STANDARD HERITAGE

HISTORIC BUILDING SURVEYOR

BUILDING SURVEY

In respect of;

Radford House,
18-20 Effingham Street,
Ramsgate,
Kent,
CT11 9AT.

Working DRAFT

For;
Ramsgate Town Council

Report produced by

Michael Foley AssocRICS, PDD (Building Cons).

For and behalf of

STANDARD HERITAGE &
AP Cost Consultants

1.12.2022

Contents

1.0 About This Report

1.1 This Building Survey is produced by an RICS surveyor, with qualifications in conservation that are recognised by Historic England and with qualifications in energy efficiency for older and traditional buildings. This service is benchmarked against and above the RICS Level 3 Building Survey, formally know as a RICS Structural Survey The survey, the report and recommendations are in accordance with the British Standard:
BS 7913; Guide to the conservation of historic buildings.

The Building Survey aims to:

- help make reasoned and informed decisions when planning for repairs, upgrading of the property and future maintenance
- provide detailed advice on condition
- help inform project team and their specifications; it is not a schedule of conditions and does not report on every minor defect
- describe the identifiable risk of potential or hidden defects
- make recommendations as to any further actions or advice which need to be obtained.

1.2 Brief

Instructions were received as part of the Project Manager brief at Radford House to undertake a Building Survey and produce a report detailing findings.

1.3 Address of property surveyed (The Property)

Radford House,
18-20 Effingham Street,
Ramsgate,
Kent, CT11 9AT.

1.4 Dates and circumstances of inspections

The inspections were undertaken over a period from July to November 2022 during unusually dry weather conditions in the months up to the end of October. Heavy rain occurred in November

1.5 Surveyor who inspected The Property (The Surveyor)

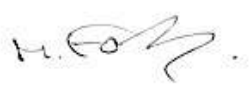
Michael Foley, AssocRICS, **PDD** (Building cons)

1.6 Details of the surveyor's company

Standard Heritage Limited –Company Number 09281715
125 Canterbury Road
Westgate-on-Sea
Kent
CT8 8NL

1.7 Report prepared by;

Michael Foley, AssocRICS, **PDD** (Building cons)



2.0 Executive Summery

Radford House was constructed adapted and maintained up to about 1919 using simple natural building materials such as clay bricks bedded and pointed in with locally sourced and produced lime mortars. The internal structure would have been construed using best quality heartwood timbers, as would have the joinery and the second fixed timbers. The roof would have had plain clay tiles. The ceilings and walls were lath and plaster (lime), decorated with natural paints such as distempers, lime washes and chalk or clay based paints. The glass for the windows would have been made by hand (locally) and the early ironmongery would have been made from iron and early mild steel. Lime washes, distempers, chalk and linseed paints would have been used for decorations. The stucco/ rendering at the front elevation and at the rear bay are of cementitious mortars of the time; early 1900's.

From about 1919 onwards, modern materials have substituted the ones mentioned above, to the detriment of the buildings overall health. There is also a backlog of maintenance works to be carried out. The building is to go through a once in one hundred year re-fit.

The building overall is in a fair condition but requires a list of works to bring the building up to a standard where it only needs routine maintenance. The list of recommended required works are divided up as :

- Now/ Short Term
- Construction Phase

For the benefit of the readability of this report, elements of Radford House will be described (Unless otherwise stated) as if looking on plan and viewed from the street i.e. to the left, right, front, back and divided up and described as:

a) The Main Building; this is the original house constructed at the beginning of the 1700's, with a latter addition for a stairwell

b) The Rear Wing; this is the two story construction added at the back and to the left of Main Building. This was added by1822 but extended up, date unknown

c) The Drill Tower

d) The Extensions; these are the flat and mono-pitched constructions situated centrally and to the right of the back of the Main Building, one houses the ground floor toilet and the other the horse drawn Carriage Entry in to the Appliance Bays

It will be beneficial for the reader to read through a previous draft report produced by Fiona Raley before or in conjunction with this report. It is also important to read through the Historic England listing for 'The Place' as this report tries not to duplicate previous work or descriptions unnecessarily so.

2.1 Works required

Now/ short term

- Clean out the boxed gutters and re-inspect the lead work
- Re-fix the flashings at the front parapet and render the exposed brickwork
- Re-fix / re-place the slipped / broken slates
- Remove the aerials and the cables from the main roof
- Remove foliage from right-hand wall
- Repair the flat roof over the stairwell
- Repair the flat roof over the toilet
- Repair the mortars at the flashings at the rear bay roof
- Clear the gutters and the drain at the back of the building
- Overhaul the rainwater downpipes and run a temporary pipe for the downpipe at the right-hand wing, so that water discharges in to the drain
- Repair leaking perimeter gutters
- Hack off cementitious plasters that have been affected by dampness
- Repair the cracks in the front elevation render with a non-hydraulic hot mixed lime and lime grouting as a temporary measure
- Provide temporary drain at side entrance
- Grind back the corner of the floor slab that's sticking up in the appliance bay
- Clear loft spaces and provide crawler boards; add loft insulation

Construction Phase

Main roof area

- Reduce weight of loft hatch and add loft ladder
- Hack off loose OPC mortars and metal corner beading etc. at the parapets and repair with a specified lime mortar
- Provide coping stones to the parapets
- Add cross flow ventilation to the roof spaces
- Fit rain cap to the only chimney pot
- Provide ventilation to all of the chimneys
- Hack off loose OPC mortars at the chimney stacks and repair with a specified lime mortar
- Re-do the lead work at the gutter outlets
- Repair the flashing /poor detailing where the rear wing roof meets the window sill
- Replace OPC mortars with lime at all lead flashings
- Recover the stairwell roof
- Replace or repair and recover the asphalt roof over the ground floor toilet
- Replace or repair and recover the asphalt roof over the Carriage Entry
- Recover the lead roof over the rear bay
- Add vent terminal cap to top of soil stack
- Re-design and run the buildings RWG and above ground drainage
- Carry out below ground drainage repairs as per drain survey recommendations
- Run Acco type drains at the front of the Appliance Bays, at the Carriage Entry and the side door
- French drains around the buildings perimeters ,depending on what happens to the external ground levels

- Repair the façade render and the render at the bays
- Remove cement pointing from the brickwork and repair/replace any broken bricks
- Remove all loose OPC work from the reveals at the windows and the side door, repair with specified lime
- Remove the OPC plinths around the bases of the walls and re-render with lime and lime wash
- Check the arches at the side of the Main Building
- Re-set the top left hand rear arch of the Main Building
- Repoint the brickwork around the central top window at the back of the Main Building and re-work the arch
- Remove any metal work built into the masonry
- Replace the decayed flush door at the chamfered corner of the drill tower
- Redecorate the external joinery
- Restore old phone box at front elevation
- Rationalise the wiring attached to the external walls
- All the pipes/ services etc. that penetrate the fire breaks/ fire compartments need to be checked for fire stopping and upgraded where necessary
- Replace the lathe and plasterwork where its missing at the front wall on the second floor
- Carry out localised repairs to internal plasterwork, second fixed timbers etc .and re-decorate.

Further Inspections/ Recommendations

- Carry out moisture profiling of the damp effected masonry and monitor
- Inspect the the right-hand wall and the condition of the single story structure at the neighbouring property
- Inspect the training tower roof
- Check all structural opening supports on the ground floor (Structural Engineer)

- Check roof spaces
- It is recommended a qualified persons from NICEIC test system as the electrical safety certificate runs out in January 2023
- Inspect the dilapidated building at No.22 and the right-hand wall of the Main Building.

3.0 Property Overview

3.1 Description

Historic England describe and list the building at 18/20 Effingham Street, Ramsgate as;

'Heritage Category: Grade: II Listed Building

List Entry Number: 1101734

Date first listed: 04-Feb-1988

Statutory Address:
Kent Fire and Rescue Services, 18-20 Effingham Street, Ramsgate, Kent, CT11 9AT.

Summary
C18 house converted and extended in 1905 under the direction of Borough Engineer T G Taylor to serve as Ramsgate Fire Station.

Reasons for Designation
Ramsgate Fire Station on Effingham Street is listed at Grade II for the following principal reasons:

Architectural interest:

* as a well-preserved fire station of 1905, adapted from a large C18 house, retaining a range of distinct features from both periods.

Historic interest:

* as a clearly legible example of how local brigade fire stations were planned and operated in the early C20.

History (Ramsgate)

Ramsgate is situated on the east coast of the Isle of Thanet, facing France and the Low Countries. Originating as a fishing village within the medieval parish of St Laurence, Ramsgate's development from the C16 was driven by the strategic importance of its coastal port. Late C17 trade with Russia and the Baltic resulted in a wave of investment and rebuilding in the town. In 1749 the construction of a harbour of refuge from storms in the North Sea and Channel was approved, and a cross wall and inner basin were completed in 1779 to the design of John Smeaton. Later improvements included a lighthouse of 1794-1795 by Samuel Wyatt and a clock house of 1817 by Wyatt and George Louch.

Into the mid-C18 Ramsgate became increasingly popular as a seaside resort, its expansion being accelerated by road improvements and faster sea passage offered by hoys, packets and steamers. In the town, an assembly room, warm water baths, subscription libraries and places of worship were joined by new streets such as Effingham Street; which became the most desirable residential street in the town. The present fire station building, initially known simply as 'Effingham House' was in the C18 the house of Admiral William Fox (1733-1810). By 1829, the house had been acquired by Richard Tomson of the local brewers Tomson and Wotton and some modifications and minor extensions to the rear of the house were made in the decades that followed. The house had, until the end of the C19, extensive grounds to the rear which extended to the west and north as far as Elms Avenue and Clarendon Gardens; this land was subsequently parcelled off to become the site of Clarendon House School and Ramsgate Library.

As the town grew following the arrival of the South Eastern Railway's branch line in 1846, a series of major urban improvements were made. The construction of Royal Parade and landscaped paths to join the upper promenades to the seafront and Undercliff walks responded to and encouraged the town's burgeoning tourist industry, whilst new hospitals, schools and services were established to serve the expanding permanent population of the town. During this period of investment, the Effingham Street site was acquired for the Ramsgate Fire Station, with conversion and significant rebuilding work conducted in 1905 under the direction of Borough Engineer T G Taylor. A plaque affixed to the façade records the opening of the station by the Mayor, R Dowling Esq, on 17 October 1905.

The Ramsgate Station opened at the beginning of a period of transition for fire stations across the country. In 1905, the Red Lion Street station in Wapping became the first to be designed specifically for motorised fire engines, setting a precedent for brigades across the country. Bromley was the first brigade in Kent to acquire motorised engines in 1910, with Ramsgate following five years later when Dame Janet Stancomb-Wills, a member of the town council and a major benefactor of the town, donated funds for this purpose. The transition towards the use of motorised engines came too late to influence the design of the Ramsgate Station, which was arranged along the lines of standard mid-sized stations of the late C19 to accommodate two horse-drawn fire carriages. A narrow range to the western end of the site, consisting of several small outbuildings and an enclosed yard is shown on the Ordnance Survey (OS) map of 1907 (Kent, 1:2500). This may have been the stabling block for the station, possibly converted from earlier structure associated with Effingham House which is shown on the OS map prior to the 1905 conversion (Kent, 1896, 1:2500). Into the later C20 the additional buildings on the station plot were cleared, including a narrow building at 18 Effingham Street, which is shown on OS maps until 1978.

Elements of the external form, roof structure and some internal fittings appear to survive from the early to mid-C18 house. However, most of the existing station is the product of the 1905 conversion. The main operational area (the appliance bay/engine house), control office and hose-drying/drill tower remain with only minor alterations since 1905. Some later modifications have been made to the upper rooms, with an arrangement consisting of mess rooms, kitchens and changing areas and dormitories with modernised kitchen and toilet facilities along with later external stairs (added around 1980) to the rear of the building.

Details:
Early to mid-C18 house converted in 1905 under the direction of Borough Engineer T G Taylor to serve as Ramsgate Fire Station.

MATERIALS:
stock brick, rendered to main elevations, with slate roof.

PLAN:
three-storey, double-range house running parallel to Effingham Street with a range to the rear with a hose-drying/drill tower. The two-bay ground floor is mainly occupied by the engine house/appliance bay which fronts onto Effingham Street. A control/watch room is set to the rear on the south side with a shallow single-storey projection to the north; this originally for taking in the horses from the rear yard. Above, on the two upper floors are the dormitories, a mess room, kitchen and kit room for the brigade.

EXTERIOR:
the principal façade has a rusticated ground floor with a cill band, a plat band with 'RAMSGATE FIRE STATION' inscribed on the second floor and a modillion cornice parapet with stacks to the left and right. The second floor has three evenly-spaced sashes, with a pair of tripartite sashes flanking one central single sash on the first floor (the upper leaves with glazing bars), these with incised keyed lintels over. Two large, replacement glazed metal carriage doors occupy the ground floor with heavy cornices on double brackets marking these out. The piers to the carriage doors have rounded edges, to prevent scuffing. Set between the carriage doors is a central oval bronze dedication plaque (fibre glass copy) with a fire bell button (since lost) in a keyed surround which records the date of opening (17 October 1905) and the town dignitaries present. Above the plaque is a wall-mounted fire lamp.

The rear elevation is comprised of a combination of later C19 additions and some rebuilding and new fenestration from 1905. The two-storey, shallow-pitched rear wing (extending from the south-west corner of the C18 core of the house) was added by 1873, although its present form is principally a product of the 1905 scheme. The most notable element of this projection is the four-storey hose-drying/drill tower at its west end, which is of stock brick with openings on its west face marked out with glazed purple bricks (the openings all fitted with modern metal shuttering). The projecting wing has a chamfered corner at ground-floor level, occupied by a narrow plank door to the workshop/store and sheltered by a stepped-brick projection. The north side of the rear elevation has a projecting single-storey range of 1905 with double carriage doors giving access from the yard to the appliance bay. Above this are two broad rendered bay windows. The central sashes of these bays have been replaced with escape doors and most of this portion of the elevation has been obscured by external metal stairs, added in around 1980. The side elevations are of plain yellow (stock) brick, with some rebuilding and repointing to the gable ends on both sides; the southern elevation with two narrow inserted sashes to the first floor and a door to the watch room to the west.

INTERIOR:

the appliance bay or engine house is simply divided into two carriage bays, with a cast-iron column with an acanthus leaf capital supporting a riveted steel transverse beam in the centre. The appliance bay walls have mottled teal tilework with brown border tiles to dado level. To the rear of the appliance bay, set centrally, is a stone, open-well staircase with decorative cast-iron splat balusters and a hardwood handrail which is turned around a curtail step at the base; this is probably retained from the original Effingham House arrangement. The watch room (control office), to the south of the stairs, has simple tongue-and-groove dado panelling, built-in cupboards and a pair of part-glazed panelled doors; one to the appliance bay flanked by narrow margin lights and another to the west side, which is set within a multi-paned glazed screen (this separating the watch room from a distinct workshop/store which can be accessed from the rear drill yard).

The upper floors retain several simple four-panelled doors, fragments of tongue-and-groove panelling, a series of window and door surrounds, skirting and some plaster cornice detailing; most of which appears to belong to the conversion of 1905, although it is possible that some earlier joinery may have been reused and some of the plaster work is potentially of greater age. A notable feature, contained within the rear dormitory room on the first floor, is a blocked and partly obstructed fireplace with a fine Adamesque surround featuring swags and floral ovoid motifs to the architrave (another probable early fixture from Effingham House).

The hose-drying/drill tower and the workshop/store within the rear range were not inspected internally.

SUBSIDIARY FEATURES:

a simple single-storey, flat-roof kit store of around 1930 is situated in the north-west corner of the rear yard; this does not contribute to the special interest and is not to be treated as part of the listed building'.

End of Historic England listing.

Radford House; Front elevation

Radford House; Rear elevations

The Historic England listing focuses mainly on the development the place from a substantial detached Georgian house to a fire station.

'Elements of the external form, roof structure and some internal fittings appear to survive from the early to mid-C18 house. However, most of the existing station is the product of the 1905 conversion'. -Historic England 2022.

However, it is important to understand how the building was originally constructed and it's original form.

Please see the image of the front elevation of a typical detached Georgian building as an indication to how the building would have looked before its conversion to a fire station.

Typical design of a detached Georgian building

Image; *Countryside Books; Georgian and Regency Houses Explained by Trevor Yorke*

The front and rear elevations of the original building have been radically changed. All but two of the original structural openings at the front elevation have gone, including the one for the front door entry. The surviving openings are the centrally located windows at the first and second floors. Only one opening remains at the rear, which is at the second floor, to the left.

There would have been a suspended timber upper ground floor with steps up to it, which has been removed. There would have been a basement/ lower ground floor area, which has been back filled.

There would have been a geometric open stringed staircase going up centrally through the building. The staircase has been removed and a rear addition has been built to house the current staircase.

There was central a masonry spine wall that would have been set on stepped foundations that ran from left to right of the building, which helped support the structural timbers such as the central roof timbers, the floor joists, which run from front to back. The spine wall has been removed at the ground floor level and is supported by structural metalwork; beams and a post.

The first floor retains its original layout, (with and addition built for a shower). The second floor has had its trussed walls removed from the front of the central spine wall but the rear part of the floor generally follows the layout of the floor below.

Once the original form of the building is understood, the following additions and how they have been built on to it become clearer.

