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

**Development Application for** _____
Name of Applicant

**Address of site** 7 - 8 Coronation Street, Mona Vale

*The following checklist covers the minimum requirements to be addressed in a Geotechnical Risk* ***Declaration made by geotechnical engineer or engineering geologist or coastal engineer (where applicable) as part of a geotechnical report***

*I,* Ben White *on behalf of* White Geotechnical Group Pty Ltd
(Insert Name) (Trading or Company Name)

on this the 29/9/21 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 $10million.

I:
**Please mark appropriate box**

☒ 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: Geotechnical Report **7 - 8 Coronation Street, Mona Vale**
Report Date: 29/9/21

Author: BEN WHITE

Author's Company/Organisation: **WHITE GEOTECHNICAL GROUP PTY LTD**

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

Australian Geomechanics Society Landslide Risk Management March 2007.

White Geotechnical Group company archives.

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 Ben White

Chartered Professional Status MScGEOLAusIMM CP GEOL

Membership No. 222757

Company White Geotechnical Group Pty Ltd

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

**Development Application for** _____
Name of Applicant

**Address of site** 7 - 8 Coronation Street, Mona Vale

*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: Geotechnical Report 7 - 8 Coronation Street, Mona Vale

Report Date: 29/9/21

Author: BEN WHITE

**Author's Company/Organisation:** WHITE GEOTECHNICAL GROUP PTY LTD

**Please mark appropriate box**

☒ Comprehensive site mapping conducted 17/9/21 (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 conducted 17/9/21

☒ 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 Ben White

Chartered Professional Status MScGEOLAusIMM CP GEOL

Membership No. 222757

Company White Geotechnical Group Pty Ltd

# GEOTECHNICAL INVESTIGATION:

New Unit Building at **7 - 8 Coronation Street, Mona Vale**

## 1. Proposed Development

**1.1** Demolish the existing houses and pool.

**1.2** Construct a new part three storey unit building with basement parking below by excavating to a maximum depth of ~6.7m.

**1.3** Landscaping works requiring filling to a maximum depth of ~3.0m and excavating to a maximum depth of ~1.5m.

**1.4** Details of the proposed development are shown on 14 drawings prepared by Gartner Trovato Architects, project number 2131, drawings numbered A00 to A13, Revision A, dated September 2021.

## 2. Site Description

**2.1** The site was inspected on the 17th of September, 2021.

**2.2** These residential properties are on the high side of the road and have a NW aspect. They are located on the gently graded lower middle reaches of a hillslope. The natural slope rises across the properties at an average angle of ~6°. The slope below the properties gradually decreases in grade. The slope above the properties gradually increases in grade.

**2.3** **7 Coronation St, Mona Vale:** At the road frontage, a concrete driveway runs to a garage attached to the house (Photo 1). Between the road frontage and the house is a gently sloping lawn. The single storey brick house with garage below is supported by brick walls and brick piers (Photos 2 & 3). The external supporting walls show no significant signs of movement. A concrete driveway runs along the NE side of the house to a concrete parking area on the uphill side of the house (Photos 2 & 4). A pool

and paved area are located beside the parking area (Photo 3). A cut and a fill level the parking and paved area. Brick and concrete block retaining walls/fences up to ~3.0m high support the cut and fill for the paved area, and support fill on the uphill neighbouring property (Photos 3 & 4). The retaining portions of the walls are up to ~1.8m high. The NE and SE walls display vertical, horizontal and stepped cracks through the mortar. Part of the SE wall is tilting downslope slightly. The walls are currently braced with timber placed vertically against the walls and acrow props angled against the walls. The parking area, pool and pavement will be filled in as part of the proposed works and the upper fences will be demolished. The retaining portions of the walls will remain and be filled in on the downhill side and be buried as part of the proposed works. The adjoining neighbouring properties were observed to be in good order as seen from the street and subject property.

**2.4 8 Coronation St, Mona Vale:** At the road frontage, a concrete and concrete stripped driveway runs to a garage attached to the house (Photo 5). A concrete carport is located on the SW side of the house. Between the road frontage and the house is a gently sloping lawn. The single storey rendered masonry and vinyl clad house is supported by masonry walls (Photos 5 & 6). The external supporting walls show no significant signs of movement. A patio and gently sloping lawn extends off the uphill side of the house (Photos 6 & 7).

