

Tipple Residence, Kaiteriteri

Geotechnical and Structural Deck Commentary

Client: Tipple Family
Supplied to: Tasman District Council
From: GM Designs Consulting Engineers Ltd
CPEng Representative: Graeme McMillan (47102)
Reference Number: P7890
Date of Issue: 4th November 2024

Brief: 38 Kaiteriteri Sandy Bay Road, Kaiteriteri – New Deck Commentary

The Executive Scope of this report aims to confirm the construction of a new geotechnical and structurally compliant deck system, highlighting the items that need to be proved or remediated for this commentary to be deemed valid.

This commentary has been formed from an on-site visit entailing geotechnical testing, with an extensive investigation by Graeme McMillan, CPEng Geotech & Structural Engineer, Director of GM Designs Consulting Engineers Ltd, compared with the recent geotechnical reporting completed for this site by Geoconsult Ltd (CHCH), Report dated 20 Dec 2021, as appended to this report.

This onsite joint Geotechnical and Structural Engineering report by G D. McMillan, Chartered Geotech, Structural & Civil Engineer, will undertake the combined disciplines commentary within the report reflecting on the global functionality of the subsoils and structural interactive review.

We will relate any previous findings of others within our documentation in this review to any earlier professional engineering reports undertaken by others, which is the accepted process to follow in such circumstances. The earlier report dealt with the adjacent garage immediately adjacent to the new boundary piling about the circumference of the new deck that has been built, which is the item of discussion within this report. A new deck was commenced under the nominal provisional understanding of non-consented works to be below 1.0m in height, which is allowed. Unfortunately, the last few meters exceeded this height to be closer to some 1.5m at the extremity of the outer pile line. This is where our report will focus, particularly scrutinising this area for the combined Geotech and structural review so laypersons can better understand an objective review.

Specialised engineering skills have been exercised to deliver this mature professional opinion to all affected parties.

In addition to the Geotechnical discussion undertaken at the time, a global engineering review was needed to evaluate the structures and geotechnical effects on the neighbouring party landowners' property within a 2.0m of their boundary as per the district scheme plan with consideration to specific land stability and loading bearing being applied by the use of nominal deck piles that exert limited loading at centres of some 1.8m. Due to erosion, the site Geotech properties have formed an essential part of the final solution to ensure the new deck's continued place meets the 50-year return period of

any consent subject to nominal continual checking and maintenance by the owners, like any repainting of exterior weatherboards.

Site Inspection Notes – September 25th, 2024 - Prepared by: Graeme D. McMillan

1. Core Sampling Summary

On-site core sampling was performed using 400mm and 800mm augers with an additional head extending to a further 1.0 m, all for 150 mm test diameter holes. Compound coupling was undertaken for sampling up to 2.1-2.3m in depth to all critical holes.

Figure 1 shows a site plan that overlays the September sampling holes with the location of hand auger investigations completed by GeoConsult.

