



## SURVEY

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Sunlight House,  
Quay Street,  
Manchester  
M3 3HP

Façade Condition Survey  
February 2024

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REF 24008-PAYE-RPT-001 **P03**



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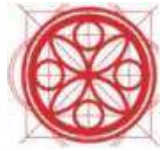
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# Executive summary

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The Portland stone, rear, and glazed brick facades were all in a good condition. There is a failed repair to the grand cornice on Little Quay Street. It is covered with lead flashing so is protected but is a risk of falling. Recommend removing the loose section of masonry as soon as possible. To expediate this, it could be undertaken via abseil.

There is evidence of extensive repairs to all vertical pilasters and to the 2<sup>nd</sup> floor cornice, that were likely a result of historic steel frame corrosion. When steel corrodes it can expand x8-13 times its original volume. If there are no voids between the steel and masonry, any expansion to the steel frame will induce a pressure on the masonry resulting in fractures. It is likely that the fractures to the façade (and extent of steel frame corrosion) was widespread as all pilasters appear to have been replaced with new “plant on” stone built off corbel brackets at every floor level and all the masonry between the 2<sup>nd</sup> floor windows and cornice has been replaced (with the exemption of the arched keystones which appear original).

Reviewing Google Maps historic images, these works were undertaken before 2008, with online research suggesting it was undertaken in 1997. It is strongly recommended to consult with a structural engineer and obtain the as-built drawings and photographs for the extensive repairs to confirm that the works were undertaken to a high standard and align with modern building codes. As a minimum, the as-built information should confirm; specification for steel frame treatment, thickness of “new” stone, fixing details including corbel brackets and restraints (including materiality), cavity trays and barriers. A structural engineer should be consulted regarding the L08 flagpole modillions, with regards to the fixing detail back to the façade or steel frame. They appear to be made from painted mild steel. There is a risk that corrosion could be occurring to part of the fixing embedded in the wall.

Fractures (category 0 to 2) and displacement to the ground floor (Quay Street), NE turret (Little Quay Street), and a ninth-floor window lintel (Atkinson Street) stone masonry were observed which may be being caused by steel frame corrosion. Hairline fractures (category 0-1) were also observed to the decorative frieze band below the cornice on Quay Street and Atkinson Street. The cause for the fractures may also be steel frame corrosion as these areas were not part of the historic repairs. Recommend consultation with a structural engineer, further investigations (e.g., to the cornice decorative frieze), and understanding the client requirements. Repairs could include cutting out the masonry to inspect and treat the steel frame or thumb pointing over the fractures to maintain the buildings weathertightness and continue to monitor for further defects as part of the regular Maintenance.

Medium to heavy levels of biological staining was observed to the coping stones, carved turret motifs, and upper levels. Lead flashing has been installed to the gable mansard, grand cornice and pilaster capitals which is providing protection to the masonry below. Cleaning the façade will improve the appearance and flush out any pointing and unseen defects. When undertaking cleaning we recommend that cleaning samples are first undertaken to confirm the most appropriate cleaning methodology.

Undertaking general maintenance repairs will prolong the longevity of the façade. To all rendered areas of the façade (West elevation), tap testing should be undertaken to confirm that the render is suitably bonded. Any loose or de-bonded sections of render should be removed. And a new compatible render reinstated on a stainless steel EML backing.

General maintenance repairs include; cleaning, repointing, replacing silicone mastic, indent repairs, pin repairs, render repairs, windowsill replacements, brick replacements, repairs to the ground floor stall risers. A structural engineer should be consulted regarding all of the fractures observed and should advise on repair specifications.



# Executive summary

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To maintain the buildings weathertightness all areas of loose and friable pointing should be raked out and repointed with a suitable mortar. At ground floor it is suspected that a cementitious pointing has been used to re-point the facade. Cementitious pointing is impervious to water and will cause deterioration to the facing Portland stone as any trapped moisture migrates into the masonry as it cannot pass through the impermeable joints. The stone around the joints become saturated and break down over time through freeze-thaw. Although deterioration was only observed to localised areas at ground floor, this issue will only worsen over time. Consider raking out all joints to the ground and first floor and repoint with a lime-base mortar.

Water-pooling was observed to the grand cornice on Quay Street. The sky surface gulley was clear on Little Quay Street; however, vegetation growth and debris was observed to the outlet. Significant vegetation growth and water pooling was observed to the grand cornice on Atkinson Street. The cornice directs the rainwater to a back gulley channel which then likely drains through a rainwater downpipe built with the build-up of the wall to the external downpipe hopper. The outlet on Quay Street is likely blocked with debris, preventing the rainwater from draining. Recommend clearing out the debris and rodding the downpipes. Consideration should be given to how the downpipes are to be maintained in the future. Installing a lead flashing with a positive gradient away from the façade will minimize the need for periodic maintenance.

Consideration should be given to undertaking other maintenance repairs (i.e., re-decorating, timber repairs, metal balustrade redecoration, roof slate / lead/ gutter repairs) at the same time. Further input may be required by a specialist to advise of the existing condition and repair strategy. The development of an effective Planned Preventative Maintenance strategy including a 5-10-year cycle of façade surveys should be considered for all facades to maintain the fabric of the buildings, reduce the cost of repair and minimise the risk of structural failure.



# Introduction

PAYE Stonework were instructed to undertake a façade condition survey to Sunlight House, Manchester. The survey was carried out using a combination of a binocular survey and his- res drone photography. The binocular survey was carried out on the 19<sup>th</sup> February 2024. The weather was overcast (approx. 8-11 degrees). The drone survey was completed the week commencing 4<sup>th</sup> March.

All observations are based on the condition of the façade at the time of the survey.

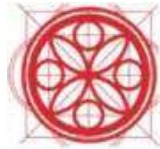
This report identifies façade deterioration / defects and comments on potential causes. The report does not provide comment on the structural capacity or condition of any embedded steel. The façade condition survey focuses on the following areas:

- Loss of surface pointing
- Deterioration of previous repairs
- Erosion and deterioration of masonry
- Fracturing of masonry units
- Displacement of masonry
- Areas of potential masonry spalling
- Rainwater management

The areas of survey include all four elevations (Quay Street, Little Quay Street, Atkinson Street, and the west elevation), and the internal lightwells. Within the report photographs have been given a reference ELEVATION-PHOTO#.

