16 May 2018

Better Exteriors
4/125 Highbury Road
Burwood VIC 3125

Attention: Mr. Mark Navakas

Ardenne Limestone Pavers
- Durability evaluation

Client reference: Request M. Navakas

Our reference: BEX0418-1

Investigating officers: Kate Tonkin

Report prepared by: Kate Tonkin

James P Mann
Laboratory Manager

	Draft	Reviewed	Released
Name	KT	GB	KT
Date	14/5/18	16/5/18	16/5/18

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1. INTRODUCTION

Stone Initiatives received a request from the client's representative to evaluate the durability of a limestone sample, proposed for use as paving. The sample supplied was identified as follows:

- Ardenne Limestone (our reference L506)

2. EVALUATION

The aim of the investigation was to determine the fitness for purpose of the stone type based on an evaluation of the stone's resistance to salt attack.

The durability of the samples was determined according to Method A of AS/NZS 4456.10:2003 "Masonry Units and Segmental Pavers- Methods of Test - Method 10: Determining Resistance to Salt Attack". This involved subjecting the specimens to 15 cycles of soaking in a 6.2% sodium sulphate solution for a period of 2 hours followed by overnight drying at 65˚C. Specimen size was modified due to sample dimensions supplied.

3. RESULTS

Results are summarized in the table below. Full test data are detailed in Appendix A of this report.

Property	Ardenne Limestone
Resistance to Salt Attack • Weight loss (%) • Mode of decay • Durability Grade	<0.1 (0.05 – 0.09) Very slight pitting and cracking AA

3.1. Discussion

The durability test results indicate a stone that is suitable for aggressive environments, constant wetting and drying and exposure to salt attack. It is important to note that the appearance of any decay that may occur over time will depend on the surface finish. Smooth surfaces such as polished or fine-honed are more likely to show minor pitting or change in gloss compared to textured finishes such as the 'tumbled' samples tested.

Plate 1: Appearance of Ardenne Limestone after durability testing.

Appendix A

Test Certificates

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RESISTANCE TO SALT ATTACK - SODIUM SULPHATE

Test Certificate

TEST METHOD		AS/NZS 4456.10-2003 Method A	
TEST DATE		17-Apr-18	
CLIENT		Better Exteriors	
OUR REFERENCE		BEX0418-1	
SAMPLE		Ardenne Limestone	
SURFACE FINISH		Tumbled	
SAMPLE ORIGIN		Not Known	
SAMPLING DATE	13/04/2018	**SAMPLE LOCATION**	Not Known
SHAPE and NOMINAL SIZE		Prism: 55mm x 69mm	
WORK SIZE		N/A - Raw material evaluation	
SOLUTION USED		6.2% Sodium Sulphate	

Conditioning: Dried for minimum 48 hours @ 65 deg C

Test Number	Specimen Identification	Mass Loss (g)	Loss at 15 Cycles	Mode of Decay
X4211	L506/1	0.15	0.05%	VSL SP, VSL CR
X4212	L506/2	0.23	0.08%	VSL SP, SL CR
X4213	L506/3	0.29	0.09%	VSL SP, SL CR
X4214	L506/4	0.17	0.05%	VSL SP, VSL CR
X4215	L506/5	0.17	0.05%	VSL SP, VSL CR

MEAN MASS LOSS: **<0.1%**

The uncertainty of measurement (u95) for this test value is 0.05%

Key to Mode of Decay

Degree	Type
VSL= Very Slight	SP= Surface pitting
SL= Slight	CE= Crumbling of edges
MD= Moderate	CR= Cracking
SV= Severe	DL= Delamination
	EX= Exfoliation

NOTE: The expanded measurement uncertainty values (u95) quoted in this report are at a confidence level of 95 % with a nominal coverage factor of 2. These values do not include any estimate of the effects associated with sampling.

COMMENTS/VARIATIONS Modified specimen dimensions.

TESTED BY: K. Tonkin & T. Baggs

APPROVED SIGNATORY:

NAME: Graham J Baggs

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