Rear elevation of Effingham House in 1865

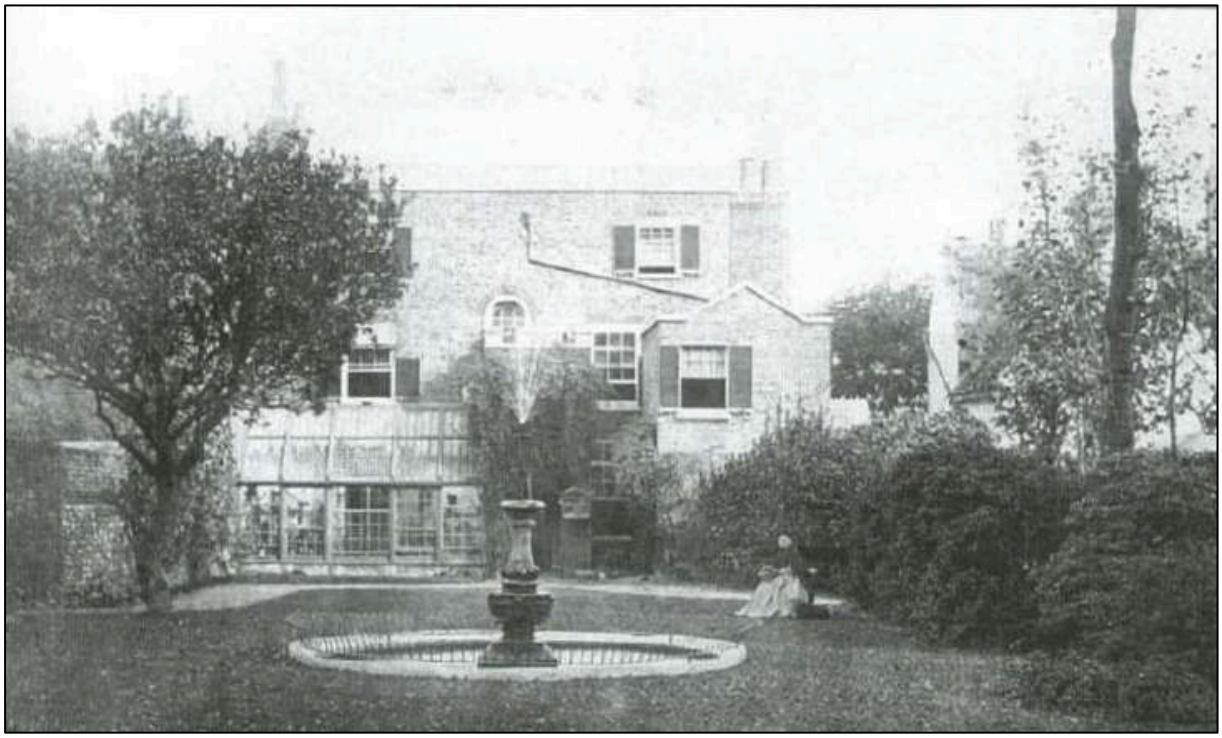


Image taken from Fiona Raleys report and subject to the same copyright clearance
'Book of Ramsgate, Busson (?) Michael's Bookshop

3.2 Construction Principles

It should be noted before reading this report that there are two distinct construction types in the UK. The first being traditional construction, which is recognised in the UK Building Regulations and Approved Documents (AD) under the headings of; Historical and traditional buildings where special considerations may apply (AD L1B & AD C) *buildings of traditional construction with permeable fabric that both absorbs and readily allows the evaporation of moisture*. The second type (modern) uses impermeable building materials and relies on impervious barriers to resist the passage of moisture from entering a buildings envelope. When modern building materials are applied to breathable building fabric, their impervious nature tends to trap moisture, which often results in dampness. It should also be noted that pre 1919 buildings are typically of traditional construction.

Important note on modern building materials

Hard cement based and other impervious materials applied either internally or externally (this includes, cement render, internal cement plasters and non-breathable masonry paints) are inappropriate for traditionally built solid walled, lime mortared and pointed construction. This is for two main reasons:

- Masonry walls built with lime mortar joints are able to move and flex with the seasons – cement is totally rigid, and when flexing in the walls occurs, the render/plaster cracks, as does cement mortar used to point the wall damaging the masonry. Water is able to penetrate the cracks, and builds up behind the cement, masonry paint and the pointing, causing high moisture levels in the wall. The trapped moisture then damages the faces of the bricks when it freezes and expands during the freeze/thaw cycle; this is known as spalling.

- Masonry walls pointed with lime externally and plastered with lime internally have the ability to let moisture escape from the materials and allow evaporation of moisture; this is commonly referred to as a wall being able to 'breathe'. If the wall is sealed internally and externally with impervious cement or paints, this process of moisture evaporation cannot occur and results in damp manifestation.

Note - Further reading and referencing for statements made in respect of why modern and impervious materials (such as cement renders and plasters) are not appropriate for solid walled buildings and the importance of maintaining breathability can be found at:

- BS 7913:2013 – Guide to the conservation of historic buildings
- The Society for Protection of Ancient Buildings (SPAB) Technical Information Sheet No 4 – The Need for Old Buildings to Breathe 1993
- The SPAB Technical Pamphlet No 5- Repointing Stone and Brick Walling
- English Heritage/ Historic England – Practical Conservation series; Mortars, Renders & Plasters. Earth Brick & Terracotta. Stone

4.0 Building Exterior

4.1 Roof Areas

The Main Building

The roof is accessible via a loft hatch in the ceiling at the front area of the second floor of the building and an extremely heavy lead covered timber hatch.

The roof over the Main Building is a hand cut and double piled (M shape) timber structure with Welsh slate covering the pitches, the ridge tiles are of blue clay, with piping top detail. The slates are fixed to close boarding with an impervious bitumen felt underlay. The roof ridges are parallel to front and rear elevation walls. The roof structure looks like a Victorian replacement. The original roof would have had much lighter timbers and it would have been covered with plain clay tiles hung on timber pegs which would have been referred to as ' Kent pegged'.

There are three timber lead covered stepped boxed gutters, which discharge through the parapet ends via leaded gutter outlets; there are parapet walls all around the main roof and up to the chimney stacks.

There are four chimney stacks; one stack at each end of the roof piles/ridges.

Aerial view of the roof looking from front to back

The central pitches of the main roof looking to the left from the central boxed gutter

The central pitches of the main roof looking to the right from the central boxed gutter

Example of timber roof structure

The ridge tiles have been bedded and pointed with modern Ordinary Portland Cement (OPC) based mortars. Even though they have been bedded and pointed with cement, which will tend to crack, there is no need to replace the mortars.

There are areas of rendering inside the front parapet which has failed, the OPC mortars need repairing, this should be done with a NHL 2 mix as soon as possible.

The lead flashing at the front parapet has come away from the wall, this will need to be clipped/wedged back in to the wall and a temporary NHL2 mortar mix used for a repair now as there are signs of (historic) rainwater ingress internally below. Note the surveyor pushed back the flashing in to the mortar joint as best as possible.

There are about 25 broken/ slipped slates, which need to be replaced now.

The parapet walls and the chimney stacks have been rendered with OPC mortars, which are failing extensively.

There are missing coping stones at the front and back parapet walls. At the front parapet the tops of the walls have been bodged with a combination of OPC mortars and rusting metal corner beading. The copings at the rear have been cast in-situ and do no have a drip detail inside the parapet.

Note;
Drip details are groves under front edge of a sill. The grooves are designed to throw rainwater away from the wall and prevent water from running under the sill and into the sill / wall junction. Missing / faulty drip details can allow rainwater to soak a wall locally and cause accelerated decay to the buildings fabric.

Foliage (Buddleia) has exploited the defective mortars at the front and rear parapets.

Foliage has appeared over the parapet and chimneys to the right, some of which was identified as Ivy. The foliage needs to be trimmed back. Note; any work carried out to the foliage must comply to the Wildlife and Countryside Act 1981; https://www.legislation.gov.uk/ukpga/1981/69

Note;
Any trimming work to the foliage at the roof area must done outside nesting bird season (early March to the end of July) and not outside the bat hibernation season (November to May) as the foliage growing up the right-hand wall of the main building may be used as a (temporary) hunting roost in late spring to late autumn. It is therefore recommended that an Ecology Survey be carried out to any chance avoid disturbing bats and the birds hunting/nesting season. The Ecology Survey should encompass the curtilage of Radford House, including the tile-hung wall of the property at 22 Effingham Street which is a potential bat hibernation/general roost. Additional note about reducing foliage; foliage such as Ivy should be trimmed carefully from the top down and not cut at the plants base. If Ivy is cut at its base, it will go into survival mode and send out roots in to the buildings masonry, potentially causing damage along with secondary damage of removing the roots while the plant is being removed.

For further information on managing Ivy in the historic environment please see the research document on the subject carried out by Historic England;
https://historicengland.org.uk/research/results/reports/7287/IvyonWalls_InterimSummaryReport

Note; the foliage growing up the right-hand wall has now been cut back at low level but some of it remains at high level, this will need cutting back and removing as best as possible, any remaining deep roots need to be treaded with a systemic, broad-spectrum glyphosate-based herbicide. This applies to all areas. Ideally this should be done before the next nesting season.

Inside the roof space there is no provision for cross-flow ventilation, this is due to the impervious bitumen felt underlay that has been laid between the slates and the roof timbers. Bitumen felt underlay was a relatively new intervention that came about around 1919 as the technology at the time allowed bitumen to made in to wide sheets that could be rolled up for transport and rolled out on the job. The felt was added to provide a secondary barrier against wind driven rain and snow penetration. However, the impervious nature of the felt effectively cut off the 'incidental ventilation' (draughts) which previously serviced the roof and held keep the building fabric dry in the event of rain/snow penetration or leaks. It is recommended that ventilation is provided to the internal roof areas, this could be done with traditional cast iron vents fitted at the top of the gables.

	Example of a slipped slate at ridge tile on the rear pile, to the left Note; the ridge tile will need to be removed to replace this slate
	Missing slate at the centre of the front pitch of the rear pile Notes; • Rainwater will be able to penetrate the roof here as there is no coverage provided by surrounding slates or the felt/undersarking The surveyor slipped a slate back in for temporary covering repair
	Failed cement work and flashing at the front parapet
	Buddleia growing at the top the rear parapet

Chimney Stacks

The chimney stacks are (all but one) missing their chimney pots. The pots have been replaced with rounded ridge tiles over the chimney flues as vented flue caps; this is practical but not in keeping with the character of the building and that of the street scene. It would benefit the buildings character if period correct clay pots were re-instated, (there would have to be a decision on which period of the buildings history for the reinstatement). This would require Listed Building Consent, alternatively the current flue caps could be left in place and maintained, this would not require Listed Building Consent. The existing pot needs a rain cap.

Note;
Unused chimneys need their pots to be capped with cowls/rain-caps and the flues vented at low level, this is to provide cross-flow ventilation inside the flue, this prevents condensation building up inside the flue and prevents rainwater from entering the flue. Masonry/ plasters in an around chimneys can become contaminated with salts from the historic burning of fossil fuels which produce soot. The soot deposits on the inside of chimney flues contain salts, if they get wet because of condensation formation or rainwater penetration the salts will diffuse in to the masonry and can appear on internal walls. These salt deposits are highly hygroscopic, which means they will absorb moisture from the air. Once internal relative humidity's exceed 80% (18°) the salts will absorb the moisture in the air and become damp, staining decorative finishes.

The OPC mortars at the crown areas of the chimney stacks and the flaunching have failed, particularly at the flaunching. The failed mortars need removing and redoing with a specified lime mortar. The flashings under the OPC mortars will need attention or replacement.

It should be noted that stripping all of the OPC mortars from the parapets and stacks may cause irreversible damage to the bricks where it is firmly attached. Localised repairs would be the initial approach. Some design work needs to go into the repair mortar mix so as to produce a 'harmonised' finish. The flaunching can be done with a NHL 5 (Natural Hydraulic Lime) mortar mix.

	The remaining chimney pot Note; Cracked and failing OPC mortars
	Current flue capping's Note; Cracked and failing OPC mortars
	Example of weathering detail at bottom of a stack

The lead work covering the stepped timber boxed gutters is in good to fair condition. It should be noted that there was debris from the failed mortars and a TV aerial in the gutters. The gutters need to be cleared and the areas made spotless, along with taking down the aerials and satellite dish attached to the stacks. Once cleared a second more detailed visual assessment can be carried out. Note; a welded repair was noted at the back right-hand gutter.

The gutters discharge through gutter out-lets in the parapet walls. The masonry is supported by slate bridges. The quality of the lead-work at the outlet discharge is poor; the rainwater bypasses the rainwater hoppers at the tops of the downpipes during heavy rain. The lead-work at the gutter outlets will need re-doing/working. Rain water also runs along the wire in the central gutter bypassing the hopper, causing raised moisture contents in the external masonry.

Water was seen to be ponding at the left-hand end of the back gutter. Rainwater should discharge completely from a roof. The lead work to the gutter outlet has been poorly dressed in and there are exposed timbers on show. Repairs to the corner brickwork here and at the front have been carried out using OPC mortars. Further accessed inspection is required to define what repair work needs to be done.

The left-hand side of the rear gutter

Notes;

- Water ponding at the gutter outlet
- Poorly dressed leadwork
- Cement mortars used in brickwork
- Exposed timbers

Section Summary

The masonry at the roof area has been maintained, repaired and adapted using OPC mortars, which have failed (inevitably) extensively. A careful programme of repairs is required, one that does not cause irreversible damage to the masonry. It is difficult to ascertain the repairs until work starts and as with the gutter outlets accessed and close inspection is needed.

The parapets need protection in the form of coping stones to arrest the decay to them that is being caused by rainwater ingress in to the tops of the masonry.

A conversation needs to be had about what to do with the chimney flues and the missing pots. However, no matter what happens, the flues must have some form of rain capping and adequate ventilation to prevent dampness in the chimney breasts throughout the building.

The missing slates need to be replaced as soon as possible and the loose piece of flashing at the front parapet re-fixed.

The weight of the roof hatch needs to be reduced and a decent ladder/access to the roof space provided because as it is currently barely open-able from the top of an extendable ladder. This should be included in the CDM.

The roof slate covering is in a serviceable condition and provided that it is maintained properly, it will continue to do its job indefinitely.

Lead runs in the boxed gutters are on the long side but there are no signs of thermal splitting; they are to be monitored. Generally lead-work has an average expected lifespan of + 100 years.

It should be noted that OPC mortars are particularly incompatible with lead as the material always fails due to its brittle nature when the lead expands an contracts with the suns heat and seasonal thermal expansion.

The Rear Wing Roof

The Rear Wing roof is traditionally hand cut and pitched timber structure with Welsh slate covering the pitches; the ridge tiles are of blue clay with piping top detail. The roofs ridge is parallel to left and right flank walls of the rear wing. The roof extends out from the Main Buildings rear wall. The left-hand pitch has been cut around the training tower and finishes as half gable end. The right-hand pitch buts up against the Training Tower. The roof has been finished with lead flashings at the abutments. OPC has been used for all the mortar work. The roof is in good shape and without any deflection. The ridge tiles and slates are all in place. The right-hand pitch has been 2/3rd's recovered with new slates.

The provision for cross flow ventilation needs to be established, this will require some dismantling of the suspended ceiling below to gain accesses to the lot hatch into the roof space. The condition of the roofs timber structure can not be commented on until access is provided.

	The left-hand pitch of Rear Wing Note; roof cut around training tower
	The right-hand pitch of Rear Wing

There is some poor detailing where the right-hand pitch meets the building. The roof line is too high, this has led to the flashing clashing with the window cill and attempts to repair/ get over this have been made using OPC mortars. It should noted that a defective window sill can soak a buildings wall; the wall internally has been dry-lined with a plastic sheet incorporated, indicating rainwater penetration. The OPC mortars will need to be stripped from the flashing and the window sill, the lead work inspected and an on-site remedy/ developed.

Poor detailing at the right-hand pitch where it meets the main building

Note;
OPC bodged in at the end of the cill

Apart from the OPC mortars and the poor detailing where the flashing clashes with the window cill the roof in general is in good to fair and in serviceable condition. It would be of benefit to the roof if the OPC mortars at the flashings were replaced with lime mortars.

It was not possible to inspect the roof at the training tower. Accessed inspection is required.

The Flat Roofs

The flat roof over the stairwell at the back of the building been adapted in the form of a lean-to mono-pitched roof, this was probably to give extra ceiling height after an adaptation to the internal staircase, the masonry has been built up here too.

The roofs timber structure has mineral bitumen felt covering. The roof has been patch repaired relatively recently. The roof covering is failing and it's at the end of its life – the roof was found to be leaking after heavy rainfall. The roof needs replacing. Temporary repairs need executing particularly where the felt has been poorly flashed into the wall as there are signs of long term water damage in the ceilings below. The roof was found to be leaking after heavy rainfall in November. This the roof also clashes with the window sill above it.

This roof is what is known as 'cold deck' but there is no provision for cross-flow ventilation. Cross-flow ventilation is essential in this roof type (cold deck) to remove any condensation, which will tend to form on the underside of the decking material and cause problems such as black mould formation and timber decay.

