5.5. Roof 5 (West) and Roof 6 (East) - 5th Floor Level – 330 Sqm combined

Description

Roof 5 (Est) and 6 (East) are of suspended reinforced concrete slab construction, rectangular in shape, and each comprise of an area of approx. 165 Sqm (33m x 5m). The existing coverings comprise exposed mastic asphalt which is weathersealed to 750mm high x 230mm thick reinforced concrete parapet walls and solid brickwork external elevation walls with approx. 230mm high asphalt upstands. Above the parapet walls sit approx. 650mm high steel mesh railings.

Each roof is afforded with approx. 19nr. concrete framed square rooflights measuring approx. 1.1m². The rooflights (which are predominantly redundant) are afforded with a combination of Georgian wired glazing, timber boards and GRP coverings.

Both roofs are afforded with substantial mechanical plant (although the west roof has significantly more plant present) including large mechanical ventilation flue ducts and high temperature hot water pipework. These fittings are generally supported by a combination of exposed steel framework and concrete plinths which are supported directly from the roof deck.

A single reinforced concrete staircase is afforded to both roofs providing direct access up to the 6th floor plant rooms.

Both roofs are drained by 6 nr. 100mm dia. RW outlets provided on the internal perimeter edge of each roof. Outlets are spaced approximately 5 metres apart. The outlets duct internally to concealed downpipes (assumed to be cast iron).

We do not believe that these roofs are thermally insulated.

Observations

The asphalt roof coverings to both roofs are in a poor and heavily deteriorated condition affected by the following defects: -

- The asphalt coverings are age deteriorated, damaged, split and blistered, with various patch repairs afforded throughout.
- There is no solar protection afforded to the exposed asphalt.
- The roof coverings are poorly detailed / jointed / bonded to the various upstands, penetrations, drainage outlets and parapet and main wall abutments of these roofs.
- The perimeter upstands don't appear to have been fully chased into the parapet walls and plant roof brickwork which is a weak point.
- There is an extensive build-up of vegetation and debris across the roof, blocking outlets, retaining water and further damaging the roof coverings.
- The rooflights (which are largely redundant) are in a heavily dilapidated condition. The exposed glazing where seen is cracked and damaged and largely covered by patch repairs. The timber covers are heavily rotten. Complete removal of the rooflights is recommended as part of any planned refurbishment works.
- Significant shrubs (tree saplings) growing out of rainwater outlets.
- The condition of the existing rainwater pipework is unknown. Given the significant build up of debris at roof level, the internal rainwater pipework may be partially or completely blocked.
- We suspect that the concealed internal rainwater pipes are of cast iron construction which are prone to age deterioration and corrosion and therefore, highly likely to be leaking.
- Leaf guards are missing to all of the existing rainwater outlets which will result in blockage.

- Extensive ponding is noted in various areas across these roofs. The existing roof falls are deemed to be insufficient.
- There is heavy rusting to steel railings serving both the parapet walls and access staircases and ideally these should be replaced as part of any planned refurbishment works.
- There is localised spalling (frost damage) to the concrete parapet walls resulting in exposed reinforcement bars which have corroded due to carbonation.
- Heavy pigeon guano which is a health hazard.
- Heavily damaged foam lagging to mechanical service pipework affixed to parapet walls.
- 2 nr. steel cat ladders to Roof 5 parapets sit directly upon roof decks which will need to be considered as part of any refurbishment proposals.
- The low temperature hot water pipework sits approx. 180mm above the roof deck which will need to be considered as part of any refurbishment proposals.
- Heavy debris coverage.
- Large steel framework to the north end of each roof supporting stainless steel canopy ductwork which is damaged and appears partly redundant. Surface rust and peeling paintwork to steel structures. Any redundant plant and supporting structures should be removed as part of any planned refurbishment works.
- 4 nr. heavily rotten and damaged timber plant room doors requiring immediate replacement.
- Various mechanical services affixed to perimeter parapet walls at approx. 300mm above roof deck level will also need to be considered as part of any refurbishment proposals.
- A localised internal inspection beneath both of these roofs revealed heavy long term water ingress and significant damage to ceiling and floor surfaces below.

In summary, the main roof coverings and associated elements (including parapet walls and surface water drainage systems) to both roofs 5 and 6 are heavily dilapidated, have reached the end their useful lives and require repair / immediate replacement. Substantial removal of redundant mechanical plant and equipment is required in conjunction with these works.

5.6. South Access Walkway and Staircases

Description

A reinforced concrete raised access walkway is afforded at 6th floor level providing access from the plant rooms to the high level main roof (Roof 1) and lower roofs (Roof 5 and 6) via reinforced concrete staircases.

The walkways are approx. 860mm wide and afforded with 1.25m high x 100mm wide x 50mm thick reinforced concrete balustrades with 40x60mm galvanised steel handrails. The balustrades lean outwards at high level by approx. 300mm which is a purpose built design feature.