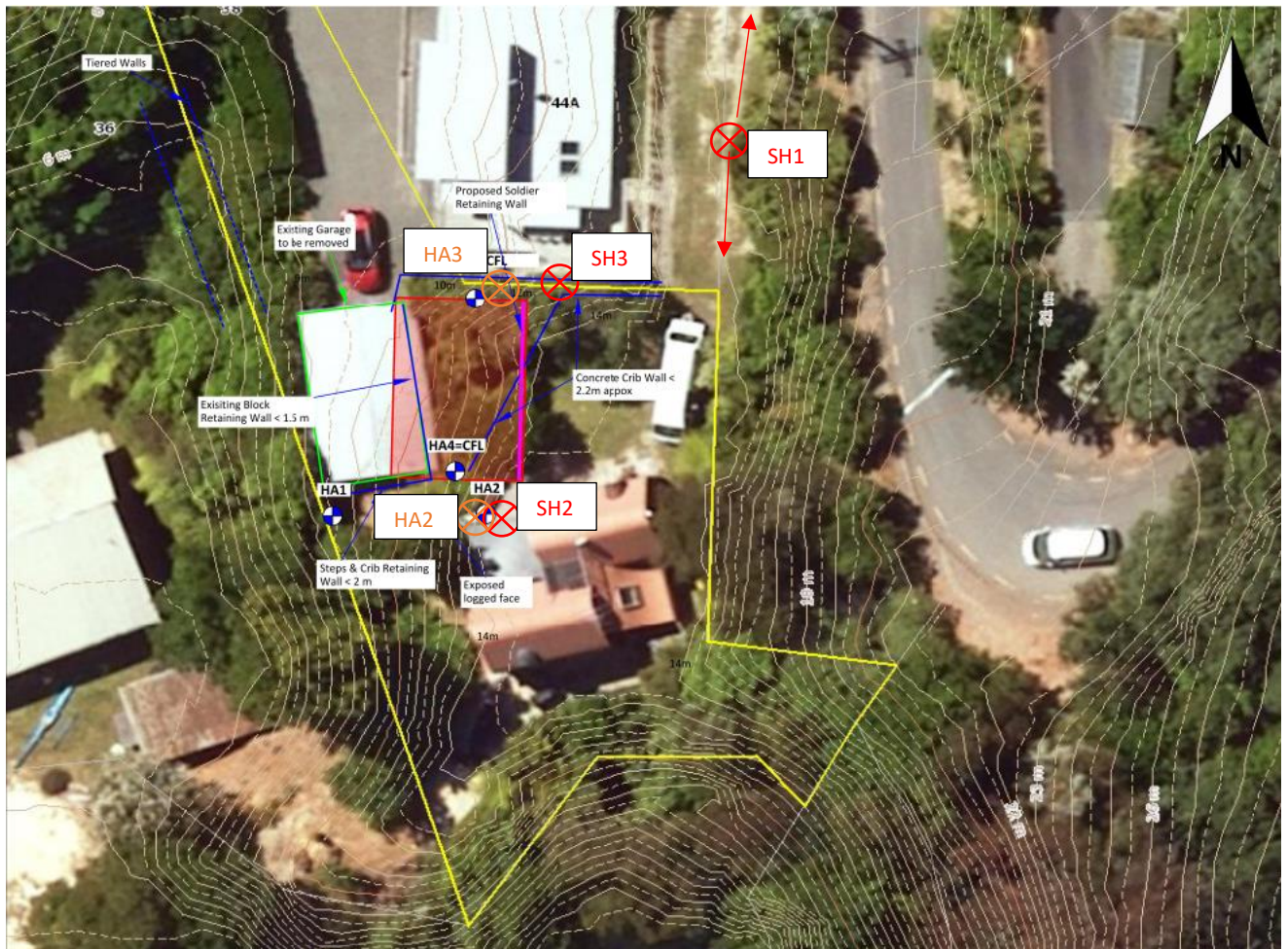


Figure 1. - Site Overlay with September Sampling Hole (SH) & Geoconsult Hand Auger (HA) test locations.

- 1.1 First Sampling Hole – **SH3** Bores undertaken by GDM referenced by **HA3** Geoconsult in 2021 report. The soil bank below the house, which had been cut during the house construction some years ago, revealed layers of yellow clay. As the depth increased, the clay became drier and lighter in colour, with minor quartz grit present. At 1.3 m, the soil was dense and moisture-free.



The magnificent eastern sea views of Kaiteriteri Bay from the new deck are obscured by the bush line directly from a front aspect at the lower Low tide line and from the water.