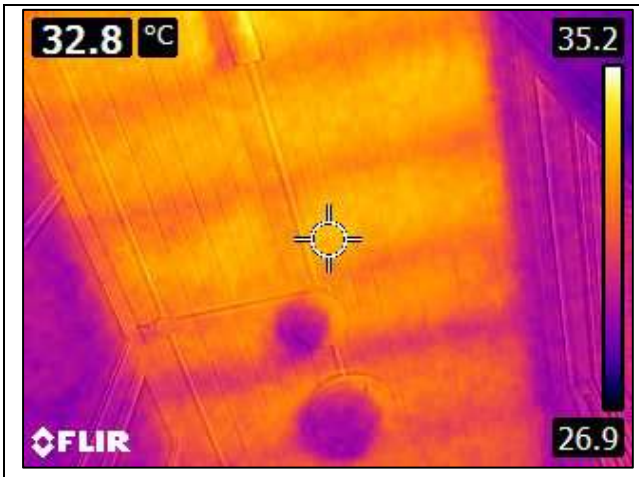
The flat roof was viewed from underneath with a thermal imaging camera in the summer for areas where there is potential for heat gain and cold bridging which will lead to condensation forming inside the roofs fabric. Condensation that forms inside a buildings elements and fabric is called 'interstitial condensation'. Interstitial condensation can and does go unnoticed until damp problems manifest internally. See web-link for more detail; https://www.designingbuildings.co.uk/wiki/Interstitial_condensation

When the flat roof covering is replaced, a well designed hybrid warm deck could be used to avoid problems associated with cold decks. See this web page for clear explanations of roof types; http://www.classicroofing.ie/docs/insulated.html

It should be noted that a change of roof covering material will need planning permission.

	The flat roof over the stair well

Thermal imaging of the underside of the stairwell roof



Notes:

- Exessive heat gain durning the summer seen by the bright colours in the image will translate to exessive heat loss in the winter
- Condensation will be forming on the building fabric inside the roof space

Comparative Digital Photograph

The flat roofs over the toilet and the rear carriage entry have been covered with asphalt. Asphalt was typically laid (hot) in two coats of about 3/8ths to ½ an inch (10/ 12mm) thickness with up-stands formed in the top coat which was worked into a mortar joint up forming skirting and a watertight seal. This up-stand/skirting detail was typically run up two brick courses (150) mm, this was done to protect the masonry from additional rainwater and dampness at the rain 'splash zone'. The skirting detail at both roofs has only been run up one brick course. This 150mm detail must be considered in re-covering/repair works.

The roof over the toilet has been poorly maintained, particularly at the up-stands at the roofs abutments / perimeters. The roof was found to be leaking after heavy rainfall in November.

These roofs are unventilated cold decks. The condition of the roofs timbers need to be established, this will require opening up works.

Cement mortars have been used as repair material at the abutments, which is failing.

Foliage is growing at the abutments. The asphalt has been run over lead dressings at the roofs end, the lead-work has lifted to the right (as seen facing) and it has melted over the lead to the left. There are various blisters in the asphalt. The blisters are caused by trapped moisture under the asphalt which expands as when heated by the sun. This moisture is probably caused by condensation caused by excessive humidity from the toilet and shower below.

The roof over the Carriage Entry is in a better condition but with some splitting to the asphalt, and some cement work at the up stands. The roof has been built on to by the rear fire escape and part of this construction is some foot traffic tiles; an asbestos survey was carried out recently, it needs to be confirmed that the tiles were checked.

Rainwater from the roof of the dilapidated next door is being discharged onto the fire escape and the roof over the Carriage Entry. This is causing dampness in their wall. Also rainwater is ponding on the roof.

It should be noted that asphalt has been used a roofing material in the UK since the late 1830's and it is a repairable material. The Victorians (and Edwardians) used it as an alternative to expensive metal roof coverings.

The metal fire escape has been built off of the flat roof. The posts have good detailing at their bases and the asphalt has been run up to them.

Flat Roof Areas

Roof over the toilet /shower

Notes:

- Foliage growing in the up-stands
- Cement used in the mortar joints
- Blistering asphalt
- Melted asphalt

Roof over Carriage Entry

The roof over the rear bay has been covered with lead; this is for all intent purposes an unventilated cold deck roof. The lead work hasn't been properly detailed at the drip; the lead hasn't been returned on itself, the lead at the central roll is lifting because of this and there is a split at the left right-hand edge where the material has folded on its own. However the lead is doing its job of shedding rainwater and just for now only needs some maintenance at the flashings. The condition of the roofs timbers need to be established, this will require opening up works. The lead roof (along with insulation) should be recovered.

	Roof over the rear bay

4.2 Rainwater Goods and Drainage

The Rain Water Goods (RWG) ie. the gutters and the rainwater downpipes are a mixture of cast iron and U-pvc. The rainwater discharge from the leaded boxed gutters at the main roof areas has been covered earlier and this part of the report should be considered as a continuation of that section.

The foliage growing the right-hand elevation was partially stripped in November 2022 thus exposing the masonry and the rainwater downpipes. The central pipe is blocked at the joints and rainwater is overflowing on to the masonry, saturating it. This situation correlates to the internal damp stains and damage to the wall finishes inside the building. The downpipes at the lower levels have been altered; the font and rear pipes have been run centrally but the front pipe has become dislocated and is discharging rainwater on to the wall and down the side of the neighbors structure. It is not possible to properly see how the pipes discharge due them being in the neighboring property. This situation is so bad that rainwater was observed penetrating the building fabric and emerging on the inside of the wall at the ground floor.

Examples of rainwater penetration form the defective downpipe

Note; arrows indicate where the pipe is blocked and leaking and how it relates to the internal wall

The rainwater downpipe at the front left of the Main Building discharges into below ground drainage via a hopper which is shared with the waste from the showers on the first floor. Hoppers like this are prone to blocking and need regular routine maintenance. Note; water from waste pipes are considered as 'foul waste' in the Building Regulations' and should not discharge into above ground drainage systems. The central left hand rainwater downpipe discharges on to the ground, this may be causing localised dampness in the masonry. Rainwater was observed running down the wall from the gutter outlet, there are a couple of wires that run through the gutter outlet, rainwater is running along them and bypassing the hopper at the top of the downpipe. Rainwater from a leak in the RWG has washed away some of the pointing mortars around the downpipe. Also, additional, concentrated rainwater is running off the ends of the pitched parapets.

The rear left hand rainwater downpipe for the Main Building has been diverted from its original plumb run and discharges in to the gutter of the Rear Wing. The gutter discharges via a downpipe into a hopper at first floor level along with a waste pipe from the toilet sink in the old mess area. The downpipe then discharges in to below ground drainage. The gutter leaks rainwater and it has done so for a prolonged period, this can be seen by the staining on the wall. The rainwater from the leak has penetrated defects the masonry at the window below and has caused internal dampness in the Watch Room.

Rainwater runs from the rear boxed gutter and the Rear Wing

Note; water staining under gutter

Quite typically, the RWG's at the back of the buildings have been run in an ad-hoc fashion to reach the buildings drains.

The soil stack that services the toilet on the first floor at the back of the rear addition is missing a 'vent terminal' cap. Vent terminal caps stop debris from falling in the pipe and blocking it. This needs replacing.

The rainwater from the Training Tower discharges on to the right-hand pitch of the Rear Wing and then into a (U-pvc) gutter and gutter-outlet. There is foliage growing in the gutter. The (cast iron) downpipe discharges into a hopper at first floor level; there is staining on the wall, which is indicative of a long term blockage. The (foul) waste pipes from the mess kitchen discharges into a hopper (U-pvc) and into a cast iron pipe. The down pipe then discharges onto the ground. This will be saturating the masonry locally. A temporary pipe needs to be run.

Note; rainwater downpipes should discharge into their drains, not over them as spilt water will find any faults in the drains benching (cement work that is formed around the drain) and cause localised dampness at the base of the wall, also the grills over the drains are prone to blocking by leaves and litter, which can cause the drains to block and flood.

The rainwater from the flat roof over the stairwell discharges onto the Carriage Entry roof, which in turn discharges in to the gutter at the ground floor toilet; the gutter was blocked and over flowing.

There is foliage growing in the gutters at the back of the building, this should be cleared as soon as possible.

	The downpipe that services the right-hand pitch of the rear wing and tower roof discharging on the ground away from the drain
	The downpipe that services the rainwater from the flat roofs and domestic wastes discharging over a blocked drain

Note; the mains water pipe in to the ground floor has been loosely run and the insulation around the pipe in not covering it properly. This insulation needs to go back on properly now to prevent frost the risk from frost damage this coming winter.

Section Summary

The rainwater downpipes at the main building need overhauling as soon as possible. This will require removing and inspecting them for defects in the cast iron work. Any replacements need to be exact like for like. The pipes at the right-hand side of the building need to be re-run in their original positions, this will prove difficult at the front pipe due to the structure there.

The RWG at the back of the building will have to be renewed where beyond repair re-designed so that they perform properly, with rainwater harvesting in mind.

Note; the mains water pipe in to the ground floor has been loosely run and the insulation around the pipe in not covering it properly. This insulation needs to go back on properly now to prevent frost the risk from frost damage this coming winter.

4.3 Main Walls

The Main Building

The front elevation of the Main Building has been altered extensively from its original design and has been rendered with a cementitious mortar; the cornice maybe stone but there will need to be safe access to confirm this.

There are Victorian/ Edwardian bay windows added at the back of the main building, which have also been rendered with a cementitious mortar.

The rendered elevations have been repaired with a different (OPC) mix, which is distinctly different from the main render. The main render has a light brown tinge to it where as the repairs are grey.

There will need to be some analysis of the mortars for the renders on the front elevation and the rear bay with some design work carried out, with exemplars so as to provide a compatible and authentic mortar repair mix.

The material and method of support across the main openings at the ground floor is not known. There are no real signs of current or on-going movement. It would be prudent to have the structural engineer check this, this may require some opening up internally.

The back and sidewalls of the main building are of exposed hand made stock bricks, with the chimney stacks rendered with cement at their tops. The bricks were originally bedded and pointed in with slaked quick lime, with crushed brick noted in the aggregates. Crushed brick was used as a Pozzalan to help locally produced pure quick lime mortars to set relatively quickly to provide enough strength in the mortar to resist frost damage in the first two years of its life; it takes two years from mixing for a pure lime mortar mix to start achieving its final set strength and frost resistance. Various attempts to repair the render and the mortars have been done using OPC mixes.

The Rear wing and extensions have been re-pointed with a 'black ash' mortar.

An OPC Plinth has been added to the bases of the wall in a misguided attempt at managing moisture. The OPC plinth will be trapping moisture and will need to be stripped and replaced with a lime render, the plinth can be decorated with a pigmented lime washed to harmonise the finish.

The collars and the cills to the windows have been done with OPC mortars as is the reveal at the side entrance door. Any loose OPC will need to be removed and re-done with lime.

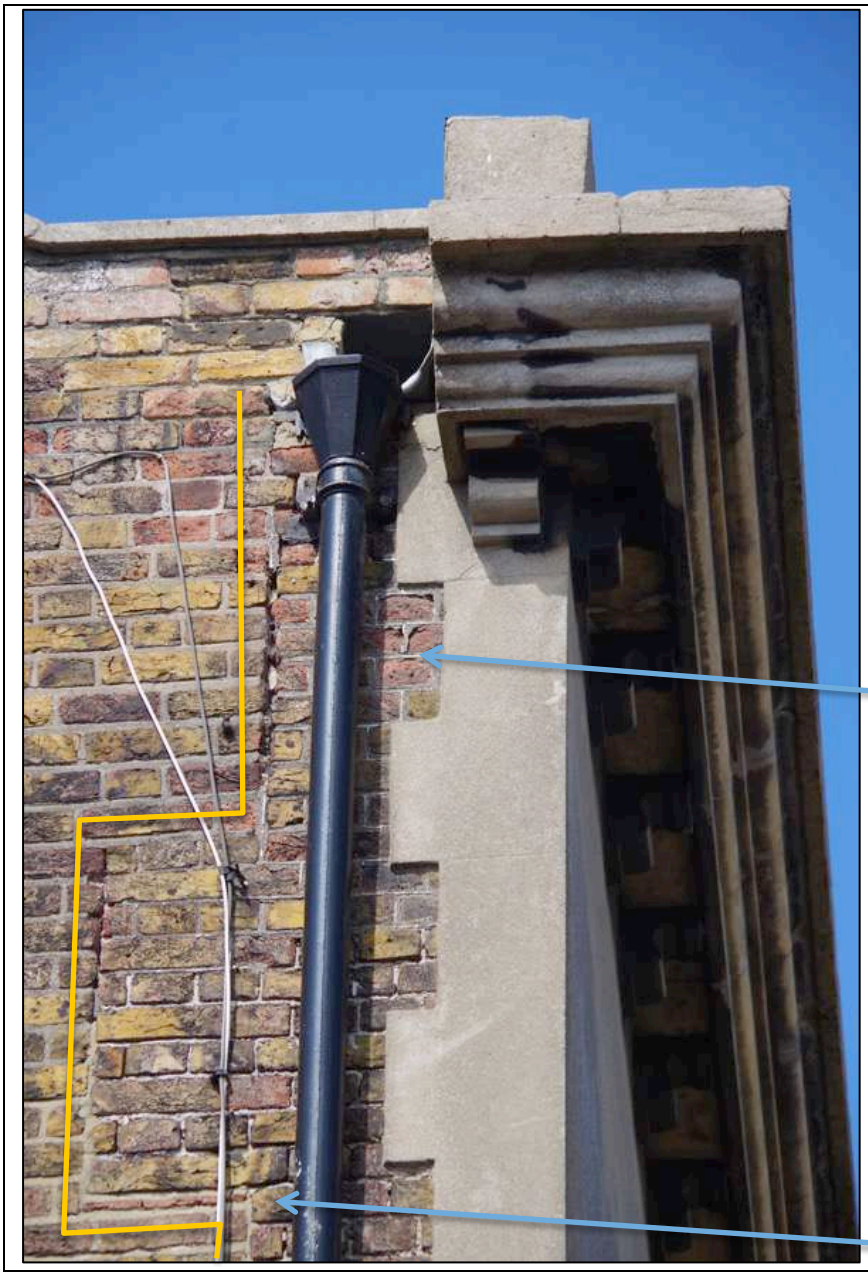
For more information on lime mortars please see Appendix A – About Lime.

The Front Elevation

The front and side elevation have been crudely 'toothed in' together instead of forming a fully bonded structure. (its difficult to comment on the right-hand side due to the remaining foliage).

This is peculiar and reason for it is unknown. There are no real signs of current or on-going movement; this is evident at some of the high level OPC mortar joints, which have not cracked. It should be noted that traditional solid-wall construction uses the forces of compression to stay in place. There is some sign of historic movement at the top of the right-hand elevation at the parapet. It would be prudent to get the structural engineers opinion on the matter.

The condition of the masonry supporting the cornice needs to be established and checked by the structural engineer to confirm its stability.



Left-hand corner of the building at high level

Notes:

Yellow line highlighting part of the crude brick work that has been toothed in

Surviving tuck pointing

Clay tile used to pack up brickwork

There is cracking all over the render, which is fairly typical as the cements are relatively brittle and do not have the ability to flex with the building as it moves during the seasons.

The top of the masonry/ parapet at the front elevation as explained earlier in this report is missing its coping stones. The render that forms cornice capping has cracked extensively.

The cornice has regular cracking in line with the structural openings at the windows below. This cracking is consistent with thermal expansion; modern buildings built with OPC as the mortar binder have expansion joints built in to them to overcome this issue. There is cracking in the render between the structural openings at the centre and right hand windows. This cracking very common in rendered/ stucco elevations. The left hand return end of the cornice has been repaired using OPC.

There is a minor diagonal crack at the top left corner of the of the elevation, the movement does not look current or on-going. The source of the crack can be identified by striking a perpendicular line (90 degrees) away from its centre; the line points to the left-hand window on the first floor.

There is a metal tie bar end between the centre and left hand first floor windows, which doesn't appear to be doing anything. This should be removed and the hole repaired as the metal will expand and potentially cause damage to the render in the future. If the structural engineer thinks some form of restraint should be used, less obvious proprietary stainless steel ties can be used.

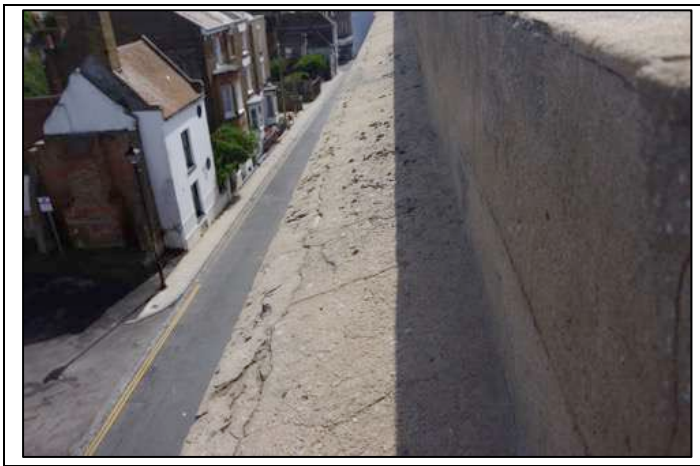
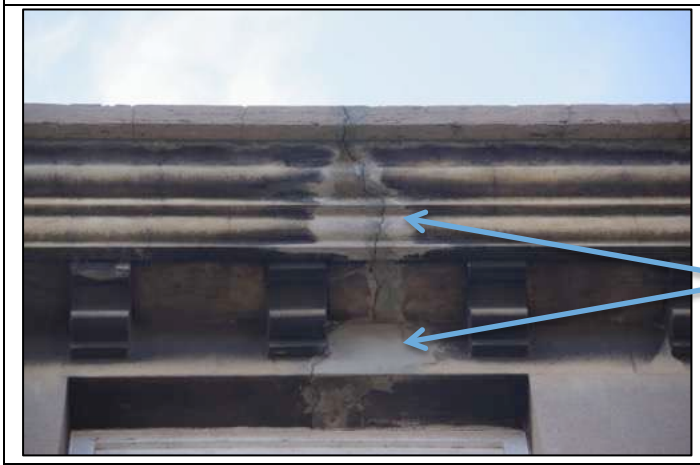
The window sills were rendered in with the front elevation, and are without drip details. There is no cracking under the sill at the wall junction and the lack of a drip detail does not appear to have had an adverse effect.

