

Date: 26th June 2019
No. Pages: 3
Project No.: 2018-116.1

Fiona Loader
15 Donnelly Lane
Balmain

Addendum Geotechnical Assessment 18-20 Sturdee Lane, Lovett Bay

It is understood that a Development Application (DA) for a proposed waste water disposal system is to be submitted to Northern Beaches Council and that an assessment is required in accordance with Geotechnical Risk Management Policy for Pittwater 6 2009 in support of the application.

Crozier Geotechnical Consultants (CGC) has previously undertaken geotechnical investigation/reporting for proposed alterations and additions at 18 6 20 Sturdee Lane, Lovett Bay, however the DA relating to this report has not yet been submitted to Council for assessment. Subsequent to completion of our report (Project No. 2018-116, September 2018) a new waste water system was proposed within the site and an additional Risk Assessment (provided herein) was required for the proposed works. The original investigation provided sufficient information on which to base required waste water risk assessment therefore this addendum report should read in conjunction with the original (un-submitted) report for clarity. It is understood that a DA will be submitted for the originally proposed alterations and additions however currently our original report is only to supplied in support of the addendum assessment for the waste water system.

We have been supplied the following documents relating to the proposed new waste disposal system:

- Waste Water System Site Plan, Detail Plan by James de Soyres and Associates, Project No.:1708a, Dwg. No.: WW-01 to WW-04, Dated: 03/06/19
- Martens Consulting Engineers -Onsite Wastewater Assessment, 18-20 Sturdee Lane, Lovett Bay, NSW, Dated: March 2019.
- Taylex Tanks, Excavation Details, Taylex Poly ABS, Dated: May 2015.

The proposed new waste water disposal system requires an excavation of up to 3.0m wide and up to 2.4m deep to allow the installation of a treatment tank approximately 6.5m from the shared boundary with No.22 Sturdee Lane (to the west). The proposed excavation is 0.4m deeper than the proposed excavations for the alterations and additions elsewhere within the site however it is anticipated the soil/bedrock profile and geological model will be similar.

The proposed waste water disposal system is located immediately adjacent to a rear access path which is understood to remain. It will be necessary to form a near vertical excavation face 2.4m in height directly adjacent to the path to accommodate the proposed disposal system. It is considered that it will be necessary to control the risk to those within the excavation and those adjacent to the crest of the excavation during tank installation.

Based on our review of the site investigation results we have identified the following geological/geotechnical landslide hazard which needs to be considered in relation to the existing site and the proposed works. This hazard is:

A. Earth slide of fill/natural soils during excavation.

A qualitative assessment of risk to life and property related to this hazard is enclosed (Table A and B) and is based on methods outlined in Appendix: C of the Australian Geomechanics Society (AGS) Guidelines for Landslide Risk Management 2007.

Due to the separation distance of the proposed works from the property boundaries and adjacent structures, along with the scale and nature of the excavation, the hazard identified is likely to impact to workers in the excavation, with the risk controlled by NSW Health and Safety legislation.

The Risk to Life from Hazard A was estimated to be up to 6.13×10^{-5} , whilst the Risk to Property was considered to be 'Very Low'. The risk to life was therefore considered to be 'Un-Acceptable' however this level of risk is applicable only to workers in the excavation prior to placement of the tank during construction. Where risk to workers during construction is not included in the assessment and in accordance with the AGS 2007 methodology, the Risk to Life is estimated to be up to 1.88×10^{-8} , which is considered acceptable. The risk to construction workers has been included here to highlight that this hazard does pose a risk to workers and will require management in accordance with NSW Workplace Safety Guidelines.

The proposed tank is understood to be installed within a slope of approximately 30° and it will be necessary to confirm the structural adequacy of the tank for this application (with the tank manufacturer) and that the installation and backfill methodology is adequate to enable the tank to act as a circular retaining structure and resist slope pressures.

It is considered that where the structural adequacy of the tank is insufficient to resist elevated ground pressures or is not adequately fixed, the long term serviceability of the tank may be impacted however significant risk to life or property resulting from minor movements of the tank is not envisaged.

The risks associated with the additional proposed works can be maintained within ~~Acceptable~~ levels with negligible impact to neighbouring or structures, provided the recommendations of our geotechnical report for the site and future geotechnical directive are implemented. As such the site is considered suitable for the proposed additional works provided that the recommendations outlined in this report are followed.

Hope the above comments meet Council requirements, if we can be of further assistance please don't hesitate to contact the undersigned.



Kieron Nicholson
Senior Engineering Geologist

Encs:
Risk Assessments (Table A and B)
Signed forms 1 and 1a.