Figure 2a & 2b. - Yellow clay layer samples from SH3 V HA3

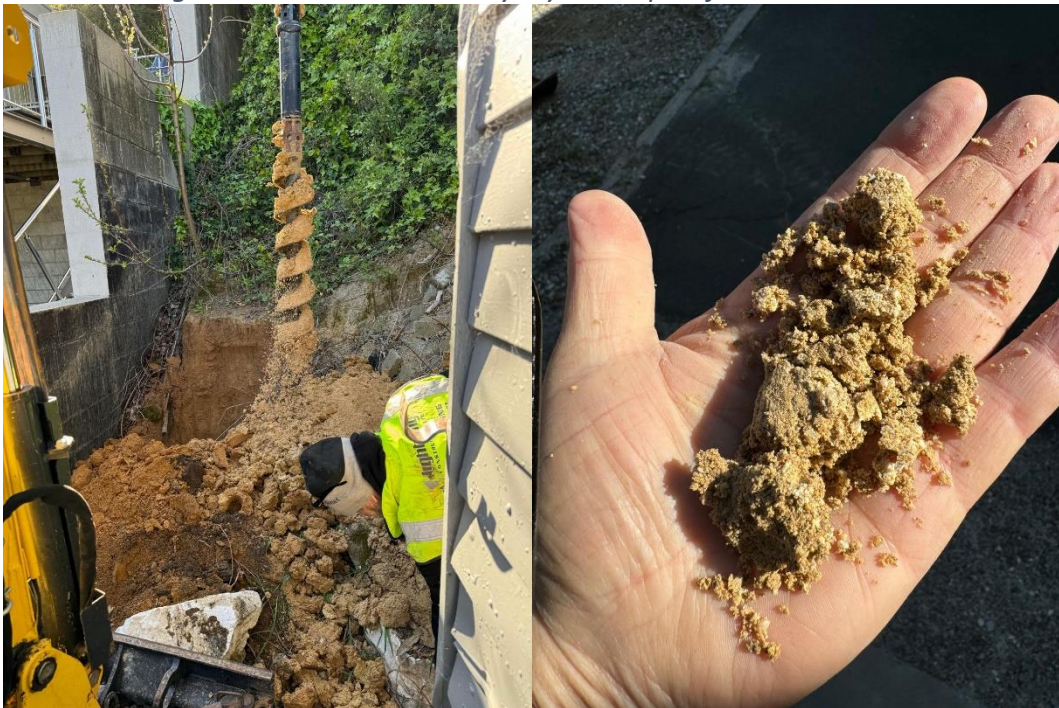


Figure 3a & 3b. – More dry, lighter clay with the presence of small quartz grit from SH3 versus HA3

1.2 Second Sampling Hole – SH2 by GDM versus HA2 By Geoconsult.

The second sample showed a composition of mud and clay. Although a 150 mm auger was used for this test, it was noted that the original piles were placed using a 300 mm auger to match the larger foundation poles of the house, some of which measure 270 mm in diameter on the north-facing side.



Figure 4. - Excavator positioning on deck for SH2 sample hole with existing dwelling to the left



Figure 5a & 4b. - Composition of mud and clay from SH2

1.3 Geotechnical Comparison

The testing completed with GM Designs on-site included the sampling holes (SH) encountered the same soil types in the same areas as the Geoconsult testing report hand augers (HA) indicate. Comparatively, the GeoConsult testing extended to a depth of 4m at HA2, whereas the 150mm auger achieved a depth of 2.1m. HA2 indicates that below 1.6m, a consistent layer of very stiff silty clay was encountered that continued until the test's end.

SH2 By GDm Versus GA2 by Geoconsult are the most applicable sampling results due to their proximity to the deck. The results of these tests are intended to represent best the soils encountered by the deck foundation. Additional site images are included in Appendix A.

The pile foundations are recommended to be embedded at a minimum depth of 2m below final ground level, which is to be at least 0.5m below any fill into the stiff natural ground in the GeoConsult Report (GCR). This recommendation is for leading edge piles of a proposed garage. The loading demand from a deck structure is less than that of a garage, with a sleepout constructed on the first floor.

Therefore, the leading-edge deck piles are embedded at a minimum depth of 2.1-2.3m below the finished ground level, with at least 0.5m embedded into the stiff natural ground layer. Given that the depth of the pile embedment is now proven, the embedment of the piles is deemed adequate.

2. Structural Observations

2.1. West Overhang of 1.37m & Structural Arrangement

The western deck overhang extends 1.37 m maximum from a row of 8 piles spaced at a maximum distance of 1.9 m. The deck's southwest boundary is positioned 100 mm from the neighbouring property, spanning approximately 7.6 m along the boundary.

The patio's maximum loading point is located at the corner where an external post is embedded to a depth exceeding 2.0 m. This post, typically 250-270 mm in diameter, supports the deck and is accompanied by small retaining timbers extending to a height of 1.0 m. Additional site images are included in Appendix A.



Figure 6a & 6b. - Row of Round Posts with 1m high retaining wall held by square posts (left) and 137cm overhang of deck from row of piles (right) along the west edge of the deck

2.2. Deck Construction Details

The larger deck structure, built around the house, is supported by square H5 posts measuring 125 mm by 125 mm. These posts are positioned outward from the house and support hardwood decking boards installed 400 mm above the ground.

A stringer board has been bolted to the house using stainless steel coach bolts, securing the deck to the original structure. The outer poles are embedded a minimum depth of 2.0 m into the ground to withstand seismic loads, with the deck diaphragm transferring loads to the house, preventing any excessive lateral force demands acting on the external boundaries. Additional site images are included in Appendix A.