One of the corbel brackets at the left-hand door hood is damaged and there is some minor damage to the cornice at the right-hand hood cornice. There is a horizontal crack along the tops of the door hoods which will be allowing rainwater ingress.

The rounded corners of the main doors have been knocked about and have been repaired with OPC and painted with impervious masonry paint up to a height of four courses in the rustication.

The wire for the FIRE lantern has been run without a drip or without the wire being clipped to the wall, the hole in the masonry hasn't been weathered either, rainwater will run down this wire and penetrate into the buildings fabric and potentially cause damp related damage. The wire needs to be run with a drip or into it behind the bracket.

There is an old sign (PRE-2018?) saying CARS MUST NOT PARK HERE and an old phone box, which could be restored.

	Extensive cracking in the render at the parapet and the top of the cornice
	Expansion crack in cornice above the central window Note crude OPC repairs
	Example of expansion cracks in masonry Note; yellow lines indicate the cracks
	Cracking/ movement at an OPC repair at the top central window

There is heavy soiling under the masonry overhangs at the main entrance doors and at the cornice. The soiling is from the exhausts of just over a century of motorised fire engine use.

	**Example of heavy soiling from the motorised fire engines** Note; The soiling at the right-hand opening is heavier than the left hand one, indicating that this bay was used more often

The Rear Bay

The rear bay is a brick built structure that extends out from the back right hand side of the building. The bay is a latter addition to the main building and sits on the Carriage Entry roof. The support for the bay should be check by the structural enginer.

The cementitious render here has also been repaired with OPC but there is an additional issue with imbedded metal pins which are rusting and in this process, blown the render and is 'jacking' the masonry. The purpose of the metal pins is not understood. Metal armatures were often used to support mouldings while they are being rendered but this is not the case here. The render has been repaired with OPC where the metal has blown the render but the force of the rusting has blown a repair off. This process will continue until the metal is extracted from the masonry.

The metal fire escape has been attached to the bay at the top landing with a galvanised steel U beam which has been fabricated to fit around its structure. Steel bolts have been used to fix the beam to the masonry. The heads of the bolts are starting to rust; if rainwater is allowed to reach the embedded parts of the bolts they may rust and cause structural damage to the masonry.

The metal fire escape does not appear to have any defects apart from some light rusting.

Section Summary

The render to the front elevation and the rear bay needs sensitive well designed and executed repairs with a robust conservation approach to avoid irreversible damage and disfigurement to one the most unadulterated historic façades in Ramsgate and the wider historic urban context.

The extent of the high level repairs at the front façade will not be known until accessed. The cementitious mortar needs to be analysed and from there a well designed mortar for repair will have to be developed to provide a good match in terms of performance functionality and not just appearance. This will involve producing exemplar samples well in advance of any upcoming restoration works.

The cracks in the front elevation should be repaired with non-hydraulic lime grouts and finished with hot mixed lime mortars as a temporary measure. The surface of the lime can be raked back when the façade is fully repaired.

The risks posed by cleaning masonry is well understood buy practical conservationists and conservators. The key questions when it comes to cleaning masonry are:

a. Does it need doing
b. Will the cleaning damage the masonry and or disfigure the patina and character of it

Note on masonry cleaning; inappropriate and poorly thought-out cleaning of masonry can cause irreversible damage to the host material and leave unsightly patchy finishes and run off stains which can lead to a significant change in the buildings character, along with stripping its patina.

The cleaning of historic masonry, particularly in the street scene of a Conservation Area generally needs listed building consent as this is a major change in a buildings character. If after careful consideration there is a decision to clean the masonry, BS 8221-2:2000 *Code of practice for cleaning and surface repair of buildings. Surface repair of natural stones, brick and terracotta* needs to be referenced.

The Rear Bay

Notes:

Metal U beam fixed to the masonry

Damaged moulding

Close up of damaged moulding; note embedded metal

OPC repair over blown cement

Example of OPC repair that has been blown off by embedded metal

The Left- and Right-hand Brick Flanks

The walls are generally intact plumb and in wind.

It should be noted that the surveyors in Georgian times (and before) had the pick of the best land to build on. The surveyors involved with the construction of Effingham House would have no doubt checked out the condition of the local bedrock (chalk) before building such a high status building. The buildings masonry walls would have been built off of the chalk on stepped brick foundations. Also, if there was (which is more than likely) a lower-ground floor they would have had to excavate in to the chalk.

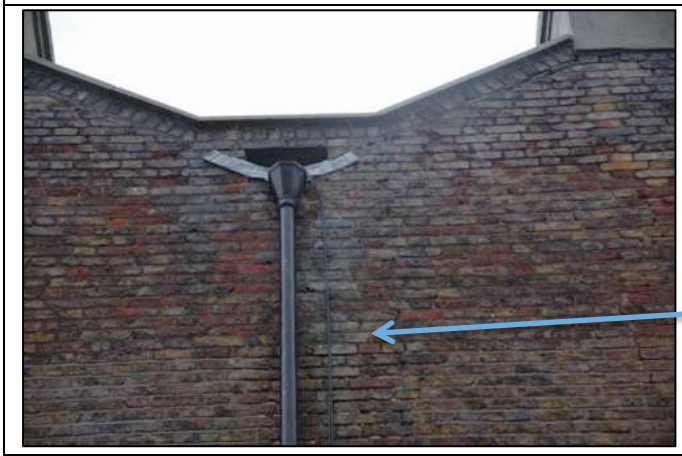
The top of the parapet detailing at the side elevations (where seen) have been added to and altered. Originally there was header bond course of bricks laid on a course of clay tiles. It looks like (from the ground) that there was another course of clay tiles/slips laid on top of the bricks; accessed inspection will confirm this. This type of detailing at the parapet helped resist rainwater penetration deep into the masonry via the horizontal surface at the top of the wall. The risk to the masonry wasn't from the rain itself as the breathable nature of the fabric allowed it to dry out, the risk was from frost damage. Frost damage is the term used for describing the damage caused by ice forming and expanding in moisture laden masonry.

The parapets have since have been re-built with OPC mortars at the front and back walls at the gutter-outlets and cast concrete coping stones provided.

The bricks across the left-hand and right-hand flanks are generally in a fair to satisfactory condition but with an amount of decayed and cracked and broken ones. The brickwork and the pointing will need accessed and close inspection to determine the condition of the bricks and the amount of repair work required. There is a significant amount of original pointing mortar remaining in the wall, which will inform the repair specification, this is along with a lot of OPC pointing, which needs removing for the long term benefit of the building. There is a steel plate in the wall to the towards the front, the steel has broken some bricks and will need removing.

There is some surviving tuck pointing at the top right hand corner of the masonry that is on the front elevation part crudely toothed in part of the wall, where as the remaining pointing the other side of the joint has a 'penny struck' or 'ruled' finish. This is peculiar as this suggests the elevation was once tuck pointed.

There are retro-fitted structural openings for the windows on the first floor, along with and along with one for the side entrance door. The arch-work over the first floor windows is of low quality; standard bricks have been used to form the arch instead of ones that have been specially made for the job, with OPC mortars taking up the shape of the arch. Also the end bricks are 'shy' of the opening and really needed to go out a bit further, this can be seen at window towards the front of the building where the (OPC) collar work has been run out to support the arch at the left-hand side (as seen facing). The condition of the arches will need accessed inspection to decide what to do to them, if anything or insitu repairs or re-building/re-setting.The rear wing has been toothed in in a similar way to the front elevation where it has been extended upwards.

	Example of parapet detailing
	Rain water bypassing the hopper downpipe at the central boxed gutter Notes • Water run off from the copings • Mortars washed away here
	Left hand wall where it meets the rear wing Note; crude bonding where the masonry has been built up
	Example of inappropriate cement plinth work

The right-hand flank has had various OPC repairs and the wall has been rendered with a cementitious render up to first floor level but more significantly, a single story structure, with a wall at the neighbouring property at 22 Effingham Street has been built up against the Main Building towards wall at the front of it. The single story structure is in a dilapidated condition and the foliage has exploited the join between it and the main building, rainwater will be penetrating into the buildings fabric here. The render at the side of the main building has cracked. Accessed inspection is required

The carriage entry buts up against the main building/house at No.22

The single story structure at 22 Effingham Street

Note;
foliage has exploited the joint here

Rear Elevation Wall

The rear elevation wall has a fair amount of surviving tuck pointing and stopping mortar. There are two structural openings for the windows at second floor level. The structural opening to the left (as seen facing) has been crudely built using OPC. The area could do with re-pointing and the arch re-worked.

The structural opening to the right (as seen facing) has a properly formed arch but is in need of re-setting as the bricks are starting to drop.

A tie-bar has been inserted into the elevation between the two windows, there is some slight bowing in the masonry. The tie-bar should be removed as the steel will expand and damage the masonry. If the structural engineer thinks some form of restraint should be a used, less obvious proprietary stainless steel tie can be used. The roof space will need to be cleared for inspection.

Rear Elevation at the second floor

Note; Crudely built window opening

The Rear Wing, the Training Tower, Carriage Entry and the Toilet Extension

The Rear Wing, the Training Tower, Carriage Entry and the extension for the toilet are of stock bricks, with 'Kent red' bricks used at the structural openings for the doors and windows, with bullnose engineering bricks used at the openings of the Training Tower and the Carriage Entry. The bricks were bedded and pointed with lime gauged with ash or a pigmented stopping; this is distinctively different to the mortars of the main building. Analysis is required to obtain matching mortar mix

The left-hand side of the rear wing

OPC has been used in various places at the Training Tower for repairs and relatively new yellow stocks have been used, most notably at top and under the shuttered openings. It should be noted that modern bricks are much harder than their old counterparts and are not at risk of damage by OPC mortars. An OPC plinth has been added to the base of the walls. The are various airbricks in the walls provided for ventilation, including plastic vents in the Carriage Entry wall for the extract fans from the toilet. There is staining on the face of the brickwork where there has been a prolonged leak in the gutter.

The structural opening at the Watch Room has been altered for a Critical style metal window. A lintel has been inserted In to the wall and rendered over with OPC, with three and a half courses relatively new bricks laid on top of it to take the place of the old brick arch. The are no signs of current or on-going movement. The opening has OPC collars along with an OPC window cill, which has been damaged.

At the first floor a new structural opening has been crudely formed (with OPC) and without a lintel. The frame work of the window is supporting the masonry.

The arch over the 20-pane Hopper window has a couple of damaged bricks (red). There is some minor diagonal cracking emanating from the 5th brick course in from the left (as seen facing). The movement looks to be historic and there doesn't seem to be current or on-going movement. There is some lead piping that has been cut back to the left of the window (as seen facing), this will need trimming back and the masonry repairing.

There is damage to some of the bricks to the sides of the structural opening of the chamfered corner, which will need repairing/replacing. The right hand side the opening has been painted with plastic masonry paint, this needs to be cleaned off, with chemical poultices', so as not to damage the bricks. The masonry can be re-decorated / white washed with a lime wash. The small structural opening for the toilet window at the back of the tower looks to be in a fair condition. Its sill has been rendered with OPC and is missing a drip detail.

The Training Tower looks to be plumb.

The masonry at the extensions which houses the stairwell and the toilet have structural openings for the windows with a red brick arch's, with two rows of headers spanning the arch with a stretcher bricks shouldering the arch at each end, one of the arches for the toilet has been blocked up. There is a training bar above the window of the addition for the stairwell which was use to place ladders against. This is an important piece of historic building fabric. The bar is made up of a metal frame with a timber bearer. Accessed inspection is required to assess the training bar to establish its condition and to develop a repair strategy. There is also part of an arch visible in the masonry of the Rear Wing, which has all but been covered by the toilet extension. Hose drying hooks are still attached the base of the tower wall, this has evidential value.

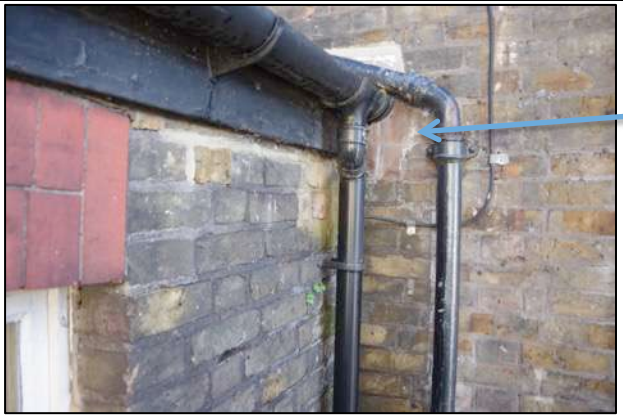
The piers to the carriage entrance have had a course of modern bullnosed bricks laid at their tops.

There are various metal fixings for wires, sleeved holes, pipes for services have been run through the walls. This is along with some lights, intruder alarm, signs and a cigarette bin by the side entrance door. These will need rationalising/ stripping and localised repairs carrying out

Section Summary

There are areas of masonry where the necessary repairs are obvious and ideally all the OPC should be stripped. However, its not until the crafts start working on the OPC is it evident how much or how little damage is being done, particularly at high level. An outline repair plan (with options) should be developed but what actually can be done without causing irreversible damage will not be known until work is started.

It should be noted that the granted Listed Building Consent says; ***L/TH/20/1267***; '***The brick bond, mortar mix and pointing techniques for the works hereby approved shall precisely match those on the existing building'.*** It is fair to assume that this means matching the original brick bonding and pointing techniques rather than replacing inappropriate and damaging OPC mortars 'like for like'. The repair work to the masonry will need some carful planning.

	The end of the rear wing where its been built around The Tower
	Hose drying hooks
	Remains of an arch where the toilet extension has been built onto the rear wing
	Ladder training bar at the top of the stair well

4.4 Damp Proof Course, External Ground Levels and Internal Floors

The external ground levels were made flush for the entry and exit of appliances when the building was converted to a fire station. The tarmac hardstanding at the left hand side of the Main Building and the rear wing is above the internal finished floor levels; this can be seen at the side entrance. It should be noted that that rainwater ponds here and will be causing localised dampness in the building fabric. This will prove to be dangerous if the rainwater were to freeze during the winter. Some form of temporary drain is required, a simple small bore hole down to the chalk bed would suffice in the short term. The small borehole could be cut through the tarmac and then backfilled with 10mm pea shingle.

The ground levels at the front elevation to the right of the right-hand roller shutter door rise up to the wall of the neighboring property. A gully has been formed in the front hard-standing an attempt to divert rainwater but wind driven rainwater still penetrates in to the appliance bays under the right-hand roller shutter door. Rainwater also penetrates under the doors into the Carriage Entry.

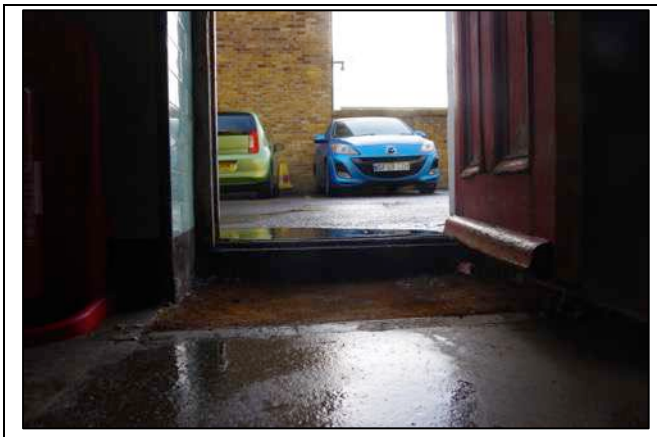
Best building practice is to have external ground levels at least 150mm (two brick courses or six inches) below the internal floor levels and any sensitive internal building fabric such as the make up of the timber panelling in the watch room. This 150mm distance is significant as it allows any ground moisture to evaporate harmlessly away from the base of the wall, provided that the wall/fabric has the ability to breathe. It is also significant as it is governed by the height of the splash back from rain; rain tends not to splash back off of hard surfaces higher than 150mm courses thus keeping sensitive building fabric out of range of the additional water caused by the rain splash back. This detail is current in UK building regulations (Approved Document C).

There is no sort of Damp Proof Course (DPC) built in the solid walls of the Main Building and Rear Wing as DPC's did not become mainstream construction practice until the late 1870's. The cement plinth-work and raised ground levels are covering the DPC in the walls of the toilet extension (if there is one).

With or without a DPC the building fabric would have relied on appropriate external ground levels, adequate internal ventilation and the breathability of the lime mortars used for the masonry to allow moisture to evaporate and breathe harmlessly away from the base of the walls. Many damp problems in old buildings are found from this mechanism of controlling damp being altered and the misunderstanding of movement of moisture within the building.

Acco type drains that connect up to the buildings below ground drainage need to be installed to prevent rainwater entering the building at the roller shutters, the side entrance and the carriage entry. French drains need to be run at the bases of the walls where external ground levels can not be reduced to 150mm below internal finished floor levels.

The external ground levels inside the property of 22 Effingham Street can not be commented on until access is allowed.