## 3. Geology

The Sydney 1:100 000 Geological sheet indicates the site is underlain by the Newport Formation of the Narrabeen Group. This is described as interbedded laminite, shale, and quartz to lithic quartz sandstone.

## 4. Subsurface Investigation

One hand auger hole (AH) was put down to identify the soil materials. Six Dynamic Cone Penetrometer (DCP) tests were put down to determine the relative density of the overlying

soil and the depth to weathered rock. The locations of the tests are shown on the site plan. 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 not expected to have been an issue for this site. But 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:

**AUGER HOLE 1** (~RL28.0) **–** AH1 (photo 8)

| **Depth (m)** | **Material Encountered** |
|---|---|
| 0.0 to 0.4 | **TOPSOIL**, sandy soil, dark brown, damp, fine to medium grained. |
| 0.4 to 0.5 | **CLAY**, orange, moist, firm to stiff. |

End of hole @ 0.5m in firm to stiff clay. No watertable encountered.

**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** (~RL26.0) | **DCP 2** (~RL25.5) | **DCP 3** (~RL24.7) | **DCP 4** (~RL26.8) | **DCP 5** (~RL28.3) | **DCP 6** (~RL28.0) |
|---|---|---|---|---|---|---|
| 0.0 to 0.3 | 9 | 11 | 4 | 2 | 4 | 4 |
| 0.3 to 0.6 | 14 | 8 | 7 | 6 | 9 | 14 |
| 0.6 to 0.9 | 15 | 35 | 15 | 30 | 15 | 33 |
| 0.9 to 1.2 | 50 | # | 30 | # | 16 | 32 |
| 1.2 to 1.5 | # | | # | | # | # |
| | End of Test @ 1.1m | End of Test @ 0.9m | End of Test @ 1.0m | End of Test @ 0.9m | Refusal on rock @ 1.0m | End of Test @ 1.0m |

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

***DCP Notes:***

DCP1 – End of Test @ 1.1m, DCP still very slowly going down, brown rock fragments on dry tip.

DCP2 – End of Test @ 0.9m, DCP still very slowly going down, brown and grey clayey soil on damp tip.

DCP3 – End of Test @ 1.0m, DCP still very slowly going down, orange shale fragments and brown soil on moist tip.

DCP4 – End of Test @ 0.9m, DCP still very slowly going down, orange shale fragments and brown soil on moist tip.

DCP5 – Refusal on rock @ 1.0m, DCP bouncing off rock surface, orange shale fragments and brown soil on wet tip.

DCP6 – End of Test @ 1.0m, DCP still very slowly going down, orange shale fragments on dry tip.

## 5. Geological Observations/Interpretation

The slope materials are colluvial at the near surface and residual at depth. In the test locations, the ground materials consist of a sandy topsoil over firm to stiff clays. The clays merge into the weathered zone of the under lying rocks at depths from between ~0.9m to ~1.1m below the current surface. The weathered zone of the underlying rock is interpreted as Extremely Low Strength Shale. It is to be noted that this material is a soft rock and can appear as a mottled stiff clay when it is cut up by excavation equipment. 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 in the rock.

Due to the slope and elevation of the block, the water table in the location is expected to be many metres below the base of the proposed works.

## 7. Surface Water

No evidence of surface flows were observed on the property during the inspection. It is expected that normal sheet wash will move onto the site from above the property during heavy down pours.

## 8. Geotechnical Hazards and Risk Analysis

No geotechnical hazards were observed above, below, or beside the property. The proposed excavation collapsing onto the worksite and impacting the neighbouring properties is a potential hazard (**Hazard One**). The vibrations produced during the proposed excavation 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 proposed ~6.7m excavation for the unit building with basement parking collapsing onto the worksite, impacting the neighbouring properties and undercutting the NE neighbouring house during the excavation process. | The vibrations produced during the proposed excavation impacting on the neighbouring properties. |
| **LIKELIHOOD** | 'Possible' ($10^{-3}$) | 'Possible' ($10^{-3}$) |
| **CONSEQUENCES TO PROPERTY** | 'Medium' (30%) | 'Medium' (15%) |
| **RISK TO PROPERTY** | 'Moderate' ($2 \times 10^{-4}$) | 'Moderate' ($2 \times 10^{-4}$) |
| **RISK TO LIFE** | $8.3 \times 10^{-5}$/annum | $5.3 \times 10^{-7}$/annum |
| **COMMENTS** | This level of risk to life and property is 'UNACCEPTABLE'. To move the risk to 'ACCEPTABLE' levels, the recommendations in **Section 13** are to be 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

The fall is to Coronation Street. All stormwater from the proposed development is to be piped to the street drainage system through any tanks that may be required by the regulating authorities.

