

2A Beatty Street, Balgowlah Heights

Comments on Updates to Plans

We have reviewed the existing geotechnical report, the plans used to carry out the report, and the updated plans shown on 4 architectural drawings prepared by Peter Downes Designs, drawings numbered A2 2267 00A to A2 2267 03A, dated 25/7/23.

The changes include:

- No significant changes to the plans.

The changes to the plans are minor from a geotechnical perspective and do not alter the recommendations or the risk assessment in the report carried out by this firm numbered J5090 and dated the 31st August, 2023.

White Geotechnical Group Pty Ltd.



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Reviewed By:



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GEOTECHNICAL INVESTIGATION:

New Inclined Lift at 2A Beatty Street, Balgowlah Heights

1. Proposed Development

- 1.1** Construct a new inclined lift that runs from beside the E corner of the house to beside the boatshed and to the foreshore area by excavating to a maximum depth of ~1.3m.
- 1.2** Details of the proposed development are shown on 4 drawings prepared by Peter Downes Designs, drawings numbered A2 2267 00 to A2 2267 03, dated 25/7/23.

2. Site Description

- 2.1** The site was inspected on the 22nd August, 2023.
- 2.2** This waterfront residential property is on the low side of the road and has a NE aspect. It is located on the steeply graded lower reaches of a hillslope. The natural slope falls across the property at an average angle of ~20°. The slope above the property decreases in grade.
- 2.3** At the road frontage, a concrete Right of Carriageway (ROW) runs down the slope to a suspended carport (Photos 1 & 2). The concrete piers that support the carport stand vertical. An inclined lift runs through a narrow strip of land to the SE of 2 Beatty St from beside the carport to beside the subject house (Photo 3). Medium Strength Sandstone bedrock outcrops and steps down the slope between the carport and the house (Photos 4 & 5). Sprayed concrete has been installed onto part of the rock face upslope of the subject house and below the uphill neighbouring house (Photo 6). This is expected to have remediated a defect in the rock face. The visible portion of the rock face appears to be stable. The two-storey tile and sandstone dressed house and single-storey secondary dwelling show no significant signs of

movement (Photos 7 & 8). Paved areas and a pool are located on the downhill side of the house (Photo 9). The pool shows no significant signs of movement.

Fill provides level platforms for paved, lawn and garden areas between the house and the downhill property boundary. Sandstone block, stack rock and timber retaining walls up to ~2.5m high support the fills (Photos 10 to 12). Most of the retaining walls appear to be stable or are sufficiently low in height that they do not pose a significant threat to life or property. A stack rock retaining wall up to ~2.0m high to the NE of a timber clad boatshed near the downhill property (Photo 12) displays minor bulging, but will be partially demolished and rebuilt as part of the proposed works. Medium Strength Sandstone bedrock outcrops at the waterfront (Photo 13). An intermittent watercourse runs down the slope on the council reserve to the SE of the property (Photo 14). The adjoining neighbouring properties were observed to be in good order as seen from the street and subject property.

3. Geology

The Sydney 1:100 000 Geological sheet indicates the site is underlain by Hawkesbury Sandstone. It is described as a medium to coarse grained quartz sandstone with very minor shale and laminite lenses.

4. Subsurface Investigation

Six Dynamic Cone Penetrometer (DCP) tests were put down to determine the relative density of the overlying soil and the depth to bedrock. The locations of the tests are shown on the site plan attached. It should be noted that a level of caution should be applied when interpreting DCP test results. The test will not pass through hard buried objects so in some instances it can be difficult to determine whether refusal has occurred on an obstruction in the profile or on the natural rock surface. This is expected to have occurred for DCP4 & 5 and may have occurred for DCP2. Due to the possibility that the actual ground conditions vary from our interpretation there should be allowances in the excavation and foundation budget

to account for this. We refer to the appended "Important Information about Your Report" to further clarify. The results are as follows:

DCP TEST RESULTS – Dynamic Cone Penetrometer						
Equipment: 9kg hammer, 510mm drop, conical tip.				Standard: AS1289.6.3.2 - 1997		
Depth(m) Blows/0.3m	DCP 1 (~RL13.5)	DCP 2 (~RL11.0)	DCP 3 (~RL9.0)	DCP 4 (~RL6.7)	DCP 5 (~RL6.7)	DCP 6 (~RL3.7)
0.0 to 0.3	Rock exposed at base of ~1.5m high retaining wall.	3	6	18	8	F
0.3 to 0.6		5	5	9	12	12
0.6 to 0.9		25	8	25	19	#
0.9 to 1.2		41	13	#	12	
1.2 to 1.5		#	19		#	
1.5 to 1.8			17			
1.8 to 2.1			58			
2.1 to 2.4			25			
2.4 to 2.7			12			
2.7 to 3.0			23			
3.0 to 3.3			14			
3.3 to 3.6			#			
		Refusal @ 1.1m	Refusal on rock @ 3.1m	Refusal @ 0.9m	Refusal @ 1.0m	Refusal on rock @ 0.6m

#refusal/end of test. F=DCP fell after being struck showing little resistance through all or part of the interval.

DCP Notes:

DCP1 – Medium Strength Sandstone exposed at the base of a ~1.5m high retaining wall.

DCP2 – Refusal @ 1.1m, DCP bouncing, light brown sand and dark brown sandy soil on moist tip.

DCP3 – Refusal on rock @ 3.1m, DCP bouncing off rock surface, light brown sand and dark brown sandy soil on damp tip.

DCP4 – Refusal @ 0.9m, DCP thudding on obstruction within the fill, white impact dust on dry tip.

DCP5 – Refusal @ 1.0m, DCP bouncing off obstruction within the fill, white impact dust and dark brown soil on moist tip.

DCP6 – Refusal on rock @ 0.6m, DCP bouncing off rock surface, red orange and white rock fragments and dark brown soil on damp tip.

5. Geological Observations/Interpretation

The surface features of the block are controlled by the outcropping and underlying sandstone bedrock that steps down the property forming sub-horizontal benches between the steps. Where the grade is steeper, the steps are larger and the benches narrower. Where the slope eases, the opposite is true. The rock is overlain by fill, a thin sandy topsoil and sand that fills the bench step formation. Fill to a maximum depth of ~2.5m provides level platforms for paved, lawn and garden areas across the property. In the test locations, where rock was not exposed, it was encountered at depths of between ~0.6m to ~3.1m below the current surface, being deeper in the filled areas and variable due to the stepped nature of the rock. DCP4 & 5 are expected to have encountered refusal on an obstruction in the fill. DCP2 may have also encountered an obstruction in fill. The sandstone exposed across the property is estimated to be Medium Strength or better and similar strength rock is expected to underlie the site. See Type Section attached for a diagrammatical representation of the expected ground materials.

6. Groundwater

Normal ground water seepage is expected to move over the buried surface of the rock and through the cracks.

The watertable is expected at or just above the mean high water mark at the North Harbour waterfront.

The footings for the proposed inclined lift are expected to be above this level and will be supported on rock.

7. Surface Water

Apart from the natural watercourse that runs down the council reserve to the SE of the property (Photo 14), no evidence of surface flows were observed during the inspection. It is expected that normal sheet wash will move onto the site from above the property during heavy down pours. If the owners know, or become aware in the future, that overland flows enter the property during heavy prolonged rainfall events our office is to be informed so appropriate drainage measures can be recommended and installed. It is a condition of the slope stability assessment in Section 8 (**Hazard One**) that this be done.

8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed below or beside the property. The steep slope that falls across the property and continues above is a potential hazard (**Hazard One**). The vibrations produced during the proposed excavations for the inclined lift are a potential hazard (**Hazard Two**).

