

BUCKLEY BARRACKS SLA REFURBISHMENT

PROPOSED STONEWORK REPAIRS TO HAVEN, HANWOOD, GRANBY & AVRO BLOCKS

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FOR AND ON BEHALF OF:
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1.0 PARAPETS

1.1 Description

Parapets are of cavity wall construction comprising common brickwork inner leaf and outer leaf constructed in coursed ashlar Bath Stone.
Parapet coping stones appear to be reconstituted stone set flush with both inner and outer walls (i.e. lacking an overhang). Lightening protection conductor tapes are fitted across Avro & Hanwood Block copings.

Parapet gutters discharge to external cast iron hoppers and downpipes situated on the front and rear elevations.

1.2 Condition

Spalling of parapet stonework is affecting all four buildings the suspected causation of which is saturation due to blocked parapet gutters rendering the stone vulnerable to frost damage. The lack of a coping overhang is contributing to dark algae staining present on the northerly facing parapets in particular.

It has not been possible to determine the nature and condition of the parapet gutters which are buried beneath a thick layer of moss and decaying leaves from adjacent trees.

Common to all the parapets is horizontal cracking of ashlar bed joints affecting third and fourth courses which is characteristic of displacement by expanding rust around corroding ferrous wall ties.

Evident across all elevations are historic parapet repairs in the form of replacement individual stone blocks and excessively wide repointed bed joints. These would indicate the parapet defects present today are progressive and past interventions have failed to remedy the underlying causes.

1.3 Repair proposals

i. A detailed photographic elevational record of the parapet walls will be produced by the appointed building contractor from which the following reconstruction can be accurately replicated.

ii. To all elevations carefully remove coping stones and take down parapets to one course below level of rainwater outlets (depending upon size of ashlar blocks this is typically 3 or 4 stone courses.

iii. Carefully clean and set aside salvageable ashlar blocks for reuse, remove and dispose of all ferrous cavity ties and cramps. Record dimensions of damaged or friable stones prior to disposal and produce a schedule of replacement ashlar blocks to be obtained from a source to be agreed with the Conservation Officer.

iv. Clear parapet gutters and allow for inspection. On the presumption defects are present in the gutter lining carefully strip back eaves tiles and apply a proprietary

liquid applied roof membrane in strict accordance with the selected manufacturers recommendations.

v. From photographic records parapets shall be reconstructed to closely replicate the original appearance. Inner leaf will be constructed in new engineering brickwork, external leaf constructed in salvaged stone supplemented with new matching stone obtained from a prior agreed source. Cavity ties and cramps are to be stainless steel, cavity trays and horizontal DPC will be proprietary modern plastic products (a detail for draining the cavity trays to be agreed). All flashings shall be Code 5 lead coated with patination oil. The mortar mix shall be determined by sample analysis of the original mortar, it is presumed this will be a natural hydraulic lime based mortar blended to replicate original appearance.

1.4 Photographs

	Parapet Photographs	**Location**
1.		Avro Block front elevation: Spalling of stone facing.
2.		Avro Block front elevation: Spalling of stone facing.

	Parapet Photographs	Location
3.		Avro Block front elevation: Recent spalling of stone facing.
4.		Avro Block rear elevation: Widening of mortar bed joints displaced by expanding rust from corroding ferrous ties.
5.		Avro Block rear elevation: Closer view of above photograph showing ferrous frame tie rust to which has lifted stonework above.

	Parapet Photographs	Location
6.		Avro Block rear elevation: Blocked valley gutter,
7.		Granby Block front elevation: Stepped cracking to east corner parapet possibly thermal related.
8.		Granby Block front elevation: Spalling of stone facing and disintegration of stone beneath parapet coping.

	Parapet Photographs	Location
9.		Granby Block front elevation: Spalling stone facing to left of a replacement stone.
10.		Granby Block front elevation: Spalling stone facing and apparent 'new' stone courses above evident by thick mortar joints.
11.		Granby Block rear elevation: Cavity tray and masonry above lifted by expanding rust to corroding cavity tie, evident by wide repointed bed joint to right of view.

	Parapet Photographs	Location
12.		Hanwood Block rear elevation: Spalling stone facings.
13.		Hanwood Block rear elevation: As above photograph, closer view of spalling stonework.
14.		Hanwood Block rear elevation: Spalling stone facing and cracking of adjacent stones indicating imminent further spalling.

	Parapet Photographs	Location
15.		Hanwood Block front elevation: Non-matching replacement stone does not appear to be Cotswold Stone.
16.		Haven Block front elevation: Spalling of stone facings.
17.		Haven Block front elevation: Spalling of stone beneath parapet coping. Also fine cracking along bed joint which is characteristic of displacement by rust formation around corroding ferrous cavity ties.

