

Heritage, Design and Access Statement

BrewDog, 11 Castle Street, Reading

BrewDog PLC

May 2024

Project: 2404-02

Version 01

Project Preface

Client Name and Address

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Project Name

External Repairs, 11 Castle Street, Reading

Project Ref

2404-02

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Project Preface

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Revision Record

Rev	Date	Clauses	Description

1.0 Introduction

- 1.1 This Heritage, Design and Access Statement has been written by JacksonBCS Limited and is submitted in support of a planning and listed building consent application for the repair of the facade of 11 Castle Street, Reading.
- 1.2 The structure is Grade II listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 for their special architectural or historic interest. The listing entry number is 1113411 and the building was listed on 14 December 1978, and amended 24 January 2024. See listing description in Appendix A.
- 1.3 The building is on the south side of Castle Street and is part of a group of historic buildings, providing group value.

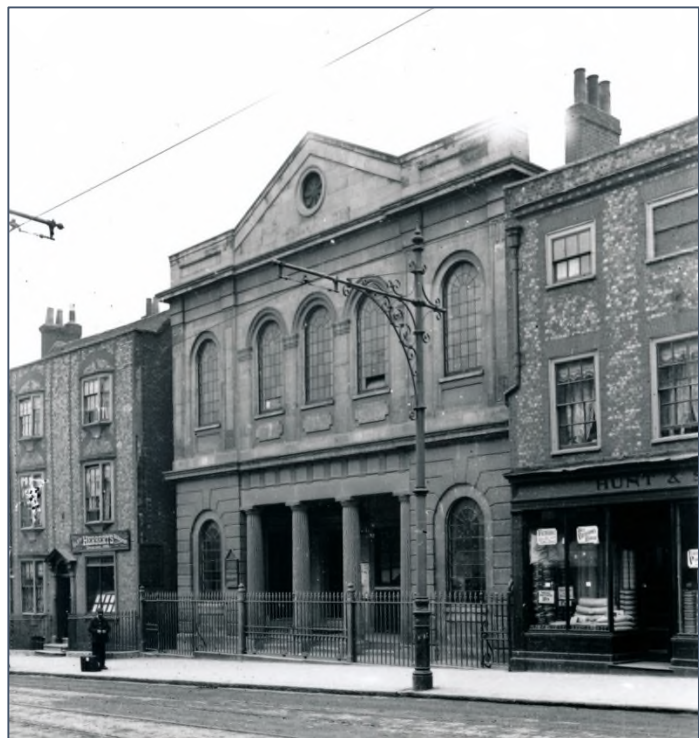
2.0 Project Overview

- 2.1 The front elevation of the building, facing Castle Street, requires repairs. The proposals are for the repairs to the masonry to this elevation.

3.0 Brief History

- 3.1 The building was erected in 1837 as the Congregational Chapel, designed by architect JJ Cooper. The building is a two-storey plain rectangular form, five bays long and five bays wide. The east, south and west elevations are in red brickwork with semi-circular headed multi-lighted windows.

- 3.2 The north elevation is a neo-classical design. At ground floor level, the three centre bays have Doric fluted columns to the centre bay, Doric pilasters to the outer bays, all surmounted by Doric entablature with triglyphs and metopes, and a modern shopfront is set behind these columns/pilasters. The first and fifth bays have semi-circular headed windows with rusticated masonry surrounds. The original windows have been replaced with modern ones. At first floor level there are five semi-circular headed windows with multi-light frames, the three centre bays with raised masonry panels below and the outer bays with recessed masonry panels. The three centre bay windows are flanked with shallow piers terminating at the springing



Congregational Church, photograph taken in early 1900s
Image from Reading Borough Council Local Studies Library

points of the semi-circular window heads. The outer bays are flanked by piers terminating at a plain cornice. The whole elevation is surmounted by a parapet with three-bay wide pediment with circular window set in the tympanum.

- 3.3 The listing description notes that the roof, now slate, may have been completely replaced in 2007.
- 3.4 In circa 1956 the building was converted to retail use, with significant interior alterations and the forming of a shopfront to the Castle Street elevation.
- 3.5 In the late 1990s the building was converted to a public house.
- 3.6 The listing description notes the principal elevation as being stucco, but some of the elevation is certainly oolitic limestone, possible Bath stone (see Appendix C).