The repairs have been given a Risk Rating of Red, Amber, Green with the definitions for each category described in the table.

| PRIORITY CODES FOR REPAIRS (1-4) | CONDITION (A-D)                                                                                                                                                                                                                                                   |
|----------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| GREEN                            | Aesthetic defect which affects the visible appearance of the building. Remedial works at the discretion of the design team.                                                                                                                                       |
| AMBER                            | Defect has an impact on the buildings ability to shed rainwater and maintain weathertightness . Visible or structural damage which is likely to deteriorate in the next 3-5 years if no action is taken. Remedial works should be programmed as soon as possible. |
| RED                              | Defect which has a direct impact to health and safety of building occupants and the public. Defect highly unstable and likely to deteriorate within 1-3 years. Remedial Works are necessary and should be undertaken immediately.                                 |



# Location

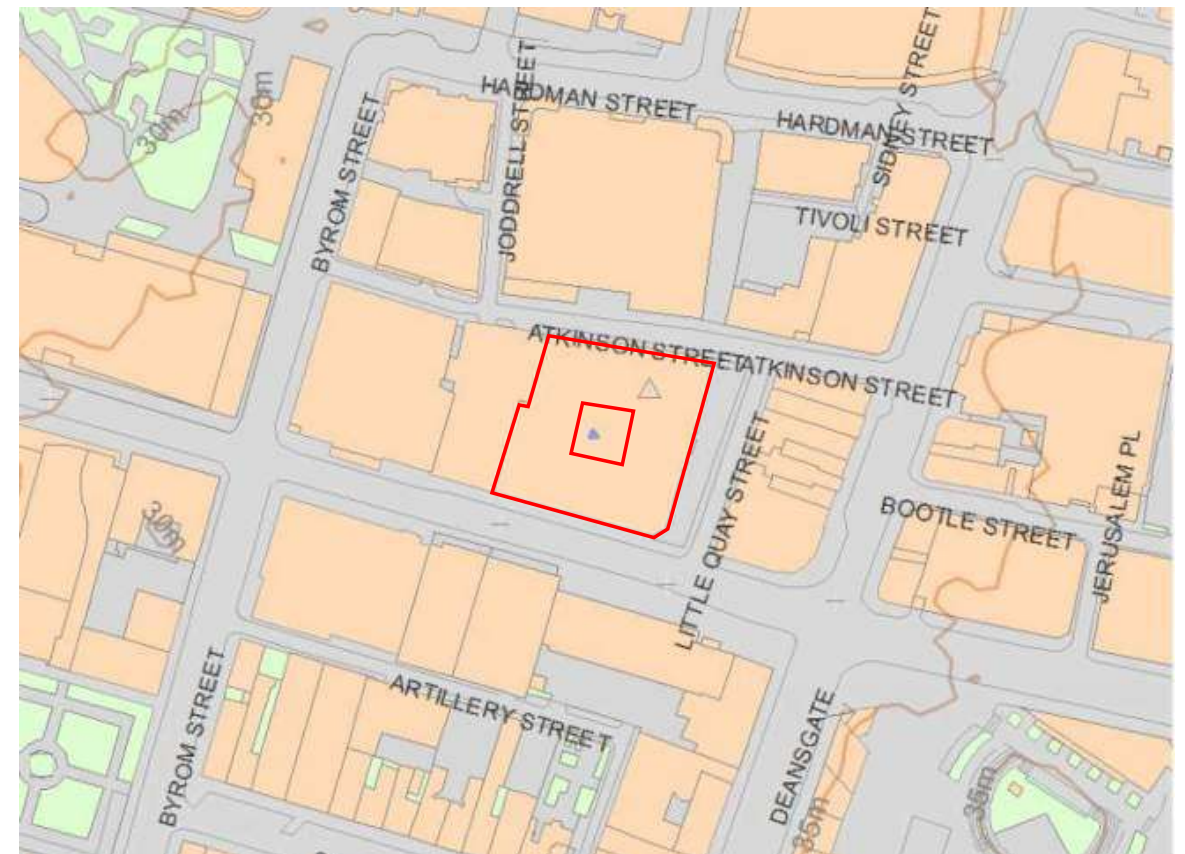
Sunlight House is a Grade II listed building in the art deco style on Quay Street in Manchester, England. It was completed in 1932 for Joseph Sunlight, who was also the architect. It was the tallest building in Manchester until the 1960s.

The building is a 14-storey steel structure, clad in Portland stone. The building is almost square in plan, with three street frontages, and a large central light-well. Each of the three street façades are seven bays, with the two street corners expressed as three-sided towers, which each rise to a four-level octagonal turret, topped by a domed lantern and finial. Between the turrets, the top four floors are expressed as a mansard roof with multiple setback square dormer windows.

The rear elevation is a modern cement rendered façade with regular movement joints (likely with a stainless steel EML and a brick or blockwork backing structure).

The lightwell is glazed brickwork with painted stone windowsills.

The building was renovated in 1997 when it was found that issues with possible steel frame corrosion which was affecting the façade. During the renovations, the ground floor entrance on Little Quay Street was modified.





# Historical context

## Location

|                                                                                    |                                     |
|------------------------------------------------------------------------------------|-------------------------------------|
| Statutory Address:                                                                 | SUNLIGHT HOUSE, QUAY STREET         |
| The Building or site itself may lie within the boundary of more than one authority |                                     |
| District:                                                                          | Manchester (Metropolitan Authority) |
| Parish:                                                                            | Non Civil Parish                    |
| National Grid Reference:                                                           | SJ 83473 98031                      |

## Details

SJ8398 QUAY STREET 698-1/16/347 (North side) 20/06/88 Sunlight House

GV II

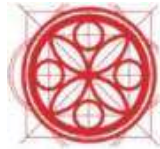
Office block. 1932, by Joseph Sunlight. Steel frame with cladding of Portland stone, slated 3-tier mansard roof with glazed centre. Large square plan with central light-well. International Modern style with classical elements. Ten storeys plus 4 attic storeys successively set back, 8 bays plus wide canted corner to right rising to octagonal turret with domed lantern and apex finial; ground and 1st floors treated as plinth, 6-storey 5-bay pilastrade to centre, with moulded frieze over 7th floor and enriched cornice over 8th floor, plain parapet over 10th floor. Very regular fenestration with casements of 3 lights to the 5-bay centre and 2 lights to the end bays, metal panels between floors; 3-light attic windows, those of the first 3 tiers set in individual projected rectangular dormers. Shop windows and a round-headed archway at ground floor. Canted corner treated as tower, given strong vertical emphasis by narrow 3-light mullioned windows in each face tiered continuously from 2nd to 10th floors, with carved decoration over 10th floor, a 1-storey drum over this, set-back 2-storey continuation, and set-back lantern; square-headed doorways to entrance porch at ground floor. Return to right and rear elevation similar, but with slated attic and extruded dormers. Forms group with Royal London House to right (Nos 188-202 Deansgate, q.v.)

Listing NGR: SJ8347398031

## Overview

|                    |                             |
|--------------------|-----------------------------|
| Heritage Category: | Listed Building             |
| Grade:             | II                          |
| List Entry Number: | 1270915                     |
| Date first listed: | 19-Jun-1988                 |
| List Entry Name:   | SUNLIGHT HOUSE              |
| Statutory Address: | SUNLIGHT HOUSE, QUAY STREET |





# Observations: General Observations

Medium to heavy levels of soiling was observed to the coping stones, projecting bands, and upper floors of masonry. Brown staining was observed to the stone at the parapet level on Little Quay Street ((D)LQ-21) which suggest there may be a pooling water issue. Coping stones appear to be covered in a cementitious slurry coat – likely installed previously as it was thought to improve weatherproofing ability.

Cleaning the façade will remove the biological staining and flush out any loose pointing and unforeseen defects. Consideration should be given to installed a lead flashing to the coping stones and high-level string courses to shed the water away from the façade and prevent further staining.

PHOTOS: Q-01, (D)Q-25, (D)LQ-21

RISK: GREEN

There is evidence of historic mortar repairs through the facades. Once access scaffold is available, all historic repairs should be inspected to confirm their integrity.

