



An **APLEONA** company

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23 October 2017

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Dear Cassandra,

**RIVERS HOUSE, BELVEDERE ROAD, CROSSNESS, LONDON SE2 9AN
CRACKING TO INTERNAL AND EXTERNAL WALLS**

Further to your instructions dated 22 September 2017 we have undertaken an inspection of Rivers House, Crossness to review and report on cracking to the internal walls of the main office building and the separate garage building at Rivers House.

Our inspection was undertaken on Tuesday 3rd October 2017 at which time weather conditions were dry. The inspection was non-intrusive, involving no opening up or removal of finishes, and was carried out from ground level.

PROPERTY

The site is located adjacent to Crossness Sewage Treatment Works, 12 miles to the east of London City Centre and within close proximity of the River Thames.

Office

The main building on the site comprises a single storey office/administration building. This has been constructed over several phases (first phase circa 1976), with the different phases incorporating different combinations of cavity brickwork and timber framed construction. The timber framed sections are clad externally with timber weatherboard and internally with plasterboard. Internal finishes comprise painted plasterboard ceilings and walls. The floors comprise in-situ cast ground bearing concrete floor slabs with carpet tile finishes. Internal walls comprise a combination of stud partitions and masonry walls.

The British Geological Survey website confirms that the property is built on superficial deposits of alluvium, including silt and peat. These soils are very soft and extremely compressible. We believe that the original wing of the office building has a raft foundation but it appears that the adjoining phases do not and may have been built with trench fill foundations. The original construction drawings would need to be obtained or trial pits dug to verify this.

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Rainwater from the rear of the office is discharged via downpipes directly onto the grass verge immediately adjacent to the rear of the building. Rainwater gullies are installed beneath each downpipe but some are partially in-filled and the shoes of the downpipes divert rainwater away from these, suggesting they have been made redundant. This arrangement will cause localised saturation of the ground in these areas and possible ground movement.

The office building underwent a package of external repair works in 2008, which included replacement of all external windows and cladding.

Garage

The garage comprises a single storey structure with cavity brick/ blockwork external cavity walls and a steel trussed pitched roof clad with asbestos cement sheets. The floor comprises an in-situ cast ground bearing concrete slab, which is left exposed. To the front elevation, two wide-spanning steel concertina doors are installed beneath pre-cast concrete lintels supported off brick piers which are 1 ½ bricks thick.

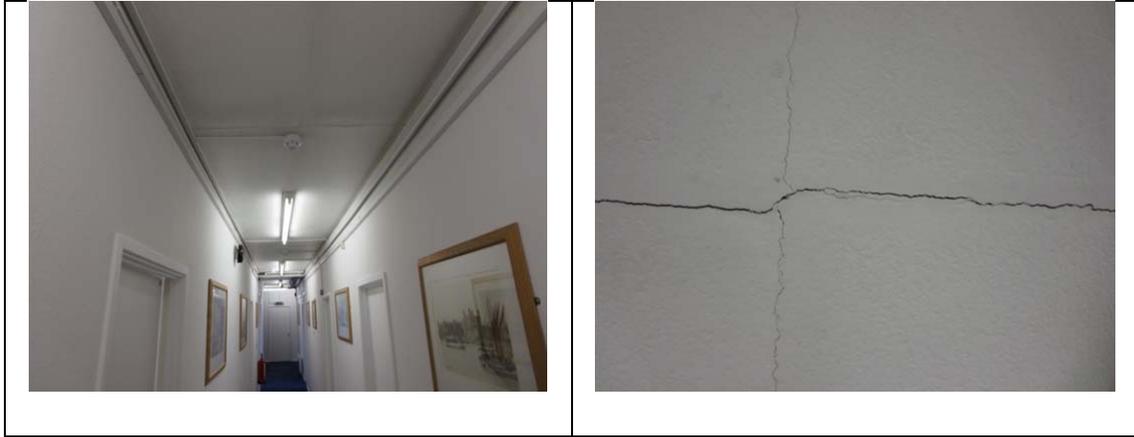
CRACKING

We identified a number of cracks to internal and external walls, which are described below and located on the enclosed annotated plans and photographs. We also enclose a schedule of photographs showing the cracking. All descriptions are written as if the reader is facing each crack or building referred to.