2.3. Deck Loading Discussion

The deck loads include 1.5 kPa live load (Q) and 0.25 kPa dead load (G) providing a working load of $G + Q = 1.75$ kPa. The loaded area for one of the 250mm diameter SED H5 piles located on the edge of the deck is $1.90 \text{ m} \times 1.37 \text{ m} = 2.60 \text{ m}^2$. This results in a total axial load demand of 4.6 kN. With a 450 mm diameter base for the footing, the demand on the soil is 29 kPa.

The safe allowable bearing pressure of the sandstone clay at a minimum depth of 2.0m indicated 300 kPa. Compared to the bearing demand from the post, this provides a factor of safety of 10.4 times, hence, this doesn't impose added risk to the lower neighbours.

A schematic of the large post section has been formed to illustrate the design in Figure 7a.

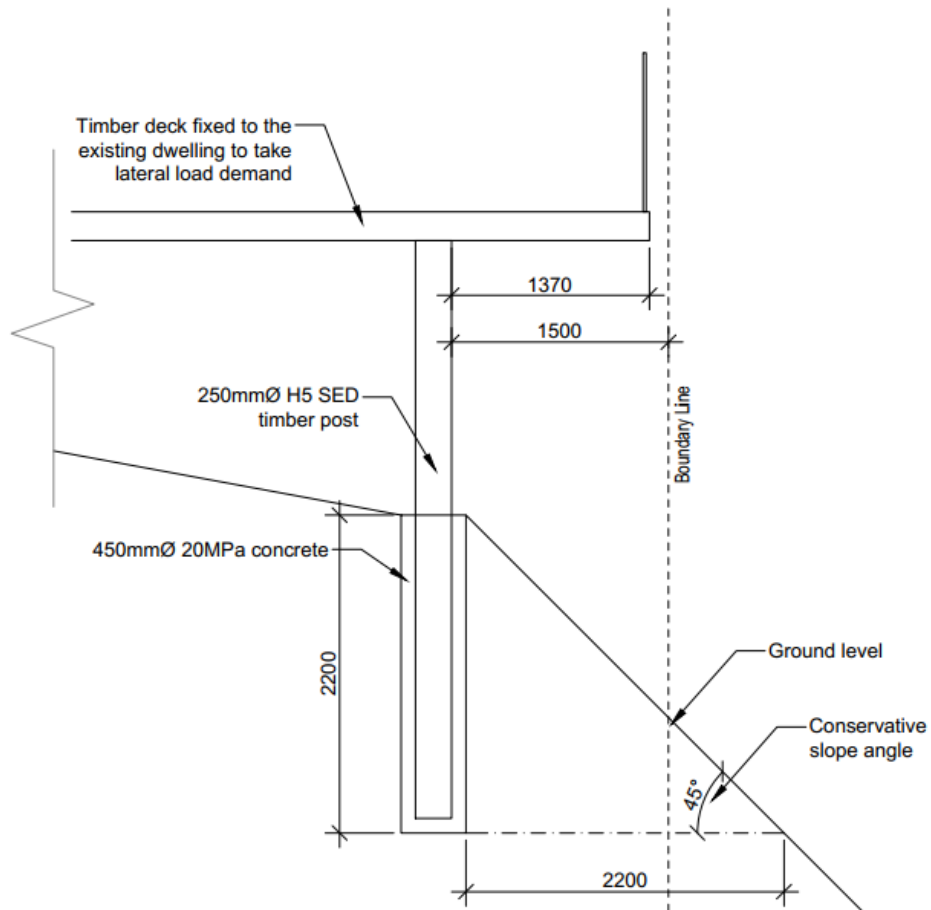


Figure 7a. - Deep Post Section



Figure 7b & 7c. – Construction images of the post holes depths. More images are included in the appendix under PS3 images.

3. Compliance and Certification Requirements

The builder has provided PS3 certification for the timber-framed deck construction and a Record of Building Work document.

The builder has provided certification images confirming the member sizes and treatment, the depth of post holes, and purchase dockets as evidence that the deck was constructed adequately. These certification images are attached in Appendix B.

4. Erosion Control Measures

The deck's external piles are free from bracing requirements, relying instead on ground stability and depth of embedment for shear load resistance. However, soil erosion surrounding these piles is a concern, particularly for piles embedded over 1.0 m in height.

To prevent erosion. A damp-proof membrane (DPM) of at least 150 microns should be applied around the base of all critical piles. This membrane should extend from the house edge and around the posts to prevent water migration and soil erosion.