RISK ANALYSIS SUMMARY ON NEXT PAGE

Geotechnical Hazards and Risk Analysis - Risk Analysis Summary

HAZARDS	Hazard One	Hazard Two
TYPE	The steep slope that falls across the property and continues above failing and impacting on the property.	The vibrations produced during the proposed excavations for the inclined lift impacting on the surrounding structures.
LIKELIHOOD	'Unlikely' (10^{-4})	'Possible' (10^{-3})
CONSEQUENCES TO PROPERTY	'Medium' (12%)	'Medium' (11%)
RISK TO PROPERTY	'Low' (2×10^{-5})	'Moderate' (2×10^{-4})
RISK TO LIFE	8.3×10^{-7} /annum	5.3×10^{-7} /annum
COMMENTS	This level of risk is 'ACCEPTABLE', provided the recommendations in Section 7 are followed.	This level of risk to property is 'UNACCEPTABLE'. To move risk to 'ACCEPTABLE' levels, the recommendations in Sections 11 & 12 are to be followed.

(See Aust. Geomech. Jnl. Mar 2007 Vol. 42 No 1, for full explanation of terms)

9. Suitability of the Proposed Development for the Site

The proposed development is suitable for the site. No geotechnical hazards will be created by the completion of the proposed development provided it is carried out in accordance with the requirements of this report and good engineering and building practice.

10. Stormwater

No significant stormwater runoff will be created by the proposed development.

11. Excavations

Two excavations to a maximum depth of ~1.3m will be required to construct the lower landings for the proposed inclined lift.

The upper excavation is expected to be through fill. The lower excavation is expected to be through topsoil and sand, with Medium Strength Sandstone expected at a depth of ~0.6m below the current surface.

It is envisaged that excavations through fill, soil, and sand can be carried out with an excavator and toothed bucket and excavations through rock will require grinding or rock sawing and breaking.

12. Vibrations

Possible vibrations generated during excavations through fill, soil, and sand will be below the threshold limit for building damage utilising a domestic sized excavator up to 16 tonnes.

The proposed excavations are set back sufficiently from the subject house and neighbouring structures so that vibrations from the excavation will not exceed tolerable limits for building damage. However, the lower excavation is set back ~3.8m from the subject boatshed. Excavations through Medium Strength Sandstone or better should be carried out to minimise the potential to cause vibration damage to the subject boatshed.

Close controls by the contractor over rock excavation are recommended so excessive vibrations are not generated.

Excavation methods are to be used that limit peak particle velocity to 5mm/sec at the subject boatshed.

If a milling head is used to grind the rock, or if rock sawing is carried out around the perimeter of the excavation boundaries in not less than 1.0m lifts, before a rock hammer up to 300kg is used to break the rock it is likely the peak particle velocity will not be exceeded provided the saw cuts are kept well below the rock to be broken.

It is worth noting that vibrations that are below thresholds for building damage may be felt by the occupants of the subject house and neighbouring properties.

13. Excavation Support Requirements

The excavations come flush with the council reserve, although the upper excavation is through fill elevated above the reserve and bedrock is exposed across the reserve beside the lower excavation. Therefore, apart from the existing retaining wall that will be partially demolished, no structures or boundaries will be within the zone of influence of the excavation.

The upper excavation requires the partial demolition of an existing stack rock retaining wall (Photo 12). The wall is to be demolished from the top down as the excavation is progressed. The fill behind the wall is to be battered at 1.0 Vertical to 1.7 Horizontal (30°) as the wall is demolished.

The fill/soil/sand portions of the excavations are to be battered temporarily at 1.0 Vertical to 2.0 Horizontal (26°) until the retaining walls are in place.

Medium Strength Sandstone or better is expected to stand at vertical angles unsupported subject to approval by the geotechnical consultant.

Upslope runoff is to be diverted from the cut faces by sandbag mounds or other diversion works. All unsupported cut batters through fill, soil and sand are to be covered to prevent access of water in wet weather and loss of moisture in dry weather. The covers are to be tied down with metal pegs or other suitable fixtures so they cannot blow off in a storm. The materials and labour to construct the retaining walls are to be organised so on completion of the excavation they can be constructed as soon as possible. The excavation is to be carried out during a dry period. No excavations are to commence if heavy or prolonged rainfall is forecast. If the cut batters through fill, soil and sand remain unsupported for more than a few days before the construction of the retaining walls they are to be temporarily supported until the retaining walls are in place.