	Rainwater ponding at the side entry door Note; External ground levels are higher than the internal floor
	Rainwater penetrating into the carriage entry
	Rainwater penetrating into the appliance bay
	Gully formed at the front to the roller shutter doors

There are solid concrete ground bearing slab floors in the Appliance Bays, the toilet and Watch Rooms. It is not known whether a Damp Proof Membrane (DPM) has been incorporated in the makeup of the floors.

Concrete ground bearing slab floors with or without a DPM or any impermeable solid floor, will tend to push any moisture under the slab towards the walls at its edges. This is opposed to traditionally loose laid flagstones/tiles/bricks or suspended timber floors, which through adequate internal ventilation and breathability will allow the evaporation of moisture. Note; DPM's are designed for modern construction of buildings and are laid at the same time as a walls Damp Proof Course where they are connected up together. DPM's are also designed to isolate modern OPC from any moisture in the ground and hardcore or materials that contain salts the are commonly found in them, this is because if the OPC, which contains a chemical called Tricalcium Aluminate comes into contact with water and salts, it expands. This chemical reaction is commonly known as 'Sulphate Attack'.

There is a corner of one of the slabs that has lifted slightly, this may have been down to localised sulphate attack; even if a concrete slab has a DPM, excessive water applied to the floor will find its way to a joint in the material and can cause localised sulphate attack. Alternatively, there may have been some settlement in the materials below the slab. The corner of the slab should be either ground back and polished or faired in to avoid a trip hazard. It is also recommended that the joints are sealed in with a proprietary flexible mastic.

As infilling with concrete is inappropriate in old solid walled buildings, common practice, when it is necessary, is to replace a concrete floor slab with a LABC (Local Authority Building Control) approved Lime-Crete floor system instead. This system prevents ground moisture from reaching the slab by providing a break in the surface tension pathways (surface tension is the transport mechanism that allows moisture movement between the surfaces of building materials) and to allow breathability. Lime-Crete floors are naturally insulated and are ideal for the installation of under-floor heating.

There is an inspection pit in the carriage entry which would have been used for servicing the fire brigades vehicles. The pit is covered with metal planks . The pit was found to be dry and in a usable order.

The floor in the front part of the watch room is 'floating timber floor, which has been covered with laminate flooring. The condition of the timbers that make it up cannot be established without invasive investigations.

4.5 Doors, Window and Second Fixed Timbers

Before reading this section of the report, it is important to understand the difference between modern and traditional paint technology.

Traditionally, joinery and second fixed timbers such as facia boards were decorated with linseed oil paints, which had lead mixed in with them to act as drying agents and to pigment them in some cases, (this is along with other pigments for decorative purposes). The chemistry of the linseed oils allows it to penetrate into the timber, forming a protective barrier but at the same time allowing some breathability. The linseed is also fairly flexible and moves with the timber throughout the seasons.

Lead additives have now been omitted in today's linseed paints and alternative drying agents have been added instead. Redecoration is simple, the paint is washed down and a thin coat of linseed paint on a rag is wiped over it, sanding is not needed. Linseed paints offer extended maintenance cycles compared to modern plastic paints, significantly reducing costs in the long term.

Modern paints are impervious petro-chemically based (plastic) and rely on adhesion to the surface of the timber. Subsequent coats of paint require a keyed in (sanded) surface, which builds up over time obliterating architectural details and causes windows to bind, permanently closing them shut in some cases. This paint (plastic) on paint process eventually requires the material to be burnt off and cleaned back to the timber, so the process can start again. This is a highly unsustainable process. One of the main problems of modern paints is that they crack and allow water to penetrate in to the timber, causing raised moisture contents, which can and does cause decay. See video for an animated explanation; https://www.youtube.com/watch?v=Lvi77USczSY

There is a wide variety of timber doors and windows, including a set of mechanically operated roller shutters at the ground floor of the front elevation, metal windows at the watch rooms and metal roller shutter doors in the drill tower.

The styles of the windows have been explained in previous reports.

The original arrangement of the boxed sash windows at the first and second floor front elevation has been altered with only the central windows in their original position. Most of the sashes at the front and back of the floors were opened, after the fitted security locks were removed.

The windows at the front elevation at the first floor and centrally on the first floor look like the original boxes have been kept with replacement sashes from 1905. The sashes (apart from the ones centrally at the first floor, which were paint bound) ran freely. It should be noted that there is a significant amount of historic hand made glass in the windows at the second floor. The historic glass can be seen by the imperfect finish of the material, these imperfections can be seen by the slight distortions when looking through them, this gives the glass a quality that modern float glass does not have, this quality is known as 'the shimmer' in the conservation world. Hand old made glass is valuable but fragile historic building fabric that can not be repaired once broken; once its gone its gone. There is some coloured glass in the windows at the first floor, which add interesting evidential value.

Some of the sashes at the back of the building are relatively recent replacements, this can be seen by the crisp 'arrises' (edges) of the timber, the three over three window at the back of the second floor is a good example.

There are some 1905 boxed sashes in the rear wing along with a top hung casement and a tilting casement at the back of the first floor toilet, which has some localised decay at the bottom right of the window.

Modern fire escape doors have been fitted into the central parts of the bays on the first and second floors at the back of the building.

There is set of purpose made Crital style windows at the side of the main Watch Room. The window has a mixture of top, side and bottom hung sashes, which are all operational. Note; the remaining brick arch detail suggests that the may have been a metal Hopper window here, like the one next to it.

At the back of the Watch Room there is an unusual 20 pane 'Hopper' window, with an inward opening sash, the sash is rust bound and doesn't open or close. These types of windows tended to be used in industrial / workshop environments and there are examples of this type of window with similar arch detailing around Ramsgate.

There are two boxed sashes to the right of the second floor of the Rear Wing and three at the rear elevations, along with a bricked up window next to the toilet window.

The main roller shutter doors are fully functionable. The doors are draught proofed. The Doors have been set /fixed to the surviving timber door frames.

The side entrance door at the ground floor, the door in to the tower and the carriage entry doors along with their door-frames are traditionally made. The carriage entry doors are glazed at high level and retain some historic glass. The bottom of the door-frame of the carriage entry has some minor decay and there is foliage growing at the weather board on the left-hand door (as seen facing).

Note: the side entrance door maybe a salvaged Georgian back door. The door into the training tower, is a modern flush door which is in a poor condition and will need replacing.

All of the doors and their frames would benefit with having the plastic paints stripped and repairs carried out. It should be noted that its not until the paints have been stripped that the extent of the repairs can be established. The windows could be brush stripped at the staff and parting beads, along with fitting brush stripping a the meeting rails.

There are metal roller shutter doors at the training tower that could not be reached, so their condition can not be commented on.

Section Summary

All of the joinery and the second fixed timbers need redecorating, particularly externally where the paint has all but gone. The timber needs the paints (plastic) removed and cleaned back to bare timber. Once the paint has been removed it will only then be possible to establish the extent of repairs needed. The paints should be removed with the use of low heat infra-red 'speed strippers'. The benefit of low heat infrared paint removal is that the fumes from any lead in the old coats of paints is reduced to safe levels and the fire risk posed by burning off the paint with hot air guns is also reduced to safe level. Also, the low temperature of the infrared strippers reduces the risk of breaking historic glass.

	Example of a timber sill being checked with a knife for firmness
	The 'Hopper' window at the rear Watch Room
	Example of 'Hopper' windows seen from Westcliff Road, Ramsgate.

5.0 Building Interior

5.1 Roof Space

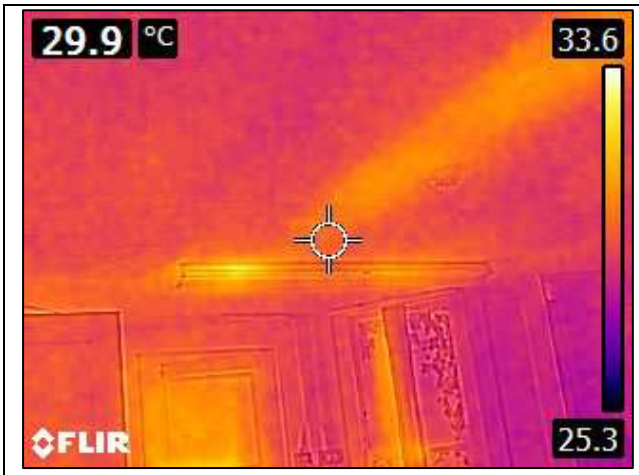
The roof spaces at the main building have been very poorly insulated and there is all sorts of things, including a couple of old doors in the rear pile/pitch. The areas need to be cleared out and a couple of loose crawler boards provided ie. 18mm ply 2400 x 600mm. This will help enable accessible inspection at the roof perimeters. Clearing the roof space of all the old insulation needs to be done by a firm that deals with substances that are hazardous to health ie. an asbestos removal firm. Clearing includes vacuuming the area . Note; Asbestos (level 4) has been identified in the roof space.

The roofs timbers have been painted with intumescent paint. The timbers were sound and decay free (where seen). See report section 6.0 Damp and the Internal Environment for further information. There were some repairs noted due the reported historic leaks.

Once the roof spaces have been cleared the areas can be fully inspected.

The roof space was viewed with thermal imaging during hot weather in the summer. The thermal images showed heat gain, which will translate to heat loss during the winter. The roof spaces need insulating properly. See report section 7.0 Energy Efficiency for further information.

Thermal imaging of the ceiling at the back room to the right of the main building



Note; the brighter colours in the ceiling shows an area where there is no insulation at all

It was not possible to gain entry to the roof space over the rear wing. The suspended ceiling grid needs to be dismantled to get to the loft hatch.

5.2 Chimney Breasts and Fire Places

The Main Building has four internal chimneybreasts, which are all in place down to the ground.

There is only one historic fire place with a surround remaining in the place, which is on the first floor of the main building at the front right-hand room. There is a 1970's brick built effort at the front left hand room of the main building.

Some of the chimney flues have not been vented.

Note; unused chimneys need their pots to be capped and the flues vented at low level, this is to provide cross-flow ventilation which prevents condensation building up inside the flue. Masonry in an around chimneys can be contaminated with salts from the burning of fossil fuels. Soot deposits on the inside of chimney flues contain salts, if they get wet because of condensation formation due to the lack of ventilation caused by fireplaces being blocked up, the salts will diffuse in to the masonry and can appear on internal walls. These salt deposits are hygroscopic, which means they will absorb moisture from the internal environment. Once internal relative humidity's exceed 80% (21°c) the salts will absorb the moisture in the air and become damp, staining decorative finishes.

There is a fireplace in the Rear Wing at the first floor, the chimney stack has been removed. It is fair to assume that the chimney is supported by the concrete deck under the timber floor but this should be checked.

5.3 Ceilings, Internal Walls, Partitions, Joinery, Built in Fittings and General Decor

The first, second floor ceilings and walls of the main building retain significant amounts of lath and plaster work, which looks like it was done in the fire station conversion work. There are also areas of hidden pockets of earlier work/ historic building fabric that have survived in the built in cupboards at the chimneys along with some early ironmongery.

Gypsum skim plasters and plasterboards have been applied to the ceilings and walls in various areas, along with lining and woodchip and anaglyptic papers painted with modern latex based paints. The gypsum skims are delaminating and the papers are starting to fail/peel.

All of the old doors in to the rooms have been replaced with modern flush fire doors. It should be noted that there was no identification on the doors noted to verify their 'fire rating' ie. 1 hour or ½ hour protection against fire penetration. The fire rating should be established if the doors are to be used going forwards. The doors have been hung in the old/historic door linings which have been adapted.

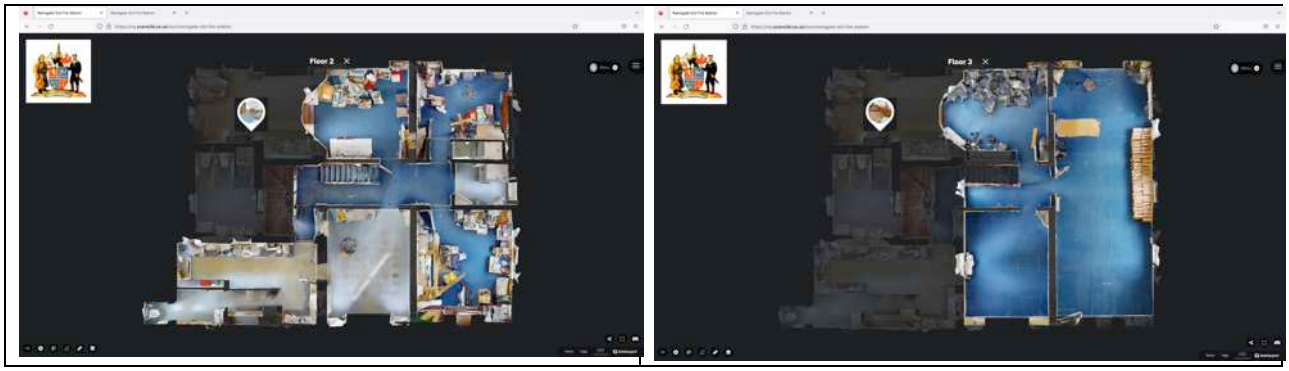
There is a mixture of flush finished and surface mounted electrical fuse boards, plug sockets, light switches and conduits. This is along with fire alarms that were fitted to alert the firemen in the building in the event of a 'shout'. There are early Bakelite phone repeaters in the halls of the first and second floors. Bakelite was discovered in 1907 and was used for various things electrical due to its high resistance to electricity and fire.

The original floor plan of the second floor towards the back remains but the front partitions have been removed, creating an open floor plan. The floor plan would have most likely been the same as the first floor.

The original floor plan on the first floor remains but with some obvious sub divisions for the showers.

The Matterport scan demonstrates the likely layout of the second floor when viewing it on plan and switching between floors 2 & 3.

First and second floor plans - floors 2&3 on the Matterport model



First floor showing original house floor plan

Second floor showing front partitions removed

The ground floor has been altered extensively to accommodate the fire station. All of the internal walls have been removed, including the masonry spine walls. The masonry spine walls at the first and second floors are supported by a riveted steel beam which is supported in the middle by a decorative cast iron post. The ends of the beams run into the external walls. There is some minor cracking in the masonry at the end of the left-hand beam. The structural engineer should comment on this.

The Main Building ground floor ceiling retains lath and plastered ceilings its cornicing at the perimeters. The external walls have been rendered with cementitious plasters and decorative tiles at low level in the appliance bays/ main building.

Ceilings and Walls

Second Floor

The ceilings are mainly of lathe and plaster, with some plaster boarding inside the built in cupboards either side of the chimneys. The ceilings have been skimmed with cementitious/gypsum plasters, which have cracked (inevitably).

The ceiling plastering at the front and back walls of the front area, and the front and back of the hall have a concave detail which runs flush in to the walls. This might be a surviving part of an earlier cornice detail.

Front Room

The lath and plaster work to the front right external wall of the second floor has been removed at some point from about 4500mm from the chimney breast, the wall has been re-plastered directly to the walls with modern cementitious plaster. The ceiling above shows signs of historic rainwater ingress, which could have caused decay to the timbers of the lathwork. There is some Sundeala fibreboard attached to the wall here centrally and the plasterwork to the left of the left-hand window has been stripped and plasterboard attached to the laths. Gypsum plasterboard has been attached to the left-hand side of the left -hand chimney breast. The plasterboard should be stripped here and the masonry inspected. The left-hand chimney has a vent fitted, the right-hand chimney is not ventilated.

The masonry spine wall which runs from one side of the building to the other is in place up to about 300mm to the left of the door into the area and about 400mm to the right, the rest of the wall is made up of studwork. There is a modern door and door set through the wall into the right-hand back room.

The ceiling at the bay in the rear right-hand room has dropped. The area was accessed from the roof space for inspection. There is evidence of an historic leak in the roof/boxed gutter, some of the ends of the ceiling joists have had metal brackets attached to them for repairs. The rainwater ingress has caused decay, the laths have dropped from their fixings and they plaster keys have crumbled. Note; this area is repairable but will need an appropriate repair strategy. The plaster keys in the loft space were checked in several other places, the keys were found to be sound, where checked.

The ceiling in the rear left-hand room has been over-boarded with plasterboard. Over-boarding lath and plaster ceilings is an economical way of repairing ceilings, it is also acceptable conservation practice as the original building fabric is left in-place and can be repaired sometime in the future when conditions allow. The ceiling has a metal eye in it. The back wall has been studded out and plaster boarded and a plastic DPM has been incorporated in the make up. This may have been done to provide dry-decorative finish's to the wall as it may have suffered dampness where the Rear Wing roof is tight under the masonry window cill, which has a bodge OPC repair and or there may have been an historic leak at the boxed gutter, which lead to decay in the timber of the lathe and plaster system. Fragments of the old lath and plaster remain inside the studded out plaster board.

There is some cornice detailing either side of the hall wall with concave detailing at either end.

Note; there is some minor vertical cracking in the hall wall next to the right –hand external wall.

There are dado rails and on the front and back walls of the front area. There are some surviving bead detail skirting at the front and spine walls and away from the spine wall up to the door sets in the hall.

There are a mix of Victorian torus and modern skirting's elsewhere.

There are timber access hatches up to the roof spaces.

Section Summary

There is evidence that rainwater has penetrated the roof area at the external boxed gutters in the past and for a prolonged period, long enough to cause decay. It's not really possible to tell when this happened and the water damage may have happened at different times at the front and the back rooms. The repairs ie. the hard cement plastered onto the walls at the front and the dry-lined stud work at the back are both relatively recent and inappropriate interventions, which be reversed.