4.0 Heritage Statement

The Proposed Works

- 4.1 Currently the Castle Street elevation at ground floor level requires repairs and redecoration to the masonry.
- 4.2 The masonry has been covered in impervious paintwork for many years. Tests have been carried out to identify cleaning techniques that will allow the paint finish to be removed causing the least amount of harm to the substrate. The first and fifth ground floor bays have been tested (Appendix B).
- 4.3 The masonry where the tests have been carried out is an oolitic limestone (see Appendix C). It is possible that other areas, as noted on the listing description, are stucco. Regardless of whether the masonry is stucco on brickwork, or a natural stone, the repair proposals are the same:
 - Carefully remove the impervious paintwork using recognised building conservation techniques with high temperature steaming cleaning with DOFF, vortex cleaning with TORC, and also various poultice mixes, causing the least damage possible to the substrate.
 - Repair damaged and decayed sections of stone/stucco with hydraulic lime: sand mixes that match the density and porosity of the substrate to ensure compatibility with it.
 - Apply Keim highly vapour permeable potassium silicate mineral paint in accordance with the manufacturer's recommendations.

The Requirement and Method for Assessment of Significance

- 4.4 The National Planning Policy Framework (NPPF) requires: In determining applications, local planning authorities should require an applicant to describe the significance of any heritage assets affected, including any contribution made by their setting. The level of detail should be proportionate to the assets' importance and no more than is sufficient to understand the potential impact of the proposal on their significance. As a minimum the relevant historic environment record should have been consulted and the heritage assets assessed using appropriate expertise where necessary. Where a site on which development is proposed includes, or has the potential to include, heritage assets with archaeological interest, local planning authorities should require developers to submit an

appropriate desk-based assessment and, where necessary, a field evaluation.

- 4.5 Historic England's document *Conservation Principles, Policies and Guidelines* sets out four criteria for understanding the values of the historic asset:
- a) Evidential value: the potential of a place to yield evidence about past human activity.
 - b) Historical value: the ways in which past people, events and aspects of life are connected through a place to the present – it tends to be illustrative or associative.
 - c) Aesthetic value: the ways in which people draw sensory and intellectual stimulation from a place.
 - d) Communal value: the meanings of a place for the people that relate to it, or for whom it figures in their collective experience or memory.
- 4.6 The NPPF also requires that the setting of the heritage asset is assessed. The NPPF's definition of the setting of a heritage asset is 'The surroundings in which a heritage asset is experienced. Its extent is not fixed and may change as the asset and its surroundings evolve. Elements of a setting may make a positive or negative contribution to the significance of an asset, may affect the ability to appreciate that significance or may be neutral.'
- 4.7 In assessing the application the NPPF requires that the local planning authority in determining planning applications should take account of (section 12, para 138):
- a) there is sufficient information comprehensively to understand the impacts of the proposal on the significance of the place;
 - b) the proposal would not materially harm the values of the place, which, where appropriate, would be reinforced or further revealed;
 - c) the proposals aspire to a quality of design and execution which may be valued now and in the future;
 - d) the long-term consequences of the proposals can, from experience, be demonstrated to be benign, or the proposals, or the proposals are designed not to prejudice alternative solutions in the future.

The Development's Impact on the Significance of the Historic Asset

- 4.8 The significance of built heritage assets is described using the following terminology:
- a) High significance: an asset of the very highest national (and international) significance.
 - b) Significant: original features that contribute to the historical and architectural interest of the heritage asset; or non-original features which are of sufficiently high quality that they maintain a high degree of architectural or historic interest.
 - c) Some significance: original features which contribute to the historical and architectural interest of the heritage asset, but which are not in themselves (or as a group) of particular importance; or non-original features which contribute to maintaining the overall architectural or historic interest of the asset.
 - d) Neutral: features of little or no interest, which do not contribute positively to the historic and architectural interest of the asset. This can include original fabric where this is of minimal special interest and is located in an area that has undergone notable change.
 - e) Detracts: features that obscure or detract from the significance of the heritage asset.

Impact of the Masonry Repairs

- 4.9 Well executed masonry repairs with the right materials will allow this façade to be restored to a sound condition. The proposed materials will allow the for the long-term

preservation of the masonry.

4.10 The sensitive repairs of this elevation will enhance this heritage asset.

5.0 Design Statement

5.1 The heritage issues are the overriding concern for these proposals. The method of cleaning, repairs and redecoration are a recognised building conservation approach.

6.0 Access Statement

6.1 No physical changes are proposed to the existing access arrangements.

Appendix A

Listed Building Description – Historic England

11 Castle Street Reading

Official list entry

Heritage Category:

Listed Building

Grade:

II

List Entry Number:

1113411

Date first listed:

14-Dec-1978

Date of most recent amendment:

25-Jan-2024

List Entry Name:

11 Castle Street

Statutory Address 1:

11 Castle Street, Reading, RG1 7SB

The scope of legal protection for listed buildings

This List entry helps identify the building designated at this address for its special architectural or historic interest.