	Parapet Photographs	Location
18.		Haven Block front elevation: Horizontal cracking along bed joint between first floor window lintels is consistent with expanding rust to corroding cavity ties.
19.		Haven Block front elevation: As above photograph closer view of horizontal cracking along bed joint between first floor window lintels.
20.		Haven Block rear elevation: Blocked parapet gutter.

2.0 CORRODING WINDOW FRAME TIES

2.1 Description

To achieve thin mortar joints during the original construction recesses are formed on the underside of stone blocks forming window openings to accommodate 210mm long x 3mm thick ferrous window frame ties and bedding mortar. It is believed there are three or possible four frame ties each side of window openings.

Forces exerted by expanding rust around the corroding frame ties has induced cracking and spalling of the ashlar facings which is affecting a significant number of window openings. This is a progressive defect consequently it is advisable to remove all frame ties.

Alternatively if the frame ties cannot be extracted it will be necessary to create voids at least six times greater than the volume of the original material to accommodate future rust expansion. This is the least desirable intervention as the voids created may provide a path for future water ingress.

2.2 Repair Proposal

i. Minimising further damage or disfigurement to the ashlar facings whilst removing the frame ties requires removal of window frames to facilitate 'side-on' drilling out of the bedding mortar and removal of the ties. Once removed the resulting voids will be filled with a hydraulic lime based mortar.

ii. Where spalling of the ashlar facing has occurred these will be repaired with a proprietary natural hydraulic lime based blended stone repair mortar colour matched to existing.

2.3 Photographs

	Damage attributable to corroding window frame ties	Location
1.		Avro Block front elevation: Stone facing displaced by expanding rust around a corroding frame tie.

	Damage attributable to corroding window frame ties	Location
2.		Avro Block front elevation: Closer view of above photograph showing pocket formed in underside of ashlar block.
3.		Granby Block front elevation: Stone facings displaced by expanding rust around corroding frame ties and a redundant eye bolt.
4.		Hanwood Block front elevation: Displacement of stonework near head of window presumably caused by corroding frame ties. The pattern and degree of damage however varies from that seen around other windows?

	Damage attributable to corroding window frame ties	Location
5.		Hanwood Block front elevation: Closer view of above photograph.
6.		Hanwood Block front elevation: Bedding mortar being displaced by corroding frame tie.
7.		Haven Block front elevation: Typical of damaged stone facings caused by corroding ferrous frame ties.

3.0 MISCELLANEOUS STONEWORK REPAIRS

3.1 Localised areas of eroded ashlar facings and washed out mortar joints to Avro, Granby, Hanwood and Haven Block rear ablutions most likely caused by overflowing gutters.

Repair proposals

i. Cast iron gutters will be cleared and where found badly corroded renewed to match existing.

ii. Walls will be gently brushed down to remove friable material. Where required mortar joints shall be raked out and repointed in natural hydraulic lime mortar blended to match existing, no further interventions are proposed in respect of surface eroded stonework.
Two deeply eroded and recessed ashlar blocks present at rear of Avro and Haven Block shall be carefully removed and replaced with matching stone bedded in matching mortar as previously described.

3.2 Reinstatement of holes through ashlar facings following removal of redundant external waste water pipework.

Repair proposals

i. Holes greater than 75mm diameter will be made square and filled with a piece of matching stone bedded in natural hydraulic lime mortar as previously described.

ii. Holes less than 75mm diameter will be filled with a proprietary natural hydraulic lime based blended stone repair mortar colour matched to existing.

3.3 Unsightly historic repairs in hard Portland cement mortar.

Repair proposals

i. Unless disturbed during the course of new works it is not proposed to replace inappropriate historic repairs. In circumstances where it is necessary to remove or disturb historic repairs these will be reinstated as described in section 3.2 above.

	Avro Block miscellaneous stonework repairs	Location
1.	 	**Rear ablutions**: Photograph showing a deeply eroded single ashlar stone block. <u>Proposals:</u> The single ashlar block will be carefully removed and replaced with a matching stone.

	Granby Block miscellaneous stonework repairs	Location
1.	 	**Rear ablutions:** Photographs showing ashlar mortar joints washed out by overflowing gutters. <u>Proposals:</u> Repointing of deeply eroded mortar joints with lime based mortar.

	Hanwood Block miscellaneous stonework repairs	Location
1.		**Rear ablutions:** Photographs showing eroded ashlar facings to corner adjacent boiler room. <u>Proposals</u> No remediation of stonework is proposed at the present time.

	Haven Block miscellaneous stonework repairs	Location
1.	 	**Rear ablutions:** Photographs showing deeply eroded ashlar block and surface exfoliation of surrounding stone facings attributable to a combination of inappropriate repointing with cement mortar and saturation from blocked and overflowing gutter above. <u>Proposals:</u> The deeply eroded single ashlar stone block will be removed and replaced. No further remediation of stonework is proposed at the present time.