



# Memo

<b>To:</b>	<b>Craig Bettjeman</b>	<b>Job No:</b>	<b>1007904.1001</b>
<b>From:</b>		<b>Date:</b>	<b>18 December 2020</b>
<b>cc:</b>			
<b>Subject:</b>	<b>Dolomite Point Walkway - Location 7: Site Observations</b>		

## 1 Introduction

In early December, the Department of Conservation (DOC) noted slight movement of the pathway during routine monitoring along the Dolomite Point Walkway. This movement was characterised by 5 mm of extension between monitoring Pins 7C and 7D at Location 7 (shown on Attachment 1), which are positioned either side of a historical crack within the sealed pathway.

This memo presents observations made during our site visit to Location 7 along the Dolomite Point pathway and provides recommendations for short term controls that could be implemented while long term solutions are considered.

## 2 Background

T+T completed an initial geotechnical assessment<sup>1</sup> of the Dolomite Point Walkway for DOC in 2019. This geotechnical assessment outlined four geotechnical hazards that were identified at Dolomite Point:

- 1 Walkway subsidence;
- 2 Local collapse of sea cliff;
- 3 Subsidence of structure foundations or abutments; and
- 4 Collapse of rock arch.

The geotechnical hazards at Location 7 are outlined in the Geotechnical Monitoring and Checklist report<sup>2</sup> completed by T+T in December 2019. In this report, T+T noted that the deformation observed along the edge of the walkway is considered most likely related to shallow instability of fill, and shallow slope instability of the ground supporting the walkway shoulders. However, it was also noted that karstic deformation of the underlying cavern is a key hazard, which may result in settlement / collapse of a section of the ground supporting the walkway.

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<sup>1</sup> T+T, 2019. Dolomite Point Walkway, Punakaiki – *Initial Geotechnical Inputs for DOC Visitor Risk Management Process*. T+T reference, 1007904.v1

<sup>2</sup> T+T, 2019. Dolomite Point Walkway, Punakaiki – *Geotechnical Monitoring and Checklist Report*. T+T reference, 1007904.1000 – Rev. 1.0

### 3 Site visit

An engineering geologist from T+T visited the Dolomite Point walkway on 9 December 2020 to undertake site observations of the ground conditions within the vicinity of the Location 7 area. Key observations are outlined below:

1. Location 7 is located at the north end of the Dolomite Point walkway approximately 20 m east of the Arch (shown on Attachment 1).
2. An 8 m long crack trends parallel with the pathway and is located approximately 100 – 300 mm from the edge of the pathway, which is supported by a grouted stone wall (See Photograph 1).
3. Monitoring points 7C and 7D are set up across the crack and have been measured daily by DOC over the previous year period.
4. The location of the cracking generally coincides with a north to south trending karstic feature, which allows water flows from the coast into the surge pool (See Photograph 2). This feature is susceptible to erosional processes and will continue to erode in the future.
5. The pathway at the location of cracking is also located on approximately 1 m of fill and appears to be located within cut ground either side of the cracking location (See Photograph 3). This fill placement indicates a generally lower natural ground profile at the location of the karstic feature, which may be due to progressive shallow soil slumps / creep movement prior to placement of the track.
6. A lesser extent of cracking/slumping is also noted in the same location on the opposite side of the pathway (See Photograph 1).
7. An inspection was undertaken of the grouted stone wall that is located downslope of the crack (See Photograph 4). There were no indications of slumping or rotation of the wall, which would likely cause cracking of the grout and ‘popping’ of the stones after a small amount of movement. A DOC employee on site at the time of the inspection indicated that the wall may be about 20 years old and is not aware any repairs to the wall in the past.
8. The cracks observed at this location appear generally consistent with other cracks seen along the Dolomite Point walkway that coincide with locations of fill placement.

### 4 Discussion

Based on the observations described above in Section 3, it appears likely that the recent movement along the crack at Location 7 has been caused due to minor slumping of fill materials. This mechanism is unlikely to cause a sudden failure of the walkway so does not appear to present a high hazard for visitor safety.

We did not observe any evidence suggesting the observed increase in crack width is related to deeper rock block failure mechanisms. However, we note that the area appears to be locally more susceptible to erosional processes and that shallow soil slumping/creep movement is also a possibility. In the longer term, there are various monitoring and management options that could be explored further at this location.

The following short-term controls could be implemented while long-term options are considered:

1. Continue daily monitoring between monitoring points 7C and 7D. A trend of movement between these pins would indicate that slumping / creep movement may be occurring and may indicate whether movement is consistent or accelerating. T+T should be alerted if further movement greater than an additional 5 mm is observed.
2. Daily visual inspection of the grouted stone wall including cracking of the grout, loosening/separation of the stones from the grout, and rotation / slumping of the wall.

- 3 Daily visual inspection of the ground, including looking for further cracking or voids. T+T should be alerted if any new cracks are observed, with particular urgency if new cracks occur in the direction across the path (i.e. perpendicular to the current cracks which run in the direction along the path).
- 4 Isolate cracked portion of the pathway from visitors using cones and plastic railing or tape (or similar). This could be revisited in a month based on the ongoing monitoring results.

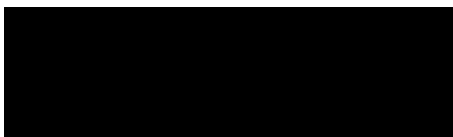
### 5 Applicability

This report has been prepared for the exclusive use of our client Department of Conservation, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

Recommendations and opinions in this report are based on data from visual observations of selected locations and geological exposures at the ground surface at the site. The nature and continuity of subsoil or rock away from these locations are inferred but it must be appreciated that actual conditions could vary from the assumed model.