First Floor

Ceilings and Walls

The front right-hand room is lath and plaster, papered over and painted. There is some surviving decorative cornice with embellishments under it inside the fitted farmhouse style dresser cupboard between the chimney and the front wall of the building. The cornice in the rest of the room is in a relatively simple corner form; the embellishments are missing. This room has a frieze and a picture rail. There are some replacement dado rails. The skirting has Victorian style torus detailing. There is a decorative timber 'Adamsque' (Robert Adam) timber fire surround but the fireplace is boarded over, with no ventilation provided. There is a partitioned off shower room here.

There is an old door and door set in the spine wall between the right-hand rooms, the door has been boarded over on the front room side.

The smaller central front room would most likely been a dressing room servicing the main bedroom. The room has been fitted out as a shower room. Note; the waste pipe from the shower has been run along the front wall and thorough the left-hand wall where it discharges in to a hopper there.

The front left-hand room also has some surviving but differently detailed decorative cornicing, at the rear and sidewalls with embellishments above. The cornice at the front wall is different.

The right hand wall of the left-hand front room has been cut about and this apparently was where the bar was before the consumption of alcohol was banned from the place. There is also a metal trunking the other side of the wall that runs from floor to ceiling which has been cut into the skirting and the dado.

There are surviving corbeled elliptical coves, either side of the chimney breast which has a 1970's brick built fireplace. The flue to the fire place is open and it looks like it was in used. There is some surviving original skirting inside the cupboard between the chimney breast and on the back wall.

	Surviving Georgian cornice inside the cupboard at the front right-hand room
	Ceiling detaining at the front right-hand room
	Example of surviving corbelled arch at the side of the chimney at the front left-hand room
	Surviving skirting under the corbelled arch

The hall ceiling and walls are lath and plaster. There is surviving cornice around most of ceiling / wall junctions with varying detailing in the back rooms and part of the hall.

There is a surviving decorative elliptical arch with pilasters dividing the spine wall with timber grounds, either side of it. The skirting detailing is Georgian at the base but has had Victorian skirting run in to it. Note on architectural moulding detailing; the Georgians preferred Greek ellipses where as the Victorians liked round Roman detailing. This subtle difference can be seen where the skirting in the hall meets the pilaster.

<table>
<tr><td>  </td><td rowspan="2">Elliptical arch between the spine walls

Note;
Different moulding details between the pilaster and the skirting</td></tr>
<tr><td>  </td></tr>
<tr><td>  </td><td>Example of the position of the original dado rail once was in the rear left-hand room</td></tr>
</table>

Left-hand hall wall is plasterboard either side going back from the mess room door. There is a cupboard under the stairs; the wall is studwork with plasterboard. There is a flush door in to the cupboard. The wall at the end of the hall/bottom of stairs cementitious solid plaster.

The back end of the hall enters the rear addition that houses the stairwell. The stairwell has been partitioned of with a half wire glazed firebreak, with fire doors at each entry to the hall and the kitchen area. The in the stair well ceiling follows the angle of the roof; the ceiling has water staining and was found to be leaking on the 16.11.22.

The rear room to the right has a suspended ceiling with lath and plaster ceiling remaining, which has been skimmed with gypsum. There are numerous fixing holes in the chimneybreast, which is vented.

The spine wall is in place, with a structural opening for a door and door set which is behind a set of low quality shelves. The architrave detail here is different from everywhere else. Note; this is the only surviving door of its type left in the Main Building. There are signs of an old dado rail in the spine wall. There is a modern dado fixed at an inappropriate height around the room, with surface mounted trunking at the chimney.

There are a mixture of skirting styles.

The wall is damp at the spine wall where it meets the external wall (on both sides). The blocked/defective rainwater downpipe reported on earlier in the report is on the other side here.

The bay window has decorative panelling with a modern fire escape door where the middle sash would have been. Wind driven rain was making its way over the top of the door on 16.11.22. There are wooden steps up to the door.

<u>The rear left-hand room /Mess Room</u>

Ceiling is lath and plaster, papered over. The cornice in this room has more detailing than the other areas. The cornice has been run across the chimney recesses via bulkheads either side it.

The left-hand wall and chimney are a mix of hardboard, lime plaster and plasterboard over the fireplace. The flue is not vented.

There is a dado rail that has been added to at the top, increasing its size. There is a plastic trunking cut in to the dado and through the cornice at the back of the right-hand wall.

There are windows either side of the chimney breast. The first sash is painted shut, the second sash opened.

There are two structural openings in the back wall. The one to the right housed a boxed sash window but now has a fixed window with wired glass. The other opening has been cut for access in to the rear wing, this has Victorian detailing at the door set.

Built-in Fittings

2nd floor

There are original built-in cupboards either side of the chimney breasts at the right of the building but only one surviving to the left-hand side, which is at the front chimney, towards the spine wall. The other three cupboards have been removed and plaster-boarded over in the front area and partially at the rear where some hooks and hook boards remain. The plasterboards will need removing to see what's behind them and what needs repairing.

The remaining cupboard doors look like they have had timbers attached to the front of them to give the impression that they are panelled; the doors internally are solid unadulterated raised panels at the top and bottom of the middle rail of the door. The right-hand cupboard door to the front retains its original hinges, along with its door catches. The cupboards timber panelling has been plaster boarded over. Clothes hook mounting boards remain inside the cupboards and its possible to see where the (missing) shelves once went by the slots in the plaster where they were plastered around.

The front left-hand chimneys has a vent fitted, the right-hand chimney is not ventilated. The rear right chimneys has a vent, the left-hand chimney is not ventilated.

There is a Victorian/Edwardian built in cupboard to the left of the rear right-hand room with salvaged doors and hooks inside the cupboard.

There is decorative timber panelling at the bay window.

1st floor

There is a Farmhouse type of dresser that has been fitted into the right-hand side (as seen facing) of the chimneybreast in the front right-hand room.

In the rear right-hand room there are a set of low quality shelves to the right of the chimney breast (as seen facing) and a built out Victorian cupboard to the other side that protrudes past the chimney breast. The cupboard is constructed with a salvaged raised and fielded four panelled door and a Georgian cupboard door set.

The Rear Wing /Kitchen Area

The rear wing has been divided up by a central modern stud partition. There is a kitchen to the right, with fitted units there and at the back wall, which is plaster-boarded out. With two boxed sashed to the right; the first sash is free running – no ironmongery, retains three panes of historic glass. The Rear sash is paint bound, the top sash houses an old ventilation fan.

There is a suspended ceiling throughout. The ceiling above the suspended ceiling is skimmed plasterboard.

There is an old airing cupboard to left-hand side, which houses an operational hot water tank that services the kitchen and the first and ground floor toilets. Part of the pipe insulation was missing. Next to the fireplace there is an old chimneybreast and fireplace.

There is a masonry wall with a door opening to the left next to the fireplace, which runs left to right, this leads into the toilet area. The masonry extends into kitchen through the stud partition and finishes as a nib there.

There is a sink on the other side of the masonry wall, with a side light window with the toilet at the end, which is built around the training tower. There is a traditionally hand cut panelled door in to the toilet, with its original ironmongery. The walls of the toilet are tiled. The toilet is functionable. The eternal walls and back outside the toilet wall has been re-plastered with cementitious plasters. The plaster over the toilet door is loose.

The Stairwell

The ceiling in the stairwell is made up of tounged and v-groove painted boards.

The roof was found to be leaking through the tounged and v-groove after heavy rain on 16.11.22.

The walls have been plastered with cementitous plasters, which have cracked.

There is a large sash window in the rear wall.

The Ground Floor; Carriage Entry, Appliance Bays & Watch Rooms

Ceilings

The ceilings in the Carriage Entry up to the main building are plasterboard boarded, skim finished and painted.

The ceilings in the Appliance Bays are lath and plaster, painted. Various services penetrate and are attached to the ceiling, including the tracks and machinery for the roller shutter doors, light fittings, pipes, wires in conduits and trunking etc. There is a crudely cut hole in the ceiling towards the staircase for pipe that penetrates it, the hole has no fire stopping, this along with some other pipes penetrating the cornice.

Significant amounts of Georgian cornice remain at the perimeter of the original building.

The ceiling in the Watch Rooms is concrete with a gypsum skim, from the rear wall of the main building to the back of the wing. There is some cracking and de-lamination in the skim plasters.

There is a lowered (under the concrete) tounged and v grooved board ceiling at the rear section of the Watch Rooms making up a bulkhead for storage. The ceiling rafters have been boarded over for this purpose. The ceiling dissects the top of the Hopper window. The bulkhead is accessed by a set of sliding doors at the front of it. There is an un-insulated hot water pipe that penetrates the concrete deck/ceiling, along with an electrical wire. The penetration is crude and no attempt has been made to make good, including fire protection. Note; the ceiling inside the bulkhead is smoke blackened.

Note; all the pipes/services etc. that penetrate the fire breaks/fire compartments need to be checked for fire stopping and upgraded where necessary. It should also be noted that none of the buildings pipework's have been sleeved. Any pipe work that penetrates masonry (or concrete) should be sleeved with a material that has the same abrasive resistance as the pipe it protects; this is to protect the pipe from damage caused by chafe and thermal expansion. Any pipes that penetrate masonry without being sleeved are prone to leaks.

Holes in ceilings: Appliance Bay

Watch Room

Walls and Fittings

The masonry spine wall that would have run from left to right and centrally to the Main Building has been stripped out for the Appliance Bays. The walls above are supported by riveted steel beam supported by a cast iron post in the middle of the space. The beam-ends have been run into the external walls between the chimney breasts, which have been built up in-between to form an arch detail. The material and method of support is not known. There is a crack in the left-hand arch, otherwise there are no real signs of current or on-going movement. It would be prudent to have the structural engineer check this, this may require some opening up.

The back wall of the main building has been altered extensively to accommodate the structural openings for; The Watch Rooms, the toilet and staircase and the Carriage Entry; the rear bay windows sit above the Carriage Entry.

The structural openings at the back wall of the main building

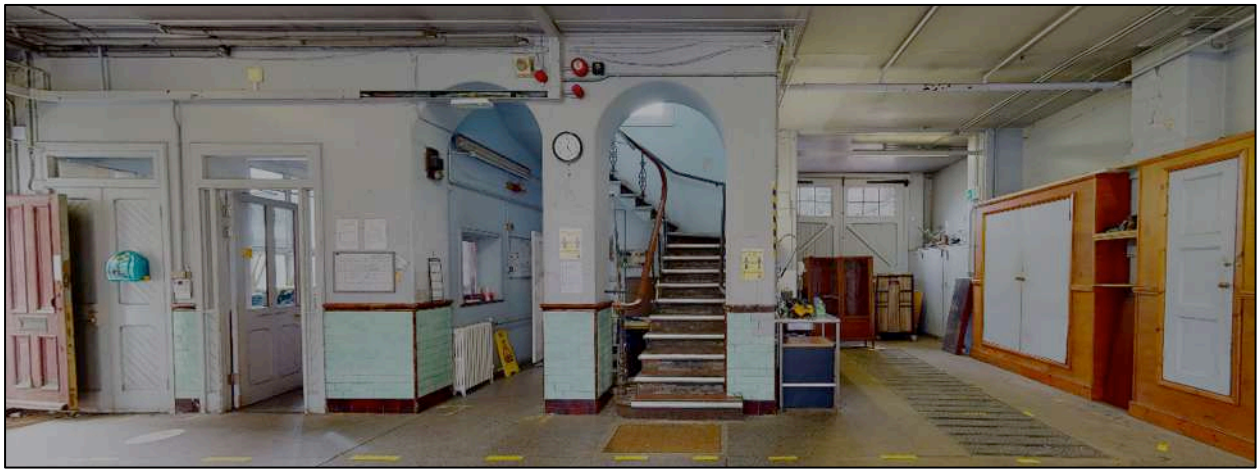


Image taken from Matterport scan

There are cementitious plasters down to the floor at both sides of the Carriage Entry.

There is a plain finished (functioning) drying unit for clothes and boots etc. to the right, with an electric heater. The unit is ventilated.

There is a plain finished cupboard at the top of the left-hand wall, which houses the extractor fans and some pipework for the toilets. The wall at the back, above the roof line and above the toilet next to it is supported by a steel beam were the wall below has been taken out presumably to house the back of the toilets. There is a non descript commercial stainless steel double sink to the left with a splash-back and electrical hand dryer attached to the wall.

	Plain finished cupboard at the top of the left-hand wall
	Inside the cupboard

Appliance Bays

The walls in the Appliance Bays are cementitious plastered from the ceilings down to decorative tiles at low level, with bead and but timber boarding at the front wall between the roller shutter doors above the decorative tiles.

Timber fixing grounds have been run around the upper side walls, to take electrical conduits etc. The walls have had an array of services attached to them associated with the running of an operational fire station, with the fuse boards and isolation switches situated at the front left corner of the Appliance Bays.

The decorative tiles at the lower parts of the main buildings/ Appliance Bay walls are polychromatic (green and brown) glazed tiles. The brown tiles are square at the base giving the impression of a skirting, and then continue in green stretcher bond up to brown moulded cap mouldings, the external corners are brown and bull-nosed.

There are some damaged tiles in various places mainly inside the built-in units and at corner of the side door entry, right-hand side of the front main entrance and at the masonry to the right of the staircase; the damage to the tiles here may have been caused by a horse drawn carriage appliance.
The fireplaces have been tiled over. Otherwise, the tiles are in a remarkably good condition, considering the use of the building.

There are extraction fans fitted in the rear chimney breasts at high level. These fans we fitted to clear fumes from the fire engines. But there is no ventilation provided to the front chimney breasts.

There are a set of 1980's built-in plywood cupboards along the right-hand wall. A couple of the doors are traditionally made three panelled doors, salvaged from elsewhere in the building. The others are plain 'egg box' core flush finished doors. A writing shelf with an open file store under it has been fitted across the rear left-hand chimney breast, with a Formica shelf between the units at the front one.

There is significant dampness at the right hand wall, as reported on earlier in this report. See report section 6.0 Damp and the Internal Environment for furthered information.

Watch Rooms

There are two structural openings in the main buildings back wall that lead in to the Rear Wing and the Watch Rooms. The Watch Rooms are entered through a part glazed door and timber frame set in the structural opening to the right and there is a pair of panelled doors with a 'story height' window at the top of the framework in the left-hand opening.

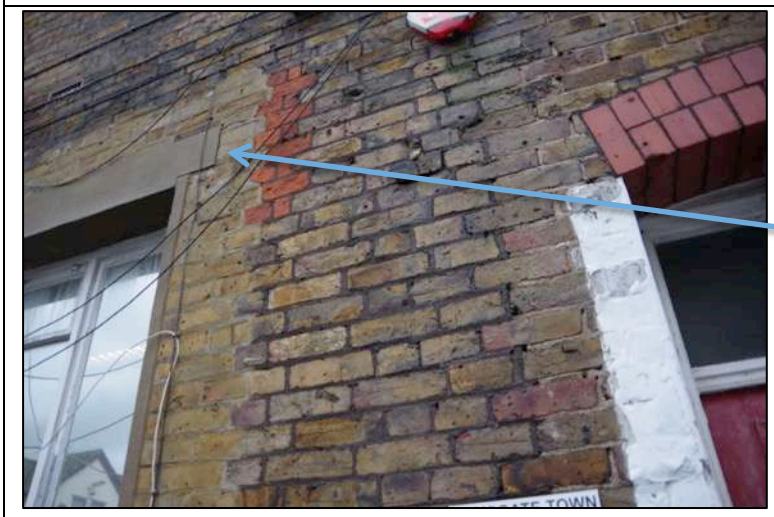
The panelling at the doors and the lower part of the right-hand door frame is tongued and v grooved boarding fitted diagonally. The pair of doors to the left have been fixed shut, a unit with cupboards at the bottom of it has been fitted internally. The Watch Rooms have been divided into two by a part glazed timber panelled wall, with a part glazed door that has the same detailing as the front door.

The walls of the front part of the Watch Room have been re-plastered using a cementitous plaster down to timber panelling at the bottom part of the walls, which is made up of battened out tongue and groove boarding with a capping and a skirting.

There is damp related damage to the plaster by the structural opening for the main Crital window, to the left, as seen facing. This is being cause by the leaking gutter and excessive rainwater on the masonry below it. The masonry around the window is made up of bricks bedded and pointed with cement, there are a gaps in the mortar at the top of the lintel right corner, which will be allowing rainwater penetration. The rainwater is being trapped between the cement work on both side of the wall causing hydrostatic pressure to build up, which in turn has the blown the plaster. It should be noted that hydrostatic pressure can build up to 1 Bar/ 15 PSI in and around masonry that has been covered with impermeable materials. This is enough to ' blow' cement plasters and plastic paints off the wall.

The upper part of the right hand wall has an array of switches, panels, plugs, conduits, trunking etc. attached to it associated with the running of the fire station, along with a central heating pipe penetrating the masonry at high level. The left-hand sidewall of the main building has a pipe penetrating it, which is surface mounted and runs along the wall at high level. There is a cold water pipe in the corner, which penetrates the concrete ceiling. The wall has surface mounted conduits attached to it. The timber panelling has various plugs and conduits.

There is a sash window in the right-hand wall at the front part of the Operations Room. The bottom sash was paint-bound and the top sash is boarded up. There is a pin-board attached to the wall.

	Hydrostatic pressure blowing the impermeable materials off of the wall in the front Watch Room
	The other side of the wall Note; gaps in the masonry were noted at the lintel

The Watch Room is subdivided by a part glazed/ part timber panelled partition, with a repeat detailed door. The walls in the rear section are tounged and grooved boarding all the way around, from floor to ceiling. There is an adapted key cupboard in the left wall, with key hooks attached to the door.

