

# 1-10 Cambridge Gate

## Condition Report

June 2021



### APPENDIX B

#### Cleaning Test Results

Report prepared for:  
**Crown Estate Paving  
Commission**

**CLIVEDEN CONSERVATION WORKSHOP LTD**  
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## CONDITION REPORT

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Job No.	Issue No.	Description	Issue Date
20240	1	Condition survey report	25.08.21

## PROJECT SUMMARY

- REGION:** County: Greater London  
Authority District: Camden (London Borough)
- PROPERTY:** 1-10 Cambridge Gate, Regents Park, London
- LOCATION:** Two sets of gate piers at either end of the sweep in front of the property.  
National Grid Reference: TQ 28742 82468
- OBJECTS:** Four terracotta statues of the Three Graces standing on plinths bearing the words, CAMBRIDGE GATES.
- MATERIALS:** Statues: Terracotta, Coade stone type, unglazed stoneware, paint remains  
Plinths: Limestone
- SURVEYED BY:** Amy Anderson, ACR and Jenna Burrell
- WRITTEN BY:** Amy Anderson

## APPENDIX B CLEANING TEST RESULTS

### Plinths

Monument  
1, west  
elevation

5% prediluted  
Synperonic A7 in  
deionised water.  
Used in  
conjunction with  
denture brushes.

Deionised water  
and denture  
brushes rinse

Biological  
and  
pollution

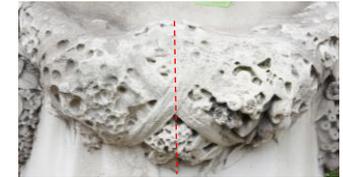
N/A

10°C,  
cloudy  
with heavy  
rain  
showers

The Synperonic was  
more effective than  
deionised water on  
its own, but soiling  
still remains. The  
brushing action  
increased the erosion  
of the carved details  
in some softer areas.

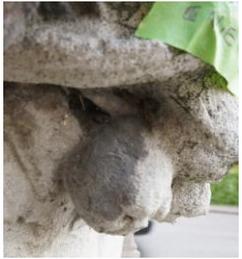
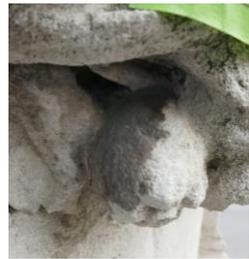


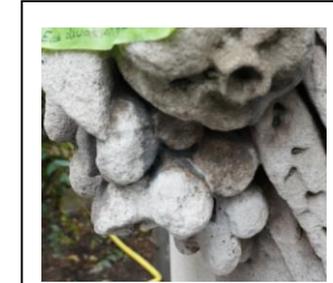
Before cleaning.



After cleaning, left side cleaned  
with deionised water, right side  
with 5% Synperonic in deionised  
water.

<p><b>Monument 3, west elevation</b></p>	<p>5% prediluted Synperonic A7 in deionised water. Used in conjunction with denture brushes.</p>	<p>Biological and pollution</p>	<p>N/A</p>	<p>10°C, cloudy with heavy rain showers</p>	<p>Effective at removing light biological and pollution staining.</p>	<div style="display: flex; flex-wrap: wrap;"> <div style="width: 50%; text-align: center;">  <p>Before cleaning.</p> </div> <div style="width: 50%; text-align: center;">  <p>After cleaning.</p> </div> <div style="width: 50%; text-align: center;">  <p>Before cleaning.</p> </div> <div style="width: 50%; text-align: center;">  <p>After cleaning.</p> </div> </div>
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<p><b>Monument 3, North east elevation</b></p>	<p>Complex Paste 1. Manufacture (restorative techniques). Paste removed with deionised water and denture brushes.</p>	<p>Sulphation</p>	<p>60 minutes. Checked every 10 minutes.</p>	<p>10°C, cloudy with heavy rain showers</p>	<p>Not effective at softening the sulphation.</p>	<div style="display: flex; justify-content: space-around;"> <div data-bbox="1368 252 1641 596">  <p>Before cleaning.</p> </div> <div data-bbox="1659 252 1944 596">  <p>After cleaning.</p> </div> </div>
<p><b>Monument 3, east elevation</b></p>	<p>Complex Paste 2. Manufacture (restorative techniques). Paste removed with deionised water and denture brushes.</p>	<p>Sulphation</p>	<p>60 minutes. Checked every 10 minutes.</p>	<p>10°C, cloudy with heavy rain showers</p>	<p>Softened the stain slightly but not very effectively.</p>	<div style="display: flex; justify-content: space-around;"> <div data-bbox="1368 719 1570 1064">  <p>Before cleaning.</p> </div> <div data-bbox="1588 719 1771 1064">  <p>After cleaning.</p> </div> </div>