**GEOTECHNICAL RISK MANAGEMENT POLICY FOR PITTWATER
FORM NO. 1 – To be submitted with Development Application**

Development Application for Fiona Loader

Address of site 18 – 20 Sturdee Lane, Lovett Bay

Declaration made by geotechnical engineer or engineering geologist or coastal engineer (where applicable) as part of a geotechnical report

I, Troy Crozier on behalf of Crozier Geotechnical Consultants on this the 24th June, 2019 certify that I am a geotechnical engineer or engineering geologist or coastal engineer as defined by the Geotechnical Risk Management Policy for Pittwater - 2009 and I am authorised by the above organisation/company to issue this document and to certify that the organisation/company has a current professional indemnity policy of at least \$2million. I

- ☐ have prepared the detailed Geotechnical Report referenced below in accordance with the Australia Geomechanics Society's Landslide Risk Management Guidelines (AGS 2007) and the Geotechnical Risk Management Policy for Pittwater - 2009
- ☒ am willing to technically verify that the detailed Geotechnical Report referenced below has been prepared in accordance with the Australian Geomechanics Society's Landslide Risk Management Guidelines (AGS 2007) and the Geotechnical Risk Management Policy for Pittwater - 2009
- ☐ have examined the site and the proposed development in detail and have carried out a risk assessment in accordance with Section 6.0 of the Geotechnical Risk Management Policy for Pittwater - 2009. I confirm that the results of the risk assessment for the proposed development are in compliance with the Geotechnical Risk Management Policy for Pittwater - 2009 and further detailed geotechnical reporting is not required for the subject site.
- ☐ have examined the site and the proposed development/alteration in detail and I am of the opinion that the Development Application only involves Minor Development/Alteration that does not require a Geotechnical Report or Risk Assessment and hence my Report is in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009 requirements.
- ☐ have examined the site and the proposed development/alteration is separate from and is not affected by a Geotechnical Hazard and does not require a Geotechnical Report or Risk Assessment and hence my Report is in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009 requirements.
- ☐ have provided the coastal process and coastal forces analysis for inclusion in the Geotechnical Report

Geotechnical Report Details:

Report Title: Addendum Geotechnical Assessment 18-20 Sturdee Lane, Lovett Bay

Report Date: 26th June, 2019

Project No.: 2018-116.1

Author: Kieron Nicholson

Author's Company/Organisation: Crozier Geotechnical Consultants

Documentation which relate to or are relied upon in report preparation:

Crozier Geotechnical Consultants 'Geotechnical Report for Alterations and Additions to existing Structure with Construction of Secondary Dwelling at 18-20 Sturdee Lane, Lovett Bay' Project No.2018-116, dated 5 September 2018.

Waste Water System Site Plan, Detail Plan by James de Soyres and Associates, Project No.:1708a, Dwg. No.: WW-01 to WW-04, Dated: 03/06/19.

Martens consulting Engineers 'Onsite Wastewater Assessment, 18-20 Sturdee Lane, Lovett Bay, NSW', Dated: March 2019.

Site survey plan supplied by SDG Land Development Solutions, Reference No. 7430, Dated 10/11/2017.

Taylex Tanks, Excavation Details, Taylex Poly ABS, Dated: May 2015.

I am aware that the above Geotechnical Report, prepared for the abovementioned site is to be submitted in support of a Development Application for this site and will be relied on by Pittwater Council as the basis for ensuring that the Geotechnical Risk Management aspects of the proposed development have been adequately addressed to achieve an "Acceptable Risk Management" level for the life of the structure, taken as at least 100 years unless otherwise stated and justified in the Report and that reasonable and practical measures have been identified to remove foreseeable risk.

Signature

Name ... Troy Crozier

Chartered Professional Status RPGeo (AICD)

Membership No. ... 10197

Company... Crozier Geotechnical Consultants



GEOTECHNICAL RISK MANAGEMENT POLICY FOR PITTWATER
FORM NO. 1(a) - Checklist of Requirements For Geotechnical Risk Management Report for Development Application

Development Application for Fiona Loader
Address of site 18 – 20 Sturdee Lane, Lovett Bay

The following checklist covers the minimum requirements to be addressed in a Geotechnical Risk Management Geotechnical Report. This checklist is to accompany the Geotechnical Report and its certification (Form No. 1).

Geotechnical Report Details:

Report Title: Addendum Geotechnical Assessment 18-20 Sturdee Lane, Lovett Bay
Report Date: 26th June, 2019 Project No.: 2018-116.1
Author: Kieron Nicholson
Author's Company/Organisation: Crozier Geotechnical Consultants