5. Site Evaluation & Proposed Actions

Further investigation will be conducted to ensure the proposed design changes have been implemented, ensuring long-term stability and compliance with code requirements. Additionally, it is necessary to address areas where erosion has occurred.

The post on the southeast corner near the old toilet area will require further work. To protect against erosion, DPM should be applied to the posts and under the deck, and ferns and other flora should be added to the land around the deck to stabilise the exposed ground.

6. Summary & Conclusion

Objective Commentary:

The structure will meet Tasman Bay Council standards, assuming compliance with timber standards, proper documentation, and addressing concerns about erosion. Once these requirements have been addressed and specific items resolved, GM Designs can certify the deck and issue a Certificate of Acceptance (COA).

This report has been prepared to comprehensively assess the deck and its compliance with the relevant regulations.

7. Final Conclusions:

We cannot see any technical reason why the sun deck could not remain after removing the roofed sundeck structure off the deck and the foliage placement to act as a screen for the deck itself.

Once undertaken, increasing any setback that may be considered of the deck from the boundary would achieve minimal visual effect, as there is a lack of perspective when viewed from the beach some 10.5m below.

Planners discuss and argue compliance with publicised documented setbacks within the district scheme plans, whereas Engineers explain why setbacks are placed from first principles. When a setback is an infringement, one must investigate the significance concerning the initial desired clause of the global rules.

There are different perspectives placed on sloping sites than on flat sites. Sometimes, councils that have laid out infringement preclude any rational understanding of the intent of any site-specific infringements; this is where we have tried to find a rational middle ground. The relevance of the infringement may not be apparent once the screening of any visual lines has been taken care of. The deck glazing is one where anyone can view through the glass. As it is translucent, limited visual effects exist when compared with a solid fence, as the immediate foreground can still be taken into one aspect setting, in this case, the hill background.

The proposed lease or purchase of the denoted paper road would best be dealt with by the Crown Land Office. The placed stairs can be painted from their current brown to a dark monument green colour, and further planting can be undertaken to minimise any visual objections. There are many examples where transversed crown land exists, and access over ground land is an accepted reasonable request for access to a beachfront. I believe an acceptable modification could be undertaken in the interests of all parties in this situation.

The rights of owners subject to street boundary frontage guidelines should be considered similarly to those of the fire controls where they apply to the far side of the roadway; in this situation, on the East frontage, there exists a paper roadway where the Crown can allow such a deviation, lease or sale to private owners. This would then see the Tasman Bay Planning restrictions placed to one side, allowing the current deck to stay as is, pending the required land stabilisation, plantings to screen any visual aspects and the status quo left as is to continue subject to the removal of the roofed structure off the deck.

CPEng Representative:



Graeme D. McMillan
Team Leader GMDCE Ltd
Geotechnical, Structural & Civil Engineer
BE(Hons): CMEngNZ, **CPEng**, AFIM, REPO, **MNZGS**

Appendix A: Site Images

Sampling Images:

SH3 GDM – HA3 Geocosult – Sampling Hole 3 depth to the base drilled to 2.3m establishing the Geoconsult report.



SH1 – Sampling Hole 1





Site Terrain Images: SH1 (GDM) /HA1 above the Bank firming up Geoconsult's report.

Below: Fig 1- 4 below shows the sound fixing of the new deck to the upper cantilevered poles and piles.



F 1-4



F1-5

Fig 1-5 above, Shows sound fixing of the newly bolted deck with the end fixing of double stringer beams bolted to the piles around the perimeter of the new deck.



Fig 1- 6 Above, show surfaces that need erosion protection to control upper sandstone instability, which can be achieved using sealed DPM

Deck Images: F 1-6 above depict the required overlays to secure the erosion-free weathering properties of the upper crust directly under the upper decking. The cracks below are undesirable, and need fixing to prevent further issues and ensure this mechanism for the long-term plan on this site achieves overall acceptability. We conclude a protective cover over the upper crust is required.



The above feature is where the original erosion, caused by the flow of water runoff, has caused this undesirable breakdown of the upper crust of the graduated topsoil and lower weathered sandstone. This needs fixing with the tampering by using clay to fill up all void holes. These veins or cracks in the upper crust shall then be overlaid with well-formed flow dish channels, say 150mm wide and graduated depth, so that the water from the house under the deck to the outside and down the bank away from any infrastructure to the natural water channels double-lined with Agtuf 150 micron film as the approved DPM medium.