## 11. Excavations

An excavation to a maximum depth of ~6.7m is required to construct the proposed new unit building with basement parking below. Other excavations to maximum depths of ~1.5m are required for landscaping works around the proposed unit building. The excavations are expected to be through topsoil and clay, with Extremely Low Strength Shale expected at depths from between ~0.9m to ~1.1m below the current surface.

It is envisaged that excavations through soil, clay and rock up to Low Strength can be carried out with an excavator and bucket. If Medium Strength Rock is encountered it will require grinding or rock sawing and breaking.

## 12. Vibrations

It is expected the proposed excavation can be carried out with an excavator and bucket and the vibrations produced will be below the threshold limit for building or infrastructure damage.

If harder rock is encountered, excavations through Medium Strength Rock or better should be carried out to minimise the potential to cause vibration damage to the neighbouring houses to the NE and SW. Allowing for backwall drainage, the excavation is set back ~4.6m from the NE neighbouring house and ~5.5m from the SW neighbouring house.

Dilapidation reporting carried out on the NE and SW neighbouring properties is recommended prior to the excavation works commencing.

Excavation methods are to be used that limit peak particle velocity to 8mm/sec at the subject house and property boundaries. Vibration monitoring will be required to verify this is achieved. Vibration monitoring must include a light/alarm so the operator knows if vibration limits have been exceeded. The equipment is to log and record vibrations throughout the excavation works.

In Medium Strength rock or better techniques to minimise vibration transmission will be required. These include:

- Rock sawing the excavation perimeter to at least 1.0m deep prior to any rock breaking with hammers, keeping the saw cuts below the rock to be broken throughout the excavation process.
- Limiting rock hammer size.
- Rock hammering in short bursts so vibrations do not amplify.
- Rock breaking with the hammer angled away from the nearby sensitive structures.
- Creating additional saw breaks in the rock where vibration limits are exceeded.
- Use of rock grinders (milling head).

## 13. Excavation Support Requirements

It is recommended, before the structural design commences for the project, exploration core drilling is to be carried out on the site to confirm to the rock quality and strength. This is to be arranged and supervised by the geotechnical consultant and should consist of a minimum of two cored bore holes taken to a depth of not less than 9.0m each. The following ground support advice can be considered preliminary and will be reviewed on recovery of the drill core. It may change as a result of the assessment of the drill core.

As this job is considered technically complex and due to the depth of the excavation, we recommend it be carried out by builders and contractors who are well experienced in similar work and can provide a proven history of completed work. We recommend a pre-construction meeting between the structural engineer, the builder, and the geotechnical consultant to discuss and confirm the excavation plan and to ensure suitable excavation equipment will be on site.

The excavation for the unit building with basement will reach a maximum depth of ~6.7m. Other excavations to maximum depths of ~1.5m are required for landscaping works around the proposed unit building. Allowing for back-wall drainage, the setbacks are as follows:

- The basement excavation is set back ~3.0m from the NE common boundary, ~3.6m from the NE neighbouring concrete pathway and ~4.6m from the NE neighbouring house.
- The basement excavation is set back ~2.2m from the SW common boundary.
- The excavation for landscaping works is set back ~0.8m from the SW common boundary.

The above common boundaries and structures will be within the zone of influence of the excavations.

Due to the depth of the basement excavation and its proximity to the neighbouring properties and structures, all sides of the basement excavation will require ground support installed prior to the commencement of the excavation. See the Basement Plan attached for the minimum extent of the required shoring shown in blue.

A spaced pile retaining wall is one of the suitable methods of support. Pier spacing is typically ~2.0m but can vary between 1.6 to 2.4m depending on the design. As the excavation is lowered in 1.5m lifts infill sprayed concrete panels or similar are added between the piers to form the wall. Drainage is installed behind the panels. To drill the pier holes for the walls, a pilling rig that can excavate through Medium to High Strength Rock will be required. The piers can be supported by embedment or by a combination of embedment and propping. The walls are to be tied into the basement and unit building slabs to provide permanent bracing after which any temporary bracing can be released.