Upon completion of the excavation, it is recommended the cut faces through rock be supported with retaining walls to prevent any potential future movement of joint blocks in

the cut face that can occur over time, when unfavourable jointing is obscured behind the excavation face. Additionally, retaining walls will help control seepage and to prevent minor erosion and sediment movement.

All excavation spoil is to be removed from site following the current Environmental Protection Agency (EPA) waste classification guidelines.

14. Retaining Structures

For cantilever or singly propped retaining structures it is suggested the design be based on a triangular distribution of lateral pressures using the parameters shown in Table 1.

Table 1 – Likely Earth Pressures for Retaining Structures

Unit	Earth Pressure Coefficients		
	Unit weight (kN/m ³)	'Active' K _a	'At Rest' K ₀
Fill, Topsoil and Sand	20	0.40	0.55
Medium Strength Sandstone	24	0.00	0.01

For rock classes refer to Pells et al "Design Loadings for Foundations on Shale and Sandstone in the Sydney Region". Australian Geomechanics Journal 1978.

It is to be noted that the earth pressures in Table 1 assume a level surface above the structure, do not account for any surcharge loads and assume retaining structures are fully drained.

Rock strength and relevant earth pressure coefficients are to be confirmed on site by the geotechnical consultant.

All retaining structures are to have sufficient back-wall drainage and be backfilled immediately behind the structure with free draining material (such as gravel). This material is to be wrapped in a non-woven Geotextile fabric (i.e. Bidim A34 or similar), to prevent the

drainage from becoming clogged with silt and clay. If no back-wall drainage is installed in retaining structures the full hydrostatic pressures are to be accounted for in the retaining structure design.

15. Foundations

The proposed inclined lift is to be supported on pad footings or piers taken to Medium Strength Sandstone. Where this ground material is not exposed at the surface, it is expected at depths of up to ~3.1m below the current surface, being deeper in the filled areas. A maximum allowable bearing pressure of 1000kPa can be assumed for footings on Medium Strength Sandstone.

Naturally occurring vertical cracks (known as joints) commonly occur in sandstone. These are generally filled with soil and are the natural seepage paths through the rock. They can extend to depths of several metres and are usually relatively narrow but can range between 0.1 to 0.8m wide. If a footing falls over a joint in the rock, the construction process is simplified if with the approval of the structural engineer the joint can be spanned or alternatively the footing can be repositioned so it does not fall over the joint.

NOTE: If the contractor is unsure of the footing material required it is more cost effective to get the geotechnical consultant on site at the start of the footing excavation to advise on footing depth and material. This mostly prevents unnecessary over excavation in clay like shaly rock but can be valuable in all types of geology.

REQUIRED INSPECTION ON NEXT PAGE

16. Inspection

The client and builder are to familiarise themselves with the following required inspection as well as council geotechnical policy. We cannot provide geotechnical certification for the owners or the regulating authorities if the following inspection has not been carried out during the construction process.

- All footings are to be inspected and approved by the geotechnical consultant while the excavation equipment and contractors are still onsite and before steel reinforcing is placed or concrete is poured.

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Photo 1



Photo 2



Photo 3



Photo 4



Photo 5



Photo 6



Photo 7



Photo 8



Photo 9



Photo 10



Photo 11



Photo 12



Photo 13



Photo 14

Important Information about Your Report

It should be noted that Geotechnical Reports are documents that build a picture of the subsurface conditions from the observation of surface features and testing carried out at specific points on the site. The spacing and location of the test points can be limited by the location of existing structures on the site or by budget and time constraints of the client. Additionally, the test themselves, although chosen for their suitability for the particular project, have their own limiting factors. The testing gives accurate information at the location of the test, within the confines of the test's capability. A geological interpretation or model is developed by joining these test points using all available data and drawing on previous experience of the geotechnical consultant. Even the most experienced practitioners cannot determine every possible feature or change that may lie below the earth. All of the subsurface features can only be known when they are revealed by excavation. As such, a Geotechnical report can be considered an interpretive document. It is based on factual data but also on opinion and judgement that comes with a level of uncertainty. This information is provided to help explain the nature and limitations of your report.

