NORTHROP

STRUCTURAL REPORT

68E Caledonia Street - Alterations & Additions

PREPARED FOR
Mary Curtis
c/Ecosystems Architecture
68E Caledonia Street
Paddington NSW 2021

Ref: S201047-00-SR01
Rev: 2
Date: 06.07.2020

Structural Report

Revision Schedule

Date	Revision	Issue	Prepared By	Approved By
30.06.2020	1	Issued for client review	J.Low	S.Maher
06.07.2020	2	Issued for Development Application	J.Low	S.Maher

Northrop Consulting Engineers Pty Ltd

ACN 064 775 088 | ABN 81 094 433 100

Level 11, 345 George Street, Sydney NSW 2000

02 9241 4188 | sydney@northrop.com.au | www.northrop.com.au

Table of Contents

1. Executive Summary

Northrop Engineers have been engaged by Mary Curtis of 68E Caledonia Street, Paddington, to provide structural engineering input and advice in relation to the proposed alterations and additions to the existing structure at 68E Caledonia Street, Paddington NSW.

This report has been written is in response to Woolhara Municipal Council *Request for information* (*Council Ref: DA 76/2020/1: Ms A Healy:kp*) dated 7 April 2020. Specifically, to demonstrate that the proposed excavation will have no adverse impacts on any surrounding property and infrastructure, including the existing boundary wall on the neighbouring property.

We have relied on the following information provided to Northrop to complete this report:

- Architectural DA drawings prepared by Ecosystem Architecture
  - DA 00_2 Cover
  - DA 01_5 Survey Plan
  - DA 02_5 Demolition Plans
  - DA 03_7 Basement Plan
  - DA 04_9 Ground Floor Plan
  - DA 05_9 Ground & Attic Plans & Part Roof Plan
  - DA 06_9 South Elevation
  - DA 07_10 North Elevation
  - DA 08_10 Section 1
  - DA 09_8 Sections 1 & 2
  - DA 10_8 Section 4
  - DA 11_4 Streetscape & Images
- Geotechnical & Hydrogeological Investigation by *JK Geotechnics* (Ref: 33171Arpt) dated 12 June 2020

2. Description of Proposed Works

Based on the DA Architectural drawings prepared by Ecosystem Architecture, we understand the proposed works comprise of:

- Partial demolition of the existing two-storey terrace house
- Construction of a new basement level below the existing ground floor
- Construction of a new attic level
- Installation of a new lift
- Internal renovations to ground and first floor
- Construction of a new in ground rainwater tank under the car space