The geotechnical consultant is to inspect the drilling process of the entire first pile and the ground materials at the base of all pier holes/excavations installed for ground support purposes.

The excavation for the landscaping works on the SW side of the unit building is to be permanently or temporarily supported to ensure the integrity of the SW neighbouring property. The support is to be installed systematically as the excavation progresses. If the

support is temporary, it is to remain in place until the retaining wall is built as a sacrificial-type system. See the Basement Plan attached for the minimum extent of the required shoring shown in blue.

Upslope runoff is to be diverted from the cut faces by sandbag mounds or other diversion works. The excavations are to be carried out during a dry period. No excavations are to commence if heavy or prolonged rainfall is forecast.

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

## 14. Fill

Excavation spoil from the proposed excavation will be placed to fill in the existing paved area (Photos 3 & 4), part of the existing pool (Photo 3) and will be placed directly above the uphill portion of the proposed basement to provide a lawn area.

The fill will reach a maximum depth of ~3.0m. Fills for landscaping purposes are to be laid in a loose thickness not exceeding 0.3m before being moderately compacted. Tracking the machine over the loose fill in 1 to 2 passes should be sufficient. No structures are to be supported on landscaped fill.

## 15. 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 ON NEXT PAGE**

**Table 1 – Likely Earth Pressures for Retaining Structures**

| Unit | Earth Pressure Coefficients | | | |
|---|---|---|---|---|
| | **Unit weight (kN/m³)** | **'Active' $K_a$** | **'At Rest' $K_0$** | **Passive** |
| Soil and Residual Clays | 20 | 0.40 | 0.55 | N/A |
| Extremely Low to Very Low Strength Rock | 22 | 0.25 | 0.35 | Kp 2.5 ultimate |
| Low Strength Rock | 24 | 0.20 | 0.35 | 1000kPa ultimate |

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. No passive resistance should be assumed for the top 0.4m to account for any disturbance from the excavation. Passive pressures are 'ultimate' so should have a suitable safety factor applied. Rock strength and relevant earth pressure coefficients are to be confirmed on site by the geotechnical consultant.

A multi-propped or anchored shoring system can be designed using a rectangular lateral earth pressure distribution using a pressure of 4H kPa for soil/clay and 3H kPa for rock up to low strength, where H is the depth of the excavation in metres (or to the top of competent medium strength rock). Where small movements are not tolerable, the wall can be designed using a pressure of 6H kPa for soil/clay and 4H kPa for rock up to low strength.

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.

It should be noted normal seepage will move into the bulk excavation for the proposed basement. We expect this seepage can be removed with a conventional sump and pump system. The bulk excavation is to be periodically inspected by the Geotechnical Consultant to monitor ground water movements into the bulk excavation.

As the downhill side of the basement is embedded a minimum of 3.0m below the current surface, it is suggested the basement be tanked to minimise the use of pumps over the life of the building. Tanking the basement will also result in less impact on soil moisture levels around the development.

## 16. Foundations

The proposed basement is expected to be seated in Extremely Low Strength Shale or better. This is a suitable foundation material for spread footings cut a minimum of 0.5m below the bulk excavation. If any portion of the unit building is not supported off the basement structure, piers taken to Extremely Low Strength Shale or better will be required to maintain a uniform bearing material across the structure. A maximum allowable bearing pressure of 600kPa can be assumed for footings on Extremely Low Strength Shale or better. It should be noted that this material is a soft rock and a rock auger will cut through it so the builders should not be looking for refusal to end the footings.

The proposed driveway can be supported off the natural surface after any organic matter has been stripped. A maximum allowable bearing pressure of 100kPa can be assumed for soil of the natural surface. Where the driveway is cut into the slope, it can be supported off the exposed firm to stiff clay and Extremely Low Strength Shale. A maximum allowable bearing pressure of 200kPa can be assumed for footings on firm to stiff clay. Where the foundation material across the driveway structure changes, expansion joints are to be installed to separate the different foundation materials and to accommodate minor differential

movement. Alternatively, the driveway can be supported on piers taken to Extremely Low Strength Shale.