The walls have various electrical panels/ boxes and associated conduits attached to them. There is a pair of 1990's wall hung cabinets to the right.

There is a 1950/60's fitted writing desk with a unit under it to the left. One of the doors is missing.

There is a floor standing unit with draws and doors at the back wall that has been laminated with Formica and finished with hardwood trims. This unit could have been made anywhere between the 1960's and 1990's. A shelf has been fitted between the unit and the writing desk unit.

There is a sink supported by a basic frame to the right, with a splash back against the wall and some fitted laminated ply to make up the gap between it and the floor standing unit.

Toilet Area

There is a cupboard with a door under the main stairs, built in the same style as the carpentry and joinery at the Watch Room.

The toilet has a suspended ceiling with a tounged and v grooved boarding above it.

The front back and left hand walls have been plaster boarded over and skim finished, with tiles to the left. Some of the tounged and grooved boarding survives behind the plasterboard.

The right hand wall has been built out using plywood and finished with skimmed plasterboard. The has been done to house the pipe works that service the toilets and the shower. There is an access hole at high level in the back toilet for the valve for the feed pipes to the cisterns. There is no other access provided for the other pipes.

Decor

All Areas

The place needs to be redecorated along with localised repairs to the plasterwork second fixed timbers .

A comprehensive plan of works for the re-decoration of the places needs to be developed, one that does not harm historic building fabric.

5.5 Floors and Staircases

Upper floors and staircases

The upper suspended timber floors were subjected to the heel drop test'; the heel drop test is carried out by raising to ones tip toes and dropping the full weight of the body on to ones heels and noting any excessive deflection in the floor. No excessive deflection was noted on the first or second floor.

There is a hard spot which is slightly raised at the first floor, this is above the supporting column below.

The floor in the Rear Wing is thought to be constructed on top of a concrete deck. The floor needs to be opened up for inspection.

The staircase from the second floor down to the first is steep with tread that have a rise of 240mm and tread of 255 mm. The stairs and the landing have hardwood 'plank banister rails'.

The first floor landing and staircase is outside the boundary of the Main Building and housed in a latter addition to it. The landing and open stringed staircase down to the ground floor is made up of concrete. The treads are covered with vinyl with anti-slip stair nosings.

There is an internal handrail made from moulded tropical hardwood, with steel a tubular bar making up the outer handrail. There are ornate cast iron balusters on every other tread. One of the balusters is missing towards the bottom of the stairs. Note; the concrete landing and staircase may have been installed anytime during the c20 but the balusters are of Georgian detailing.

5.6 Services

Services are not tested or commented on as far as compliance with current regulations.

The electrical services are operational. It is recommended a qualified persons from NICEIC test system as the electrical safety certificate runs out in January 2023.

The gas boilers for the buildings heating have had the electronics tampered with, so much so that they don't work and are beyond repair.

Note on historic Mechanical, Electrical and Plumbing (MEP). A listed buildings existing MEP systems are often overlooked or not thought about and end up stripped out, for no other reason other than 'tiding up'. The alarms, bells, motors and wiring etc. particularly on the ground floor all help to tell the story of the buildings development as an operational fire station over a century. There is an eclectic collection of high quality historic radiators throughout the building which add to the significance of the place.

Here is an extract from Historic England's guidance note on 'Heating Systems for Historic Buildings';

Existing radiators, if of great age, and other heat emitters…may be of great historical importance as well as being quite suitable for re-use if free from leaks.

https://historicengland.org.uk/advice/technical-advice/building-services-engineering/heating-historic-buildings/heating-systems-for-historic-buildings/

Historic England provides guidance for installing new services in older buildings;
https://historicengland.org.uk/advice/technical-advice/building-services-engineering/installing-new-services/

6.0 Damp and the Internal Environment

It is important to understand that dampness only occurs in a building via a defect, inappropriate alterations/materials , or deviation from the original construction design principles.

An old building that is well maintained using the correct materials that considers traditional construction design principles will not suffer from damp related damage. For instance- dry timber is immune from all forms of decay and by using the correct lime mortars that manage moisture in the building fabric and the internal environment will keep a building dry. For further information please see Appendix:

A - Wood boring insects and rot

B- About Lime

The leaking roofs are obvious defects, which need to be dealt with.

The leaking RWGs are causing issues, particularly at the right hand side of the main building and at the front Watch Room. These issues are being exacerbated by the cementitious building materials that have been applied to the masonry.

It should be noted that a traditionally built masonry unit (wall) can perform as a 'breathable element' providing one side is 'vapour open'. Problems arise when both sides of the units have impermeable building materials applied to them.

The ground floor wall at the front and right of the building has impermeable materials applied to both sides. There is an additional problem of the dilapidated structure in next doors property. The wall here is saturated and will remain in this condition all the time the RWG are defective, the impermeable materials remain attached to the walls and the single story structure remains in a dilapidated condition. Note; further investigation is required in to the condition of the structure and the right-hand wall of the main building, once this has been done, along with repairing the RWG's a repair strategy can developed. Further invasive testing and analysis of the moisture content of the buildings walls need to be carried out. The invasive testing will provide a moisture profile of the building and will provide a reference to see how the masonry is drying down after remedial works have been executed. It should be noted as a rule of thumb, masonry, once all remedial works have been carried out takes about an inch a month to dry out.

The cement plinth at the base of the walls to the right and back of the building will be trapping moisture and need to be replaced with lime mortars.

The blocked drain at the back of the building is causing damp issues and needs to be cleared, along with any recommendations from the recent CCTV drain survey.

Perimeter drainage in the forms of Acco type surface drains at the openings to the building and French drains will be needed unless the external ground levels are reduced.

Managing the internal environment is crucial. Please see following note for more information.

Note on the Internal Environment

It is crucial that the internal humidity levels are managed in any old property, especially when its ability to breathe has been compromised by the use of inappropriate building materials and the blocking up of the building's built-in passive ventilation such as its chimney flues. It should be noted that throughout any building damp problems maybe encountered where air flow in rooms is limited and internal humidity is high.

Once internal relative humidity levels go above 18% (18°c) in any building the moisture content of its elements such as masonry and timbers, start to increase an so does the risk of condensation formation. Symptoms will include so called 'rising damp' patches on plasterwork at the base of walls, especially external walls, water condensing on and streaming down windows, odd patches of mould in areas of minimal air movement and hollow sounding plasterwork when tapped, especially around windows and near floors. This list is not exhaustive, but gives a flavour of the symptoms that can be experienced when subjecting an old building built with adequate ventilation and traditional materials, to modern airtightness and inappropriate building material such as cement tanking plasters, gypsum plaster, cement render and pointing, acrylic emulsion paints, wallpaper etc. – anything which is plastic or impervious and prevents the fabric of the building from breathing.

The RICS reference publication the Watts Pocket Handbook recommends humidity controlled ventilation and low background heating to help keep a building dry. Research by the Chartered Institute of Building Services Engineers (CIBSE) Historic England, Historic Scotland, the SPAB and others including our survey group, shows that if the internal relative humidity is maintained between 50 and 55% (18°c) and background heating is maintained, few, if any damp problems will occur in a well maintained building. This is provided that the building fabric is kept at or above 15 degrees centigrade. To help maintain a low relative humidity level, it is necessary to introduce humidity controlled mechanical ventilation with supplementary passive ventilation, if required .

7.0 Energy Efficiency

There is a government led drive to reduce energy consumption in existing buildings and part of this drive is the encouragement of introducing insulation wherever possible.

It is difficult to retro-fit an existing historic/ traditionally built buildings walls with insulation and actually save energy. Attention to detail is critical and qualified professional input is required. For instance a thermal element ie. a wall has to have an even covering of insulation to provide any benefit / energy savings. All the benefits / energy savings can lost through un-insulated window reveals and at floor /ceiling junctions resulting in a performance gap (the difference between the predicted performance and the actual performance).

This attention to detail also translated to the roof areas. For instance, a roof plane has to have an even covering in terms of U-value for it to actually prevent heat loss. Any gaps in a roof's insulation will allow heat to escape in a similar way to an open window. For instance, all the benefit from any loft insulation can be lost through an un-insulated loft hatch. Again, resulting in a performance gap.

See Historic England paper on insulating roofs for more technical details;
https://historicengland.org.uk/images-books/publications/eehb-insulating-pitched-roofs-ceiling-level-cold-roofs/

Extract from the SPAB website on U-value calculations;

'Ongoing research by the SPAB is providing convincing evidence to support our long-held contention that the thermal performance (U-value) of old, solid walls is frequently better than assumed and use of 'breathable' ('vapour-open') insulation minimises the risk of elevated moisture levels that can harm not only traditionally constructed (pre-c1919) buildings but their occupants' health.

Our findings to date are that standard U-value calculations (used across the construction industry to quantify the rate of heat transmittance through building elements) underestimated the thermal performance of the traditional solid walls sampled in 77% of cases. In some instances, heat loss was up to three times lower than calculated. Ultimately, this could have negative consequences for old buildings because the adoption of overly pessimistic theoretical U-values as the baseline for assessing the thermal performance of their walls may lead to disproportionate energy saving interventions that are not only unnecessary but also invasive and potentially harmful to historic fabric'.

For more details on the research see; https://www.spab.org.uk/advice/research/findings

In Approved Document L Volume 2, paragraph 0.12, there are special considerations for listed buildings, buildings in conservation areas and scheduled monuments;

'Work to a building in paragraph 0.12 must comply with the energy efficiency requirements, where this would not unacceptably alter the dwelling's character or appearance. The work should comply with standards in this approved document to the extent that is reasonably practicable.' (Volume 2, page 4, paragraph 0.13)…

'The energy efficiency of historic and traditional dwellings should be improved only if doing so will not cause long-term deterioration of the building's fabric or fittings. In particular, this applies to historic and traditional buildings with a vapour permeable construction that both absorbs moisture and readily allows moisture to evaporate. Examples include those built with wattle and daub, cob or stone and constructions using lime render or mortar'. This directly relates to modern impermeable materials.

The internal walls of the main building on the first and second floors have lath & plaster dry-linings, with some alterations/ poor repairs. The build up of the walls ie. the lath and lime plaster with the air gap and thickness of the walls reduces the overall U-value. But it needs to be understood that this is significant historic building fabric, which has embodied energy. Embodied energy is the associated energy that goes in to extracting and processing raw materials, their transportation, manufacturing and the construction process. Embodied energy is a key factor in measuring and assessing sustainability.

Second floor were the lath and plaster has been replaced by cementitious solid plaster

Note; temperature difference between the two sets of materials; solid plaster to the left, lath and plaster to the right. The imaging was done in the summer months when the building was near equilibrium with its environment. The solid plaster needs to be stripped and the lath and plaster reinstated.

The walls in the rear wing on the first floor are a mixture of plasterboard dry-linings and solid cementitious plasters and have no real historic value.

The solid plasters at the ground floor are replacement modern impervious cementitious materials. The glazed tiles and timber panelling at low level have high historic evidential value.

It should be noted that a damp/wet traditionally built can be up to 30% less efficient as if it was dry. This particularly relates to the right-hand wall of the main building where the RWG's are defective.

It is important to maintain keep the building fabric dry, reduce draughts and manage the buildings thermal mass. Thermal mass is a buildings ability to store the summers heat energy in its fabric. The best way of managing this stored energy is to maintain background heating in the colder months and never let the building get cold as it will take a lot of time and energy to bring it back up to heat.

For further and practical advice on energy see the Historic England and SPAB papers which can be found at;

https://historicengland.org.uk/advice/technical-advice/retrofit-and-energy-efficiency-in-historic-buildings/

http://www.spab.org.uk/downloads/SPAB%20Briefing_Energy%20efficiency.pdf

8.0 Grounds, Boundaries and Out Buildings

To be continued.

Appendix A – Wood boring insects and rot

Basically dry timber is immune from wood boring insect activity and rot.

Wood boring insects need a certain amount of moisture in timber of around 20% and higher to thrive. Even Death Watch Beetle (DWB) does not thrive if wood moisture contents remain below 15% all year round; dry timber in the average building has a moisture content of about 11%.
Insects and rot will only affect the sapwood of a timber member. Sapwood is the relatively new outer layers of a tree between the heartwood (inner part of the tree) and the bark, it contains the resins and proteins that the insects and rot need to feed on. The heartwood contains extractives, which are deposited in the timber as the tree grows, these extractives are toxic to insects and all forms of rot. Extractives can be 'washed out' of the timber by rainwater through a defect in the buildings external envelope. The chemistry of heart wood timber can be altered by fungus (caused by wetting) enough to make it palatable enough for insects. Basically, the extractives are the trees natural preservative.
Rots that affect timber need much higher moisture contents to thrive. For instance the brown rots AKA wet and dry rot need moisture contents of around 28% to cause serious damage to sapwood timbers. In other words – there needs to be a serious issue because timber needs to be really damp for problems to occur.

Wood boring insects have natural predators – spiders. The long legged house spider in particular (Pholcus phalagioides) is an effective predator. The wide spread use of chemical preservatives have a negative impact on the eco-system in a buildings roof or subfloor space as the spiders are more susceptible to the preservatives than the wood boring insects.
All wood boring insects including Death Watch Beetle populations will decline if dry conditions are maintained inside a building, at the same time the predation of spiders will become more effective, eventually leading to the extinction of the infestation. And all forms of rot will perish in dry conditions – no chemicals needed.

Here is an extract of what English Heritage has to say about Dry Rot: Mythology & Reality in the Timber volume of their Practical Building Conservation series;
'Dry rot is often seen as a cancer-like fungus that cannot be halted, except by drastic treatment, because some exaggerated characteristics have been attributed to it. These popular myths include the ability to produce enough water from the decaying wood to sustain its self (so the fungus continues to spread and cause damage even if the original source of moisture that has caused the attack is removed), that it has the ability to transmit moisture through its chords, making dry timber wet enough to attack, or that buildings dry through a 'moisture zone' in which there is a risk of dry rot developing.
Despite these ideas being nonsensical, they are still widely believed, with the consequence frequently being massive destruction. In many cases the dry-rot treatment has caused far more damage to the historic building than the fungus'.

Basically, find the moisture source, turn off the tap and the rot will start to dry and die – no chemicals needed.

Appendix B -About Lime

Lime can generally be categorised into two types:

- Non Hydraulic Limes (putty and quicklime)
- Natural Hydraulic Lime (NHL and Natural Cements)

The main differences between the two types are;

- Non Hydraulic Limes are pure lime and were made locally (Isle of Thanet) by burning chalk. They set by carbonating and sometimes have additives (silica) mixed in with the mortar mix to help provide hydraulic and stronger final sets, theses additives are known as Pozzolans; Pozzolan additives in mortars were developed by the Romans. Examples of the durability of these mortars can be seen at Richborough Roman fort;

https://www.english-heritage.org.uk/visit/places/richborough-roman-fort-and-amphitheatre/

- Natural Hydraulic Limes set by adding water to them and have certain percentages of clay in the lime, which gives them their final set strength, they also set with carbonation but not as much as pure limes.

During the hundred years between 1750 and 1850 major discoveries were found about mortar properties. The relationship between limestone and clay impurities were not understood before John Smeaton's work in the 1750's that confirmed the link between the clay (silica) content in lime and hydraulicity. The Cross Wall and Dry-dock at Ramsgate Harbour are among Smeatons ' notable works' ;

https://www.ice.org.uk/what-is-civil-engineering/civil-engineer-profiles/john-smeaton

Both types of lime have their place in traditional mortar mixes but careful consideration must be given to which type is used.

Note;

Extensive research was carried out by English Heritage under the guidance of Professor John Ashurst as there seemed to be inconstancies with the classification of NHL's by the different manufacturers. It was found that the clay content in the NHL's varied by significant amounts; some NHL2's were found to be equivalent to NHL 3.5 and some NHL 3.5 were equivalent to NHL 5. This was leading to the wrong mortar specifications and historic masonry was being damaged as a result.

The French lime manufacturer – St Astier worked with John Ashurst and English Heritage and St Astier produced relevant technical information on the amount of clay in their lime and have produced tables setting out their mortars final sets.

The designations (2 – 3.5 -5) for NHL's is modern cement test and is measured at 28 days as this is how long it takes cement to set after mixing , whereas lime takes 24 months to reach final set.

Note; some (St Astier) NHL 2 mortars can have a final set that is equivalent to NHL 3 and NHL 4.25.

See link;http://www.stastier.co.uk/nhl/data/nhl2.htm

Only St Astier NHL's can be used/ recommended in historic/ pre-1919 construction as they are they only manufacturer that provides technical data on the final set strengths and therefore the only reliable source of lime.

St Astier NHL 2 has a final set strength that would be equivalent historic 'moderately hydraulic' lime (defined by Smeaton) and should be considered the maximum strength for most mortar mixes for most traditional masonry units.

The use of traditionally slaked lump lime / hot mixed quick lime mortars have seen a renaissance in recent years and extensive study has been carried out Nigel Copsey, the Building Limes Forum, staff at Historic England and Historic Environment Scotland.See Link to Nigel Copsey's book below for the most up to date information on the subject.

The ideal time to complete external lime work works is between April and September this is to prevent frost damage. A temperature of over 6 degrees °c is required to ensure set in hydraulic mortars. Lime work should be damped down regularly after application, this is particularly important during the summer and windy conditions.