Office Building - Internal

The main central corridor which runs north-south from the reception is formed with stud partitions and lined with plasterboard on either side. Regularly spaced at 1200mm centres along the corridor walls are c. 1mm vertical cracks to the internal walls which align with the c. 1mm horizontal cracks to the ceiling. The cracks align with similar cracking on the reverse side of the walls, within the adjacent rooms. The most significant crack is located around half way along the corridor and also spans across the internal and external walls within rooms C15 and C16. The rooms adjacent to the central corridor are showing the same cracking to both walls and ceilings.





The corridor walls have been redecorated within the past 12 months but the cracks have re-formed. We were advised by staff that the internal cracking to walls has been present to the same extent for the last nine years and that following each periodic redecoration the cracks shortly reappear. You have confirmed that your term maintenance contractor, Interserve, monitored the significant crack to C15 & C16 for circa 12 months from June 2014 and that no movement was identified during this period. We have located a small number of photographs taken during the 2008 refurbishment project and, although these photos do not show the entire building, the cracks they show appear not to have worsened relative to present day.



The regularity of the cracking, following the line of the plasterboard sheets, suggests that the timber frame to which they are fixed is able to move to a greater extent than the plasterboard joints are able to accommodate, with the resulting tension causing the cracking. This may be due to a lack of diagonal bracing to provide lateral stability, resulting in frequent but minor movement.

Having reviewed our files we can see that during 2008 a package of external repair works was undertaken, which included replacement of all external windows and cladding. Correspondence during the course of the project confirms that when floor coverings were removed to facilitate the works, cracking to the screed on the concrete floor slab was identified and a structural engineer was appointed to inspect. At the time of the project it is evident that the Environment Agency only intended to remain in occupation of the building for five years and as such the scope of repair works and the basis of the structural engineer's review was that the building was to remain in a reasonable state for occupation until circa 2013 when it was intended to hand it back to the landlord. The structural engineer's email is appended to this letter but below is an extract:

PJH (GVA) Email 12/03/2008

"The engineer is happy that the movement/cracking will not be an issue over the next five years. Minor making good will suffice based on this length of occupation. If you do stay in occupation for longer a review of the general structural condition would be prudent (say at the end of year 5)."

If redecorated, the joints between plasterboard sheets will re-open and the cracks re-form.

Office building – external

On the enclosed elevation drawing we have annotated the position of cracking within the external brickwork walls. These cracks are minor, less than 1mm wide, and it is evident that previous mortar repairs have been carried out in these areas.





Garage

Access to the rear and left hand elevation of the garage is only possible from the adjacent Thames Water property. The right hand elevation is concealed behind vegetation and accessible only from a neighbouring plot of land. The adjacent landowners will need to be notified of any works which will require access onto their land.



Please refer to the enclosed annotated photographs, which show the locations of internal cracks in yellow and external cracks in red.

To the front, left hand and rear elevation is diagonal cracking within the brickwork, with cracks wider at the top than the base, indicative of differential settlement or subsidence. It is likely the foundations were undersized for the soft ground conditions, however, there is no sign of progressive movement.

A half brick thick skin of brickwork has been on to the face of the right side of the front elevation to support the concrete lintel above the sliding doors. This outer skin is bowing outwards where it is not adequately tied back to the original brickwork.



Internally the left and right flank walls have vertical cracking which appears to be caused by differential thermal movement where steelwork has been built directly into the wall with no allowance for movement and a lack of vertical movement joints.



CONCLUSION AND NEXT STEPS

As no movement occurred to the most significant cracks to both buildings during the course of a 12 month monitoring period this can give some reassurance that the worst of the movement is historic and not progressive. Previous photographs from 2008 also suggest that there has been little if any further movement. However, as not all cracks were monitored or photographed previously we do not have a reference point for all cracks to determine whether these are continuing to move.

It is likely that the timber framed sections of the office building will continue to move to a minor degree due to thermal and moisture movements, sufficient to cause the internal plasterboard joints to continue to form following redecoration. We do not believe this to be of structural concern but if you wish to consider a permanent solution to prevent on-going cracking internally this would require opening up to allow a full structural review of the timber frame, the foundations and the connections to the adjacent cavity walled structures. This would allow remedial strengthening of the structure to be designed and installed. This would be costly and intrusive. Alternatively a movement joint could be introduced across the building although localised opening up would be required to determine how effective this would be.