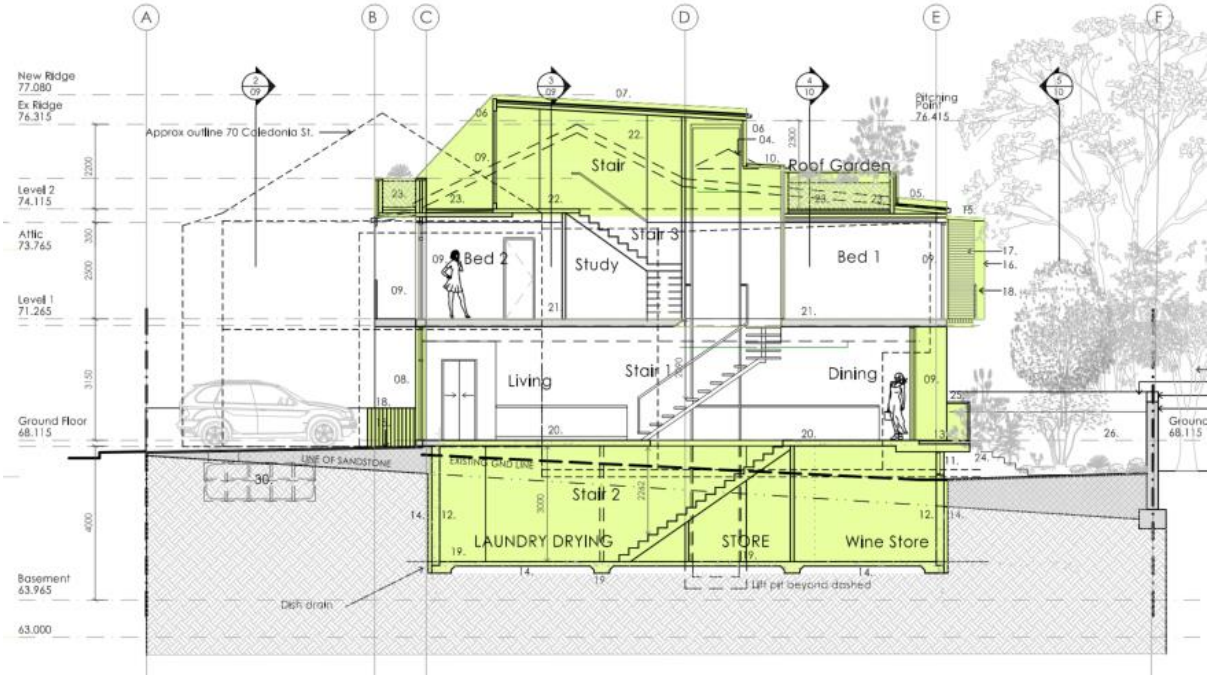


Figure 1 - Architectural Section showing the extent of proposed works

3. Geotechnical Conditions

A geotechnical and hydrogeological investigation has been prepared by JK Geotechnics. Refer to report 33171Arpt dated 12 June 2020. A summary of the sub-surface conditions is noted below:

Pavers
Brick Pavers between 50-60mm thick.

Fill
Poorly to moderately compacted Sandy fill with sandstone gravel to depths of between 450mm to 600mm.

Residual Silty Sand
Residual Silty Sand between 450-950mm below ground surface

Sandstone bedrock
Sandstone bedrock was encountered at 950mm below ground surface. The sandstone was initially highly to moderately weathered of low to medium strength. The sandstone improved in quality at depth. A cored borehole was taken down to a depth of 5.95m, where the sandstone was found to be high strength.

4. Proposed Construction Methodology

This section of the report intends to address the concerns raised by Council.

4.1 Location of nearby foundations

The location of the nearby foundations is captured on structural sketch SK01. This sketch is appended to this report and shown in the figure below:

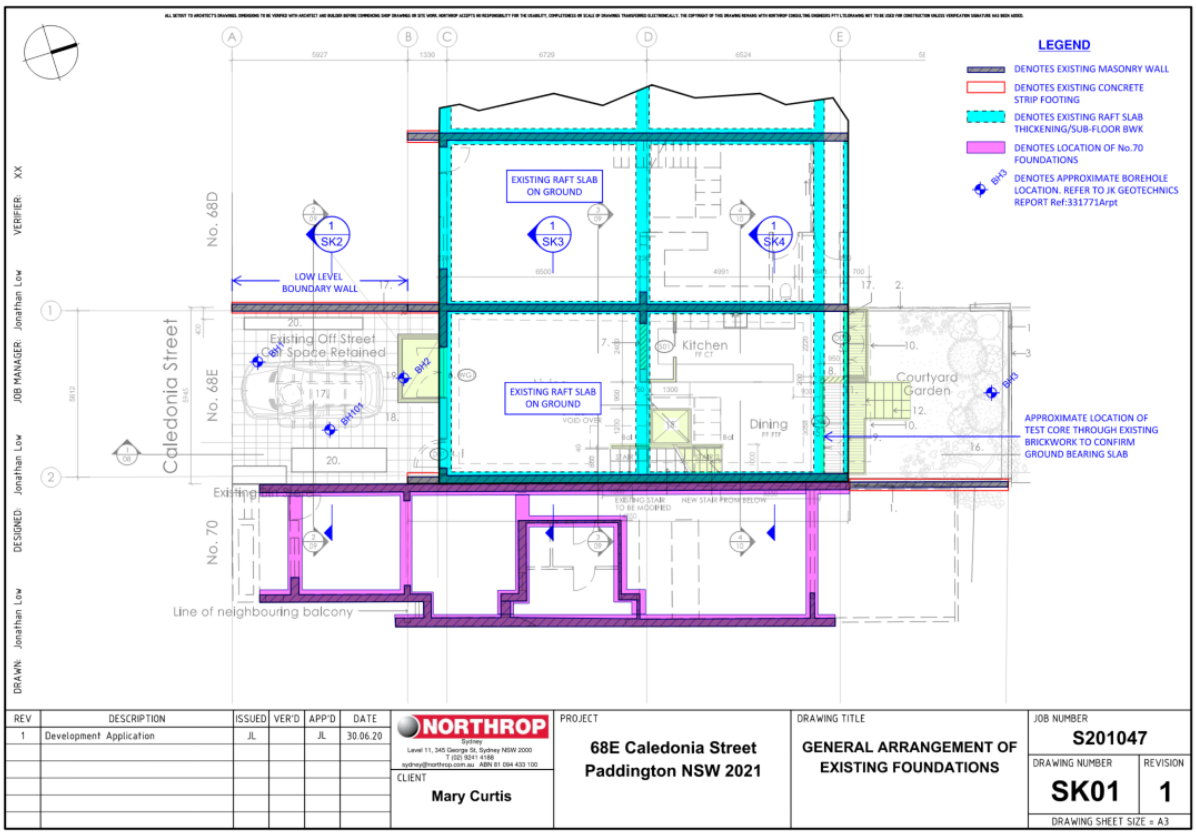


Figure 2 - General arrangement of existing foundations

4.2 Proposed Method of excavation

The depth of the fill above the sandstone bedrock varies across the site from around 600-950mm. The fill will be excavated using a standard hydraulic excavator and bucket.

Excavation of the medium and high strength sandstone will require a combination of rock saws, ripping tynes and rock hammers.

Due to the excavation taking place within the envelope of the existing house, the size of the plant will be limited to a maximum size of 3.5 tonne excavator.

4.3 Permanent & Temporary Support Measures for excavation

No ground anchors are proposed.

Permanent Case

In the permanent case, the basement walls will be constructed out of reinforced concrete, using a proprietary permanent formwork system such as Rediwall or Dincel. The wall will be designed to accommodate any lateral loads imposed from the soil profile above the sandstone bedrock.

Temporary Case

The soil profile at the northern and southern ends of the excavation, and for the rainwater tank, will need a temporary batter slope no steeper than 1 vertical:1.5 horizontal.

Based on our review of the existing structure and preliminary site investigations, we anticipate that the existing slab on ground will have a thickening along the length of the party wall with 68D, down to rock. This thickening will either be bearing on rock for its entire length or have bucket piers to rock at regular intervals. Should the latter situation be revealed during demolition of the existing ground slab, then the soil profile between bucket piers will need to be retained using a 'hit/miss' approach, similar to an underpinning exercise. Refer to section below for further clarification. Once this soil profile is stabilised, then the vertical cut into the medium to high strength sandstone can take place.