Unless the List entry states otherwise, it includes both the structure itself and any object or structure fixed to it (whether inside or outside) as well as any object or structure within the curtilage of the building.

For these purposes, to be included within the curtilage of the building, the object or structure must have formed part of the land since before 1st July 1948.

Location

Statutory Address:

11 Castle Street, Reading, RG1 7SB

The building or site itself may lie within the boundary of more than one authority.

District:

Reading (Unitary Authority)

Parish:

Non Civil Parish

National Grid Reference:

SU 71366 73220

Summary

Former congregational chapel, built in 1837, designed by JJ Cooper, converted to retail use in around 1956, subsequently converted to use as a public house in the late 1990s.

Reasons for Designation

11 Castle Street, Reading, is listed at Grade II for the following principal reasons:

Architectural interest:

- * as a mid-C19 building, with good architectural design, which contributes to the character of an architecturally varied historic streetscape.

Historic interest:

- * as part of the urban development of Reading's ancient core.

Group value:

- * the building is in close proximity to a large number of listed buildings and forms part of a strong historic grouping.

History

The crossroads formed by the north-south route of St Mary's Butts and Bridge Street and the east-west route of Gun Street and Castle Street is believed to be the centre of the original Saxon settlement at Reading, established sometime before the ninth century with the lowest crossing point of the River Kennet lying a short distance away to the south. Reading was well-established by the time of the Norman Conquest, and the Domesday Book (1086) records six mills and a large estate in the town. St Mary's Church, which lies on the north-east corner of the crossroads and was mostly rebuilt in 1551-1555, was the town's primary church until the establishment of Reading Abbey in the C12 and became so again following the dissolution in the late 1530s.

Running west from the crossroads, Castle Street forms part of the ancient route through the town between London and the West Country, and the street historically contained many inns and guesthouses. As Reading expanded beyond its medieval limits during the C18 and C19, development spread further along Castle Street. Until the mid-C20, redevelopment on the street was piecemeal and mostly confined to individual plots, leading to the street's great architectural diversity. This pattern was broken in the late 1960s and 1970s, with the construction of the expansive civic complex on the north side of Castle Street, and of the Inner Relief Road immediately to the west of the new complex. These major works required the demolition of most of the buildings on the north side of Castle Street and severed the more commercial, eastern end of the street nearer the town centre and the more residential, western end of the street as it becomes Castle Hill.

11 Castle Street is the former Castle Street Congregational Church, which was opened in 1837. The church closed in 1956, at which time the building was converted to retail use at ground-floor level with offices above. During the 1990s, the basement was converted to use as a gym while the ground and first floors became a nightclub and subsequently a public house.

The Congregational Chapel was designed by the architect JJ Cooper, in the neoclassical style. It was altered internally and externally to facilitate its conversion to shop use, with a new shop frontage added to the ground floor. Columns loosely replicating those of the building's original entrance were added to the shopfront in around 1989. The roof of the building is understood to have been entirely replaced in around 2007.

Details

Former congregational chapel, built in 1837, designed by JJ Cooper, converted to retail use in around 1956, subsequently converted to use as a public house in the late 1990s.

MATERIALS: the building is constructed of brick, with a stucco principal elevation. The roof covering appears to be slate.

PLAN: the building is laid out on a rectangular footprint orientated north-south.

EXTERIOR: the building is of two tall storeys across five bays facing onto Castle Street, under a pitched roof. The principal, north elevation is designed in a neoclassical style executed in stucco. At ground-floor level, the three central bays contain a recessed modern shopfront, with a pair of columns flanking the central entrance and two half-columns set against the sides of the recess. Above the shopfront is a partial Doric entablature with triglyphs and metopes. The two end bays are of channelled stucco and contain a large, round-arched opening containing modern fixed windows.

At first-floor level are five slightly recessed, round-arched openings, all containing fixed windows with applied glazing bars and a low-level casement element. The three central arches spring from simple moulded pilasters, and each has a raised panel beneath the window. The two outer bays are flanked by pairs of larger pilasters with Soanian incisions, and there is a recessed panel beneath the windows. The four larger pilasters rise to a simple cornice with a parapet above with a central pediment containing a circular window within the tympanum.

The east and west elevations each contain five tall, first-floor round-arched openings, each containing a fixed window with many glazing bars and a casement element, apart from the second bay from the south on the west elevation, which contains a doorway leading to an emergency staircase. There appears to be a corresponding range of round-arched openings at ground-floor level on either elevation, although these are largely hidden from the street.