We would recommend that a structural engineer is appointed to inspect the crack through the external low level block work to the rear elevation, adjacent to office C15 to advise upon its cause, significance and whether any repair works or periodic monitoring is required. Their investigation is likely to require localised lifting of carpet tiles and may require forming openings in the plasterboard wall linings to inspect the structure in the area. The structural inspection should therefore be coordinated with your maintenance contractor.

It would be prudent whilst the structural engineer is on site for them to inspect the garage building and report on the cracking / bowing to advise what remedial works are required. To allow thorough inspection, access will need to be arranged onto the land adjacent to the rear and side elevations of the garage.

We therefore recommend that a structural engineer is appointed to undertake an inspection, report on their findings and prepare a specification for remedial works where required. In order that the engineer can inspect the cracking previously identified to the floor slab, we recommend that your maintenance contractor is in attendance to remove and reinstate floor, wall and ceiling finishes as necessary. Please let us know if you would like us to arrange this.

FURTHER CONSIDERATIONS

In addition to the above, we identified a small number of relatively minor items which should be picked up with your term maintenance contractor. These are as follows:

1. The rainwater goods to the garage building are in poor condition. Gutters to the left elevation are broken in places and the gutter to the right hand elevation is blocked with vegetation. Where the rainwater goods are not working adequately this can exacerbate movement of the building and cause dampness internally so these should be repaired immediately.
2. To the rear elevation of the garage a verge capping sheet is missing, allowing rainwater to penetrate into the cavity wall and also into the garage itself. A new verge cap sheet should be installed. Please consult with the asbestos register/ refurbishment survey report as the roof sheets are anticipated to be formed of asbestos cement.
3. We recommend that the drainage drawings for the property are reviewed and enquiries made as to why the original rainwater gullies are not used. If they were taken out of action because they were blocked or backing up you will need to instruct a CCTV survey and drainage condition report to establish what repairs are required to these.
4. Where textured ceiling finishes are installed these may contain asbestos. You will need to consult your asbestos register/ refurbishment survey report prior to any works being carried out which may disturb these.