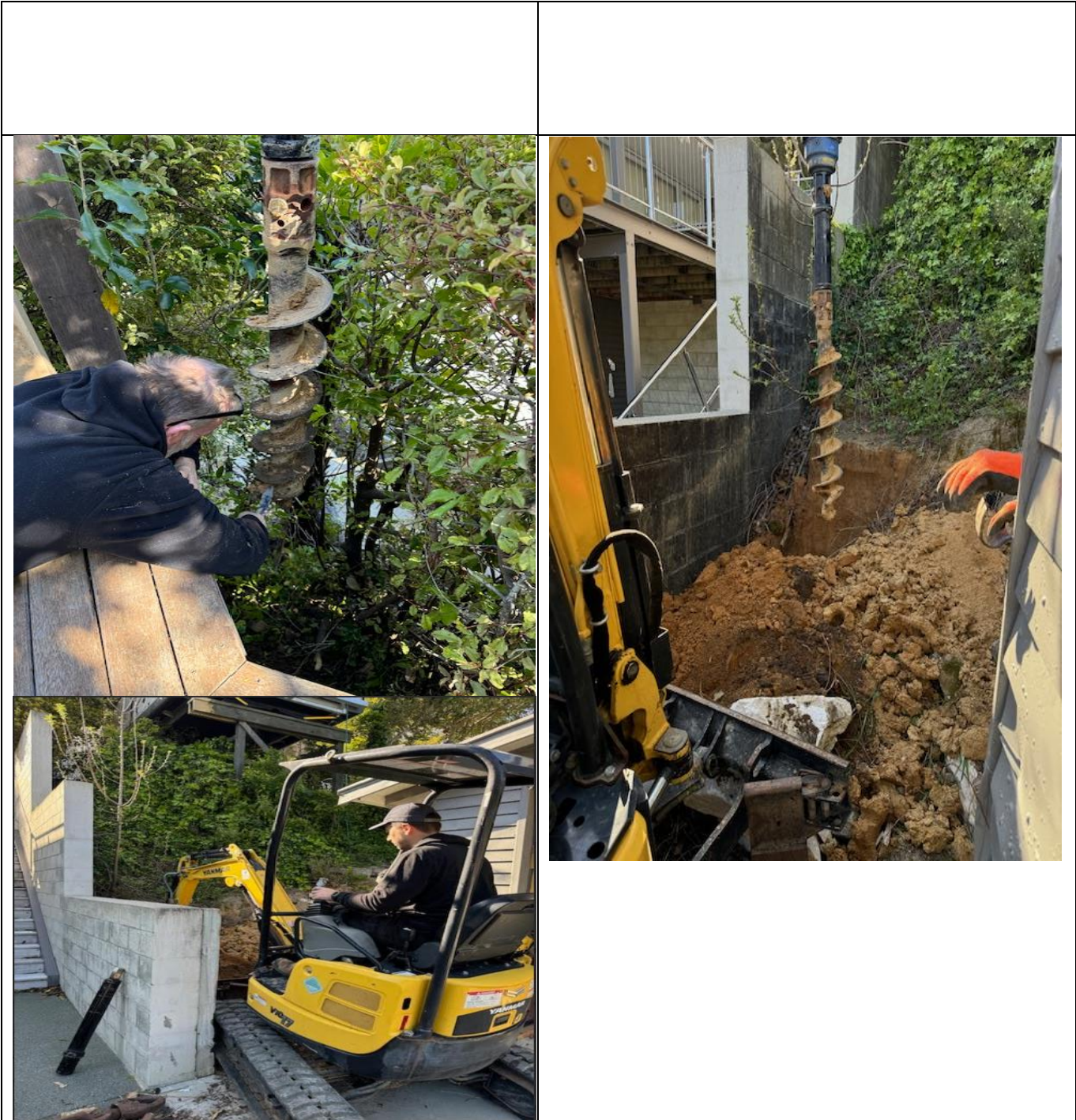


Figure G1. – Post to ground interface that highlights the top of the concrete partially hidden by topsoil used in the soil loading calculations. Additionally, the image shows the importance of placing waterproof membrane around the base of the pile to protection from weathering and erosion.



Views of the Bay F1&2 above and SE corner of the new Deck < 900mm off the firm ground.
 : The sunshade is a structure because of its roof and obstruction within 4.0m of the edge. This **must be removed as it can be seen from below, which is detrimental to our argument that the deck can stay subject to planting** green foliage to hide the deck itself from any views below, excluding the translucent glass.