There is a full-width, brick projection to the rear, south, elevation of two lower storeys, with a pair of modern doors at ground-floor level. Above this projection, on the rear elevation of the main body of the former chapel, is a large chimney stack rising through the roof ridge. On either side of the stack at high level are a pair of small, round-arched openings, now blocked.

Legacy

The contents of this record have been generated from a legacy data system.

Legacy System number:

38789

Legacy System:

LBS

Sources

Books and journals

Pevsner, N, Bradley, S, Tyack, G, *The Buildings of England: Berkshire*, (2010), pp438-440, p471

Websites

Ditchfield, PH, Page, W, *A History of the County of Berkshire: Volume 3* (1923), pp.336-342, accessed 28 September 2023 from <https://www.british-history.ac.uk/vch/berks/vol3>

Reading Borough Council, *History of Reading* (2012), accessed 28 September 2023 from <https://web.archive.org/web/20120425235452/http://www.reading.gov.uk/residents/history-of-reading/>

St Mary's Butts and Castle Street Audio Trail, accessed 20 October 2023 from www.reading.gov.uk/planning-and-building-control/heritage-and-conservation/readings-high-street-heritage-action-zone/community-engagement/reading-audio-trails/st-marys-butts-and-castle-street/

Legal

This building is listed under the Planning (Listed Buildings and Conservation Areas) Act 1990 as amended for its special architectural or historic interest.

Map

This map is for quick reference purposes only and may not be to scale. This copy shows the entry on 16-May-2024 at 14:39:54.



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End of official list entry

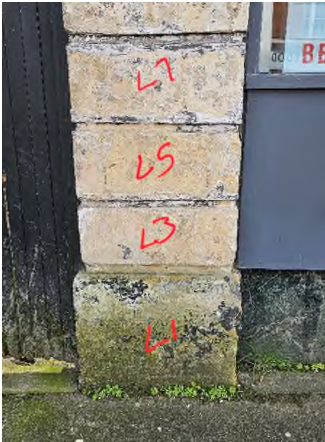
Appendix B

Masonry Cleaning and Repairs Assessment – Capital Stone

BrewDog, 11 Castle Street, Reading

Masonry Cleaning and Repairs Assessment

Left Bay Survey



Item	Description
	The perimeter of all stones require repairing
L1	plastic repairs to returns, face fill
L3	crack repair, remove old repairs, face fill
L5	plastic repairs to edge, remove old repairs, face fill
L7	crack repair, face fill



Item	Description
L2	plastic repairs to returns, face fill
L4	face fill
L6	face fill
L8	cut back and plastic repair



Item	Description
L9	crack repair, plastic repair to edge, face fill
L11	crack repair, face fill
L13	plastic repair to left side, face fill rest
L15	sounds hollow, possible cut back and reface
L17	indent to right side, face fill rest



Item	Description
L10	cut back and plastic repair
L12	plastic repair to left side, face fill rest
L14	plastic repair to left side, face fill rest
L16	plastic repair to left side, face fill rest
L18	crack repair



Item	Description
L19	OK
L20	crack repair
L21	OK
L22	crack repair
L23	larger repair to return, possibly indent
L24	crack repair
L25	OK
L26	OK
L27	crack repair
	Unable to tap test higher but look OK from ground
	The cornice looks in poor condition and unstable in some areas, this will require closer inspection when we have access



Right Bay Survey



Item	Description
R1	crack repair, plastic repair
R3	plastic repair
R5	crack repair, plastic repair
	The plinth will require plastic repairs along the top and face filling



Item	Description
R2	plastic repair
R4	plastic repair
R6	face fill



Item	Description
R7	plastic repair to right, face fill rest
R9	face fill
R11	face fill



Item	Description
R8	face fill
R10	face fill
R12	face fill



Item	Description
R13	crack repair
R15	crack repair, plastic repair
R17	crack repair, large hole to repair
R19	face fill



Item	Description
R14	face fill
R16	face fill
R18	face fill
R20	face fill
R21	face fill
R22	face fill
	Unable to reach higher for tap test but look OK
	All stones require edges repairing
	The cornice looks in poor condition and unstable in some areas, this will require closer inspection when we have access



Tests to Remove Existing Paint Finish



Scraped pilaster



Poultice stripped pilaster

Appendix C

Identification of Stone – Sandberg

REPORT 76942/G
IDENTIFICATION OF
POTENTIAL STONE SOURCE
READING

Sandberg LLP
5 Carpenters Place
Clapham High Street
London SW4 7TD

Tel: 020 7565 7000
email: mail@sandberg.co.uk
web: www.sandberg.co.uk

REPORT 76942/G
IDENTIFICATION OF
POTENTIAL STONE SOURCE
READING

Capital Stone
Sewardstone Hall Farm
Sewardstone Road
Chingford
London
E4 7RH

This report comprises
Cover page
This contents page
4 pages of text
Table 1 of 5 sheets
Back page