The staircases are approx. 640mm wide, incorporating 920mm high steel balustrades (18mm² spindles and 40mm wide handrails). The treads are 160mm wide, the risers are 200mm high.

Observations

Both the access walkway and staircases serving this block are in a poor and heavily deteriorated condition affected by the following defects: -

- There is localised spalling (frost damage) both to the concrete staircases and access walkway soffits, concrete kerbs and concrete balustrades, resulting in exposed reinforcement bars which have corroded due to carbonation.
- Heavy salt staining (leaching) to concrete soffits serving staircases and access walkways.

- There are a large number of missing spindles and handrails to the access walkways which is a safety issue.
- There are a number of holes in the concrete walkways which require repair.
- Flimsy and rusted steel steps afforded over mechanical service pipework to access walkways which is a safety issue.
- Corrosion and peeling paintwork to staircase steel balustrades and handrails.
- Staircases very narrow (560mm) and steep.
-

In summary, both the access walkway and staircases serving this block are heavily dilapidated, have reached the end their useful lives, are affected by a number of safety issues and require comprehensive repair / replacement in the short term.

5.7. Block G External Elevations (5th and 6th floor levels)

Description

5th and 6th floor external elevations consist of an exposed concrete structural frame incorporating solid brickwork infill panels with reinforced concrete window frames inset with a combination of timber single glazed (Georgian wire cast glazing) and aluminium double glazed units. Also, large timber ventilation grilles.

Observations

Whilst the external elevations to the block were seen to be generally level, upright and in a structurally satisfactory condition, the following defects were identified: -

- Various holes and voids in brickwork for service penetrations, a number of which have been removed with the openings remaining allow access to insects, birds and rainwater.
- There is localised spalling (frost damage) and rust staining to the exposed concrete framework and window surrounds resulting in exposed reinforcement bars which have corroded due to carbonation.
- Heavy salt staining (leaching) to concrete framework and brickwork particularly at high level, emanating from leaking flat roof.
- Heavy surface weathering, wet rot and missing paintwork to timber windows and ventilation grilles generally throughout.
- Various broken windows panes.
- Faulty seals/gaskets to double glazed window panes resulting in significant fog/misting between the panes.
- Various wires and cables strewn about the external elevations which would benefit from improved cable management.
- Various redundant fixings installed throughout these elevations which ideally should be removed as part of these works.
- Corroded and damaged steel rainwater pipes.
- Presumed asbestos cement panels above 5th floor windows. Any proposals to remove or work on these panels must be undertaken in strict accordance with the Control of Asbestos Regulations 2012.
- Various diagonal cracks on south elevations of Roofs 5 and 6 ranging from between 5mm and 10mm in width.
- 2 nr. heavily rotten and damaged timber plant room doors requiring immediate replacement.
- Brickwork and concrete surfaces are generally surface weathered, stained and discoloured throughout.

In summary, a comprehensive overhaul is required throughout the external elevations of this block in the short term including masonry repairs, window and external door replacements and full redecoration to uphold the integrity of these materials against the elements.

Note, for the purpose of this exercise which focuses on the condition of the roof coverings, elevations, mechanical and electrical plant and equipment, we have excluded window and external door replacements and full redecoration from our assessment and budgetary costs but can include these elements at a later date if required.

6. TBA BLOCK H – ROOFS

6.1. Roof 1 - Main Flat Roof (Above 6th Floor Plant Rooms) – 924 Sqm

Description

The main flat roof of Block G is of suspended reinforced concrete slab construction, rectangular in shape, and comprises an area of approximately 924 Sqm (33m x 28m). The existing covering is a torch on felt system. The felt is weathersealed to approx. 1.15m high x 5m wide x 80mm thick reinforced concrete parapet wall panels and solid brickwork plantroom external walls with approx. 120-150mm high felt upstands. Lead apron flashings are afforded in some areas. Pre-cast concrete paviours are afforded in some areas.

Single galvanised steel staircase afforded to the north end of the roof and provides access to adjacent roofs and staircase. This is supported from the concrete roof deck by rubber pads.

The roof is drained via approx. 100mm dia. RW outlets provided to the east and west sides of the roof. 6 no. outlets are provided to each side, and these are spaced approximately 5 metres apart. The outlets predominantly duct internally to concealed downpipes (assumed to be cast iron) although some modern bespoke PVC external rainwater pipes are afforded in areas.

Various WC extractor vent cowls penetrate the roof deck and covering. Steel conduit supporting mechanical and electrical services is sat directly upon the roof decks and supported by rubber pads.

3 nr. large 'York' chillers supported by concrete plinths dressed in felt are afforded to this roof.

Lightning conductor tapes have been fixed directly onto the concrete parapet walls rather than roof decks. Plinths afforded for satellite antenna.

There is significantly less plant afforded to this roof than the main roof of Blok G.

We do not believe that this roof is thermally insulated.