<p><b>Monument 3, east elevation</b></p>	<p>Complex Paste 3. Manufacture (restorative techniques). Paste removed with deionised water and denture brushes.</p>	<p>Sulphation and pollution</p>	<p>60 minutes. Checked every 10 minutes.</p>	<p>10°C, cloudy with heavy rain showers</p>	<p>Reduced the staining but a pinkish brown staining became more evident.</p>	 <p>Before cleaning.</p>	 <p>After cleaning.</p>
<p><b>Monument 3, north elevation</b></p>	<p>Monumentique paste Manufacturer: Restorative techniques</p>	<p>Sulphation</p>	<p>6-16 hours</p>	<p>10°C, cloudy with heavy rain showers</p>	<p>1<sup>st</sup> application, 6 hours: Successfully removed most of the staining with some small residues remaining. 2<sup>nd</sup> application, 16 hours: Successfully removed most of the staining with some small residues remaining and some faint pinkish residue</p>	 <p>Before cleaning.</p>	 <p>After cleaning. Left side left to dwell for 16 hours, right side 6hours. Some slightly pink residue at the edges.</p>

<p><b>Monument</b> 3, east elevation</p>	<p>10% ammonium carbonate poultice with Sepiolite and Arbocel®</p>	<p>Thick sulphation</p>	<p>16 hours and</p>	<p>10°C, cloudy with heavy rain showers</p>	<p>The staining was only slightly reduced. The sulphation did soften slightly but it was difficult to remove without eroding the limestone surface.</p>	 <p>Before cleaning.</p>	 <p>After 1<sup>st</sup> application.</p>
						 <p>After 2<sup>nd</sup> application.</p>	

<p><b>Monument</b> 3, south west elevation</p>	<p>10% ammonium carbonate poultice with Sepiolite and Arbocel®</p>	<p>Sulphation</p>	<p>16 hours</p>	<p>10°C, cloudy with heavy rain showers</p>	<p>The staining was reduced, though not removed completely after two applications.</p>	 <p>Before cleaning, east elevation.</p>	 <p>After 1<sup>st</sup> application.</p>
						 <p>After 2<sup>nd</sup> application.</p>	

## Discussion and Conclusions

### *Cleaning off biological growth*

5% prediluted Synperonic A7 in deionised water used in conjunction with nylon denture brushes was more effective than brushing with water alone. Although brushes are likely to be a relatively gentle way of surface cleaning, it did erode the stone and some of the cleaning effect may simply be to have removed the surface. No other surfactants were tested and it could be

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worth trying Vulpex, a liquid soap as it is often used to remove sooty deposits from many types of objects after fire damage. It may have a small contributory effect on the removal of the pollution deposits

Complex pastes 1 and 2 were not effective on removal of the sulphation crusts and can be discounted for use on the limestone sections of the monument.

### *Cleaning off pollution deposits*

10% Ammonium Carbonate in a Sepiolite and Arbocel poultice was tested in two areas. It did not remove the sulphation on one area, but softened it and removing it was found to erode the stone. On the second test with 2 applications, it removed sulphation but not entirely

Monumentique paste also removed sulphation but not entirely after a 16-hour application with no removal and reapplication. Some deposit remained and a faint pinkish stain emerged at the edges. It was easier to remove than the Ammonium carbonate poultice without damaging the stone.

The thickness and coverage of the areas tested and the accessibility of the cleaning site to easy use of brushes varied. The ammonium carbonate tests were under deep undercuts with thicker sulphation crusts. Monumentique appears to be the most effective and safest to use on the limestone with the same dwell time as it seems easier to rinse away. Ammonium carbonate may be equally effective on a similar level of pollution as Monumentique. Monumentique is expensive to use on a large scale and it may be that further trials can establish which is the most effective and time efficient in different circumstances. Both are good tools to have in the box for this project and may have their own merits. It may be more time efficient and less damaging to the monuments to use dry steam to help remove the poultices with less abrasion.

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## **Discussion and Conclusions**

### *Cleaning off biological growth*

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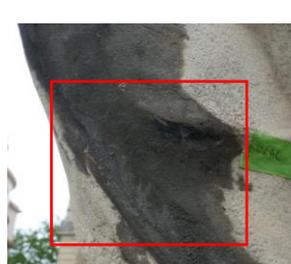
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Location of trial	Cleaning material	Stain type	Dwell time	Weather	Application Method and Result	
<b>Monument 2</b> <b>Figure 2, just below waist on drapery (r.p. side)</b>	Deionised water and denture brushes	Biological	N/A	11°C, cloudy	Effective at removing light biological staining.	 <p>Before cleaning.</p>  <p>After cleaning.</p>
<b>Monument 2</b> <b>Figure 2, just below waist on drapery (r.p. side)</b>	Deionised water and melamine sponges	Biological	N/A	11°C, cloudy	Effective at removing light biological staining.	 <p>Before cleaning.</p>  <p>After cleaning.</p>

