



Condition Survey of Pavement Lights
at
Cheetwood House, Newton Street, Manchester, M1 1FZ

Introduction

We were asked by Beech Design & Build to provide our opinion on the defects noted to the pavement lights on the Newton Street and Dale Street elevations at Cheetwood House. Please note that some of the pavement lights have been concreted over in the past and therefore it is not possible to comment on the condition of these particular pavement lights.

A number of defects were noted to the pavement lights and we will expand on these later in the report together with a brief specification for replacement and photographs showing the type of damage that was discovered.

Condition of Pavement Lights

The existing pavement lights surrounding Cheetwood House have deteriorated over a number of years with evidence of crack damage to the concrete frames and damaged glass blocks also noted. Three of the pavement lights have also been infilled with concrete at some point in the past. In our experience, the infilling of the lights is usually undertaken due to the poor condition of the lights and the possibility of collapse.

The existing pavement lights are constructed of 60mm deep reinforced concrete with 4" x 4" glass blocks. These frames are no longer manufactured as the 60mm depth is not considered deep enough to withstand modern loadings, they are now manufactured to a depth of 100mm. There is a gap between adjacent glass blocks of 30mm which is also considered insufficient to modern standards.

It should be noted that the old 60mm deep pavement lights were not designed for vehicle loading when initially installed. It is only more recently that vehicles such as road sweepers etc. use the pavements and therefore the smaller depth and cracking to the concrete gives cause for concern if any vehicle loading was to occur.

Closer inspection of the pavement lights revealed cracking to the majority of the frames with numerous glass blocks that are cracked or missing completely. Repair of the frames and replacement of the glass blocks will be difficult in this situation due to the stress that would be exerted on the concrete frames and the potential for collapse of the pavement lights. We have gone into more detail on this in the recommendations section .

Three of the pavement lights have been infilled in the past and in our experience, this is usually carried out because the lights were in a poor state of repair with the possibility of collapse.

Recommendations

As mentioned above, the existing pavement lights are constructed of 60mm deep concrete with 30mm set between adjacent glass blocks. This construction is no longer manufactured as it is not considered adequate for today's loadings. The new pavement lights are now constructed of 100mm deep reinforced concrete with a 50mm concrete set between the glass blocks.

The existing pavement lights were designed for a pedestrian loading of no greater than 4kN/m² whereas the new modern pavement lights are designed for accidental vehicle loading of 20kN/m².

Pavement lights are designed to utilise any natural light available but in the event of a fire, smoke will fill quickly in to the room below. The pavement lights are therefore designed to allow a fire fighter to break through the whole pavement light panel using a lump hammer where the underside collapses first as it absorbs the blows. The fire fighter then breaks the remaining top side of the panel exposing the reinforcing bars. This allows for any smoke to escape from the basement and once the steel reinforcement is cut, fire fighters hoses can be put through the structural opening to fight the fire.

We would be concerned that trying to break out damaged sections of pavement lights and/or removing damaged glass blocks will cause sufficient stress to potentially collapse the pavement lights.

Due to the issues noted above, we consider that the most appropriate and cost effective way to rectify the defects noted will be to replace the existing pavement lights with new. This will ensure that they comply with current regulations with regard to the additional loadings that could be placed on them. Please note that aesthetically and for planning purposes, the new pavement lights will look very similar to the existing.

A brief method statement for the replacement of the pavement lights is as follows:

Carefully remove the existing damaged reinforced concrete pavement lights including any infill concrete and dispose. Cut down the bearings to accommodate the new deeper pavement lights. Form the required shuttering and cast in situ new pavement light with 100mm x 100mm x 28mm pressed annealed glass lenses with adequately reinforced concrete ribs. New concrete to be grade C40 with a trowelled finish to the top surface and a cast surface to the underside.

On completion, pour a hot poured bitumen seal around the perimeter edges of the new work covered with a sand and cement protection and trowelled finish.

Please note that access will be required below the existing openings regardless of whether repair or replacement work is to be undertaken either to form the timber shuttering and remove on completion or to allow the operatives to hold a container below when removing defective concrete or replacing the glass blocks to catch any debris .



Pavement Light 1 - 2380mm x 500mm. Note the slight cracking to the concrete surround and some damaged glass blocks.



Pavement Light 2 - 1070mm x 400mm. Note the slight damage to the glass blocks.



Pavement Light 3 - 2100mm x 500mm. Note the slight cracking to the concrete surround and some damaged glass blocks.



Pavement Light 4 - 2850mm x 600mm. Note the damaged glass blocks in various locations.



Pavement Light 5 - 1070mm x 400mm. Note the pavement light has been covered with concrete. The sizes etc. are similar to Pavement Light 2.



Pavement Light 6 - 2380mm x 500mm. Note the pavement light has been covered with concrete. The sizes are similar to Pavement Light 1.



Pavement Light 7 - 1700mm x 600mm. Note the pavement light has been covered with concrete.