For information on lime work , see these websites for guidance;

- https://historicengland.org.uk/content/docs/research/ctx154-henry-hot-mixed-mortarspdf/
- http://www.stastier.co.uk/guides.htm
- https://www.chalkdownlime.com/aboutus
- https://www.mikewye.co.uk/guidesheets/

And these publications:

- Hot Mixed Lime and Traditional Mortars: A Practical Guide to Their Use in Conservation and Repair. By Nigel Copsey

https://www.waterstones.com/book/hot-mixed-lime-and-traditional-mortars/nigel-copsey/9781785005558

Practical Conservation Series by English Heritage/ Historic England, Volumes:

- Mortars, Renders & Plasters
- Earth Brick and Terracotta
- Stone
- Roofing
- Environment

Appendix B – Terms of Engagement and Survey Limitations

1. This is a bespoke service which is bench marked against RICS level three Building Survey as described in the RICS Home Survey Standards (1st edition). It differs from the RICS Level 3 survey but instead of using colour coding building condition it describes them. With time scales describing when works should be carried out: Now or in the Construction Phase

2. The Surveyor will undertake a visual, non-destructive, inspection of so much of the exterior and interior of the property as is accessible safely and without undue difficulty, unless agreement for invasive inspections are gained. Accordingly, the report will cover all the parts of the property, which are visible whilst standing at the various floor levels. The Surveyor will open trap doors where accessible and possible with safety and without undue difficulty. However he will be under no obligation to raise floorboards or to inspect those areas of the property that are covered, unexposed, or are not readily accessible with safety and without undue difficulty.

3. The Surveyor has no authority to cause damage to any part of the building in order to further his investigation. However, the Surveyor may recommend if he considers it advisable to open up and expose parts of the property for a more detailed inspection. The surveyor will by prior agreement of the property owner open up and make invasive inspections where deemed necessary.

4. The inspection will include, subject to reasonable accessibility with safety and without undue difficulty, the roof space(s) without moving insulation material. Inspection of the roof space is confined to details of design and basic construction; individual timbers are not specifically examined although, where defects are observed as part of the general examination, such defects will be noted in the report. It is not possible to report on the condition of flues or the presence of flue liners. The report will not advise upon whether or not any chimneys can be used.

5. The outer surfaces of the roofs will be inspected from ground level, or with close inspection if they can be readily accessed from a 3 metre (10ft) ladder.

6. Except where the contrary is stated, woodwork, foundations and other parts of the structure which are covered, unexposed or inaccessible, will not be inspected and the Surveyor will be unable to report that such parts of the property are free from rot, beetle or other defects. The report will not purport to express an opinion about or to advise upon the condition of uninspected parts and should not be taken as making any implied representation or statements about such parts.

7. Visual inspections will be made of the services. An assessment of the suitability, method of installation, condition, efficiency and capacity of any central heating system, boiler or other equipment can only be made by specialist testing. The safety, standard of workmanship, and state of repair of the gas and electrical installations are also outside the scope of this report.

8. Comments on attached garages and other attached outbuildings are limited to significant defects only. Detached out buildings and grounds are excluded unless by prior specific agreement.

9. The report is provided for the sole use of the named client and is confidential to the client and his/her professional advisers only. No responsibility is accepted to others. The Surveyor accepts responsibility to the client alone for the stated purposes that the report, which will be prepared with the skill, care and diligence reasonably to be expected of a competent Surveyor. No responsibility will be accepted to any person other than the client, and any such person relies upon the report at his/her own risk.

10. The report has been prepared by the Surveyor (The Employee) on behalf of Standard Heritage Limited (The Employer). The statements and opinions expressed in this report are expressed on behalf of the Employer, who accepts full responsibility for these. Without prejudice and separately to the above, the Employee will have no personal liability in respect of any statements and opinions contained in this report, which shall at all times remain the sole responsibility of the Employer to the exclusion of the Employee. To the extent that any part of this notification is a restriction of liability within the meaning of the Unfair Contract Terms Act 1977, it does not apply to death or personal injury resulting from negligence.

11. Reinstatement Costs and property Valuation are not provided as part of this report.

12. Complaints Handling Procedure: Any complaints will be considered by a senior member of staff. If the complaint cannot be resolved, it will be referred to an independent redress scheme; the property ombudsman service. Standard Heritage may be required to disclose the Building Survey report to RICS Regulation to ensure that RICS professional standards are being maintained.

13. Complaints Handling Procedure. As a regulated RICS firm, we have Complaints Handling Procedure (CHP) in place which meets the institutes' regulatory requirements. Our CHP has two stages. Stage one of the CHP gives our firm the opportunity to review and consider your complaint in full. If you are not happy with our response (Stage One), you will have the opportunity to take your complaint to Stage Two. Stage two gives you the client, the opportunity to have your complaint reviewed and considered by an independent redress provider, approved by RICS. Contact our firm for full details of our CHP office@standardheritage.uk. Standard Heritage Ltd may be required to disclose the Building Survey report to RICS Regulation to ensure that RICS professional standards are being maintained.

14. Liability Cap: Our aggregate liability arising out of, or in connection with this instruction, whether arising from negligence, breach of contract, or any other cause whatsoever, shall in no event exceed the lesser amount of 100 times the net fee paid or £500,000.00 This clause shall not exclude or limit our liability for actual fraud, and shall not limit our liability for death or personal injury caused by our negligence.

15. The survey excludes any flood risk assessment or any advise in respect of future flood risk. Clients are advised to engage a solicitor to undertake searches and to advise on flood risk.

In making the report, the following assumptions will be made:

- That no high alumina cement concrete or calcium chloride additive or other deleterious material was used in the construction of the property. Neither will comment be made on any assumed health risk related to any structural or cavity fill material which may be covered and unapparent from the inspection or any ground released gasses or other contamination or noxious seepage.

- That the property is not subject to any unusual or especially onerous restrictions, encumbrances or outgoings and that good title can be shown.

- That the property and its value are unaffected by any matters which would be revealed by a Local Search and Replies to the Usual Enquiries, or by a Statutory Notice, and that neither the property, nor its condition, nor its use, nor its intended use, is or will be unlawful.

- That the inspection of those parts which have not been inspected would neither reveal material defects nor cause the Surveyor to materially alter his opinion.

- This inspection does not cover invasive plant species

Glossary of Terms

Aggregate: Pebbles, shingle, gravel etc used in the manufacture of concrete, and in the construction of "soakaways".

Airbrick: Perforated brick used for ventilation, especially to floor voids (beneath timber floors) and roof spaces.

Architrave: Joinery moulding around window or doorway.

Asbestos: Fibrous mineral used in the past for insulation. Can be a health hazard – specialist advice should be sought if asbestos (especially blue asbestos) is found.

Asbestos Cement: Cement with 10-15% asbestos fibre as reinforcement. Fragile – will not bear heavy weights. Hazardous fibres may be released if cut or drilled.

Ashlar: Finely dressed natural stone: the best grade of masonry.

Asphalt: Black, tar-like substance, strongly adhesive and impervious to moisture. Used on flat roofs and floors.

Barge Board: See 'Verge Board'.

Balanced Flue: Common metal device normally serving gas appliances which allows air to be drawn to the appliance whilst also allowing fumes to escape.

Beetle Infestation: (Wood boring insects: woodworm) Larvae of various species of beetle which tunnel into timber causing damage. Specialist treatment normally required. Can also affect furniture.

Benching: Smoothly contoured concrete slope beside drainage channel within an inspection chamber. Also known as 'haunching'.

Bitumen: Black, sticky substance, related to asphalt. Used in sealants, mineral felts and damp-proof courses.

Breeze Block: Originally made from cinders ("breeze") – the term now commonly used to refer to various types of concrete and cement building blocks.

Carbonation (Concrete): A natural process affecting the outer layer of concrete. Metal reinforcement within that layer is liable to early corrosion, with consequent fracturing of the concrete.

Carbonation (Lime): A natural process in where Lime render / mortar etc sets through carbonation.

Cavity Wall: Standard modern method of building external walls of houses comprising two leaves of brick or block-work separated by a gap ("cavity") of about 50mm (2 inches).

Cavity Wall Insulation: Filling of wall cavities by one of various forms of insulation material:

Beads: Polystyrene beads pumped into the cavities. Will easily fall out if the wall is broken open for any reason.

Foam: Urea formaldehyde form, mixed on site, and pumped into the cavities where it sets. Can lead to problems of dampness and make replacement of wall-ties more difficult.
Rockwool: Inert mineral fibre pumped into the cavity.

Cavity Wall-Tie: Metal device bedded into the inner and outer leaves of cavity walls to strengthen the wall. Failure by corrosion can result in the wall becoming unstable – specialist replacement ties are then required.

Cesspool: A simple method of drain comprising a holding tank which needs frequent emptying. Not to be confused with "septic tank"..

Chipboard: Also referred to as "particle board". Chips of wood compressed and glued into sheet form. Cheap method of decking to flat roofs, floors and (with formica or melamine surface) furniture, especially kitchen units.

Collar: Horizontal timber member intended to restrain opposing roof slopes. Absence, removal or weakening can lead to roof spread.

Combination Boiler: Modern form of gas boiler which activates on demand. With this form of boiler there is no need for water storage tanks, hot water cylinders etc.

Coping/Coping Stone: Usually stone or concrete, laid on top of a wall as a decorative finish and to stop rainwater soaking into the wall.

Corbel: Projection of stone, brick, timber or metal jutting out from a wall to support a weight.

Cornice: Ornamental moulded projection around the top of a building or around the wall of a room just below the ceiling.

Coving: Curved junction between wall and ceiling or (rarely) between ceiling and floor.

Crack: Cracks or fractures referred to in this report follow the classifications of Building Research Digest 251: up to 1mm = negligible or very slight, 1mm to 5mm = slight, 5mm to 15mm = moderate, 15mm to 25mm = severe, over 25mm = very severe.

Dado Rail: Wooden moulding fixed horizontally to a wall, about 1 metre (3ft 4in) above the floor, originally intended to protect the wall against damage by chair-backs.

Damp Proof Course: Layer of impervious material (slate, mineral felt, pvc etc) incorporated into a wall to prevent dampness rising up the wall

Deathwatch Beetle: (Xestobium Refovillosum.) Serious insect pest in structural timbers, usually affects old hardwoods with fungal decay already present.

Double Glazing: A method of thermal insulation usually either:

Sealed unit: Two panes of glass fixed and hermetically sealed together; or
Secondary: In effect a second "window" placed inside the original window.

Dry Rot: (Serpula Lacrymans.) A fungus which attacks structural and joinery timbers, sometimes with devastating results. Can flourish in wet moist, unventilated areas.

Eaves: The overhanging edge of a roof.

Efflorescence: Salts crystallized on the surface of a wall as a result of moisture evaporation.

Engineering Brick: Particularly strong and dense type of brick, sometimes used as a damp-proof course.

Fibreboard: Cheap, lightweight board material of little strength, used in ceilings or as insulation to attics.

Flashing: Building technique used to prevent leakage at a roof joint. Normally metal (lead, zinc, copper) but can be cement, felt or proprietary material.

Flaunching: Contoured cement around the base of chimney pots, to secure the pot and to throw off rain.

Flue: A smoke duct in chimney, or a proprietary pipe serving a heat-producing appliance such as a central heating boiler.

Flue Lining: Metal (usually stainless steel) tube within a flue – essential for high output gas appliances such as boilers. May also be manufactured from clay and built into the flue.

Foundations: Normally concrete, laid underground as a structural bas to a wall: in older buildings may be brick or stone.

Frog: A depression imprinted in the upper surface of a brick, to save clay, reduce weight and increase the strength of the wall. Bricks should always be laid frog uppermost.

Gable: Upper section of a wall, usually triangular in shape, at either end of a ridged roof.

Ground Heave: Swelling of clay sub-soil due to absorption of moisture: can cause an upward movement in foundations.

Gully: An opening into a drain, normally at ground level, placed to receive water etc from downpipes and wastepipes.

Haunching: See “Benching”. Also term used to describe the support to a drain underground.

Hip: The external junction between two intersecting roof slopes.

Inspection Chamber / Man hole Cover : Commonly called “man-hole”: access point to a drain comprising a chamber (of brick, concrete or plastic) with the drainage channel at its base and a removable cover at ground level.

Jamb: Side part of a doorway or window.

Joist: Horizontal structural timber used in flat roof, ceiling and floor construction. Occasionally also metal.

Landslip: Downhill movement of unstable earth, clay, rock etc often following prolonged heavy rain or coastal erosion, but sometimes due entirely to sub-soil having little cohesive integrity.

Lath: Thin strip of wood used in the fixing of roof tiles or slates, or as a backing to plaster.

Lintel: Horizontal structural beam of timber, stone, steel or concrete placed over window or door openings.

Longhorn Beetle: (Hylotrupe Bajulus.) A serious insect pest mainly confined to the extreme south-east of England, which can totally destroy the structural strength of wood.

LPG: Liquid Petroleum Gas or Propane. Available to serve gas appliances in areas without mains gas. Requires a storage tank.

Mortar: Mixture of sand, cement, lime and water, used to join stones or bricks.

Mullion: Vertical bar dividing individual lights in a window.

Newel: Stout post supporting a staircase handrail at top and bottom. Also, the central pillar of a winding or spiral staircase.

Oversite: Rough concrete below timber ground floors: the level of the oversite should be above external ground level.

Parapet: Low wall along the edge of a flat roof, balcony etc.

Pier: A vertical column of brickwork or other material, used to strengthen the wall or to support a weight.

Plasterboard: Stiff "sandwich" of plaster between coarse paper. Now in widespread use for ceilings and walls.

Pointing: Smooth outer edge of mortar joint between bricks, stones etc.

Powder Post Beetle: (Bostrychidae or Lyctidae family of beetles.) A relatively uncommon pest which can, if untreated, cause widespread damage to structural timbers.

Purlin: Horizontal beam in a roof upon which rafters rest.
Quoin: The external angle of a building; or, specifically, bricks or stone blocks forming that angle.

Rafter: A sloping roof beam, usually timber, forming the carcass of a roof.

Random Rubble: Primitive method of stone wall construction with no attempt at bonding or coursing.

Rendering: Vertical covering of a wall either plaster (internally) or cement (externally), sometimes with pebble-dash, stucco or Tyrolean textured finish.

Reveals: The side faces of a window or door opening.

Ridge: The apex of a roof.

Riser: The vertical part of a step or stair.

Roof Spread: Outward bowing of a wall caused by the thrust of a badly restrained roof carcass (see "Collar").

Screed: Final, smooth finish of a solid floor; usually cement, concrete or asphalt.

Septic Tank: Drain installation whereby sewage decomposes through bacteriological action, which can be slowed down or stopped altogether by the use of chemicals such as bleach, biological washing powders etc.
Settlement: General disturbance in a structure showing as distortion in walls etc, possibly a result of major structural failure. Sometimes of little current significance.

Shakes: Naturally occurring cracks in timber; in building timbers, shakes can appear quite dramatic, but strength is not always impaired.

Shingles: Small rectangular slabs of wood used on roofs instead of tiles, slates etc.

Soakaway: Arrangement for disposal of rainwater, utilising graded aggregate laid below ground.

Soaker: Sheet metal (usually lead, copper or zinc) at the junction of a roof with a vertical surface of a chimney stack, adjoining wall etc. associated with flashings which should overlay soakers.

Soffit: The under-surface of eaves, balcony, arch etc.

Solid Fuel: Heating fuel, normally coal, coke or one of a variety of proprietary fuels.

Spandrel: Space above and to the sides of an arch; also the space below a staircase.

Stud Partition: Lightweight, sometimes non-loadbearing wall construction comprising a framework of timber faced with plaster, plasterboard or other finish.

Subsidence: Ground movement, generally downward, possibly a result of mining activities or clay shrinkage.

Sub-Soil: Soil lying immediately below the top-soil, upon which foundations usually bear.

Sulphate Attack: Chemical reaction, activated by water, between tricalcium aluminate and soluble sulphates. Can cause deterioration in brick walls and concrete floors.

Tie Bar : Heavy metal bar passing through a wall, or walls, to brace a structure suffering from structural instability.

Torching: Mortar applied on the underside of roof tiles or slates to help prevent moisture penetration. Not necessary when a roof is underdrawn with felt.
Transom: Horizontal bar of wood or stone across a window or top of door.

Tread: The horizontal part of a step or stair.

Trussed Rafters: Method of roof construction utilising prefabricated triangular framework of timbers. Now widely used in domestic construction.

Underpinning: Method of strengthening weak foundations whereby a new, stronger foundation is placed beneath the original.

Valley Gutter: Horizontal or sloping gutter, usually lead or tile-lined, at the internal intersection between two roof slopes.

Ventilation: Necessary in all buildings to disperse moisture resulting from bathing, cooking, breathing etc, and to assist in prevention of condensation.

Floors: Necessary to avoid rot, especially dry rot; achieved by airbricks near to ground level.

Roofs: Necessary to disperse condensation within roof spaces; achieved either by airbricks in gables or ducts at the eaves.

Verge: The edge of a roof, especially over a gable.

Verge Board: Timber, sometimes decorative, placed at the verge of a roof: also known as "barge board".

Wainscot: Wood panelling or boarding on the lower part of an internal wall.

Wall Plate: Timber placed at the eaves of a roof, to take the weight of the roof timbers.

Wet Rot: (Coniophora Puteana.) Decay of timber due to damp conditions. Not to be confused with the more serious dry rot.

Woodworm: Colloquial term for beetle infestation: usually intended to mean Common Furniture Beetle (Anobium Punctatum): by far the most frequently encountered insect attack in structural and joinery timber.

Notes