Environment Agency
October 23, 2017
Page 8

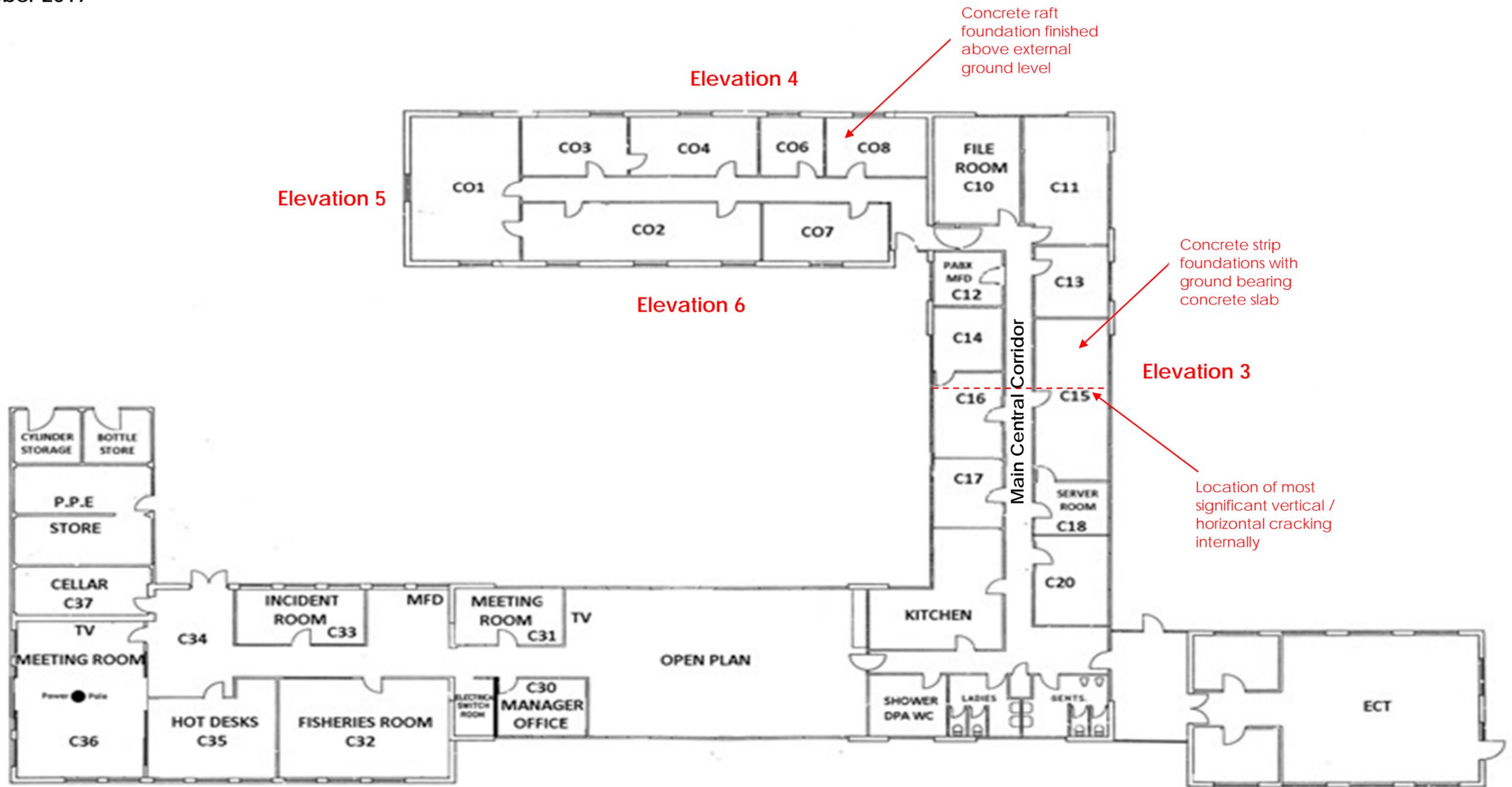
Yours sincerely,



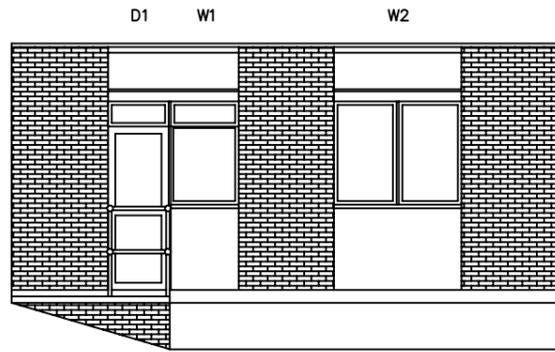
William Blackburn BSc (Hons) PG Dip MRICS
Building Surveyor
020 7911 2636
william.blackburn@gva.co.uk
For and on behalf of GVA Grimley Limited

Enc. Crack location plan and annotated drawings – Office Building
Annotated photographs – Garage Building
Structural investigation summary email 12/03/2008

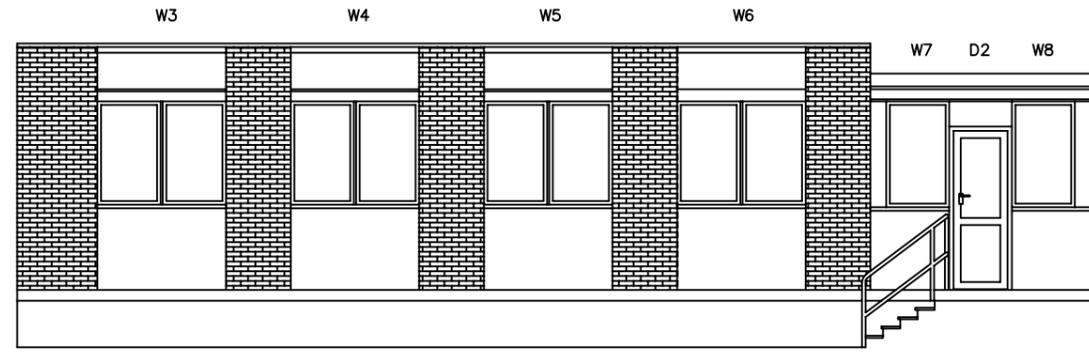
Office Building | Rivers House, Crossness
Location Plan
October 2017