As the bearing capacity of shale and clay reduces when it is wet we recommend the footings be dug, inspected and poured in quick succession (ideally the same day if possible). If the footings get wet, they will have to be drained and the soft layer of weathered shale or clay on the footing surface will have to be removed before concrete is poured.

If a rapid turnaround from footing excavation to the concrete pour is not possible a sealing layer of concrete may be added to the footing surface after it has been cleaned.

***NOTE***: If the contractor is unsure of the footing material required it is more cost effective to get the geotechnical professional 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.

## 17. Geotechnical Review

The structural plans are to be checked and certified by the geotechnical engineer as being in accordance with the geotechnical recommendations. On completion a Form 2b will be issued. This form is required for the Construction Certificate to proceed.

**REQUIRED INSPECTIONS ON NEXT PAGE**

## 18. Inspections

The client and builder are to familiarise themselves with the following required inspections as well as council geotechnical policy. We cannot provide geotechnical certification for the Occupation Certificate if the following inspections have not been carried out during the construction process.

- The geotechnical consultant is to inspect the ground materials while the first pier for the ground support is being dug to assess the ground strength and to ensure it is in line with our expectations.

- All finished pier holes for piled wall/excavations for ground support are to be inspected and measured before concrete is placed.

- The excavation face is to be progressively monitored as it is lowered by the geotechnical consultant to ensure the ground materials are as expected and to monitor groundwater flows into the bulk excavation.

- 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.

White Geotechnical Group Pty Ltd.

Ben White M.Sc. Geol.,
AusIMM., CP GEOL.
No. 222757
Engineering Geologist.


*Photo 1*


*Photo 2*


*Photo 3*


*Photo 4*


*Photo 5*


*Photo 6*


*Photo 7*


*Photo 8*

## 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.

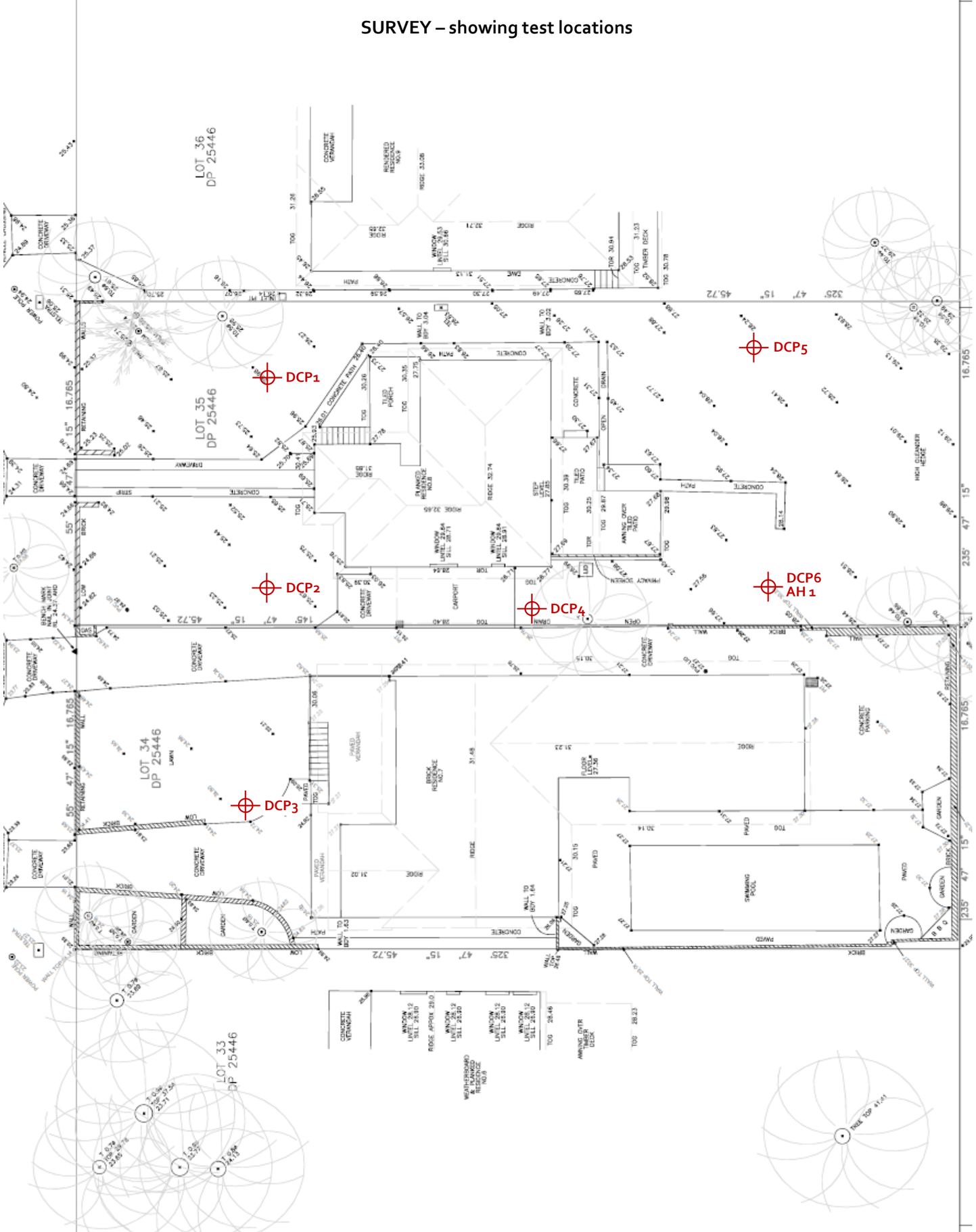
- The report addresses issues relating to your specific design and site. If the proposed project design changes, aspects of the report may no longer apply. Contact White Geotechnical if this occurs.