For the attention of Mr Mark Johnson

13 May 2024

Partners: N C D Sandberg S C Clarke D J Ellis M A Eden J D French C Morgan G S Mayers G C S Moor
J Fagan J H Dell Dr E D W Maclean M I Ingle A L Pitman J Glen Dr R M Harris
Senior Associates: R A Lucas D A Kinnersley Y N P Guellil P Bennett-Hughes G Lee M Sabra T C Cosgrove J Morris
Associates: K J Green J Gallagher N A Fetter E McPheat F Easthope E Krylowicz S R Kwincinski
C S Newberry J S Jones S A J D Hudson A H Khokhar N Cruickshank C M Walden H G R Birchall

REPORT 76942/G

IDENTIFICATION OF

POTENTIAL STONE SOURCE

READING

Reference : Instructions from Mr Mark Johnson of Capital Stone.

1. **INTRODUCTION**

A stone sample (received broken into two pieces), advised to be from the above site, was received in our laboratory on 17 April 2024 and subjected to testing in accordance with your instructions.

We were instructed to undertake testing in order to identify the stone type and potential matching stone source/s of the submitted sample.

2. **SAMPLE RECEIVED**

Sandberg Ref.	Advised Location Details	Specimen weight, g
G54932	Reading	363

3. TEST METHODS AND RESULTS

3.1 Petrographic examination

The sample was subjected to petrographic examination in accordance with methods described in BS 5930:2015+A1:2020¹, ISRM² and BS EN 12407:2019³.

Record colour photographs of the sample received are presented in Table 1 of this report.

The sample was first subjected to macroscopical and low power stereoscopic microscope examination supported by simple physical and chemical tests.

A representative portion from the sample was used to prepare a large area thin section, which was examined under a Leica DM4500P high power petrological microscopes employing plane polarised and cross polarised light at magnifications up to x1000.

The detailed petrographic examination results are given in Table 1 of this report.

The macroscopical examination findings for the stone sample may be summarised as follows:

Specimen G54932

The stone was pale cream to off-white on broken surfaces, and grey on exposed and polluted surfaces, predominantly medium grained, oolitic bioclastic LIMESTONE. The stone was generally well to moderately compacted, moderately hard to moderately soft, moderately robust to moderately weak and appeared generally porous (subjective estimate). The sample's apparently exposed surfaces were generally weathered.

4. DISCUSSION

On the basis of the microscopic examination the stone sample was found to be an oolitic limestone similar in colour and general composition to potential source/s which are given in the Table below together with the degree of confidence in the match.

¹ BS 5930:2015+A1:2020. Code of Practice for Site Investigation, Clause 36, Description and Classification of Rocks for Engineering Purposes.

² Rock Characterisation Testing and Monitoring. International Society for Rock Mechanics (ISRM) Suggested methods. Petrographic Description of Rocks p.73, 1981 Edition.

³ BS EN 12407:2019. Natural Stone Test Methods - Petrographic Examination.

Sandberg Ref.	Potential Source Material	Estimated Degree of Confidence in Match
C23296	Bath stone - Monks Park Quarry Location : Monks Park, Corsham, Wiltshire	Probable
	Bath stone, Combe Down - Upper Lawns Quarry Quarry Location : Upper Lawns , Combe Down, Bath	Possible
	Guiting Stone - Cotswold Hill Quarry Quarry Location : Cotswold Hill, Ford, Nr Temple Guiting, Cheltenham, Gloucestershire	Possible
	Danglingworth Stone Quarry Location : Danglingworth, NW of Cirencester, Gloucestershire	Possible

The sample was compared against archived petrographic data and thin sections. It is therefore recommended that colour matching of the stone from the suggested potential sources with the material/s on site is carried out.

The above suggested stone source/s are generally similar in colour and appearance but not identical to the submitted stone.

It is therefore recommended that colour matching of the stone from the suggested sources with the material/s on site is carried out. This is important in respect of variation due to fresh and weathered stone both in the quarry and on the structure.

It should be borne in mind that, apart from the parameters discussed above, ultimately the matching of a potential source stone with that in a historic structure is also dependent upon a range of other additional factors. These include:

Weathering

The rate of weathering in the installation climate will affect how the new stone will appear during long-term exposure (i.e. the colour of fresh stone will alter over time and this needs to be considered in respect of the original stone appearance in the structure).