Observations

The main roof coverings are in a poor and heavily deteriorated condition affected by the following defects: -

- The felt coverings are age deteriorated, damaged, split and brittle, with various patch repairs afforded throughout.
- The roof coverings are poorly detailed / jointed / bonded to the various upstands, penetrations, WC extractor vents, drainage outlets and parapet walls of the roof.
- The various perimeter upstands at 120mm are considered too shallow and should be 150mm as a minimum.
- The perimeter upstands don't appear to have been fully chased into the parapet walls and plant roof brickwork which is a weak point. A number of these upstands have detached resulting in large gaps and water ingress.
- There is an extensive build-up of vegetation and debris across the roof, blocking outlets, retaining water and further damaging the roof covering.
- The condition of the existing rainwater pipework is unknown. Given the significant build up of debris at roof level, the internal rainwater pipework may be partially or completely blocked.
- We suspect that the concealed internal rainwater pipes are of cast iron construction which are prone to age deterioration and corrosion and therefore, highly likely to be leaking.
- Leaf guards are missing to all of the existing rainwater outlets which will result in blockage.

- Openings formed at low level within the parapet walls to the south east and south west corners to allow rainwater to discharge onto adjacent roofs 2 and 3. These are considered a weak point in this roof and will also result in excessive surface water build up on roof 2 and 3.
- Extensive ponding is noted in various areas across the roof. The existing roof falls are deemed to be insufficient.
- There is spalling (frost damage) to the concrete panel perimeter walls resulting in exposed reinforcement bars which have corroded due to carbonation.
- Various open joints to parapet wall panels which could allow water ingress.
- Detaching lead flashings, cracked and eroded cement mortar fillets to brick wall abutments.
- Steel staircases either sit directly upon roof decks which will need to be considered as part of any refurbishment proposals.
- The 3 nr. chillers sit approx. 350mm above the roof deck which will also need to be considered as part of any refurbishment proposals.
- Redundant and corroded steel hoist to south end of roof which should be removed as part of any planned refurbishment works.
- Large redundant steel water tank supported by galvanised steel framework, and 2 nr. large redundant mechanical fans which should be removed as part of any planned refurbishment works.
- Heavy water ingress internally resulting in salt staining (leaching to high level concrete soffits) and ponding water throughout the plant rooms.

In summary, the main roof covering and associated elements (including parapet walls and surface water drainage systems) are heavily dilapidated, have reached the end their useful lives and require repair / immediate replacement. Removal of redundant mechanical plant and equipment is required in conjunction with these works.

6.2. High Level Plant Room / Water Tank Roofs – 68 Sqm combined

Description

There are 2 nr. single storey purpose built plant rooms (presumed to be original) afforded to the south end of the main roof of Block G. These are rectangular in shape and each comprise a roof area of 34 Sqm (6m x 5.7m).

The plant rooms are of concrete frame construction and solid brick external walls. 2 nr. reinforced concrete panel water tanks (again presumed original) sit directly above these plant rooms. The roofs are of exposed concrete slab construction. A single concrete hatch is afforded to the roof of both tanks along with steel railings, steel cat ladders, aerials, antenna's and lightning conductor tapes. No inspection was undertaken inside either of these plant rooms or water tanks. The following defects were identified: -

- 3 nr. heavily rotten and damaged timber plant room doors requiring immediate replacement.
- Surface rot and heavy weathering to low level timber grillages.
- The steel railings and cat ladders are heavily corroded and non-compliant and require replacement as part of these works.
- There is surface rust and spalling (frost damage) to the water tank concrete panel walls and hatches along resulting in exposed reinforcement bars which have corroded due to carbonation.

There is a bespoke and dilapidated timber store shed attached to the north west plant room. No access was afforded into this space during our survey and we are unclear what this space serves. However, the felt roof

covering is old and brittle, whilst the timber wall frames and panels are rotten and damaged. The shed should be removed or replaced as part of any proposed refurbishment works.

A comprehensive overhaul of both of these elements is required as part of any planned refurbishment works.

6.3. Roofs 2 and 3 – (Main Roof Level) – 110 Sqm combined

Description

Roofs 2 and 3 are both of suspended reinforced concrete slab construction, rectangular in shape, each comprises an area of approximately 55 Sqm (5m x 11m). The existing coverings are a torch on felt system. The felt is weathersealed to approx. 1.15m high x 5m wide x 80mm thick reinforced concrete parapet wall panels on the north elevations via 150mm high felt upstands. The remaining elevations are open and finished with approx. 150mm high x 230mm wide exposed reinforced concrete kerbs. The felt upstands here are only 80mm high.

The roofs are both drained via a single 75mm dia. RW outlet ducted internally to concealed downpipes (assumed to be cast iron). However, both roofs also accept rainwater discharge from the main roof of Block H and are believed to be overloaded by surface water discharge.

We do not believe that these roofs are thermally insulated.