- This report should not be applied to any other project other than that outlined in section 1.0.

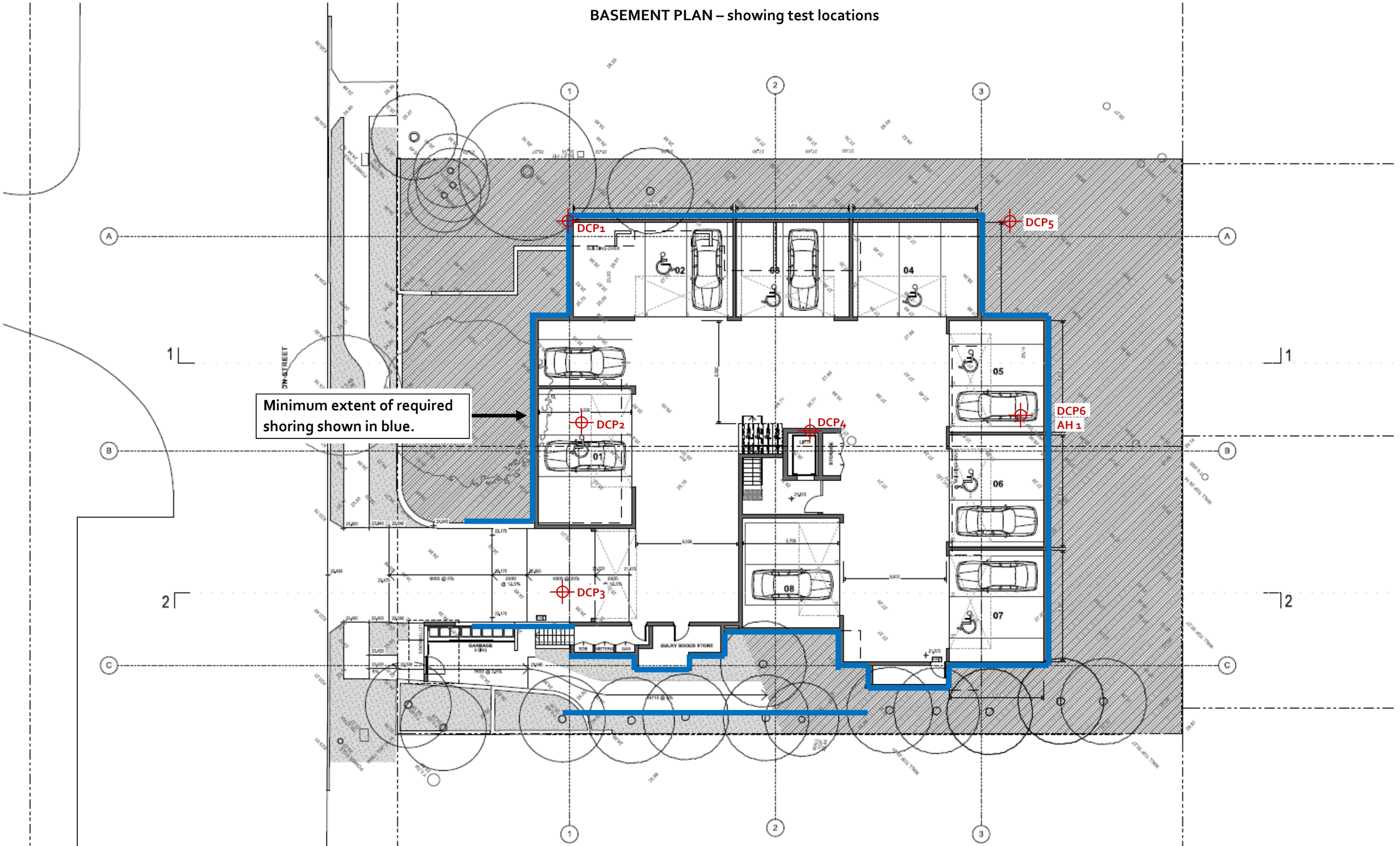
- This report is to be read in full and should not have sections removed or included in other documents as this can result in misinterpretation of the data by others.