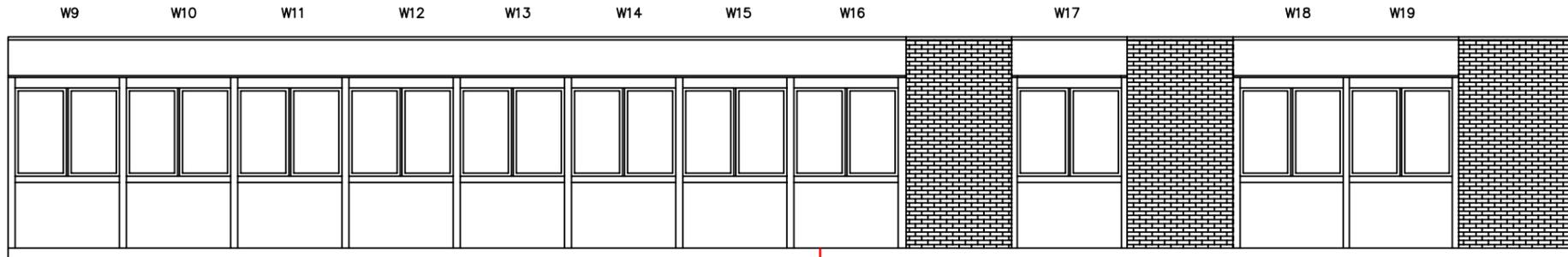
NOT TO SCALE



Elevation 1

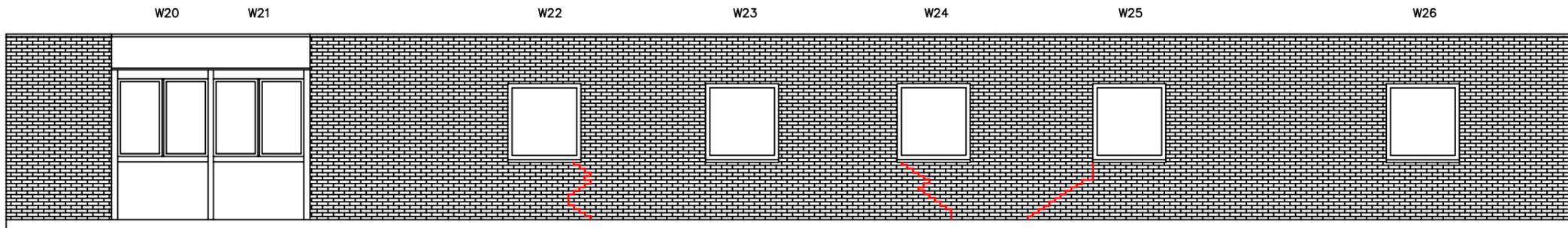


Elevation 2

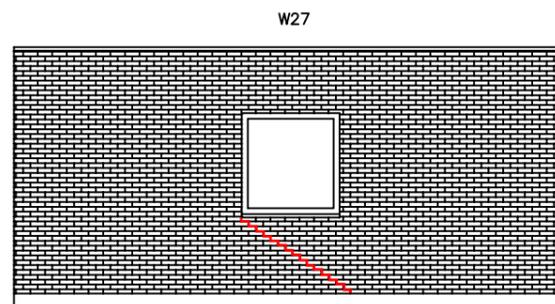


10mm Crack through blockwork

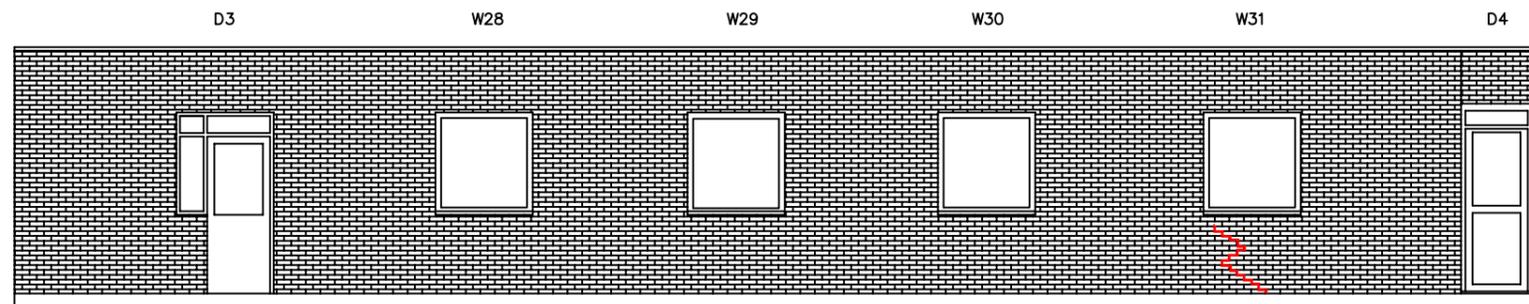
Elevation 3



Elevation 4



Elevation 5



Elevation 6

Notes

All existing full height timber glazed panels to be replaced with uPVC windows built into timber frame studwork.

Proposed windows to match existing overall dimensions. Proposed new windows to have 2 no. pivot opening casements with central mullion.

Render system with white finish to panels beneath windows and timber fascia panels above windows.

6 no. existing timber casement windows in brickwork walls to be replaced with uPVC units of matching dimensions.

DETAILS

DRAWING STATUS —

PROJECT NAME
RIVERS HOUSE
CROSSNESS
ABBAY WOOD

CLIENT
ENVIRONMENT AGENCY

DRAWING TITLE
EXTERNAL ELEVATIONS (1-6)
PROPOSED OPTION 1
RENDER OPTION

DRAWN BY AG CHECKED BY — DRAWN DATE 22/11/07

SCALE @ A3 1:100@A3 CAD FILE REF A3.dwg

OFFICE ID	PROJECT	DISCIPLINE	DRAWING No.	REVISION
02A	02A7364	71 A	204	—



DANGER
Fragile roof

Fire cabinet label







Blackburn, William (GVA)

From: Hewitt, Paul
Sent: 12 March 2008 22:51
To: 'brian.d.hughes@environment-agency.gov.uk'
Cc: Gould, Alexander
Subject: Crossness - Structural Matters

Follow Up Flag: Follow up
Flag Status: Flagged

Brian

The engineer's comments are in. In summary:

We can create a double opening in the wall if you wish.

The ceiling in the link presents no immediate danger and just needs to be monitored. Rainwater collecting on the roof should be removed if large quantities accumulate.

The engineer is happy that the movement/cracking will not be an issue over the next five years. Minor making good will suffice based on this length of occupation.

If you do stay in occupation for longer a review of the general structural condition would be prudent (say at the end of year 5).

The engineer's more detailed comments are as follows:

Following my visit yesterday:

Once the proposed repairs and upgrading is complete, I am satisfied that from a structural point of view, a life of not less than five years may be expected.