RISK: GREEN

Cementitious render (both repairs and original detailing) has been installed to the setback areas at high level (to the lintel band just below the balustrade and at the quoin with the rear elevation). Recommend undertaking tap-testing to all areas of render. All loose or de-bonded render should be removed and a new compatible render installed.

PHOTOS: (D)Q-21, -22, -23

RISK: AMBER

Where stone windowsills are detailed, there is no projection or drip detail to shed the water away from the facade. Some windowsills have had a cementitious slurry coat applied to the sky surface which has run down the face of the façade. This likely installed as it was thought to improve weatherproofing ability.

PHOTOS: Q-03, (D)Q-20, (D)A-22

RISK: AMBER

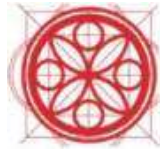
It appears that the curtain walling between the pilasters are formed from timber windows and spandrel panel. Decay was observed to several of the timber windowsills. Hairline cracks were observed to the paint of several spandrel panels. It is recommended to undertake a full condition survey of the timber windows and spandrels. Undertaking repairs – e.g., timber splice repairs - and re-decoration will improve the longevity of the windows.

PHOTOS: Q-04, -05, (D)LQ-22

RISK: AMBER



*Common typical defect photographs; staining, rainwater goods, launching staining to stone windowsills, timber decay and flaking paint to timber sills.*



# Observations: General Observations

Redundant fixings, are observed to all elevations. Removing the fixings and infilling with a suitable colour-matched compatible render.

RISK: GREEN

The pointing was generally friable, especially at high level and below stone windowsills. This is common as these areas are more exposed to the elements. An allowance should be made for raking out loose joints and repointing the joints with a lime-base mortar. This will maintain the buildings' ability to be weathertight.

PHOTOS: Q-06, A-07, (D)LQ-24, -25

RISK: AMBER

At ground floor it is suspected that a cementitious pointing has been used to re-point the facade. The type of pointing to the upper levels is unknown.

Cementitious pointing is impervious to water and will cause deterioration to the facing Portland stone. Any trapped moisture migrates into the masonry as it cannot pass through the impermeable joints. The stone around the joints become saturated and break down over time through freeze-thaw.

Cement pointing is also stronger than the Portland stone, and therefore any differential movement in the façade will result in cracking through the stone and not the pointing.

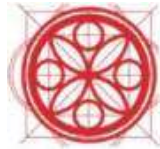
Although cracks and deterioration was only observed to localised areas at ground floor, this issue will only worsen over time. Consider making an allowance to rake out all joints to the ground and first floor and repoint with a lime-base mortar.

PHOTOS: Q-07, LQ-07

RISK: AMBER



*Common typical defect photographs; friable pointing, cementitious pointing observed to the ground floor.*



# Observations: Pilaster / 2<sup>nd</sup> Floor Cornice Modifications

There is evidence of extensive repairs to all vertical pilasters and to the 2<sup>nd</sup> floor cornice, that were likely a result of historic steel frame corrosion. When steel corrodes it can expand x8-13 times its original volume, resulting in fractures to the Portland stone masonry. It is likely that the fractures to the façade (and extent of steel frame corrosion) was widespread as all pilasters appear to have been replaced with new “plant on” stone. From observations it can be concluded that the below works were undertaken.

1. The masonry between the 2<sup>nd</sup> floor windows and cornice has been replaced (with the exemption of the arched keystones which appear original). This may also have been part of the façade modifications which were undertaken to entrance on Little Quay Street.
2. All central pilasters (between L02- L06 and L08-L09) have been replaced with new ‘cladding’ built off corbel brackets at every floor level. A silicone movement joint has been included at the new-old stone vertical reveal joint and horizontally at every floor level.
3. All quoin / turret pilasters (between L02- L09) have been replaced with new ‘cladding’ built off corbel brackets at every floor level. A silicone movement joint has been included at the new-old stone vertical reveal joint and horizontally at every floor level.

It is strongly recommended to consult with a structural engineer and obtain the as-built drawings and photographs for the extensive repairs to confirm that the works was undertaken to a high standard and align with modern building codes.

The as-built information should confirm; specification for steel frame treatment, thickness of “new” stone, fixing details including corbel brackets and restraints (including materiality), cavity trays and barriers.

It was not possible to confirm the condition of the silicone mastic, however, it is likely at the end of its lifespan (typically 20years). Recommend to replace all mastic with new to maintain the weathertightness of the building.

PHOTOS: Q-08, -09, -10, LQ-01

RISK: AMBER

A structural engineer should be consulted regarding the L08 flagpole modillions, with regards to the fixing detail back to the façade or steel frame. They appear to be made from painted mild steel. There is a risk that corrosion could be occurring to part of the fixing embedded in the wall.