The hydraulic Drill head of the digger was used throughout the new deck build. It took all main poles into 450mm diameter holes to a depth of 2.1-2.3m, removing any adverse loads from the base of the pole.
Fig 3: _____
 The edge of the deck shall be required to have **foliage planted** to obscure the deck edge.



These augured holes were at the same location as those defined and reported on by the Geoconsult report, which we determined was commonality within our peer review of their work. SH2 Fig 1 And SH3 Fig 2 & 3 reflecting on Ha2 & Ha3

Fig 1 Top LHS; Fig 2 Top RHS
Fig 3 Bottom LHS



The above image is south facing from the north side of the dwelling. The red star indicates the sunshade structure that is placed on the deck that should be removed due to its intrusion on natural views from the beach level to the public.

Appendix B: Builder Certification Documents & Dockets

Form 6A

Memorandum from Licensed Building Practitioner – Record of Building Work

Section 88, Building Act 2004

Please ensure all fields are completed in full. Licensed Building Practitioners (LBPs) must provide a Records of Building Work for all aspects of restricted building work carried out or supervised by each LBP

Building Consent Information	
Building consent number:	
Full site address:	38 Kaiteriteri Sandy Bay Road, Kaiteriteri

Owner			
Owner's name:	Timothy Tipple	Phone number:	
Address:			
Email address:	tim@guncity.com		

Record of work that is restricted building work				
Tick if the work is RBW	Description of RBW	Carried out	Supervised	
Primary structure: B1				
<input checked="" type="checkbox"/>	Foundations and subfloor framing	constructed decks as per the NZBC	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Walls		<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Roof		<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Columns and beams		<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Bracing		<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/>	Other		<input type="checkbox"/>	<input type="checkbox"/>

External Moisture Management Systems – E2				
<input checked="" type="checkbox"/>	Damp proofing <small>(EP1 or EP2)</small>	Moisture management, weed control and erosion control matting installed in accordance with NZBC	<input type="checkbox"/>	<input type="checkbox"/>
	Roof cladding or roof cladding system		<input type="checkbox"/>	<input type="checkbox"/>
	Ventilation system <small>(e.g. subfloor cavity)</small>		<input type="checkbox"/>	<input type="checkbox"/>
	Wall cladding or wall cladding system		<input type="checkbox"/>	<input type="checkbox"/>
	Waterproofing		<input type="checkbox"/>	<input type="checkbox"/>
	Other		<input type="checkbox"/>	<input type="checkbox"/>

Issued by			
Name:	alan Dibnah	Company:	
Licensing class/role:	Carpentry/site2	LBP or registration number:	105815
Phone number:	021 766 190	Mobile number:	021 766 190
Email:	bestwayalan@hotmail.com		
Website:		Fax number:	
Street address/registered office:			
Mailing address: <small>(if different from the above)</small>	177 Wainakei Rd Chch 8053		

Declaration			
<p>The information you have provided on this form is required so that the building consent it relates to can be processed under the Building Act 2004. Tasman District Council collates statistics relating to building work and has a statutory obligation to provide information to third parties. The information is stored on a public register, which must be supplied to whoever requests the information. Under the Privacy Act 2020, you have the right to see and correct personal information Tasman District Council hold about you.</p>			
<p>All the information contained in the application is, to the best of my knowledge, true and correct.</p>			
<input checked="" type="checkbox"/>	I carried out or supervised the restricted building work recorded on this form.		
Name:	Alan Dibnah	Date:	9/10/2024
Signature:	Alan Dibnah		

PRODUCER STATEMENT CONSTRUCTION PS3

Author's Name: Alan Dibnah Licence Number: PSA/ LIBP 105815

- Tick applicable Contractor for:
- | | | | |
|-------------------------------------|----------------------|--------------------------|-----------------------------|
| <input checked="" type="checkbox"/> | Building | <input type="checkbox"/> | Automatic Sprinkler Systems |
| <input checked="" type="checkbox"/> | Waterproof Membranes | <input type="checkbox"/> | Plumbing |
| <input type="checkbox"/> | Cladding | <input type="checkbox"/> | Fire Alarm |
| <input type="checkbox"/> | Ventilation | <input type="checkbox"/> | Emergency Lighting |
| <input type="checkbox"/> | Other: | | |

Issued by: to Tasman District Council

SECTION 1:

Owner: Timothy Tipple
Project Address: 38 Kaiteriteri Sandy Bay Road, Kaiteriteri
Building Consent Number: BDG/.....
Description and Location of Building Work: Construction of timber framed deck around existing dwelling
Scope of Work Covered by Statement: Augered foundations, >1m high timber retaining walls, deck framing,
deck fixing to existing dwelling, DPM placement for erosion protection
~~Any Special Limitations or Conditions:~~
System / Product Used (if applicable):

I (Constructor): Alan Dibnah
have been engaged by Timothy Tipple (building consent applicant)
to construct: All Part only

Work completed on (dd/mm/yyyy)

As specified in the attached particulars of Building Consent Number and its attached conditions and am satisfied on reasonable grounds that the building work specified above has been completed to the extent required by that Building Consent and complies with the Building consent.

Specific reference to the Building Code:

	<u>B1</u>	<u>B2</u>	C1	C2	C3	C4	C5	C6	D1	D2
What clauses of the Building Code are covered by the Producer Statement?	E1	<u>E2</u>	E3	F1	F2	F3	F4	F5	F6	F7
(Circle applicable clauses)	F8	G1	G2	G3	G4	G5	G6	G7	G8	G9
	G10	G11	G12	G13	G14	G15	H1			

I understand that this Producer Statement, if accepted, will be relied upon by for the purpose of establishing compliance with the Building Consent documentation.

SECTION 2:

Name: Alan Dibnah
Address: 177 Wairakei Rd Christchurch

Phone Number: Home: Work: Mobile: 021 766190

Fax: Email: bestwayalan@hotmail.com

Signature: Alan Dibnah Date: 9/10/2024

NB: All sections of the PS3 must be completed.

PS3 Construction Images:

Post Holes:





H5 Posts:





TAX INVOICE

#5700020071088

Richmond

20/05/2021 08:39
GST Number: 19-888-339

62 Gladstone Road
Richmond
Phone: 03 544 0199

Customer No: **30201327** Order Number: . Ship To:

Gun City Limited
5/484 Cranford Street
Redwood
Christchurch 8042

30 Quaid's Road
Marshland
Christchurch 8051

Phone: 033798888

Code	Description	Qty	Sell Price	Total excl
GFYPOST180	GOFENCE Ypost 1.80	10	\$7.09	\$70.90
TP042250H5	4.2m x 250mm Tanapole H5	5	\$160.82	\$804.10
TP036275H5	3.6m x 275mm Tanapole H5	5	\$150.26	\$751.30
TP048275H5	4.8m x 275mm Tanapole H5	5	\$219.16	\$1,095.80
CEMENTPAC25	Holcim Ultracem 25kg	4	\$11.57	\$46.28
			Subtotal:	\$2,768.38
			Plus GST of:	\$415.24
			TOTAL:	\$3,183.62

Payments:	Type	Amount
	ACCOUNT	\$3,183.62

You were served at checkout 2 by Helen Thank you for shopping with us



TAX INVOICE

#5700040036126

Richmond

04/06/2021 12:59
GST Number: 19-888-339

62 Gladstone Road
Richmond
Phone: 03 544 0199

Customer No: 30201327	Order Number: .	Ship To:
Gun City Limited 5/484 Cranford Street Redwood Christchurch 8042		30 Quaid's Road Marshland Christchurch 8051
Phone: 033798888		

Code	Description	Qty	Sell Price	Total excl
RS125125H51.2	125mm x 125mm Square House Pile H5 1.2m	8	\$36.23	\$289.84
GTBIGBOYH44.8M	BIG BOY Timber H4 4.8m	6	\$55.98	\$335.88
GTBIGBOYH46.0M	BIG BOY Timber H4 6.0m	4	\$69.98	\$279.92
RS125125H53.6	125mm x 125mm Square House Pile H5 3.6m	4	\$115.33	\$461.32
RS125125H52.1	125mm x 125mm Square House Pile H5 2.1m	10	\$60.55	\$605.50
RS125125H52.4	125mm x 125mm Square House Pile H5 2.4m	13	\$72.42	\$941.46
			Subtotal:	\$2,913.92
			Plus GST of:	\$437.09
			TOTAL:	\$3,351.01

Payments:	Type	Amount
	ACCOUNT	\$3,351.01

You were served at checkout 4 by Helen

Thank you for shopping with us

Bank account: Goldpine Industries Ltd - 02 0747 0045821 002
PO Box 3331, Richmond, Nelson 7050