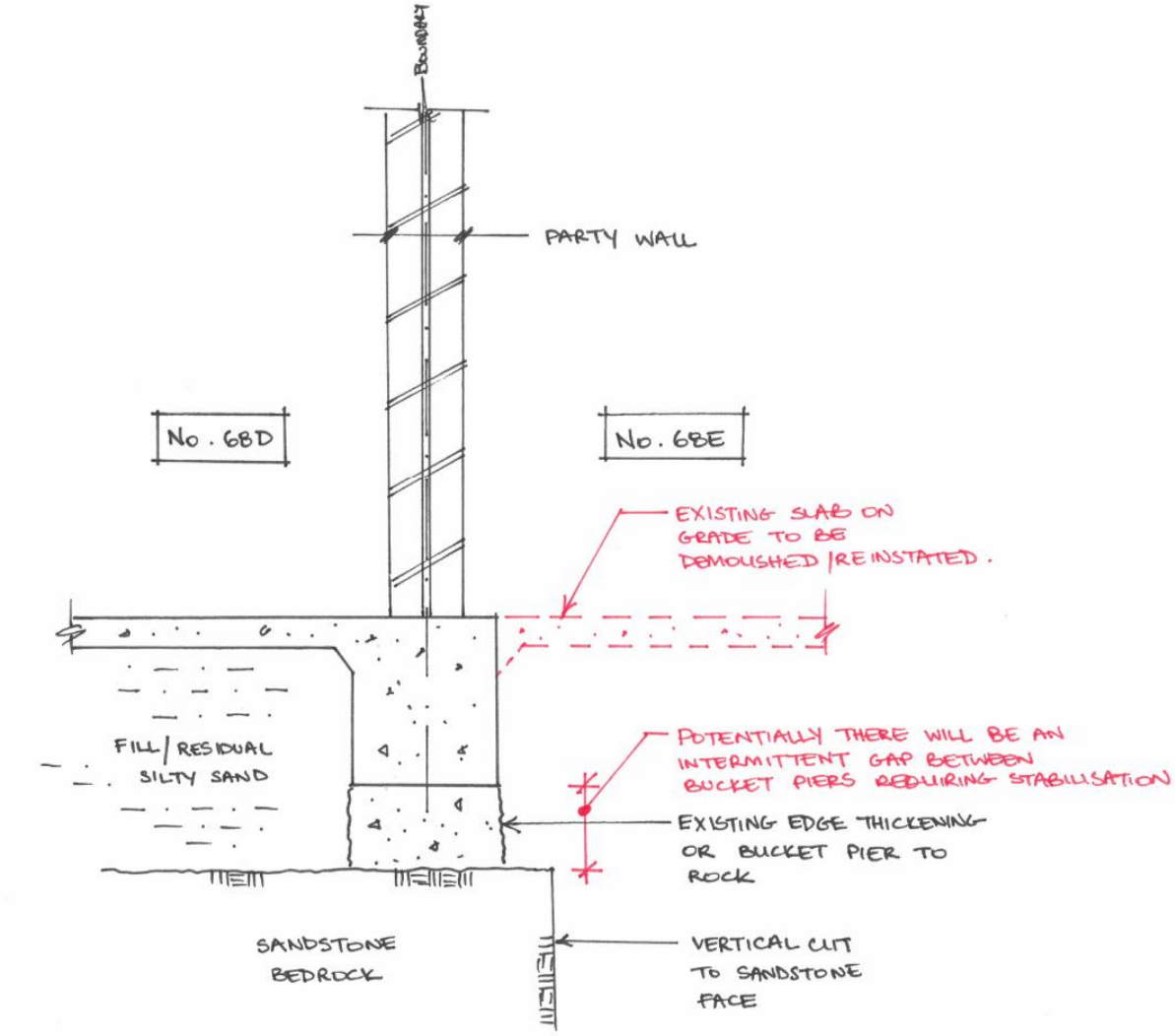


Figure 3 - Section through party wall with No.68D

Similar to western elevation discussed above, the eastern wall of 68E is supported on a slab edge thickening which is supported on sandstone bedrock.

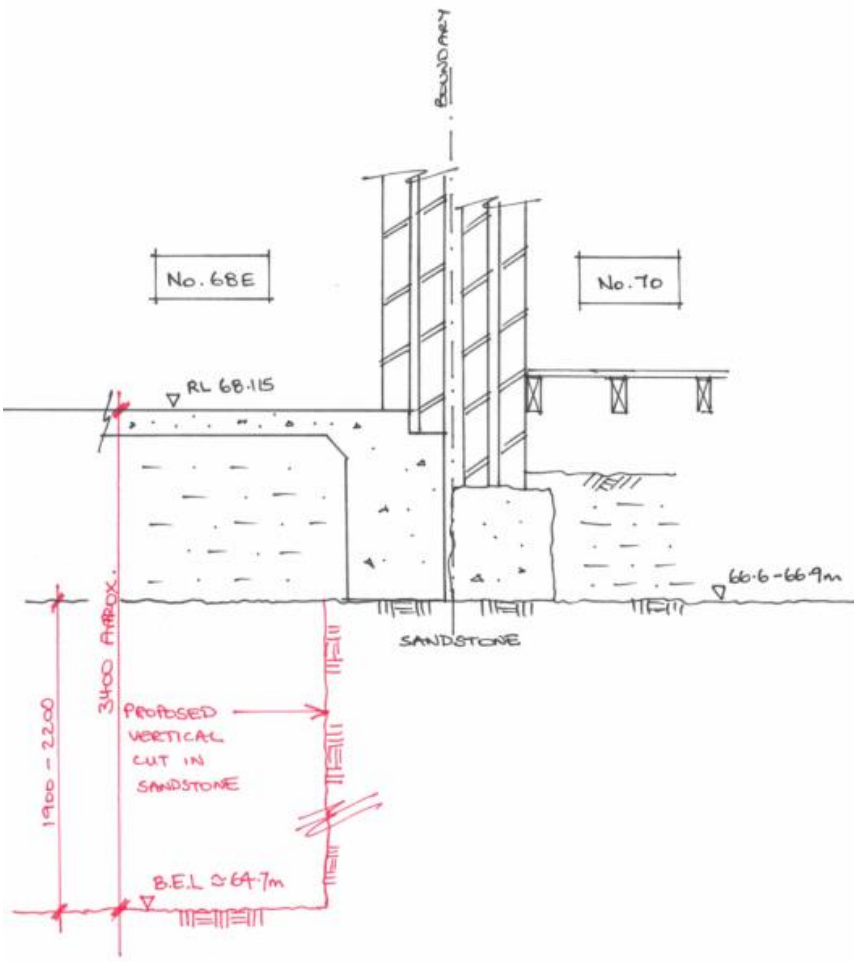


Figure 4 - Section through Eastern boundary

4.4 Potential settlements affecting foundations

Based on the information provided in the geotechnical report by JK Geotechnics, and through visual inspection of the existing structures at 70 Caledonia Street and 68D Caledonia Street; we have determined that the foundations of the existing structures are found on sandstone bedrock.