Observations

The coverings to both of these roofs are in a poor and heavily deteriorated condition affected by the following defects: -

- The felt coverings are age deteriorated, damaged, split and brittle with various patch repairs afforded in the past.
- Both roof coverings are poorly detailed / jointed / bonded to the drainage outlets, parapet walls and perimeter kerbs.
- The various perimeter upstands at 80mm high are considered too shallow and should be 150mm as a minimum.
- The perimeter upstands have not been chased into the parapet walls which is a weak point. These upstands have detached resulting in large gaps and significant water ingress.
- The condition of the existing rainwater pipework is unknown. Given the significant build up of debris at roof level, the internal rainwater pipework may be partially or completely blocked.
- Leaf guards are missing to the existing rainwater outlets which will result in blockage.
- The steel access walkway framework on both roofs sits approx. 230mm above the roof deck which will also need to be considered as part of any refurbishment proposals.
- Redundant mechanical fan plant present which should be removed as part of any planned refurbishment works.
- There is no perimeter edge protection which should be considered as part of any refurbishment works.
- Extensive ponding is noted in various areas across both roofs. The existing roof falls are deemed to be insufficient.
- As both roofs take surface water from the main roof and are each only afforded with one RW outlet, we recommend that additional outlets are provided to both roofs as part of any proposed refurbishment works.
- Lightning conductor tapes are affixed to the concrete perimeter kerbs which will need to be considered as part of any planned refurbishment works.

In summary, the roof coverings and associated elements (including perimeter kerbs and surface water drainage systems) to both Roofs 2 and 3 are heavily dilapidated, have reached the end their useful lives and require repair / immediate replacement. Removal of redundant mechanical plant and equipment is required in conjunction with these works.

6.4. Roof 4 – South Hoist Platform Roof (6th Floor Level) – 128 Sqm

Description

Roof 4 is of suspended reinforced concrete slab construction, rectangular in shape, and comprises an area of approximately 128 Sqm (16m x 8m). The roof appears uncovered with an exposed concrete deck with slab joints exposed and various patch repairs clearly evident. The roof is bordered by 1.15m high x 5m wide x 80mm thick reinforced concrete parapet wall panels and solid brickwork plantroom external walls with approx. 80mm felt/lead upstands.

Two large, galvanised steel staircases are afforded to this roof which provide access to the main roof of Block H. These are either supported directly from the concrete roof decks.

The roof is drained via 2 nr. approx. 100mm dia. RW outlets provided to the north side of the roof. The outlets predominantly duct internally to concealed downpipes (assumed to be cast iron).

On the south side of the roof, there are a single pair of 1.15m high double leaf steel gates which allow access for materials to be hoisted up directly from ground level to these roofs.

We do not believe that this roof is thermally insulated.

Observations

The roof has no covering and is in very a poor and heavily deteriorated condition affected by the following defects: -

- The concrete roof deck is exposes with open joints and various patch repairs afforded throughout.
- The roof is poorly detailed / jointed / bonded to the various upstands, penetrations, drainage outlets and parapet walls.
- The various perimeter upstands at 80mm are considered too shallow and should be 150mm as a minimum.
- The perimeter upstands don't appear to have been fully chased into the parapet walls and plant roof brickwork which is a weak point.
- There is an extensive build-up of vegetation and debris across the roof, blocking outlets, retaining water and further damaging the roof covering.
- The condition of the existing rainwater pipework is unknown. Given the significant build up of debris at roof level, the internal rainwater pipework may be partially or completely blocked.
- We suspect that the concealed internal rainwater pipes are of cast iron construction which are prone to age deterioration and corrosion and therefore, highly likely to be leaking.
- Leaf guards are missing to all of the existing rainwater outlets which will result in blockage.
- Various open joints to parapet wall panels which could allow water ingress.
- Steel staircases sit directly upon roof decks which will need to be considered as part of any refurbishment proposals.
- Heavy debris coverage.

- There is substantial spalling (frost damage) to the main elevation concrete framework adjoining this roof, resulting in exposed reinforcement bars which have corroded due to carbonation.
- The roof houses 2 nr. large electrical transformers and therefore considerable care should be undertaken to avoid these appliances whilst undertaking any repair or re-roofing works.
- 3 nr. roller shutters are afforded to this roof which provide level access to the various plant rooms at this level. Consideration of level access thresholds is required when introducing new roof coverings and possibly thermal insulation.
- 3 nr. heavily rotten and damaged timber plant room doors requiring immediate replacement.
- Heavily rusted steel gates to south parapet. Also, no means of protecting the exposed roof edge from falls whilst these gates are open. These gates require replacement in the short term. Consideration of permanent edge protection whilst these gates are in use is required at the same time.
- Heavily rusted and redundant cat ladder to south parapet requires removal as part of any planned works.

In summary, the roof (which has no covering) and associated elements (including parapet walls and surface water drainage systems) are heavily dilapidated, have reached the end their useful lives and require repair / immediate replacement. Removal of redundant mechanical plant and equipment is required in conjunction with these works.