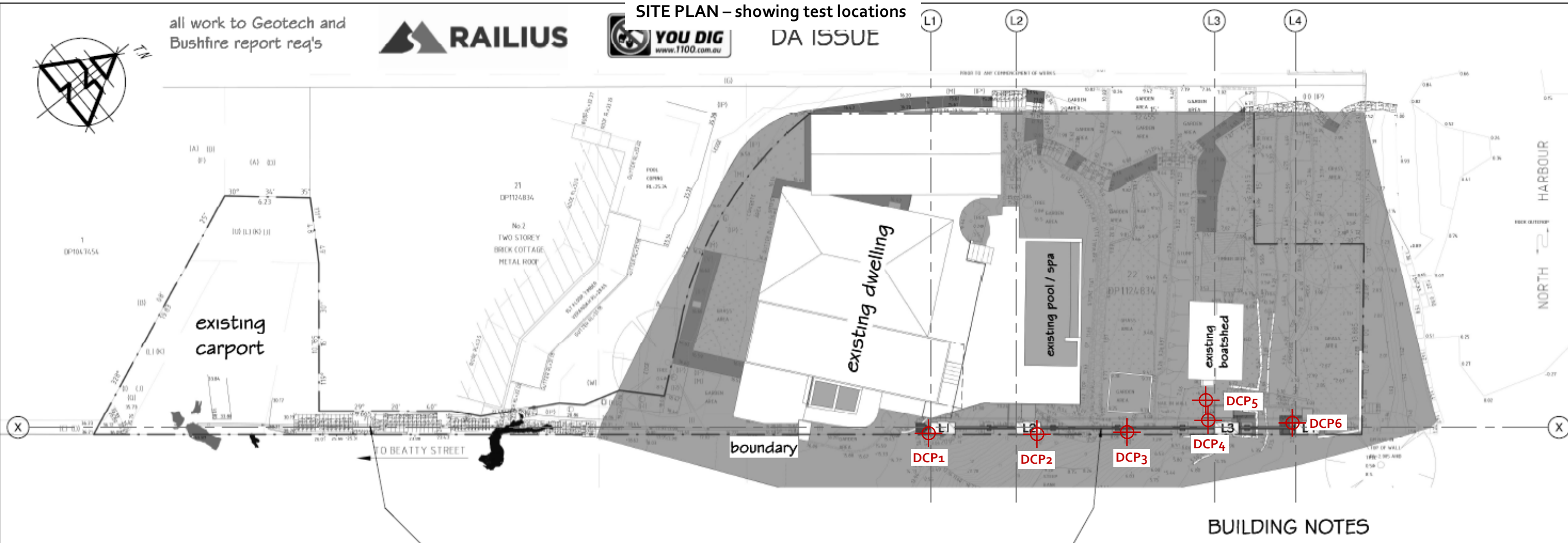
With this in mind, the following points are to be noted:

- If upon the commencement of the works the subsurface ground or ground water conditions prove different from those described in this report, it is advisable to contact White Geotechnical Group immediately, as problems relating to the ground works phase of construction are far easier and less costly to overcome if they are addressed early.
- If this report is used by other professionals during the design or construction process, any questions should be directed to White Geotechnical Group as only we understand the full methodology behind the report's conclusions.
- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.
- This report should not be applied to any other project other than that outlined in section 1.0.
- This report is to be read in full and should not have sections removed or included in other documents as this can result in misinterpretation of the data by others.
- It is common for the design and construction process to be adapted as it progresses (sometimes to suit the previous experience of the contractors involved). If alternative design and construction processes are required to those described in this report, contact White Geotechnical Group. We are familiar with a variety of techniques to reduce risk and can advise if your proposed methods are suitable for the site conditions.

all work to Geotech and
Bushfire report req's



SITE PLAN – showing test locations
DA ISSUE



existing Inclined Lift

SITE PLAN @ 1:200

proposed Inclined Lift
to Railius details

BUILDING NOTES

All work to be carried out by suitably licensed and qualified tradesmen, and to comply with all relevant standards and Councils requirements.