For the subject property, we have calculated that the current bearing pressure on these existing footings is in the order of 75kPa (based on a 400mm wide edge thickening). With the proposed works, the bearing pressure increases to approximately 85kPa.

For the neighbouring properties, 68D and 70 Caledonia Street, the bearing pressure at the underside of the existing footings will remain at approximately 75kPa.

The geotechnical investigation indicates that the allowable bearing capacity for the sandstone is 1000kPa. Based on above, we are of the opinion that settlements of the existing foundations will be negligible, assuming the works are carried out by an experience contractor and in accordance with the recommendations of this report.

4.5 Excavation support

The sandstone bedrock is of sufficient quality and strength to be cut vertically and self-support. The soil profile above the sandstone bedrock will be supported in the temporary case using temporary batter slopes (for the rainwater tank) and stabilisation through underpinning if required (see section 4.3).

In the permanent case, the basement walls will be designed to accommodate the laterals loads imposed by the overlying soil profile.

4.6 Ground water levels

No groundwater was observed during the preliminary geotechnical investigation by Jeffrey and Katauskas Pty. Ltd. in 2011, or in the most recent geotechnical & hydrogeological investigation by JK Geotechnics in June 2020.

4.7 Potential Vibration

As noted in section 4.2, the excavation through the medium to high strength sandstone will require the use of rock saws and rock hammers. The use of such equipment has an inherent risk of direct transmission of vibrations into the existing structures. The risk of damage to the adjacent structures will need to be managed by the contractor. As a minimum, the following procedures are to be adopted by the contractor:

1. Vibration monitors should be installed on party wall of 68D and the boundary wall of No.70 Caledonia Street. These locations should be determined in collaboration with the geotechnical engineer and specialist engaged to carry out the monitoring. Vibrations are to be limited to a peak particle velocity (PPV) of 5mm/sec. Should the pre-construction dilapidation surveys of the adjacent buildings indicate the houses are in poor condition, the PPV should be limited to 3mm/sec.
2. A grid of saw cuts to be made in the sandstone prior to use of rock hammers.
3. Maintain rock hammer oriented towards the face of the excavation and enlarge the excavation by breaking small wedges off the face.
4. If using multiple plant; operate one hammer at a time, in short bursts to reduce amplification of vibrations.

Notwithstanding the above, the contractor is to adopt the recommendations set out in the geotechnical report.

4.8 De-watering (including seepage & offsite disposal)

Temporary de-watering will not be required during construction. The geotechnical and hydrogeological report by JK Geotechnics notes that while there may be limited local seepage at the soil/bedrock interface and through joints in the bedrock after rain events, the volume of seepage is expected to be controllable using conventional sump and pump methods. In the long-term, a ‘drained’ basement is suitable for the proposed development.