6.5. Roof 5 (West) and Roof 6 (East) - 5th Floor Level – 330 Sqm combined

Description

Roof 5 (Est) and 6 (East) are of suspended reinforced concrete slab construction, rectangular in shape, and each comprise of an area of approx. 330 Sqm (33m x 5m). The existing coverings comprise GRP/liquid resin which is weathersealed to 750mm high x 230mm thick reinforced concrete parapet walls and solid brickwork external elevation walls with approx. 230mm high asphalt upstands. Above the parapet walls sit approx. 650mm high steel mesh railings.

Each roof is afforded with approx. 19nr. concrete framed square rooflights measuring approx. 1.1m². The rooflights (which are predominantly redundant) are afforded with a combination of Georgian wired glazing, timber boards and GRP coverings.

Both roofs are afforded with substantial mechanical plant (although the west roof has significantly more plant present) including large mechanical ventilation flue ducts and high temperature hot water pipework. These fittings are generally supported by a combination of exposed steel framework and concrete plinths which are supported directly from the roof deck.

A single reinforced concrete staircase is afforded to both roofs providing direct access up to the 6th floor plant rooms.

Both roofs are drained by 6 nr. 100mm dia. RW outlets provided on the internal perimeter edge of each roof. Outlets are spaced approximately 5 metres apart. The outlets duct internally to concealed downpipes (assumed to be cast iron).

We do not believe that these roofs are thermally insulated.

Observations

The GRP/liquid resin coatings to both roofs are in a poor and heavily deteriorated condition affected by the following defects: -

- The liquid resin coatings are age deteriorated, damaged, split and blistered, with various patch repairs afforded throughout.
- The roof coverings are poorly detailed / jointed / bonded to the various upstands, penetrations, drainage outlets and parapet and main wall abutments of these roofs.
- The perimeter upstands don't appear to have been fully chased into the parapet walls and plant roof brickwork which is a weak point.
- There is an extensive build-up of vegetation and debris across both roofs, blocking outlets, retaining water and further damaging the roof coverings.
- The rooflights (which are largely redundant) are in a heavily dilapidated condition. The exposed glazing where seen is cracked and damaged and largely covered by patch repairs. The timber covers are heavily rotten. Complete removal of the rooflights is recommended as part of any planned refurbishment works.
- Significant shrubs (tree saplings) growing out of rainwater outlets.
- The condition of the existing rainwater pipework is unknown. Given the significant build up of debris at roof level, the internal rainwater pipework may be partially or completely blocked.
- We suspect that the concealed internal rainwater pipes are of cast iron construction which are prone to age deterioration and corrosion and therefore, highly likely to be leaking.
- Leaf guards are missing to all of the existing rainwater outlets which will result in blockage.
- Extensive ponding is noted in various areas across these roofs. The existing roof falls are deemed to be insufficient.
- There is heavy rusting to steel railings serving both the parapet walls and access staircases and ideally these should be replaced as part of any planned refurbishment works.
- There is localised spalling (frost damage) to the concrete parapet walls resulting in exposed reinforcement bars which have corroded due to carbonation.
- Heavy pigeon guano which is a health hazard.
- Heavily damaged foam lagging to mechanical service pipework affixed to parapet walls.
- 2 nr. steel cat ladders to Roof 5 parapets sit directly upon roof decks which will need to be considered as part of any refurbishment proposals.
- The low temperature hot water pipework and stainless steel cylindrical ductwork sit approx. 180mm above the roof deck which will need to be considered as part of any refurbishment proposals.
- Heavy debris coverage.
- Large steel framework to the south end of each roof supporting stainless steel canopy ductwork which is damaged and appears partly redundant. Surface rust and peeling paintwork to steel structures. Any redundant plant and supporting structures should be removed as part of any planned refurbishment works.
- 4 nr. heavily rotten and damaged timber plant room doors requiring immediate replacement.
- Various mechanical services affixed to perimeter parapet walls at approx. 300mm above roof deck level will also need to be considered as part of any refurbishment proposals.
- A localised internal inspection beneath both of these roofs revealed heavy long term water ingress and significant damage to ceiling and floor surfaces below.
- Heavily rusted pipework casings.
- Heavily damaged flue ductwork and serve pipework lagging.

In summary, the main roof coverings and associated elements (including parapet walls and surface water drainage systems) to both roofs 5 and 6 are heavily dilapidated, have reached the end their useful lives and

require repair / immediate replacement. Substantial removal of redundant mechanical plant and equipment is required in conjunction with these works.

6.6. North Access Walkway and Staircases

Description

A reinforced concrete raised access walkway is afforded at 6th floor level providing access from the plant rooms to the high level main roof (Roof 1) and lower roofs (Roof 5 and 6) via reinforced concrete staircases.

The walkways are approx. 860mm wide and afforded with 1.25m high x 100mm wide x 50mm thick reinforced concrete balustrades with 40x60mm galvanised steel handrails. The balustrades lean outwards at high level by approx. 300mm which is a purpose built design feature.

The staircases are approx. 640mm wide, incorporating 920mm high steel balustrades (18mm² spindles and 40mm wide handrails). The treads are 160mm wide, the risers are 200mm high.