Main contractor to be responsible for obtaining all necessary inspection certificates.

An approved sedimentation control system is to be installed and maintained for the duration of the contract.

Adjoining properties to be adequately protected at all times.

Asbestos (if encountered) is to be removed and disposed of by a suitably qualified contractor.

Builder / Railius to confirm all dimensions onsite.

Lift noise level shall not exceed 60dB(A) when measured 1 meter from any adjoining premises.

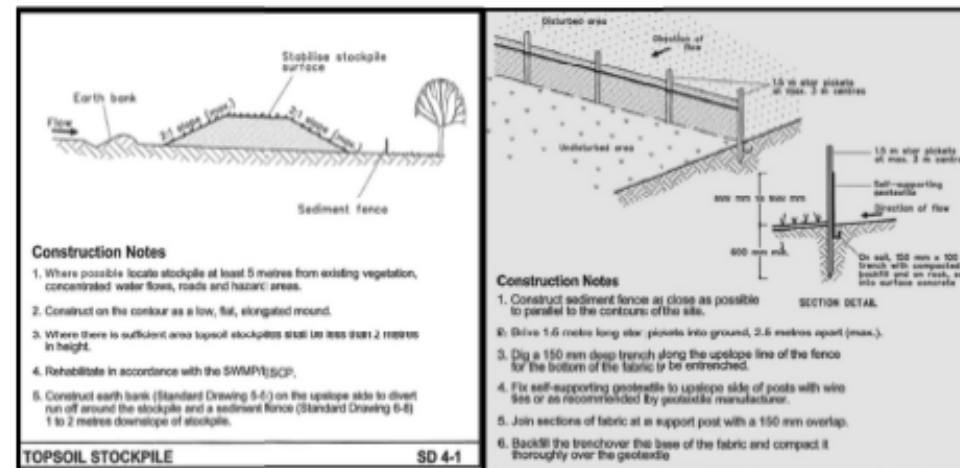
Railcars and landings to be painted in med to dark colours to blend in with the natural landscape.

Proposed Incline Passenger Lift and associated gates and safety mechanisms to Railius details and designed and constructed to NZS 5270-2005.

All handrails and gates to BCA req's.

EROSION AND SEDIMENT CONTROL PLAN

1. All excavations and backfilling associated with the erection or demolition of a building must be executed safely and in accordance with appropriate professional standards.
2. All excavations associated with the erection or demolition of a building must be properly guarded and protected to prevent them from being dangerous to life or property.
3. Where excavations extend below the level of the base of the footings of a building on an adjoining allotment of land, the person causing the excavation must preserve and protect the building from damage and, if necessary, underpin and support the adjoining building in an approved manner.
4. Temporary sedimentation and erosion controls are to be constructed prior to commencement of any work to eliminate the discharge of sediment from the site.
5. Adequate measures shall be undertaken to remove clay from vehicles leaving the site so as to maintain public roads in a clean condition.
6. Builder to confirm the locations of barrier fences and stockpiles onsite, see suggested main barrier fence location on site plan.
7. Sediment fences and stockpiles to be constructed in accordance with modern standards and the diagrams seen to the right.
8. Due to the steeply sloping site, special care will be taken to prevent soil runoff into existing drains or the waterway.
9. Note that due to the constraints of the site, barriers may need to be relocated during construction.
10. All ESCP measures are to be installed and managed in accordance with Landcom's Managing Urban Stormwater: Soils and Construction 2004.