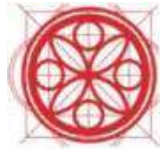
PHOTOS: (D)Q-43, -44

RISK: AMBER

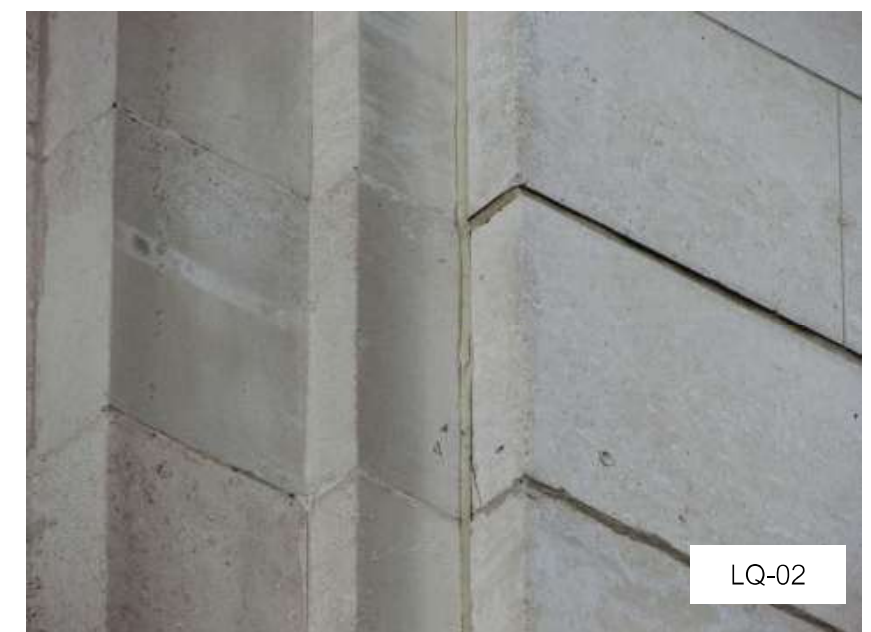
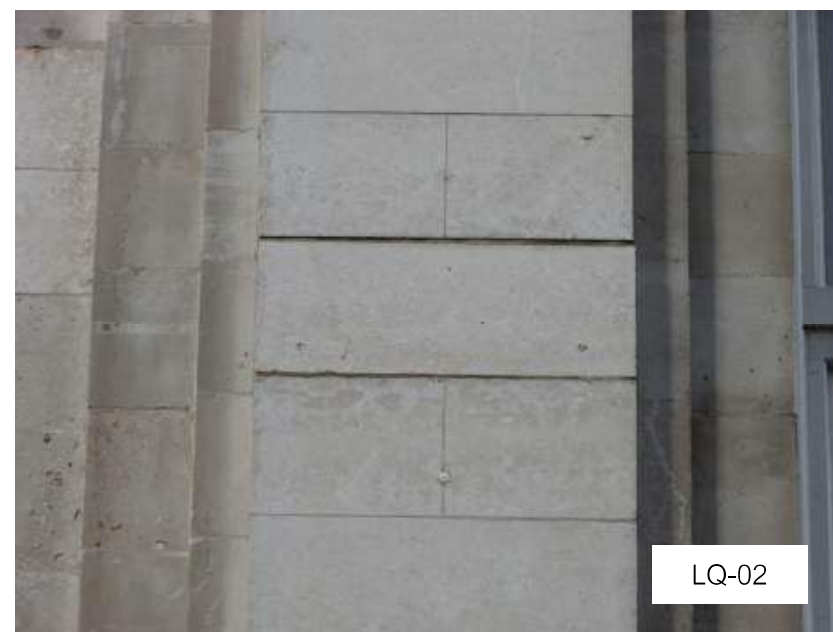
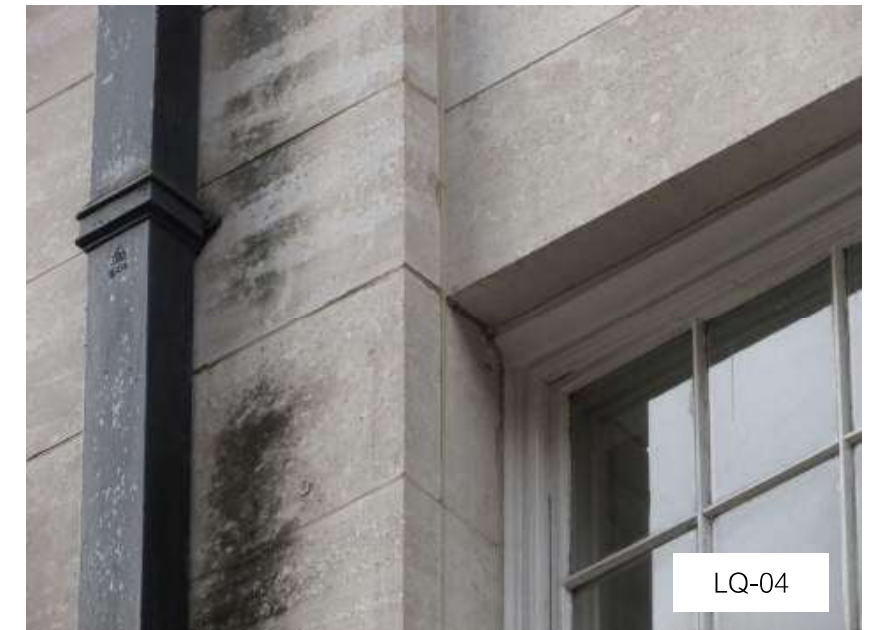
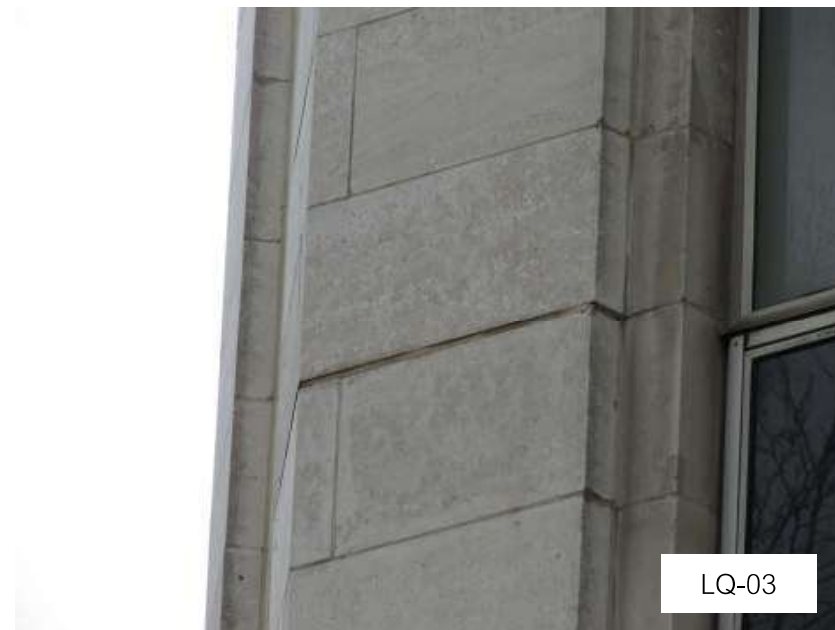
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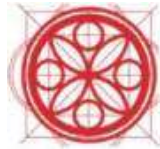
*Notable defect photographs; modifications to ground floor (note ‘new’ stone below the cornice), movement joints observed to the pilasters*



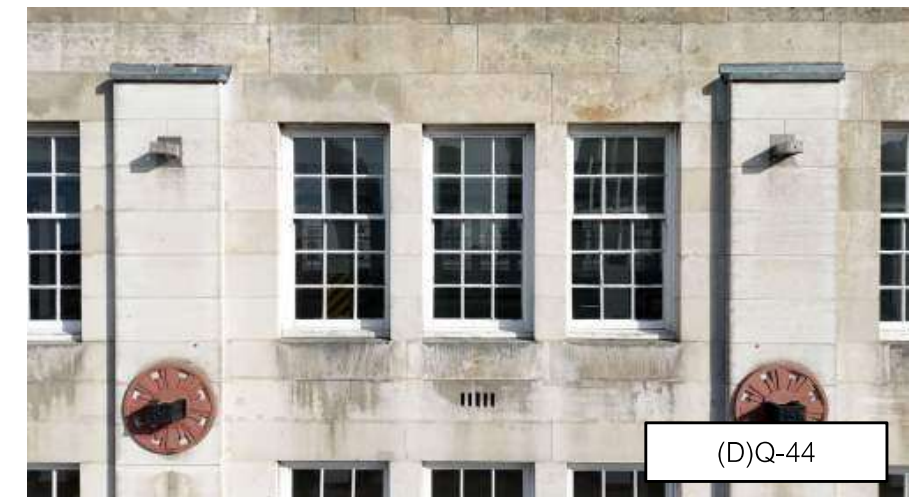
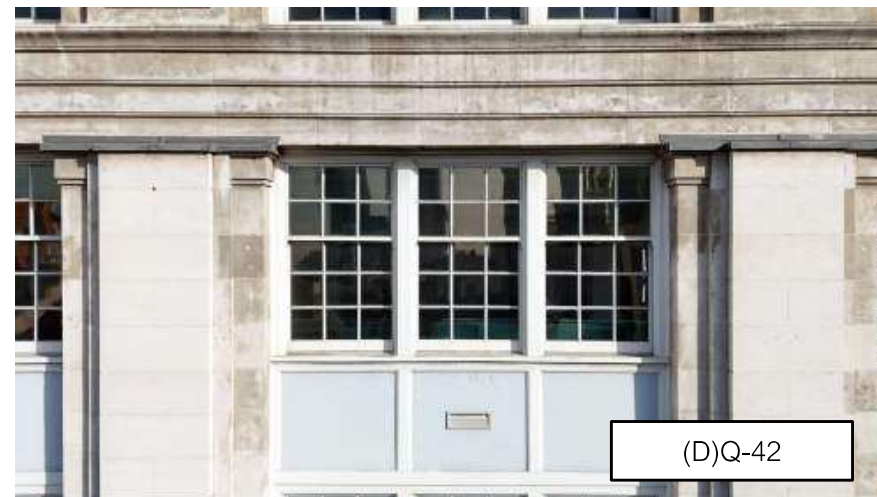
# Observations: Pilaster Modifications Photos