Observations

Both the access walkway and staircases serving this block are in a poor and heavily deteriorated condition affected by the following defects: -

- There is localised spalling (frost damage) both to the concrete staircases (soffits, treads and risers) and access walkway soffits, concrete kerbs and concrete balustrades, resulting in exposed reinforcement bars which have corroded due to carbonation.
- Heavy salt staining (leaching) to concrete soffits serving staircases and access walkways.
- There are a large number of missing spindles and handrails to the access walkways which is a safety issue.
- There are a number of holes in the concrete walkways which require repair.
- Flimsy and rusted steel steps afforded over mechanical service pipework to access walkways which is a safety issue.
- Corrosion and peeling paintwork to staircase steel balustrades and handrails.
- Staircases very narrow (560mm) and steep.
- Heavy moss and vegetation growth to access walkways.

In summary, both the access walkway and staircases serving this block are heavily dilapidated, have reached the end their useful lives, are affected by a number of safety issues and require comprehensive repair / replacement in the short term.

6.7. Block H External Elevations (5th and 6th floor levels)

Description

5th and 6th floor external elevations consist of an exposed concrete structural frame incorporating solid brickwork infill panels with reinforced concrete window frames inset with a combination of timber single glazed (Georgian wire cast glazing) and aluminium double glazed units. Also, large timber ventilation grilles.

Observations

Whilst the external elevations to the block were seen to be generally level, upright and in a structurally satisfactory condition, the following defects were identified: -

- Various holes and voids in brickwork for service penetrations, a number of which have been removed with the openings remaining allow access to insects, birds and rainwater.
- There is heavy spalling (frost damage) and rust staining to the exposed concrete framework and window surrounds resulting in exposed reinforcement bars which have corroded due to carbonation.
- There is substantial spalling and corrosion to exposed reinforcement to the south elevation of Block H at the junction with Roof 4.
- Heavy salt staining (leaching) to concrete framework and brickwork particularly at high level, emanating from leaking flat roof.
- Heavy surface weathering, wet rot and missing paintwork to timber windows and ventilation grilles generally throughout.
- Various broken windows panes.
- Faulty seals/gaskets to double glazed window panes resulting in significant fog/misting between the panes.
- Various wires and cables strewn about the external elevations which would benefit from improved cable management.
- Various redundant fixings installed throughout these elevations which ideally should be removed as part of these works.
- Corroded, damaged and missing steel rainwater pipes.
- Presumed asbestos cement panels above 5th floor windows. Any proposals to remove or work on these panels must be undertaken in strict accordance with the Control of Asbestos Regulations 2012.
- Various diagonal cracks on south elevations of Roofs 5 and 6 ranging from between 5mm and 10mm in width.
- 2 nr. heavily rotten and damaged timber plant room doors requiring immediate replacement.
- Brickwork and concrete surfaces are generally surface weathered, stained and discoloured throughout.
- An asbestos cement flue pipe is afforded to south end of Roof 6. Any proposals to remove or work on this pipe must be undertaken in strict accordance with the Control of Asbestos Regulations 2012.

In summary, a comprehensive overhaul is required throughout the external elevations of this block in the short term including masonry repairs, window and external door replacements and full redecoration to uphold the integrity of these materials against the elements.

Once again, for the purpose of this exercise which focuses on the condition of the roof coverings, elevations, mechanical and electrical plant and equipment, we have excluded window and external door replacements and full redecoration from our assessment and budgetary costs but can include these elements at a later date if required.

7. COMBINED SERVICES CONDITION SURVEY

7.1. Brief and Survey Scope

In conjunction with our inspection of the structure and fabric of the main roofs and external elevations of Blocks G and H (from 5th floor level and above), we also undertook a visual non-intrusive condition survey of the existing Electrical, Mechanical and Public Health Building Engineering Services installations which we feel would be impacted by any proposed roof replacement and upgrade works.

Appendix A contains our Combined Services report and includes a number of key observations and recommendations for both repair and modification works to the existing mechanical and electrical services plant and equipment both to facilitate the re-roofing and associated upgrade works, and to improve on health and safety and achieve statutory compliance. The report also includes a number of recommendations to remove redundant services plant and equipment in conjunction with the re-roofing works.

8. CONCLUSION AND RECOMMENDATIONS

8.1. Blocks G & H - External Walls / Structure

From a structural point of view, the feasibility of the proposed roof replacement/upgrades for Blocks G & H is contingent upon a holistic understanding of the existing structures, its capacity and fixing capabilities and limitations. The recommended investigations and testing will refine our understanding and will allow a suitable options to be progressed.

The preliminary visual condition surveys conducted internally and externally provided valuable insight into the current condition of the Block G & H reinforced concrete (RC) framed buildings. Whilst the internal condition was deemed fair, external defects, such as spalling concrete and corrosion-related cracking were identified. This is particularly noted to a number of the RC columns and the underside of the RC staircases of Blocks G & H.

As such, further intrusive investigations and opening up is required to determine the scale of the defects i.e., carbonation and corrosion to reinforcement.