Please mark appropriate box

- ☒ Comprehensive site mapping conducted ___6th July 2018___
(date)
- ☒ Mapping details presented on contoured site plan with geomorphic mapping to a minimum scale of 1:200 (as appropriate)
- ☒ Subsurface investigation required
☐ No Justification
☒ Yes Date conducted6th July, 2018.....
- ☒ Geotechnical model developed and reported as an inferred subsurface type-section
- ☒ Geotechnical hazards identified
☒ Above the site
☒ On the site
☐ Below the site
☐ Beside the site
- ☒ Geotechnical hazards described and reported
- ☒ Risk assessment conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009
☒ Consequence analysis
☒ Frequency analysis
- ☒ Risk calculation
- ☒ Risk assessment for property conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009
- ☒ Risk assessment for loss of life conducted in accordance with the Geotechnical Risk Management Policy for Pittwater - 2009
- ☒ Assessed risks have been compared to "Acceptable Risk Management" criteria as defined in the Geotechnical Risk Management Policy for Pittwater - 2009
- ☒ Opinion has been provided that the design can achieve the "Acceptable Risk Management" criteria provided that the specified conditions are achieved.
- ☒ Design Life Adopted:
☒ 100 years
☐ Other
specify
- ☒ Geotechnical Conditions to be applied to all four phases as described in the Geotechnical Risk Management Policy for Pittwater - 2009 have been specified
- ☒ Additional action to remove risk where reasonable and practical have been identified and included in the report.
- ☐ Risk assessment within Bushfire Asset Protection Zone.

I am aware that Pittwater Council will rely on the Geotechnical Report, to which this checklist applies, as the basis for ensuring that the geotechnical risk management aspects of the proposal have been adequately addressed to achieve an "Acceptable Risk Management" level for the life of the structure, taken as at least 100 years unless otherwise stated, and justified in the Report and that reasonable and practical measures have been identified to remove foreseeable risk.

Signature

Name ...Troy Crozier...

Chartered Professional Status...RPS (AIG)...

Membership No. ...10197...

Company... Crozier Geotechnical Consultants



TABLE : A

Landslide risk assessment for Risk to life

HAZARD	Description	Impacting	Likelihood of Slide	Spatial Impact of Slide		Occupancy	Evacuation	Vulnerability	Risk to Life
A	Landslip (earth slide 4m ²) from soils at crest of excavation for treatment tank	a) Base of excavation during construction b) Rear access path immediately adjacent to excavation.	Likely excavation within colluvial soils over residual soils then bedrock up to approximately 2.40m depth.	a) A slide would likely impact up to 1/3 of the excavation base b) A slide would impact the path directly adjacent		a) 8 hrs per day maximum b) 5 minutes per day for access only	a) Likely to not evacuate b) Unlikely to not evacuate	a) Person in confined space, possibly crushed b) Person in open, unlikely engulfed.	
			Possible	Prob. of Impact	Impacted				
		b) Workers in base of excavation b) Site users around excavation	0.001 0.001	1.0 1.0	0.33 0.10	0.3300 0.003	0.75 0.25	0.75 0.25	6.13E-05 1.88E-08

* hazards considered in current condition and/or without remedial/stabilisation measures

* likelihood of occurrence for design life of 100 years

* Spatial Impact - Probability of Impact refers to slide impacting structure/area expressed as a % (1.00 = 100% probability of slide impacting area if it occurs), Impacted refers to % of area/structure impacted if slide occurred

* neighbouring houses considered for bedroom impact unless specified

* considered for person most at risk

* considered for adjacent premises/buildings founded via shallow footings unless indicated

* evacuation scale from Almost Certain to not evacuate (1.0), Likely (0.75), Possible (0.5), Unlikely (0.25), Rare to not evacuate (0.01). Based on likelihood of person knowing of landslide and completely evacuating area prior to landslide impact.

* vulnerability assessed using Appendix F - AGS Practice Note Guidelines for Landslide Risk Management 2007

TABLE : B

Landslide risk assessment for Risk to Property

HAZARD	Description	Impacting	Likelihood		Consequences		Risk to Property
A	Landslip (earth slide 4m ³) from soils at crest of excavation for treatment tank	Pathway	Rare	The event is conceivable but only under exceptional circumstances over the design life.	Insignificant	Little Damage, no significant stabilising required or no impact to neighbouring properties.	Very Low

* hazards considered in current condition, without remedial/stabilisation measures and during construction works.

* qualitative expression of likelihood incorporates both frequency analysis estimate and spatial impact probability estimate as per AGS guidelines.

* qualitative measures of consequences to property assessed per Appendix C in AGS Guidelines for Landslide Risk Management.

* Indicative cost of damage expressed as cost of site development with respect to consequence values: Catastrophic : 200%, Major: 60%, Medium: 20%, Minor: 5%, Insignificant: 0.5%.

TABLE: 2

Recommended Maintenance and Inspection Program

Structure	Maintenance/ Inspection Item	Frequency
Stormwater drains.	Owner to inspect to ensure that the drains, and pipes are free of debris & sediment build-up. Clear surface grates and litter.	Every year or following each major rainfall event.
Retaining Walls. or remedial measures	Owner to inspect walls for deviation from as constructed condition and repair/replace. Replace poorly constructed rock walls	Every two years or following major rainfall event. As soon as practicable
Large Trees on or adjacent to site	Arbourist to check condition of trees and remove as required. Where tree within steep slopes or adjacent to structures require geotechnical inspection prior to removal	Every five years
Slope Stability	Hydraulics (stormwater) & Geotechnical Consultants to check on site stability at same time and provide report.	One year after construction is completed.

N.B. Provided the above schedule is maintained the design life of the property should conform with Councils Risk Management Policy.