- 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.

**SURVEY – showing test locations**



# BASEMENT PLAN – showing test locations




N

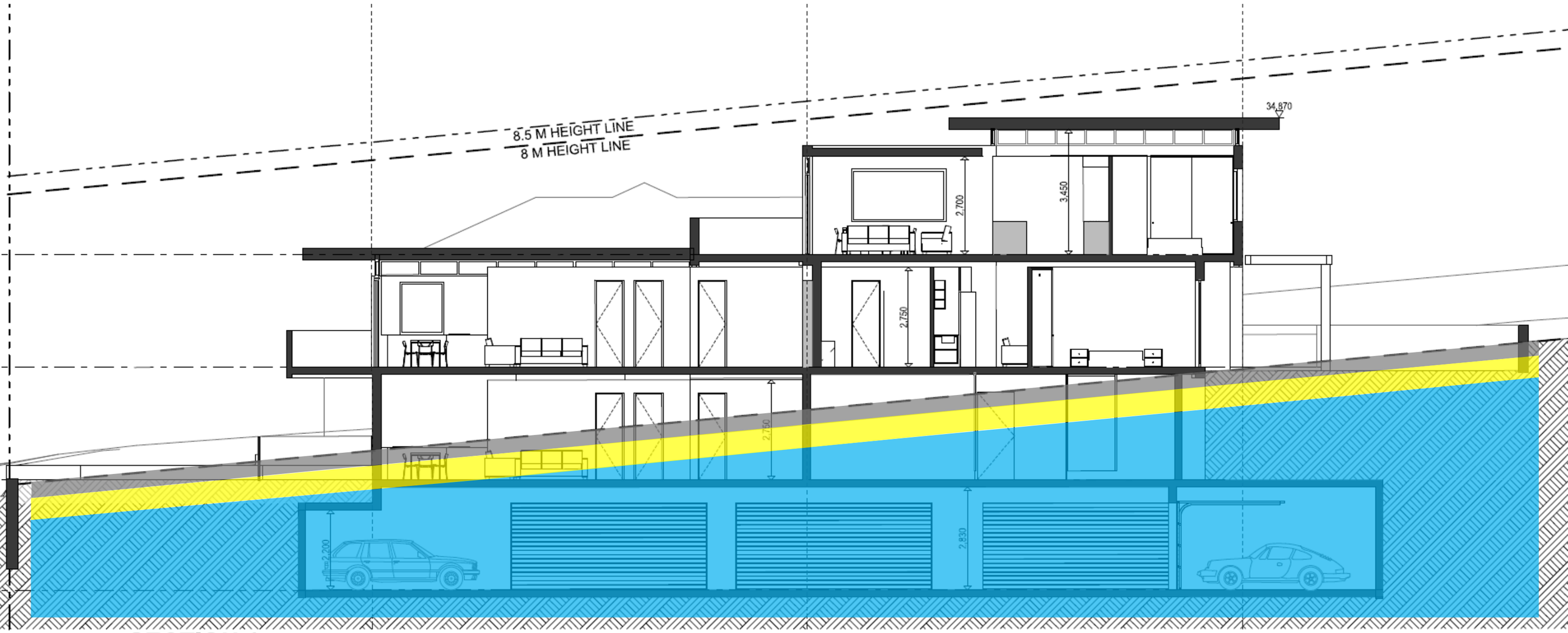
GARTNERTROVATO ARCHITECTS

NEW HOUSING SEPP HSPD
7 + 9 CORONATION STREET
MONA VALE NSW 2105
LOTS 34 & 35 DP 26496

BASEMENT PLAN

2131 A04 P6