The investigations will determine the condition and construction detailing including the below, to a sample of structural elements including:

- Concrete compressive strength in columns, walls, walkways, balustrade
- Reinforcement type, quantity, grade in columns, walls, walkways, balustrade
- Carbonation testing generally
- Chlorination testing generally
- Concrete cover to columns, walls, walkways, balustrade

We also recommend that all existing defects are recorded in detail, are scheduled and are repaired using a proprietary repair system by Fosroc or SIKA or similar.

The urgent remediation works to the corroded column is required to prevent further damage which could further compromise the overall stability of the structure in this area.

The spalling concrete will need to be carefully broken back to expose the full extent of the corrosion. Any loose corroded or flaking material to the reinforcement should be carefully removed using hand tools, and then the remaining corrosion should be mechanically wire-brushed until only sound, solid steel remains.

Once this is done, further inspection by the structural engineer will be required to determine if sufficient reinforcement is still present or if replacement bars are required.

Further to the concrete investigations and repairs, localised repairs to the solid brick infill panels of the blocks are required. The recommended repairs to external walls and structures include the following;

- The removal of any redundant fixtures and fittings,
- Infilling the various holes noted through the brickwork,
- Thoroughly cleaning off the salt staining (efflorescence) across the external walls,
- Undertaking localised repairs to replace the loose and eroded pointing noted to the brickwork,

- Repairing spalling (frost damage) and rust staining to the exposed concrete framework and window surrounds,
- Repairing substantial spalling and corrosion to exposed reinforcement to the south elevation of Block H at the junction with Roof 4,
- Repairing and redecorating heavily surface weathered and rotten timber windows and ventilation grilles generally throughout (excluded from budget cost estimate).
- Various broken windows panes,
- Replacing faulty seals/gaskets to double glazed window panes resulting in significant fog/misting (excluded from budget cost estimate),
- Improved cable management to wires and cables strewn about the external elevations,
- Corroded, damaged and missing steel rainwater pipes.
- Replacement of all heavily rotten and damaged timber plant room doors,

A comprehensive overhaul is required throughout the External Walls / Structures in conjunction with the proposed roof recovering and upgrade works.

8.2. Blocks G & H - Roof Coverings and Associated Repairs

In summary, all of the flat roofs provided to Blocks G & H can be described as being in poor condition, and at the end of their serviceable life. The recommended repairs to the various roofs include the following;

- Replace failure roof coverings throughout with new with new thermal insulated coverings (tapered to improved falls),
- Removal of a significant build-up of debris and vegetation and moss across the roofs and addressing a history of a lack of routine maintenance,
- Improving detailing/jointing/bonding of coverings to main walls, upstands, parapets, penetrations and drainage outlets which is currently poor.
- Improving insufficient roof falls (leading to water ponding on flat roofs), using tapered thermal insulation to prevent future ponding water,
- Removal of debris blockages within roof outlets,
- Provision of leaf guards to outlets where mostly missing,
- Improvements to rainwater management systems throughout,
- Repairs to spalled (frost damaged) concrete structures resulting in exposed reinforcement bars which have corroded due to carbonation,
- Replacement foam lagging to mechanical service pipework which is heavily damaged,
- Removal and infilling of various redundant and dilapidated rooflights and roof hatches to prevent water ingress,
- Removal of various redundant mechanical services plant and equipment (including water tanks and mechanical ventilation ductwork) to facilitate these works,
- Removal of redundant and corroded steel hoists to facilitate these works,
- Redecoration of rusted and peeling paintwork to steel supporting structures generally to uphold the integrity of these materials against the elements,
- The provision of safety edge protection to remove the serious risks from falls from height by maintenance operatives,

Complete replacement of the existing roof coverings throughout Blocks G and H with new thermal insulated coverings (tapered to improved falls), together with improved rainwater management systems, improved perimeter edge protection and various associated repairs are recommended in the short term.

8.3. Blocks G & H – Access Walkways and Staircases

In summary, all of the external access walkways and staircases provided to Blocks G & H can be described as being in poor condition, and at the end of their serviceable life. The recommended repairs to these elements include the following;

- Repair all spalled (frost damage) concrete soffits, kerbs and balustrades which has resulted in exposed reinforcement bars which have corroded due to carbonation,
- Deep clean surfaces throughout to remove heavy salt staining (leaching) to concrete soffits,
- Replace a large number of missing spindles and handrails to the access walkways,
- Repair all holes in the concrete walkways,
- Replace all flimsy and rusted steel steps afforded over mechanical service pipework to access walkways,
- Replace all corroded staircase steel balustrades and handrails.

A comprehensive overhaul is required to both sets of Access Walkways and Staircases in conjunction with the proposed roof recovering and upgrade works.

9. FURTHER CONSIDERATIONS

9.1. Impact on Building Use

The works to the roofs, external elevations, access walkways and external staircases of Blocks G and H can be undertaken in isolation to the aircraft hangars (pens) which are in constant use and independent from these areas.