<p><b>Monument 2</b> <b>Centre of the three figures</b></p>	<p>Deionised water and denture brushes</p>	<p>Biological and pollution</p>	<p>N/A</p>	<p>11°C, cloudy</p>	<p>Effective at removing the staining.</p>	 <p>Before cleaning.</p>	 <p>After cleaning.</p>
<p><b>Monument 2</b> <b>Figure 2, just below waist on drapery (l.p. side)</b></p>	<p>Deionised water and melamine sponges</p>	<p>Pollution</p>	<p>N/A</p>	<p>11°C, cloudy</p>	<p>Not effective at removing the staining. Gave a patchy appearance.</p>	 <p>Before cleaning.</p>	 <p>After cleaning.</p>

<p><b>Monument 3</b> <b>Figure 3, l.p. leg</b></p>	<p>Monumentique paste Manufacturer: Restorative techniques</p>	<p>Sulphation on a cement repair</p>	<p>6-16 hours</p>	<p>10°C, cloudy with heavy rain showers</p>	<p>1<sup>st</sup> application, 6 hours: Softened the staining following some mechanical agitation with small tools and denture brushes.  2<sup>nd</sup> application, 16 hours: Equally effective following some mechanical agitation with small tools and denture brushes. As this was tested on a cementitious fill, this result is not applicable to the terracotta as effects of dwell time on surface of terracotta was not examined.</p>	 <p>Before cleaning.</p>	 <p>After cleaning.</p>
<p><b>Monument 3</b> <b>Figure 3, l.p. leg</b></p>	<p>10% ammonium carbonate poultice with Sepiolite and Arbocel®</p>	<p>Sulphation on a cement repair</p>	<p>6-16 hours</p>	<p>10°C, cloudy with heavy rain showers</p>	<p>1<sup>st</sup> application, 6 hours: Softened the staining following some mechanical agitation with small tools and denture brushes.  2<sup>nd</sup> application, 16 hours: Equally effective following some mechanical agitation with small tools and denture brushes. As this was tested on a cementitious fill, this result is not applicable to the terracotta as effects of dwell</p>	 <p>Before cleaning.</p>	 <p>After cleaning.</p>

					time on surface of terracotta was not examined.	
<b>Monument 1</b>	10% ammonium carbonate poultice with Sepiolite and Arbocel®	Pollution deposits, medium soiling Pollution deposits, medium and dark soiling on terracotta	16 hours	10°C, cloudy with heavy rain showers	1 <sup>st</sup> application, 16 hours: poultice removed then rinsed with warm water, denture brush and melamine sponge. Moderate staining lessened but left a ring of pink stain around the poultice area 2 <sup>nd</sup> application, 4 hours applied to surrounding area: no change to pink stain	

<b>Monument 1</b>	Monumentique paste Manufacturer: Restorative techniques	Pollution deposits, medium and dark soiling Pollution deposits, medium and dark soiling	6-16 hours	10°C, cloudy with heavy rain showers	1 <sup>st</sup> application, 16 hours: Softened the staining following some mechanical agitation with small tools and denture brushes.  Partially successful. Lighter staining removed but darker stains persisted.  Second application or use in conjunction with other methods.	
<b>Monument 1</b>	Complex P1-3 gels Manufacturer: Restorative techniques				1 <sup>st</sup> application 20 mins including mechanical agitation with denture brushes. Then rinsed with deionised water, denture brush and melamine sponge:  P1 not much cleaner  P2 and P3 similar in outcome, perhaps modestly cleaner with P3 but density of pollution deposition may have affected the result.  Appeared slightly more successful than Monumentique and useful with faster dwell time for smaller areas.	

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## Discussion and Conclusions

### *Organic soiling*

Deionised water used with nylon denture brushes and water used with Melamine sponges were both successful at cleaning organic soiling from the terracotta surface.

### *Pollution soiling*

All three chemical methods tested had an effect on cleaning the pollution. Complex Paste 2 and 3 (stronger). Paste 2 seemed effective as Paste 3, although the slight variations of soiling may be the answer for this. Both removed moderate pollution staining with some remaining deposits with a dwell time of 20 minutes followed by rinsing with water.

Monumentique also removed moderate pollution staining with some remaining deposits. The dwell time for this was 16 hours. It did not remove the darker staining.

The ammonium Carbonate poultice produced a similar result and with a dwell time of 16 hours but it produced a very distinct pink stain around the edge. A second application to remove the pink stain was not successful.

It is suggested that Ammonium Carbonate poultice is re-trialled with shorter dwell times, but it may not be suitable to use in this circumstance. Its use on the limestone produced the same pink staining and the opacity of the poultice makes it hard to monitor during the process, it is suggested that in these tests, Complex pastes 2 and 3 were the least damaging at cleaning.

Tests were limited due to time and all three have merits. It is suggested that further tests and trials of larger areas are carried out to establish the extent to which these stains can be cleaned, and if it is desirable to spend the time needed to do this. These cleaning options may be best used in combination or different dwell times. Cleaning large areas with Complex paste may be

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difficult due to the short dwell time of 20 minutes but may be useful for denser stains which need repeated applications. It may also be effective and time saving to use dry steam to clear the chemicals.

