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Avanti Architects Ltd  
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Ref: 090055/S Prior  
7 Jul 2009

Dear Fiona

**Re: 2 Willow Road (Investigations), Camden Town, NW3**

Following the our visual inspections, completion of the investigative works undertaken by Martech and receipt of their findings I am pleased to provide our report and recommendations relating to the concrete and brickwork to the rear elevation of 2 Willow Road.

## Background

A previous visual inspection by ourselves identified a long standing issue with water ingress around the balcony slab to the rear of the property. The water ingress appeared related to the visible and previously repaired cracking within the balcony slab and poor detailing around the large windows and doors onto the balcony. Martech were commissioned by the National Trust to undertake brickwork cavity inspections in order to establish the nature and extent of the water ingress and to establish the presence and condition of any wall ties within the brickwork, which may have suffered corrosion as a result of the ongoing water ingress issues. In addition concrete testing to identify any defects to the balcony slab and downstand beam was also undertaken.

Areas of the parquet flooring within the room from which the balcony extends were also lifted to allow inspection for the presence of water ingress and any resultant damage.

## Findings

On the day of the investigations it was raining heavily and this revealed that the current repairs within the balcony slab are ineffective with through flow of water through the crack clearly visible. Visual inspection of the rear façade also highlighted damp patches to the exterior brickwork directly below the cracks within the balcony slab.

The brickwork cavity inspections revealed the cracking to the soffit continues into the downstand beam at the back of the balcony slab. Small damp patches were identified around the cracks to the balcony soffit within the cavity and within the downstand beam, along with a some spalling at an area of low cover to the reinforcing steel. The spalling was directly below the visibly damp area of the balcony soffit and adjacent to the crack in the downstand beam. (see location A, SK1). Note for reference, location A on SK1 is Martech BWK area 1 and location B is Martech BWK area 2.

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The cavity was found to be 50mm wide and generally dry other than the areas discussed above and highlighted in SK1 (attached). There was no visible sign of wall ties within those areas of cavity inspected. However a single line of ties was detected using a wall tie detector below the first floor windows at approximately 500mm centres. Due to the distance from the balcony soffit, issues relating to the corrosion of the wall ties due to the water ingress identified would seem improbable.

In order to establish the condition of the reinforced concrete, testing was undertaken to the balcony slab soffit and the downstand beam. For ease of access and taking into account the clients wishes to reduce disruption to the external brickwork the downstand beam was tested from inside the structure.

The concrete testing revealed variable levels of concrete cover to the reinforcing steel although depths of cover were found to be generally acceptable considering the age of the structure. Depth of carbonation of the concrete was found to be less than 5mm in all areas tested indicating the presence of corrosion to the reinforcing steel is unlikely. The exception to this was at those sections of steel which cross the line of the crack in the balcony slab. Whilst the depth of carbonation was still low breakouts undertaken to expose the reinforcement revealed the through flow of water has resulted in corrosion of the reinforcing steel in the vicinity of the crack which has resulted in loss of section ("necking") of the steel in these areas. See photograph 8 and 9 in the Martech Report.

Chloride levels within both the balcony slab and downstand beam were found to be low and indicate a negligible / low risk of reinforcement corrosion due to chloride attack. Chlorides are therefore not considered to be a significant factor in this instance.

When the parquet flooring was lifted it was found to be very wet, spongy and rotten confirming a long standing water ingress issue. Whilst lifting the flooring the wooden trim was also removed from the bottom edge of the doors/windows leading onto the balcony. This revealed the timbers behind to be completely rotten and the mastic seal along the bottom of the window to be poorly applied and ineffective with no seal between the frame and the balcony slab and areas where some of the sealant had simply been applied into the gaps left by the rotten timber between the leading edge of the frame and the internal wooden trim.

Visual inspection of the mastic joints between the concrete slabs to the top surface of the balcony slab revealed the edges to be poorly bonded and therefore ineffective and providing further flow paths for water ingress.

### Recommendations

The testing and investigation results and the visual surveys indicate that the primary cause of the water ingress into the structure is the migration of water along the cracks in the slab however the poor detailing to the base of the door / window frame and the poor sealants to the top surface of the balcony slab also play a significant role in allowing water ingress into the structure.

It is recommended in order to repair the cracks and prevent further water ingress that the previous resin crack repairs are cut out and the cracks chased out beyond the line of the door / window frame to the top surface of the balcony slab, beyond the line of the external brickwork on the balcony slab soffit and down the external face of the downstand beam behind the external brickwork façade. The crack can then be



repaired using traditional crack repair methods which should be matched to the existing colour and texture of the concrete. Note, the appearance of the top surface and soffit of the balcony slab is different and the repair would need to be matched accordingly.

In order for the crack to be chased out within the section of soffit beyond the line of the external brickwork and the face of the downstand beam and for the area of spalled concrete at location A (see SK1) to be repaired a section of brickwork would need to be removed at each location. This should be done in such a way as to minimise damage to the existing bricks so that they can be reinstated and they should be put back with a colour matched sand and cement mortar so as to maintain the existing appearance of the structure.

The selected use of vapour phase corrosion inhibitors is also recommended within the balcony slab at crack locations in order to reduce any ongoing corrosion of the steel and prevent the need for more extensive breaking out and repair around the areas of corroded reinforcement thus reducing the visual impact of the repairs. Alternatively crack Injection repair mortars within inbuilt corrosion inhibitor are also available which may reduce the need for separate corrosion inhibitor applications.

Whilst it would be the job of others to specify such repairs it is also recommended that in order to ensure the water tightness of the structure that the rotten timbers in the door/window frame are cut out and new timber spliced in and the mastic seal between the frame and the balcony slab is renewed along with those in the top surface of the balcony slab.

This report was prepared for the client, Avanti Architects Ltd, and we accept no liability for any reliance placed upon it by any third party. Other than specifically mentioned above we did not inspect any woodwork or any parts of the structure that are covered or unexposed and we therefore unable to report that any such parts of the structure are free from defects.

Yours sincerely

Simon Prior  
For Conisbee

Enc Martech Report – Ref 09048.