Similarly, the internal office areas and archive stores located immediately below these roofs are largely redundant and unoccupied and therefore, these areas are largely unaffected.

The various plant rooms located immediately below these roofs will be impacted by the removal of mechanical plant and equipment.

Separate access to these roofs can be afforded via an independent access scaffold (highlighted green) and hoist (1) positioned within the enclosed ground level forecourts housed to the north of Block G, and south of Block H as indicated in the image below.

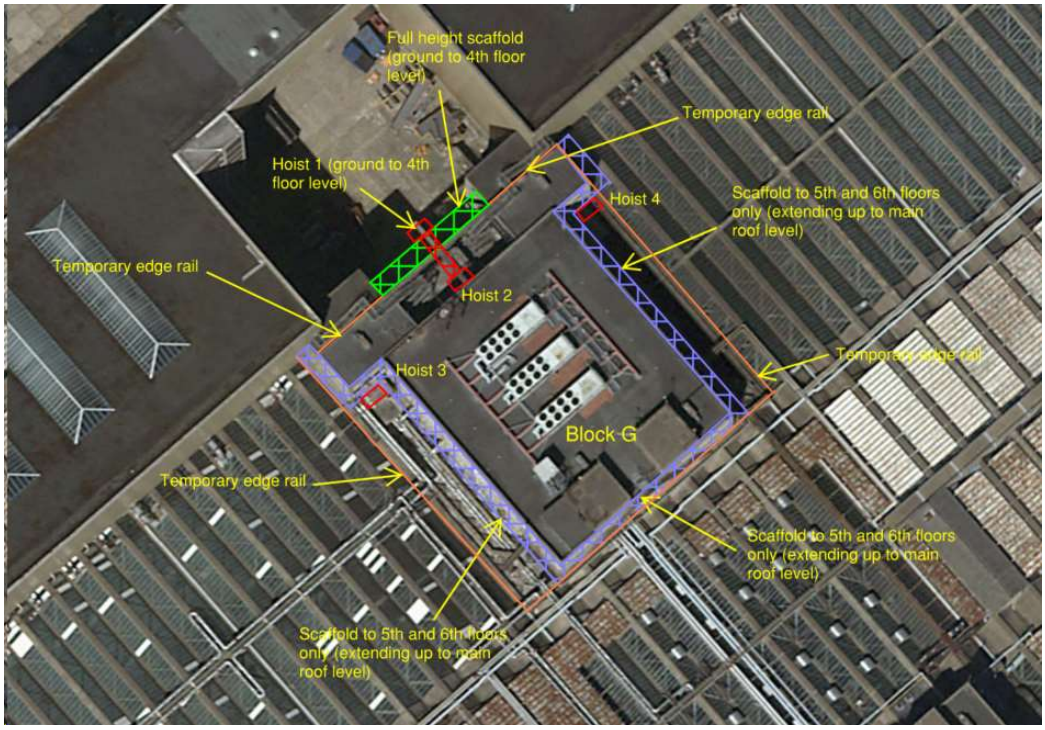

Figure 25 Suggested scaffold and hoist locations for Block G. (Block H has a similar arrangement).

A full perimeter access scaffold will be afforded at 5th and 6th floor levels only (highlighted purple on the image above) to facilitate works to the main roof (Roof 1 and external elevations).

Hoist #1 will allow materials to be transported from the ground level up to Roof 4. A second hoist (#2) will be positioned on Roof 4 and allow materials to be taken up to main roof level (Roof #1). Hoists 3 and 4 will allow materials to be taken down to lower Roofs 5 and 6. These hoist will also allow for rubbish and debris to be transported off of these roofs.

Internal central passenger lifts and staircases provide access for operatives accessing the works areas from ground to sixth floors, without impact the users of the aircraft hangars (pens).

9.2. Impact on Services

The proposed works are located adjacent to live aircraft hangars (pens) and therefore, there is always a risk of falling objects and materials through the roof glazing whilst these works are being carried out.

However, this risk can be greatly reduced through the implementation of a detailed assessment, safe system of work and a detailed work plan implemented by the installer to include: -

- Tethering all tools, materials and plant at main roof glazing level
- Introducing crash decks in the areas of works immediately adjacent to the roof glazing
- Introducing crash nets in the areas of works immediately adjacent to the roof glazing

Ultimately, the risk will need to be fully assessed by the client as to whether aircraft should be removed from each hangar to facilitate the works. Alternatively, it may be possible to sequence the works in ways that allow the aircraft to remain insitu with the works take place in remote areas away from the aircraft. These options will need to be discussed in detail with the building users and all relevant stakeholders.

9.3. Planning and Building Control

The works to replace are likely to require an application to the local authority for listed building consent.

The works will also require a full plans application to the local building control authority.

Project programmes should accommodate suitable time for achieving planning permission and building regulation approval for the works.

9.4. Asbestos

In order to undertake the works as advised in this report, an Asbestos Refurbishment & Demolition Survey will be required. Any contractors undertaking the works should also be given access to any existing asbestos management information.