Furthermore, different stones will weather and react in different ways according to their composition and physical properties (i.e. will the new stone weather or degrade at the same rate as the original or not).

Permeability

A key parameter of any replacement stone is its permeability. A new (substitute) stone needs to have compatible porosity and inter-connectivity characteristics to those of the original stone, otherwise moisture migration can be inhibited and lead to accelerated deterioration.

Strength

If a stone is load-bearing in a structure, it is critical to establish that any new stone has adequate strength to meet the required factors of safety.

Workability

Any stone considered for replacement works must have characteristics that allow it to be worked into the necessary shape and form of the elements that comprise the structure.

We would strongly recommend that the suggested source quarries are visited by an experienced geologist and samples are examined in detail with respect to compatibility of physical characteristics, durability and comparative performance. We would welcome the opportunity to assist in this process.

5. REMARKS

The stone matching was based upon the sample submitted. Stone sources may be expected to exhibit considerable lateral and vertical variations in composition and character over short distances and single samples are unlikely to be reliably representative of whole source areas or specific locations within these areas during continuing exploitation.

In addition, the above suggested quarries may have stopped operating or the new stone extracted may differ considerably in colour, texture and overall composition with that originally produced.

These results and comments conclude the testing requested to date. Please do not hesitate to contact us if we can be of further assistance.

Capital Stone
Sewardstone Hall Farm
Sewardstone Road
Chingford
London
E4 7RH

for Sandberg LLP

For the attention of Mr Mark Johnson

Panos Sotiropoulos
Principal Geologist

Geology/Laboratory

13 May 2024

File:76942g.rep.wpd

SAMPLE PHOTOGRAPHS



G54932. View of sample received exhibiting exposed and broken / sawn surfaces.



G54932. View of sample received exhibiting broken / sawn surfaces.

SAMPLE PHOTOGRAPHS



G54932. Close-up of an exposed surface of sample received.



G54932. Close-up of a broken surface of sample received.

PETROGRAPHICAL EXAMINATION OF ROCK

BS 5930:2015+A1:2020, BS EN ISO 14689:2018, ISRM Method, BS EN 12407:2019, ASTM C1721-22

Tested by / Date

PS/08-05-2024

SAMPLE DETAILS			
Sample Reference:	G54932	Client Reference/Site Mark:	-
Sample Type, Source and Sampling Location Details:	Reading		
Condition on Receipt:	Dry	Sample weight, g :	363 approximately
Methods of Preparation of Specimens and Examination Procedures:	The stone sample was first subjected to macroscopical and low power stereomicroscopical examination supported by simple physical and chemical tests. A representative specimen from the sample was used to prepare a large area thin section which was examined under a Leica DM4500P high power petrological microscope, employing plane, cross polarised and ultra violet light modes and magnifications up to x1000.		
Any Other Details:	The thin section specimen was taken across the pieces of the sample. Thin section dimension 45mm x 49mm approximately which was completed on 8 May 2024.		