*Notable photographs; modifications to pilasters. Note the 'new' stone and movement joints observed to the pilasters*



# Observations: Pilaster Modifications Photos



*Notable photographs; modifications to pilasters. Note the 'new' stone and movement joints observed to the pilasters. A structural engineer should be consulted regarding the L08 flagpole modillions, with regards to the fixing detail back to the façade or steel frame.*



# Observations: Possible Steel Frame Corrosion

Fractures (category 0 to 2) and displacement were observed to the ground floor. The cause for the fractures may be steel frame corrosion – with the ground floor not part of the historic repairs. Recommend consultation with a structural engineer.

Repairs could include cutting out the masonry to inspect and treat the steel frame or thumb pointing over the fractures to maintain the buildings weathertightness and continue to monitor for further defects as part of the Pre-Planned Maintenance.

PHOTOS: Q-13, -14, LQ-08, LQ-10

RISK: AMBER

A continuous vertical hairline fracture was observed to the NE turret to Little Quay Street. The cause of the fractures may be settlement or steel frame corrosion. Recommend consultation with a structural engineer.

PHOTOS: (D)LQ-25

RISK: AMBER

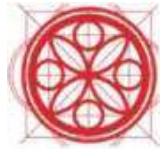
Horizontal hairline fractures were observed to a ninth-floor window lintel on Atkinson Street. The stone joint arrangement suggests the likelihood of a steel beam behind. The cause for the fractures may be steel frame corrosion. Although in its infancy, there is a risk that if left untreated it could deteriorate (especially due to the proximity the parapet hidden gutter). Historic mortar repairs were observed to the same bed joint three bays over (see (D)A-23 & -24), which suggest there may have been a historic issue. Recommend consultation with a structural engineer and further investigations (if required).

PHOTOS: (D)A-21, -23, -24

RISK: AMBER



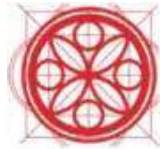
*Notable defect photograph; fractures observed through masonry to lower levels possibly caused by steel frame corrosion*



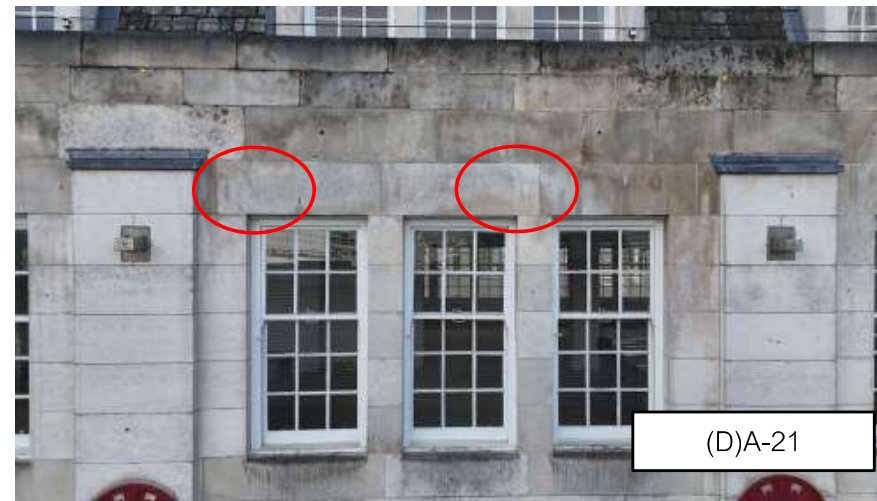
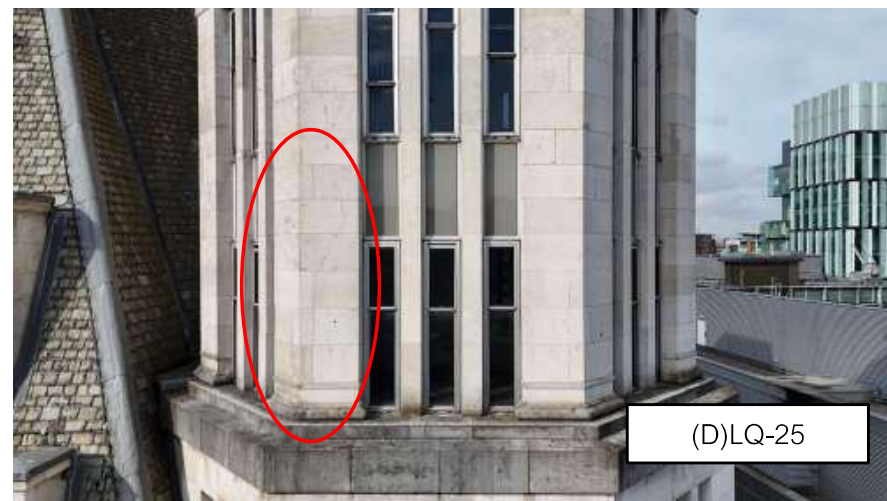
## Observations: Possible Steel Frame Corrosion Photos



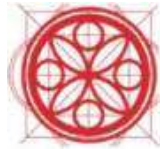
*Notable defect photograph; fractures and displacement observed through masonry to lower levels possibly caused by steel frame corrosion*



## Observations: Possible Steel Frame Corrosion Photos



*Notable defect photograph; hairline fractures observed through masonry possibly caused by steel frame corrosion. Note the previous repairs to (D)A-23 and -24*



# Observations: Grand Cornice

Water-pooling was observed to the grand cornice on Quay Street. The sky surface gulley was clear on Little Quay Street; however, vegetation growth and debris was observed to the outlet. Significant vegetation growth and water pooling was observed to the grand cornice on Atkinson Street. The cornice directs the rainwater to a back gulley channel which then likely drains through a rainwater downpipe built with the build-up of the wall to the external downpipe hopper. The outlet on Quay Street is likely blocked with debris, preventing the rainwater from draining.

Recommend clearing out the debris and rodding the downpipes. Consideration should be given to how the downpipes are to be maintained in the future. Installing a lead flashing with a positive gradient away from the façade will minimize the need for periodic maintenance.

PHOTOS: (D)Q-30, (D)LQ-30, (D)A-30, -31

RISK: AMBER

Hairline fractures (category 0-1) was observed to the decorative frieze band below the cornice on Quay Street and Atkinson Street. The cause for the fractures may be steel frame corrosion. Strongly recommend consultation with a structural engineer with further investigations undertaken.