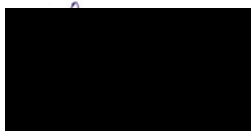
Tonkin & Taylor Ltd

Report prepared by:



Engineering Geologist

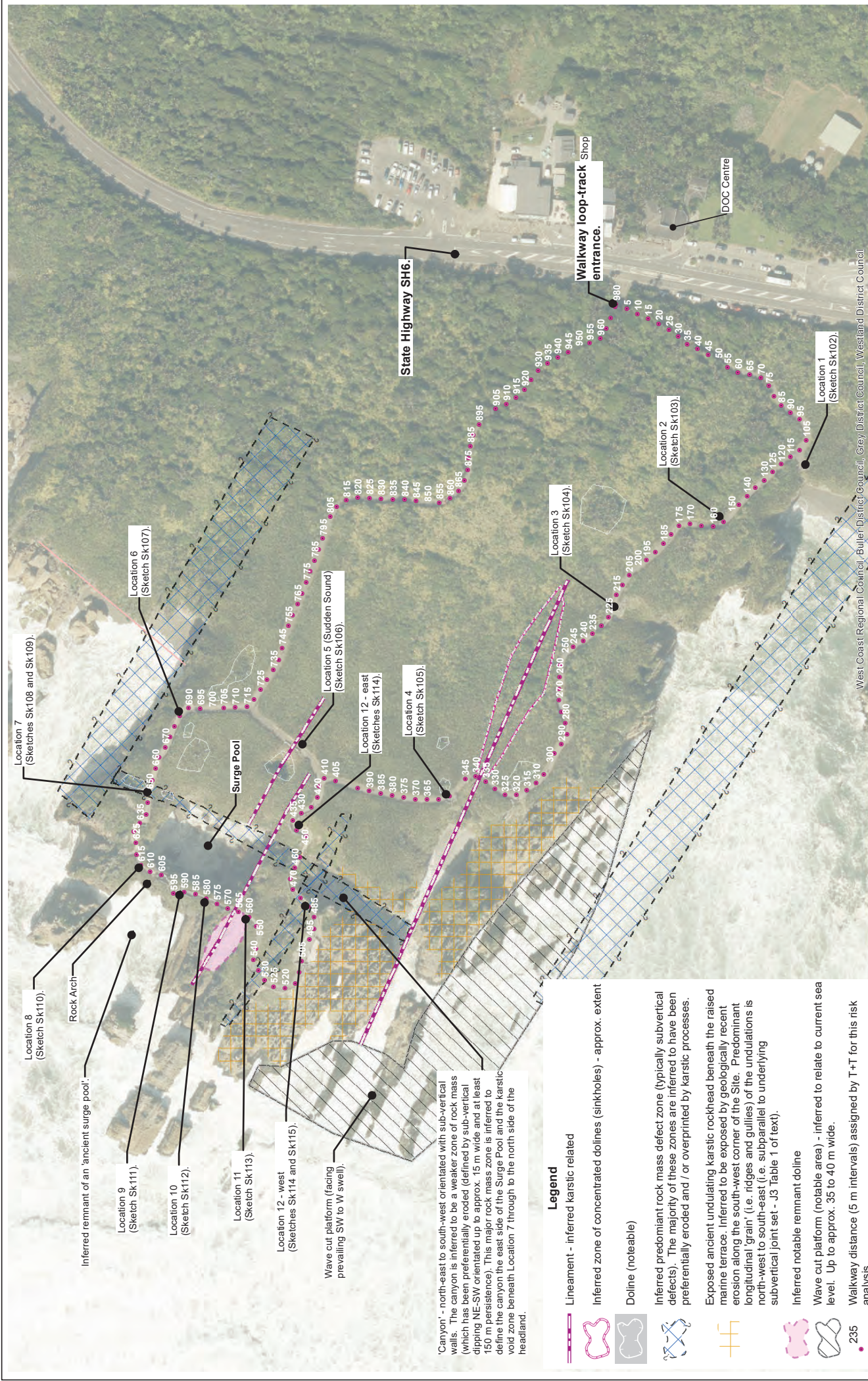
Authorised for Tonkin & Taylor Ltd by:



Project Director

Attached: Attachment 1: Site Plan  
Photographs 1 - 4

18-Dec-20  
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Department of Conservation  
 Dolomite Point Walkway, Punakaiki  
 Visitor Risk Management - Geotechnical Quantitative Risk Analysis  
 Engineering Geology Site Plan

FIGURE No. Sketch - SK203

1007904\_1000

PROJECT No. 1-1,500

SCALE (AT A3 SIZE) 1:1,500

ARCFILE 1007904\_1000 - SK203.mxd

APPROVED

CHECKED

EBBL June 20

DRAWN

West Coast Regional Council, Buller District Council, Grey District Council, Westland District Council

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Department of Conservation  
 Te Papa Atawhai

A3 SCALE 1:1,500

0 50 100 (m)

Notes:  
 1. Base photograph from West Coast Regional and Local Authority GIS web servers. This is subject to survey confirmation and do not scale off this plan.  
 2. Location references and Sketch No. - refer to T+T geotechnical monitoring and checklist report Dec. 2019.

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Photographs 1 – 4 – Location 7 along Dolomite Point walkway



Photograph 1: Location 7 crack location.



Photograph 2: North to south trending karstic feature.



Photograph 3: Observed cut/fill locations at Location 7.



Photograph 4: Grouted stone wall downslope of crack.