I opened up part of the screed at the worst of the cracking and found that it did not pass through the concrete slab. The screed is hollow in places around the cracking. The screed is only about 25mm thick, and too thin to be reliable as a non-bonded screed. The bond appears to have broken down to lead to the uplift and cracking. A simple repair would involve lightly hammer testing the area around the cracking, removing any unsound screed and cleaning the concrete substrate; applying a PVA bonding agent and re-applying a sand/cement screed (a proprietary product with polymer modified cement barely seems worthwhile for the short life expectancy required). Incidentally, there are construction/movement joints in the concrete slab, and the finish may have been taken across these, so cracking will probably have occurred at any of these joints.

With regard to the wall to be opened up, I believe that there is a ply plate beam over this wall, that is intended to take the load, so the partition is probably non load-bearing. However, it is probably stiffening the frame which relies on these cross wall to stabilise it, so its complete removal is not recommended. A double door opening would be acceptable. The presence of the ply plate beam above the opening can be checked when it is cut to allow confirmation of any requirements for a lintel. I doubt that anything structural will be required.

In the link structure the ceiling is a rather poor infill between the two original blocks in channel reinforced wood wool slabs. We couldn't check the depth of these without damaging the membrane, but after probing, I believe they are

about 50mm deep. They have deflected, possibly under ponding or access loading, but they do not appear to be on the point of failure. They are unsatisfactory, but provided the roof is not surcharged, and ponding water is cleared away regularly, they should be reasonably serviceable for five years.

I have read briefly read the report attached to your e-mail and am broadly in agreement with it, but I am happy with the above recommendations on the basis of a five year life.

End

Paul Hewitt, GVA Grimley Ltd,

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