MATERIAL DESCRIPTION:	The stone was pale cream to off-white on broken surfaces, and grey on exposed and polluted surfaces, predominantly medium grained, oolitic bioclastic LIMESTONE. The stone was generally well to moderately compacted, moderately hard to moderately soft, moderately robust to moderately weak and appeared generally porous (subjective estimate). The sample's apparently exposed surfaces were generally weathered.
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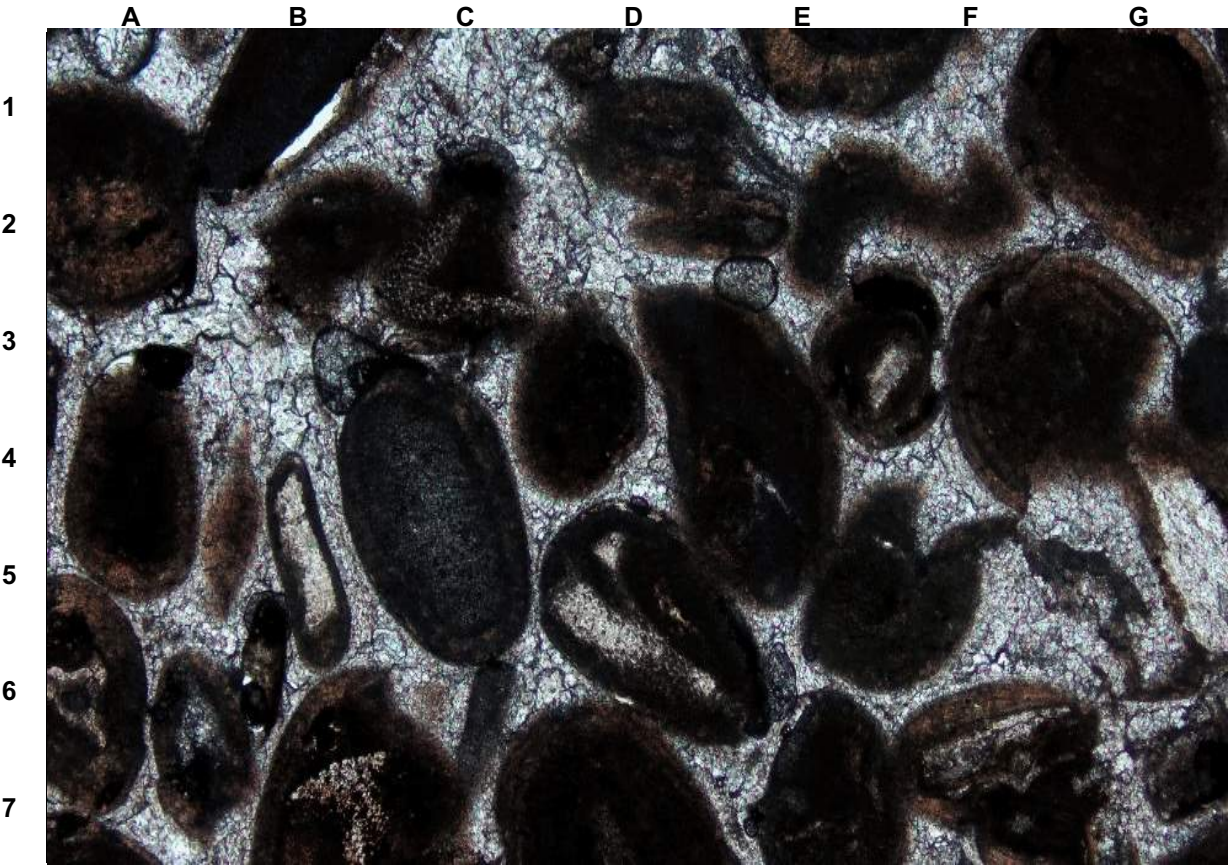
MATERIAL COMPOSITION:		PETROGRAPHICAL DETAILS ⁿ
COMPONENT	Volume % (estimated)	The stone was found to be a generally matrix supported oolitic bioclastic limestone (oobiosparite) consisting primarily of ooids and relict bioclasts and predominantly sparry calcite forming the matrix and/or intergranular material. Sporadic iron and/or manganese oxide imparted a brownish to pale orange colouration to parts of ooids and relict bioclasts. The ooids were typically rounded and occasionally elongate and sometimes subround (ranging in size from 50µm to 800µm and commonly 200µm to 500µm in diameter or across) and generally exhibited concentric structure. The ooids consisted mainly of micritic calcite and sporadically central parts exhibited partial crystallisation to microspar and/or sparry calcite. Relict bioclasts (up to 1.5mm long, 0.6mm across and commonly less than 0.5mm long and 300µm across) were unevenly distributed and consisted mainly of elongate to subround shell pieces, sporadically exhibiting an aragonitic texture with a micrite periphery and were sometimes partially replaced by micrite and/or sparry calcite. The matrix comprised mainly sparry calcite anhedral grains (up to 600µm and commonly less than 200µm across) forming a mosaic with generally tight contacts. Orange brown possibly iron and/or manganese oxide occasionally partially stained ooids or parts of ooids and relict bioclasts respectively. The stone was generally well to moderately compacted and porous. There were voids (up to 0.4mm and commonly 0.1-0.3mm across) which were generally associated with the ooids. Micrite, which was the main constituent of the ooids, was also microporous thus contributing to the overall porosity of the stone.
Ooids / Relict Bioclasts	70	
Matrix	30	
Iron and/or Manganese oxide	<1	
TOTAL:	100	

UE = Undulatory Extinction. ND = Not Determined. NA = Not Applicable. NS = Not Supplied.

ⁿ Details mainly relate to components or features of possible engineering significance.