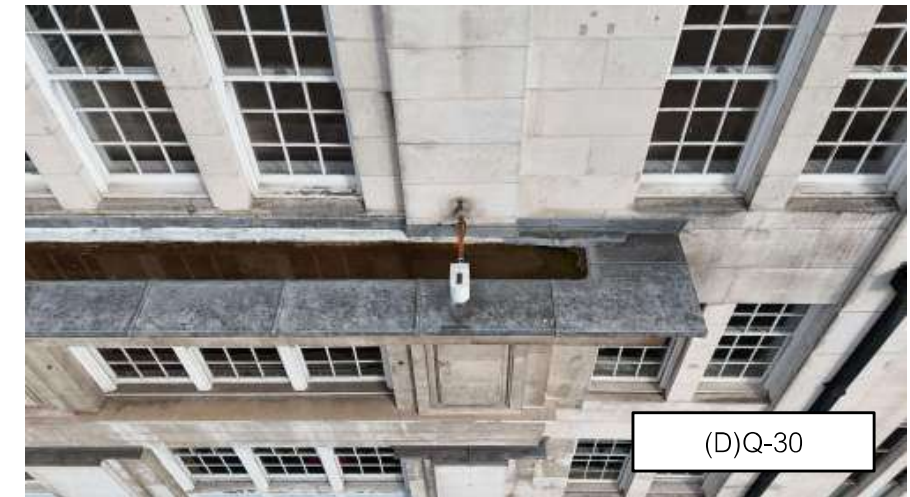
PHOTOS: D(Q)-31, -32, (D)A-32

RISK: AMBER

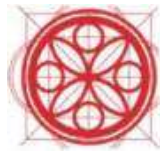
A hairline fracture was observed to the cornice nosing on Atkinson Street. The cause of fractures may be settlement to the facade. Consider undertaking pin repairs, subject to a structural engineer's recommendation.

PHOTOS: (D)A-20

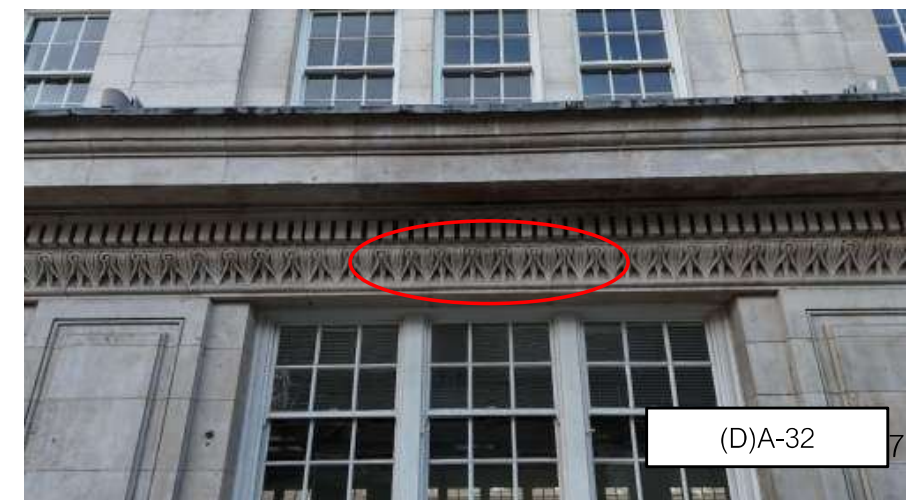
RISK: AMBER

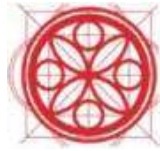


*Notable defect photograph; water pooling, vegetation growth to the grand cornice, hairline fractures to decorative frieze (overleaf).*



## Observations: Grand Cornice Photos





# Observations: Structural Repairs

Fractures were observed across the façade. It is recommended that a structural engineer is consulted regarding all observed fractures.

Hairline fractures and fractures were observed to individual window lintels at the upper levels. The cause of fractures may be settlement to the facade. Consider undertaking pin repairs, subject to a structural engineer's recommendation.

PHOTOS: Q-11, (D)Q-24

RISK: AMBER

Hairline fractures were observed to individual window lintel spandrel just below the cornice. The cause of fractures may be settlement to the facade. Consider undertaking pin repairs, subject to a structural engineer's recommendation.

PHOTOS: LQ-05, (D) LQ-05

RISK: AMBER

Hairline fractures were observed to individual window mullions to the turret. Recommend continued monitoring for further defect. Consider undertaking indent repairs, subject to a structural engineer's recommendation.

PHOTOS: (D)Q-27

RISK: AMBER

A fracture was observed to one ground floor arch stone. The cause of fractures may be settlement to the facade. Consider undertaking pin repairs, subject to a structural engineer's recommendation.

PHOTOS: A-05

RISK: AMBER

Fractures were observed to individual pilaster bases. The cause of fractures is likely expansion of a ferrous fixings. Consider undertaking indent repairs, subject to a structural engineer's recommendation.

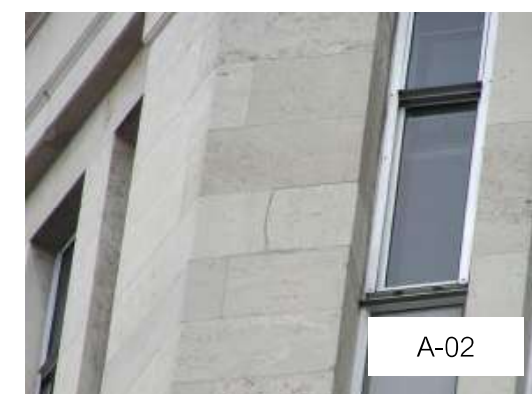
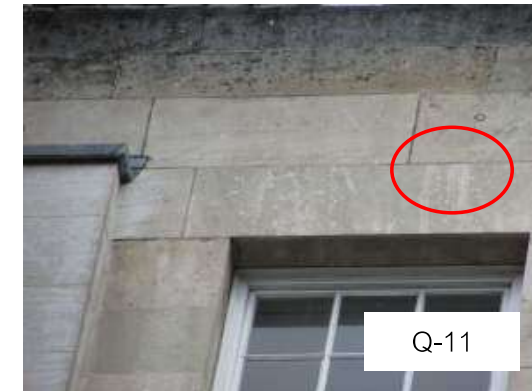
PHOTOS: Q-12

RISK: AMBER

Hairline fractures were observed to individual ashlar units. The cause for the fracture may be a natural fissure in the stone. Recommend repointing with a lime-based mortar to maintain weathertightness, subject to a structural engineers' recommendations.

PHOTOS: A-01, -02, (D)Q-26, (D)LQ-20

RISK: AMBER



*Notable defect photograph; fractures observed through masonry*



# Observations: General Maintenance Repairs

There is a failed repair to the grand cornice on Little Quay Street. It is covered with lead flashing so is protected but is a risk of falling. Recommend removing the loose section of masonry as soon as possible. To expediate this, it could be undertaken via abseil. Once scaffold is available recommend an indent repair.

PHOTOS: LQ-10, (D)LQ-10

RISK: RED

The granite stall risers on Quay Street are not original. Impact damage was observed to a step and a window stall riser. Recommend undertaking indent repair.

PHOTOS: Q-16, -17

RISK: GREEN

The stall risers on Atkinson Street have been skim coated in a cementitious render. To localised areas, the render has failed due to natural weathering or impact damage. Allow to skim coat ground floor risers with new render.

PHOTOS: A-06

RISK: GREEN

Minor damages were observed across all elevations. Consider undertaking general maintenance repairs (e.g., pin or indent repairs).

