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3rd November 2020

Our Reference: 14567F

HEPBURN SHIRE COUNCIL PO BOX 21 DAYLESFORD VIC 3460

Email: arousset@hepburn.vic.gov.au

Dear Sir,

Re: Pavilion Café, Mineral Springs Reserve Road, Hepburn Springs, Victoria.

As requested we have visited the above site to undertake a geotechnical investigation to determine the cause of differential floor settlement within the main dining area of the pavilion.

The scope of works was to include tile removal, underlying slab coring and augering of the subgrade soils to determine foundation conditions at five nominated locations.

This scope could not be accommodated as only two of the proposed locations of the floor were sufficiently damaged to allow coring and augering without further damaging of the floor beyond its current condition. The three remaining locations would require floor tile removal by a specialist and therefore these locations for testing were abandoned.

Nevertheless, our examination of floor and subgrade conditions at the two locations (Test Sites 3 and 4) provided sufficient information to determine the geotechnical issues that are causing the floor damage to the pavilion.

Essentially the two major discoveries that we have made are firstly the lack of a floor slab of any acceptable integrity and secondly the subgrade or foundation being poorly consolidated filling to a depth of at least 1200mm.



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Based on these findings our view is that the following sequence of site preparation and building construction have occurred.

The site is within a creekside or riparian zone and has been infilled to elevate the final ground level we assume to above common flood levels.

The pavilion building has been constructed on the prepared site and observations of the over century old building indicate that the footings have been suitably designed and installed for the foundation conditions encountered as there is no obvious major structural damage identifiable.

It appears that the floor area has then been infilled up to the required floor height with a soil mix, predominantly a silty clay/clay/gravel mix. This has then been overlain with the equivalent of a sub-base of a sand/gravel mix approximately 350mm thick. This in turn has been overlain by a mortar bed approximately 20mm thick in which the tiles have been set.

This scenario was identical at both Test Sites and we see no reason to not expect this to be representative of the complete floor construction.

Our view is that the passage of time has seen water ingress and differential settlement of the subgrade throughout the building floor but especially at the two locations tested resulting in cracking of the mortar bed and tile dislodgement.

It should be noted a large section of the floor has in fact survived the above scenario and is performing adequately.

Rectification works will need to be invasive as opposed to grout injection which can passively level floor slabs without the need of excavations and soil removal and replacement. However, as discovered, there is no floor slab to inject under.

Considering the longevity of most of the floor, reinstatement along a similar methodology of creating a geotechnically proven subgrade and sub-base with an infill floor slab upon which the tiles can be replaced it is our opinion this is the preferred option for rectification.

As to the extent of these works, that is an economical imperative and in the likelihood that the whole floor is not reinstated in one project we suggest that a staged series of works be designed for with the replacement slabs being designed for integration as the stages proceed, allowing structural integrity of the floor eliminating potential differential movement between sections.



Re: Pavilion Café, Mineral Springs Reserve Road, Hepburn Springs, Victoria.

We hope our investigation has provided the information required.

Please contact the undersigned should you require additional advice or investigation.

Yours sincerely,

ANDREW REDMAN BSc. <u>GEOLOGIST.</u> AR: hs

Enclosed:

- 1. Site Photographs
- 2. Test Site Location Plan
- 3. Cross sectional Borelogs
- 4. Geovic Map













SITE PHOTOGRAPHS























AERIAL PHOTOGRAPH



SUBJECT SITE



TEST SITE LOCATION PLAN



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CLIENT: HEPBURN SHIRE COUNCIL							REFERENCE NUMBER:	14	1567F					
PROJECT ADDRESS: Pavilion Café, Mineral Springs Road, HEPBURN SPRINGS							DATE: 03/11/2020 GEOLOGIST: Andrew Redman							
TEST SITE 3 EXCAVATION METHOD: HYDRAULIC DRILLING RIG EXCAVAT							TEST SITE 4 ION METHOD: HYDRAULIC DRILLING RIG							
Depth	FILL	SOIL PROFILE	"C″	ABP	Depth	FILL	SOIL PROFILE	"C″	ABP	Depth	FILL	SOIL PROFILE	"C″	ABP
mm					mm					mm				
		40mm tile on 20mm					40mm tile on 20mm						-	
40		mortar bed			40		mortar bed			100				
200		FILL: GRAVEL/SAND			200		FILL: GRAVEL/SAND			200				
300		MIX dry; moderately-			300		MIX dry; moderately-			300				
400		variably compacted			400		variably compacted			400				
500		FILL: SILTY CLAY/			500		FILL: SILTY CLAY/			500				
600					600					600				
/00		brown/grey			/00		brown/grey			/00				
800		very moist; soft			800		very moist; soft			800				
900		unconsolidated			900		unconsolidated			900				
1000		FILL: SANDY SILTY			1000					1000				
1100		CLAY MIX black			1100					1100				
1200		soft		-	1200		END BORE HOLE			1200				
1300		END BORE HOLE			1300					1300				
1400					1400					1400				
1500		PENETRATE			1500		FLOATER/ROCK IN			1500				
1600		FLOATER/ROCK IN			1600		FILLING			1600				
1/00		FILLING			1/00					1/00				
1800					1800					1800				
1900					1900					1900				
2000					2000					2000				<u> </u>
ABP = Allowable Bearing Pressure "C" = Cohesion					າ (V.S.T)									

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GEOVIC MAP