76942/G
Table/Sheet
1/4
Plate
1

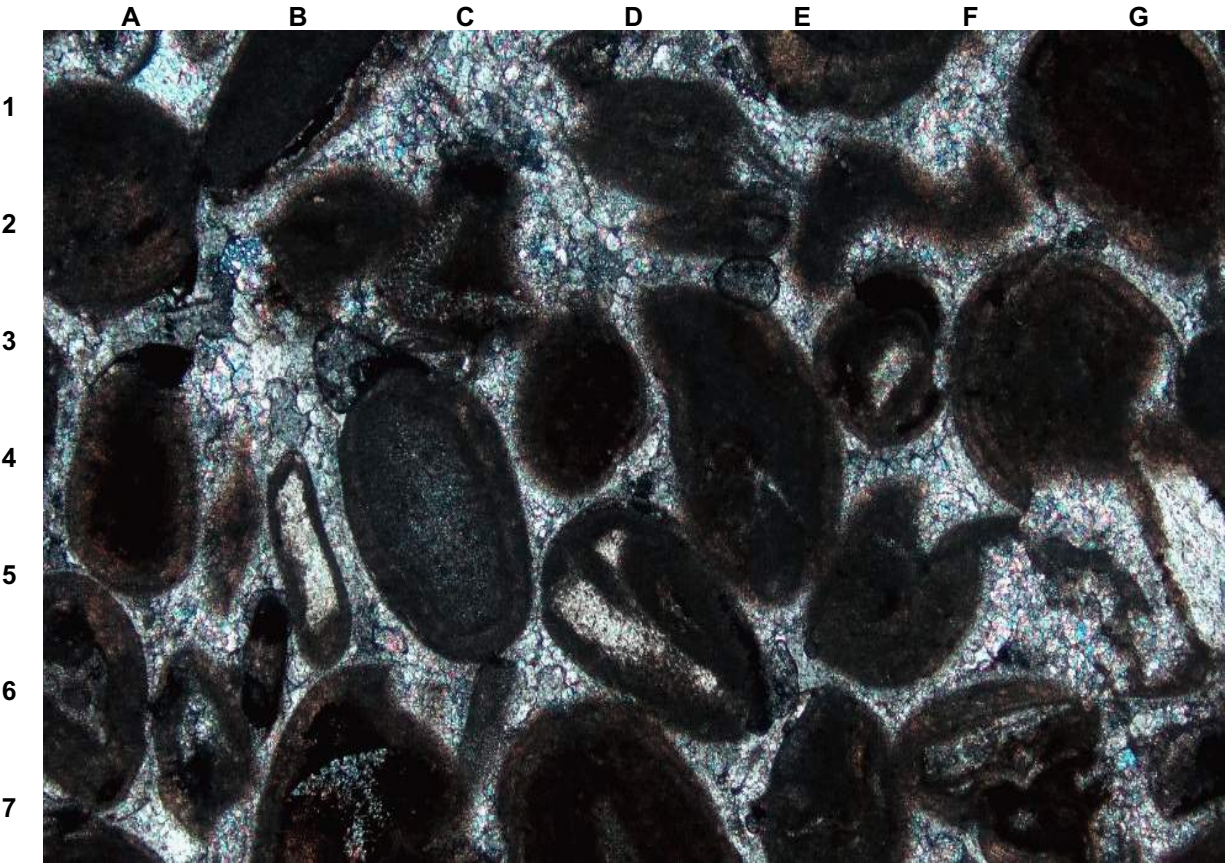
PETROGRAPHICAL EXAMINATION OF STONE - PHOTOMICROGRAPH



Photomicrograph Details			
Sandberg Sample Ref:	G54932	Client Ref/Site Mark:	-
Microscope Light:	Plane polarised	Objective Magnification:	x5
Photomicrograph Description			
General view of the stone structure under plane polarised light. The ooids are generally spherical to subround exhibiting concentric texture (e.g. B-C/4-6, E-F/3-4, A/1-2 etc.) and elongate relict bioclasts can be seen at C-D/5-6 & B/5-5 the central parts of which exhibit the original aragonitic texture. Sparry calcite cement matrix is bright intergranular material.			

76942/G
Table/Sheet
1/5
Plate
2

PETROGRAPHICAL EXAMINATION OF STONE - PHOTOMICROGRAPH



Photomicrograph Details			
Sandberg Sample Ref:	G54932	Client Ref/Site Mark:	-
Microscope Light:	Cross polarised	Objective Magnification:	x5
Photomicrograph Description			
General view of the stone structure under cross polarised light. The ooids are generally spherical to subround exhibiting concentric texture (e.g. B-C/4-6, E-F/3-4, A/1-2 etc.) and elongate relict bioclasts can be seen at C-D/5-6 & B/5-5 the central parts of which exhibit the original aragonitic texture. Sparry calcite cement matrix is bright intergranular material.			

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Where test results are given, the results and our conclusions relate only to the samples tested and apply to the sample(s) as received, except where sampling has been conducted by Sandberg LLP.

Materials, samples and test specimens are retained for a period of 2 months from the issue of the final report.

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End of report.