PHOTOS: Q-15

RISK: AMBER

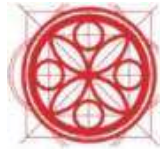
A fracture was observed to one coping stone. Recommend undertaking pin repairs.

PHOTOS: A-03

RISK: AMBER



*Notable defect photograph; Indent and pin repairs, repairs to ground floor threshold*



# Observations: Rainwater Management Strategy

Vegetation growth was observed to a hidden rainwater gulley below the coping. Biological growth can root into joints, weakening the bond and creating a point of water ingress into the façade. Recommend removing all rooting buddleia and clearing all debris from gutters and rainwater outlets during periodic maintenance.

PHOTOS: (D)Q-25, (D)A-25

RISK: AMBER

Biological staining was observed to the ninth and tenth floor copings and high-level masonry. The cause for the staining is because water is allowed to sit on the surface of the stone and allow spore growth.

Lead flashing has been installed to the grand cornice and pilaster capitals which is providing protection to the masonry below.

Consideration should be given to installing a Code 6 lead flashing with suitable drip detail either side to the gable copings to shed water away from the building.

A Code 5 cover flashing with suitable drip detail could be installed just above the detailed motifs to the turrets to she water away and prevent biological growth.

It should be noted that planning permission may be required to install lead flashings as it will alter the appearance of the façade.

PHOTOS: Q-18, LQ-09

RISK: AMBER

The paint to the rainwater downpipes is beginning to flake in areas. To two downpipes, it appears the hoppers are blocked causing rainwater to cascade down the face of the stone, resulting in organic staining.

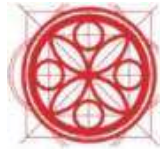
Recommend refurbishing all rainwater downpipes and undertaking maintenance of the hoppers. Consideration should be given to how the downpipes are to be maintained in the future.

PHOTOS: Q-02, LQ-06, A-04

RISK: AMBER



*Notable defect photograph; staining, staining caused by overflowing hoppers, paint flaking to rainwater downpipes*



# Observations: Rear Elevation

Medium to heavy levels of soiling was observed the copings, windowsills, and at high level. This is typical as these areas are more exposed to the weather. Low to medium levels of soiling was observed to the lower levels.

Cleaning the façade will remove the biological staining. Consideration should be given to installing a lead flashing to the coping stones to shed the water away from the façade and prevent further staining.

PHOTOS: W-01, -02

RISK: GREEN

Hairline cracks (or crazing) were visible to areas of the render at high level. The cause for the cracking could be façade differential settlement or shrinkage of the render. Once scaffold access is available, all areas of render should be tap tested. Any loose or de-bonded sections of render should be removed. And a new compatible render reinstated on a stainless steel EML backing.

PHOTOS: W-04, -05, -06, (D)W-20, -23

RISK: AMBER

It was not possible to confirm the condition of the silicone mastic, however, it is likely at the end of its lifespan (typically 20years). Recommend to replace all mastic with new to maintain the weathertightness of the building.

PHOTOS: W-04, -05, -06

RISK: AMBER

The copings and windowsills are pre-cast concrete and appear generally in a sound condition (if not a bit weathered). Cracks were observed to nine windowsills. The cause for the cracks is likely corrosion of embedded steel reinforcement. All windowsills should be tap-tested once scaffold access is available. Recommend replacing defective windowsills with new pre-cast concrete sills to match existing

The pointing to the copings has washed out. Recommend repointing all coping stone joints with a suitable mortar.

PHOTOS: W-02, -03, (D)W-20, -21, -22, -24

RISK: AMBER

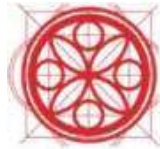
Cementitious render repairs has been installed to the quoin with Quay Street elevation. Recommend undertaking tap-testing to all areas of render. All loose or de-bonded render should be removed and a new compatible render installed.

PHOTOS: (D)W-25

RISK: AMBER



Common typical defect photographs; missing pointing, staining, hairline cracks to rendered facades



# Observations: Glazed Brick Lightwells

The lightwells are generally in a good condition. The precast concrete copings appear OK but the joints are washed out. Organic growth is observed to the brick joints at high level which suggests the pointing has washed out. Rust staining was observed to several lintel and windowsills at L13. The cause for the rust staining is likely corrosion of the steel lintels which has washed down the window to the windowsill. Recommend consultation with a structural engineer and up-close inspection once access scaffold is available.

Vegetation growth was observed to one gutter. Decay was observed to several of the timber windowsills. It is recommended to undertake a full condition survey of the timber windows and spandrels. Undertaking repairs – e.g., timber splice repairs - and re-decoration will improve the longevity of the windows.

PHOTOS: LW-01, -02, (D)L13-6, -9, -22, L12-1

RISK: GREEN / AMBER

There are redundant fixings / drill holes to the glazed brick facades which have not been repaired. Small chips were observed to the arises of individual bricks. Where the chip or fixing hole is less than 20mm it is recommended to undertake a lime-based mortar repair with Keim glaze finish to match the glazed brick texture. Where the hole is greater than 20mm it is recommended to carefully cut out the defective brick and install a new brick to match the existing.

PHOTOS: LW-03, -05

RISK: GREEN / AMBER

There were several defective bricks (i.e., fracture through the full height of the brick). Recommended to carefully cut out the defective brick and install a new brick to match the existing.

PHOTOS: LW-04, (D)L13-6, -9

RISK: GREEN / AMBER

All the windowsills were painted making it impossible to determine the condition of the underlying masonry. Generally, they were in a good condition. Hairline fracture or fractures were observed to several windowsill. The fractures could be to the stone sill (and possibly caused by differential settlement of the façade) or could just be flaking paint. Recommend up close inspection once scaffold is available.

PHOTOS: LW-06, (D)L13-9, 12-01, 12-10, 10-31, 09-29

RISK: AMBER

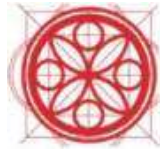
Hairline fractures - originating from the windowsill – were observed to localised areas. The cause for the fractures is possibly settlement of the façades. Recommend consultation with a structural engineer and continued monitoring as part of the Pre-Planned Maintenance.

PHOTOS: (D)ROOF-14, (D)L13-09, 12-01

RISK: AMBER



*Common typical defect photographs; vegetation growth to joints, rust staining to steel lintels and windowsills, small fixings, defective bricks, small chips, fractures observed to painted windowsill.*



# Recommendations

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The Portland stone, rear, and glazed brick facades were all in a good condition. There is a failed repair to the grand cornice on Little Quay Street. It is covered with lead flashing so is protected but is a risk of falling. Recommend removing the loose section of masonry as soon as possible. To expediate this, it could be undertaken via abseil.

There is evidence of extensive repairs to all vertical pilasters and to the 2<sup>nd</sup> floor cornice, that were likely a result of historic steel frame corrosion. When steel corrodes it can expand x8-13 times its original volume. If there are no voids between the steel and masonry, any expansion to the steel frame will induce a pressure on the masonry resulting in fractures. It is likely that the fractures to the façade (and extent of steel frame corrosion) was widespread as all pilasters appear to have been replaced with new “plant on” stone built off corbel brackets at every floor level and all the masonry between the 2<sup>nd</sup> floor windows and cornice has been replaced (with the exemption of the arched keystones which appear original).