REVISION		multi-award winner designs 77 Riviera Ave, Avalon Beach 2107 0488 662 445 www.peterdownes.com.au	PROJECT Proposed Inclined Passenger Lift at 2A Beatty Street Balgowlah Heights	DRAWN SD	CHECKED SD
				SCALE 1 : 200	DATE 25.7.23
				DRG. A2	2267 01
			DRAWING Site Plan		

TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials

proposed Inclined Lift to Railius details

L3 - boatshed - new timber platform and stairs
4 risers @ 182.5
3 treads @ 270
tbc onsite

boundary

L4 - Foreshore Area - new timber platform

polish existing or retaining wall

new conc footings to eng's details

platform height to match boatshed floor level

partially disassemble existing drystone wall, re-build as req'd within boundary line to provide clearance under rail

dig footing behind existing walls

low drystone wall

DIAL BEFORE

all work to Geotech and

Legend:

- Fill
- Topsoil, Sand, Clay
- Hawkesbury Sandstone – Medium Strength

Elevations: RL 15480, RL 13010, RL 7330, RL 3400

Dimensions: 1040, 2650

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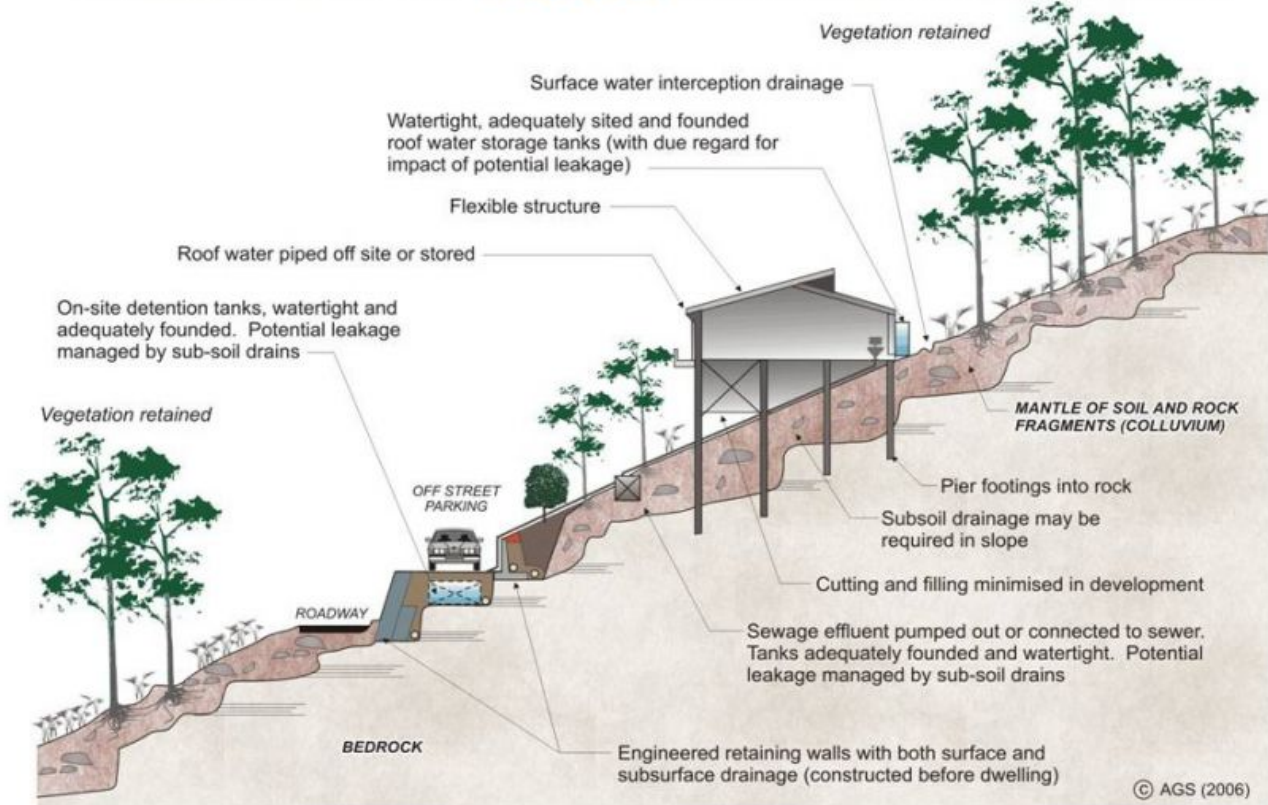
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EXAMPLES OF **GOOD** HILLSIDE PRACTICE



EXAMPLES OF **POOR** HILLSIDE PRACTICE