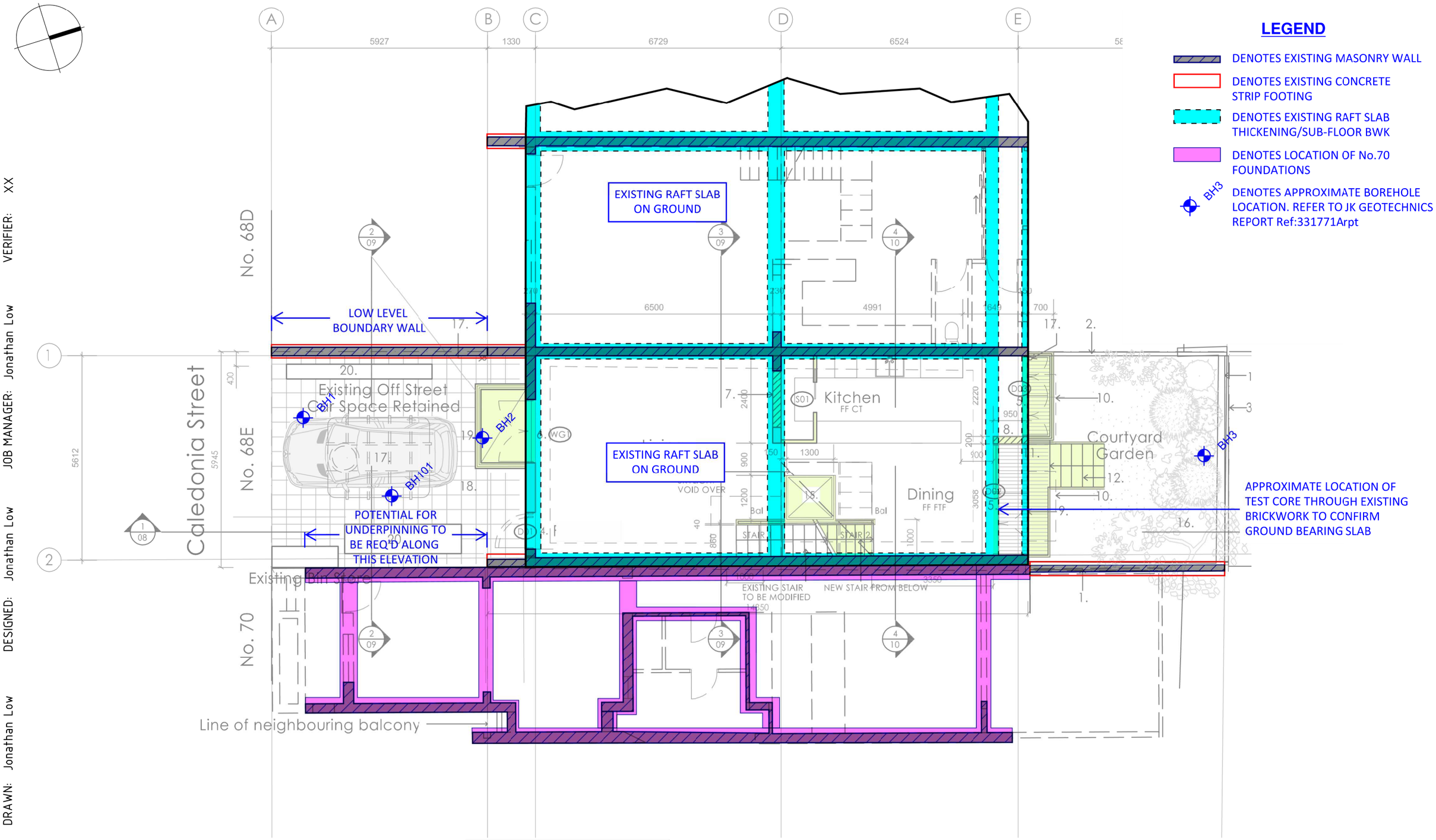
Disposal of the seepage water will be through the stormwater system.

5. Conclusion

Based on the information provided to us in the geotechnical investigation and through our own site investigations, **it is our professional opinion that the proposed works depicted in the *Ecosystem Architecture* Development Application drawings will not have any adverse impacts to the adjoining properties**. This is provided that the works are carried out in a competent manner, by a contractor experienced in confined work and who is aware of vibration damage risks.

Jonathan Low
Associate | Senior Structural Engineer
BE Civil (structures) MIEAust CPEng NER

DRAWN: Jonathan Low
DESIGNED: Jonathan Low
JOB MANAGER: Jonathan Low
VERIFIER: XX



LEGEND

- DENOTES EXISTING MASONRY WALL
- DENOTES EXISTING CONCRETE STRIP FOOTING
- DENOTES EXISTING RAFT SLAB THICKENING/SUB-FLOOR BWK
- DENOTES LOCATION OF No.70 FOUNDATIONS
- BH3 DENOTES APPROXIMATE BOREHOLE LOCATION. REFER TO JK GEOTECHNICS REPORT Ref:331771Arpt

REV	DESCRIPTION	ISSUED	VER'D	APP'D	DATE
1	Development Application	JL		JL	30.06.20

NORTHROP
Sydney
Level 11, 345 George St, Sydney NSW 2000
T (02) 9241 4188
sydney@northrop.com.au ABN 81 094 433 100

CLIENT
Mary Curtis

PROJECT
68E Caledonia Street Paddington NSW 2021

DRAWING TITLE
GENERAL ARRANGEMENT OF EXISTING FOUNDATIONS

JOB NUMBER
S201047

DRAWING NUMBER
SK01

REVISION
1

DRAWING SHEET SIZE = A3