Reviewing Google Maps historic images, these works were undertaken before 2008, with online research suggesting it was undertaken in 1997. It is strongly recommended to consult with a structural engineer and obtain the as-built drawings and photographs for the extensive repairs to confirm that the works were undertaken to a high standard and align with modern building codes. As a minimum, the as-built information should confirm; specification for steel frame treatment, thickness of “new” stone, fixing details including corbel brackets and restraints (including materiality), cavity trays and barriers. A structural engineer should be consulted regarding the L08 flagpole modillions, with regards to the fixing detail back to the façade or steel frame. They appear to be made from painted mild steel. There is a risk that corrosion could be occurring to part of the fixing embedded in the wall.

Fractures (category 0 to 2) and displacement to the ground floor (Quay Street), NE turret (Little Quay Street), and a ninth-floor window lintel (Atkinson Street) stone masonry were observed which may be being caused by steel frame corrosion. Hairline fractures (category 0-1) were also observed to the decorative frieze band below the cornice on Quay Street and Atkinson Street. The cause for the fractures may also be steel frame corrosion as these areas were not part of the historic repairs. Recommend consultation with a structural engineer, further investigations (e.g., to the cornice decorative frieze), and understanding the client requirements. Repairs could include cutting out the masonry to inspect and treat the steel frame or thumb pointing over the fractures to maintain the buildings weathertightness and continue to monitor for further defects as part of the regular Maintenance.

Medium to heavy levels of biological staining was observed to the coping stones, carved turret motifs, and upper levels. Lead flashing has been installed to the gable mansard, grand cornice and pilaster capitals which is providing protection to the masonry below. Cleaning the façade will improve the appearance and flush out any pointing and unseen defects. When undertaking cleaning we recommend that cleaning samples are first undertaken to confirm the most appropriate cleaning methodology.

Undertaking general maintenance repairs will prolong the longevity of the façade. To all rendered areas of the façade (West elevation), tap testing should be undertaken to confirm that the render is suitably bonded. [Any loose or de-bonded sections of render should be removed. And a new compatible render reinstated on a stainless steel EML backing.](#) General maintenance repairs include; cleaning, repointing, replacing silicone mastic, indent repairs, pin repairs, render repairs, windowsill replacements, brick replacements, repairs to the ground floor stall risers. A structural engineer should be consulted regarding all of the fractures observed and should advise on repair specifications.



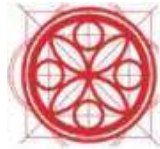
# Recommendations

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To maintain the buildings weathertightness all areas of loose and friable pointing should be raked out and repointed with a suitable mortar. At ground floor it is suspected that a cementitious pointing has been used to re-point the facade. Cementitious pointing is impervious to water and will cause deterioration to the facing Portland stone as any trapped moisture migrates into the masonry as it cannot pass through the impermeable joints. The stone around the joints become saturated and break down over time through freeze-thaw. Although deterioration was only observed to localised areas at ground floor, this issue will only worsen over time. Consider raking out all joints to the ground and first floor and repoint with a lime-base mortar.

Water-pooling was observed to the grand cornice on Quay Street. The sky surface gulley was clear on Little Quay Street; however, vegetation growth and debris was observed to the outlet. Significant vegetation growth and water pooling was observed to the grand cornice on Atkinson Street. The cornice directs the rainwater to a back gulley channel which then likely drains through a rainwater downpipe built with the build-up of the wall to the external downpipe hopper. The outlet on Quay Street is likely blocked with debris, preventing the rainwater from draining. Recommend clearing out the debris and rodding the downpipes. Consideration should be given to how the downpipes are to be maintained in the future. Installing a lead flashing with a positive gradient away from the façade will minimize the need for periodic maintenance.

Consideration should be given to undertaking other maintenance repairs (i.e., re-decorating, timber repairs, metal balustrade redecoration, roof slate / lead/ gutter repairs) at the same time. Further input may be required by a specialist to advise of the existing condition and repair strategy. The development of an effective Planned Preventative Maintenance strategy including a 5-10-year cycle of façade surveys should be considered for all facades to maintain the fabric of the buildings, reduce the cost of repair and minimise the risk of structural failure.



# Defect commentary

Classification of building damage has been traditionally divided into three general categories after those employed by Skempton and MacDonald (1956). These classifications, architectural damage, functional damage, and structural damage are described as follows:

**Architectural damage** affects the appearance of structures, and is usually related to cracks or separations in panel walls, floors, and finishes. Cracks in plaster walls greater than 0.5 mm wide and cracks in masonry or rough concrete walls greater than 1 mm wide are considered to be representative of a threshold where damage is noticed and reported by building occupants (O'Rourke et al. 1976; Burland et al. 1977).

**Functional damage** affects the use of the structure, and is exemplified by jammed doors and windows, extensively cracked and falling plaster, tilting of walls and floors, and other damage that would require non structural repair to return the building to its full service capacity.

**Structural damage** affects the stability of the structure, usually related to cracks or distortions in primary support elements such as beams, columns, and load bearing walls.

These classifications are obviously quite general with no clearly defined limits. As a result, there may be considerable overlap of the categories depending upon the type and use of the particular structure considered. Burland et al. (1977) present a classification of visible damage based upon the work of Jennings and Kerrich (1962), The National Coal Board (1975), and MacLeod and Littlejohn (1974). This classification system, shown in the table, is based in part on the ease of repair of the damage, and thus provides a defined framework for the evaluation of in particular settlement damage.

However, it can be crudely applied to the assessment of masonry facades and the cracking that can be caused by settlement, thermal movement and the expansive force for corroding steel and clinker concrete.

| Category of damage | Limiting tensile strain ( $\epsilon_{lim}$ )(%) | Normal degree of severity | Description of damage                                                                                                                                                                                          | Affection      |
|--------------------|-------------------------------------------------|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| 0                  | 0 – 0.050                                       | Negligible                | Hairline cracks less than 0.1mm                                                                                                                                                                                | Aesthetics     |
| 1                  | 0.050 – 0.075                                   | Very slight               | Fine cracks up to 1mm.<br>Damage generally restricted to internal wall finishes.<br>Fine cracks easily treated during normal redecoration.<br>Cracks in exterior brickwork visible upon close inspection.      | Aesthetics     |
| 2                  | 0.075 – 0.150                                   | Slight                    | Cracks easily filled up to 5mm<br>Redecoration internally probably required. Exterior cracks visible, some repointing may be required for weather tightness. Doors and windows may stick slightly.             | Aesthetics     |
| 3                  | 0.150 – 0.300                                   | Moderate                  | Cracks from 5 to 15mm.<br>Cracks may require cutting out and patching.<br>Weathertightness often impaired.                                                                                                     | Serviceability |
| 4                  | > 0.300                                         | Severe                    | Cracks from 15 to 25mm.<br>Extensive repair involving removal and replacement of sections of walls, especially over doors and windows required. Walls lean or bulge noticeably, some loss of bearing in beams. | Serviceability |
| 5                  |                                                 | Very severe               | Cracks > 25mm.<br>Major repair required involving partial or complete rebuilding. Beams lose bearing, walls lean badly and require shoring. Windows broken by distortion.                                      | Stability      |

*Table Classification of visible damage to walls with particular reference to ease of repair of plaster and brickwork for masonry based upon (Burland et al., 1977)*