacerbated by the proposed footpath. It could be argued that the open drain provides protection to pedestrians from an errant vehicle. Further infilling of the drain would reduce this protection. The depth of the drain is not considered sufficiently deep to present more than a minor hazard, an errant vehicle would not come to a dead stop and is unlikely to roll. The depth of the ditch could be moderated by placing anti scour rock armour in the invert but even this is not considered necessary.	
Safety Engineer: Agree with Designer, the cost/benefit would not add up. If any money was spent on improving the safety level of service, it would be better spent on purchasing two small triangles of lane at the boundary corners to enable further separation between path and drain. Although I don't believe this is warranted either.	
Client Decision: Agree with both the designer and safety engineer.	

Action Taken: Revised drawings will show the over-deep section of water table lined with rockspall to mitigate further scouring

2.7. Culvert adjacent to crossing point, Ch 780

In order to construct the crossing point to link the proposed footpath to the existing footpath approximately 6m of the existing roadside water table is shown to be culverted. This leaves approximately 6m remaining between this culverted section and the nearby driveway culvert. This short length presents a roadside hazard, particularly as it is on the outside of the curve. It is possible that a vehicle could crash into this short length of culvert either by losing control or by not realising its presence.

Figure 9 shows this short length of open water table and **Figure 10** shows the proposed design showing water table to be culverted and that to remain open.

Figure 9 : Water table Ch 780.

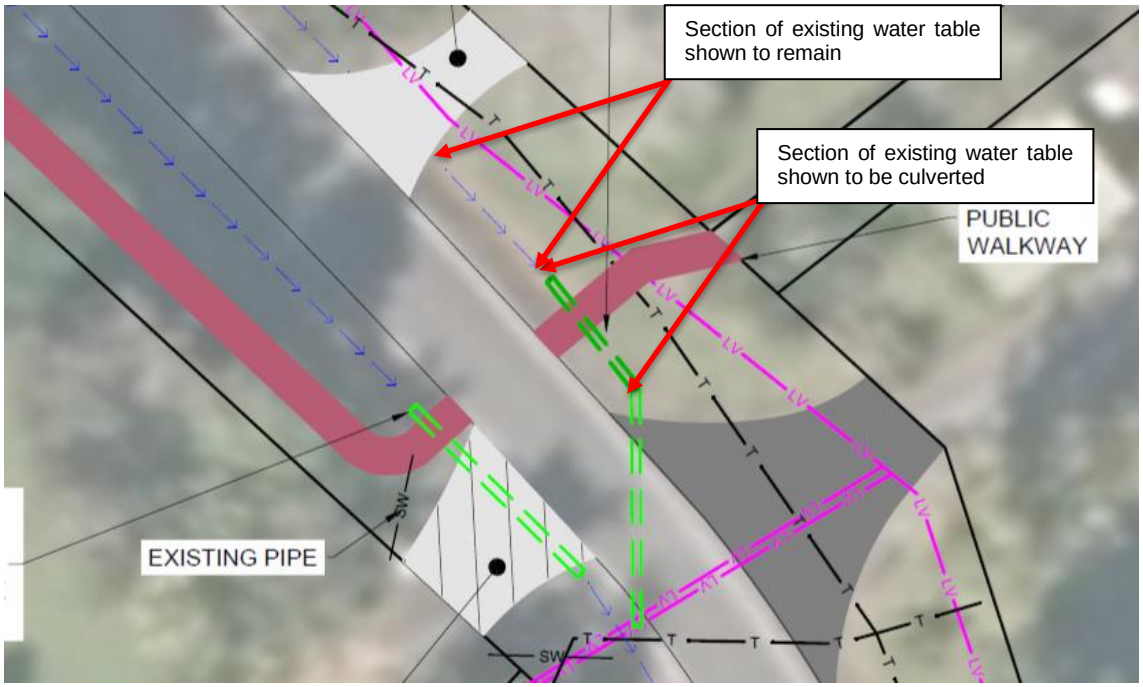

Figure 10 : Extract of design drawings showing section of existing water table to be culverted and section to remain

Recommendation

Consider extending the culverting of the water table to the adjacent driveway.

Overall Rating: Minor	
Frequency Rating: Infrequent	**Severity Rating: Unlikely**
Designer Response: Not accepted – The road is un-kerbed and open roadside drainage is a common feature. The open drain hazard is an existing feature which is not exacerbated by the proposed footpath. The depth of the drain is not considered sufficiently deep to present more than a moderate hazard, an errant vehicle would not come to a dead stop and is unlikely to roll. The depth of the ditch could be moderated by placing anti scour rock armour in the invert but even this is not considered necessary.	
Safety Engineer: Agree with designer, outside the remit and scope of this project.	
Client Decision: Agree with both the designer and safety engineer.	
Action Taken: No action needed.	

3. Audit Statement

We certify that we have used the available plans, and have examined the specified roads and their environment, to identify features of the project we have been asked to look at that could be changed, removed or modified in order to improve safety. The problems identified have been noted in this report.

Signed:. ..... Date: 6/10/2020

David Spoonley BEng, CEng, CIHT MICE
Project Manager / Road Safety Engineer NCC – Consulting Engineers, Whangarei

Signed: ..... Date: 6/10/2020

Sandi Morris NZDE Civil, NZ Cert Business, MEng
Road Safety & Traffic Planning Engineer – Far North District Council

Designer:
Name: Tom Adcock Position: Senior Engineer…....

Signature: ..... Date: 14th October 2020.....

Safety Engineer:
Name: Nick Marshall ..... Position: Team Leader, Road Safety & Traffic Eng.

Signature: ..... Date: 21 April 2021

Project Manager:
Name: James Obamila Position: Capital Works Project Manager

Signature: . Date: April 12, 2021

Action Completed:
Name: James Obamila Position: Capital Works Project Manager

Signature: Date: April 12, 2021

Project Manager to distribute audit report incorporating decision to designer, Safety Audit Team Leader, Safety Engineer and project file. Date: .....

Appendices

Appendix A: Design Drawings

Appendix A: Design Drawings

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