**TYPE SECTION – Diagrammatical Interpretation of expected Ground Materials**

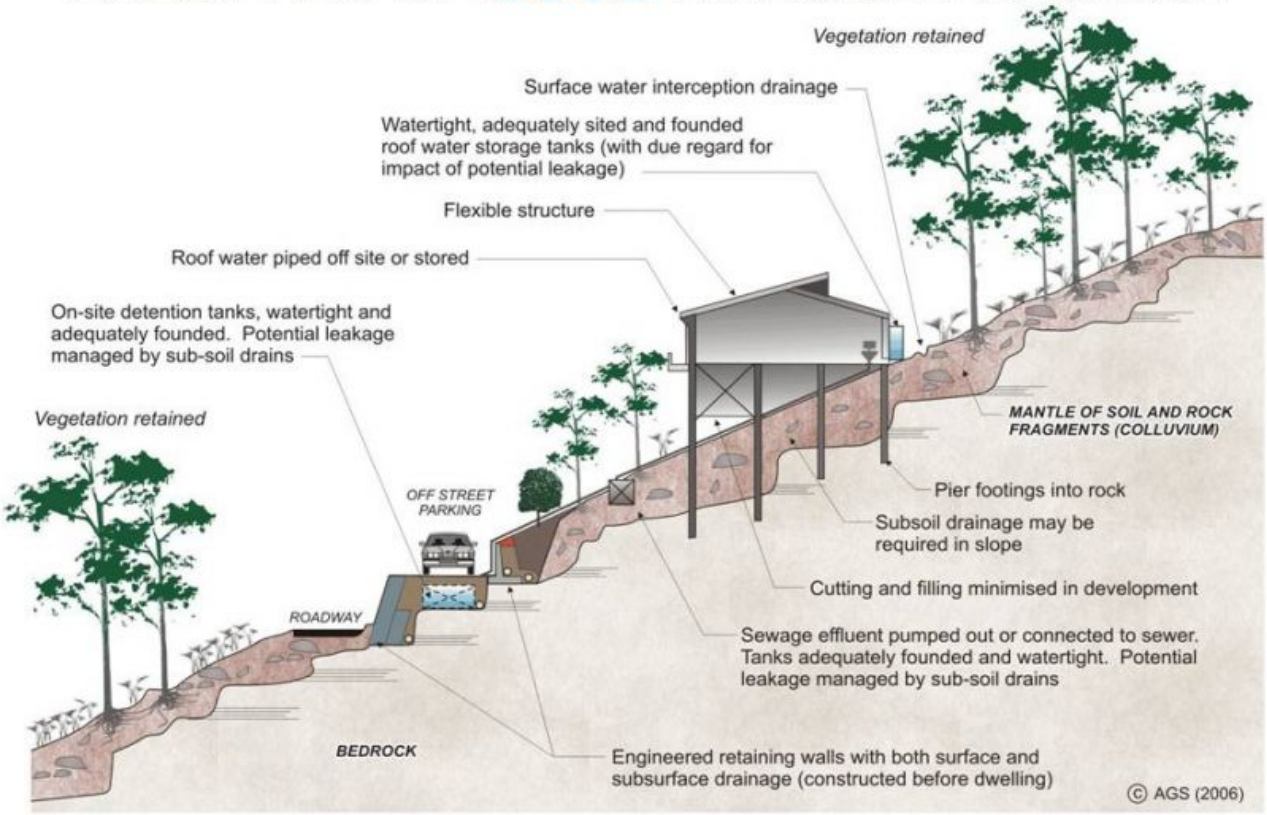



**SECTION 1**

Scale: 1:100 @A3

- Topsoil
- Clay
- Narrabeen Group Rocks – Extremely Low Strength Shale - after being cut up by excavation equipment can resemble a stiff to hard clay.

# EXAMPLES OF **GOOD** HILLSIDE PRACTICE




# EXAMPLES OF **POOR** HILLSIDE PRACTICE