

Client: Bro Morgannwg NHS Trust

Value: £2.0m

This project will provide extended teaching facilities at the Princess of Wales District General Hospital which is set over 15 acres on the outskirts of Bridgend, Wales.

The Princess of Wales DGH has continually expanded since first completed in the early 1980's and now occupies most of the 15 acre site.

The initial development was based upon an NHS Template module which incorporated a three storey insitu concrete frame with masonry elevations supported by mass concrete pad foundations.

The construction challenges encountered within this existing District General Hospital are typical of those to be overcome when developing within most healthcare facilities where disruption to services and more importantly patient care cannot be tolerated.



Typical difficulties that have to be overcome include ; construction access, Health & Safety requirements, existing and proposed siting of new services (including plant location), and working in close proximity to existing structures.

These risks may be mitigated by:

1. A detailed review of site constraints
2. Careful and detailed specification and control



3. Survey and clear record keeping, identifying maintenance implications
4. Detailed survey and condition assessment.

The structural frame solution for the new two storey extension comprised composite structural steelwork with insitu concrete floor supported by profiled permanent steel decking. Some of the internal spaces within the existing concrete framed building were to be modified as part of a limited refurbishment.

The underlying ground conditions comprise a firm to stiff clay which was able to support mass concrete pad and strip foundations.

At inception stage, two major challenges were to be overcome; maintenance of emergency access routes, and the risk to the construction programme of uncovering unrecorded buried services.

1.0 Emergency Access Routes

The location of the new extension clashed with a primary external pedestrian thoroughfare which had to be maintained at all times.

The route dictated the finalised structural grid immediately and adjacent to the existing building. Sufficient construction had to be completed to allow the formation of a re-located protected enclosure away from the original route. Once installed the remainder of the foundation and structural steelwork superstructure could be completed to "catch up"

with the rest of the development. NJP were able to limit the impact upon the "out of sequence" programme of works by utilising "temporary" cantilevering steelwork to oversail the original route.

2.0 Unrecorded Service Routes

The pedestrian thoroughfare severely restricted investigation for buried services and obstructions by hand-dug trial pits and trenches. The risk of delay to the construction programme was of considerable concern to the Trust, as it had experienced a major problem of this kind in the recent past.



NJP designed a foundation solution incorporating a reinforced concrete ground beam which cantilevered over a mass concrete base. This provided two significant advantages over the use of similar bases elsewhere;

- A. The adoption of this ground beam did not require deep excavation and construction adjacent to the existing building.
- B. The thickness of the ground beam could be easily altered on site utilising additional steel reinforcement to oversail any unrecorded shallow buried services.

In the end, one primary gas and one secondary water supply pipes were uncovered adjacent to the existing building and yet the solution provided by ourselves limited the delay to only one day, whilst additional reinforcement was expressed to site!

The small section of refurbishment works within the existing building allowed us to provide a structural solution that not only overcome an unforeseen difficulty but also provide real value to the project.

A part of the refurbishment, a number of walls were to be removed from within the original reinforced concrete frame, which based upon our review of the original construction drawings were noted as non-load bearing partition walls, prior investigation of these walls was not possible due to their sensitive location.

However, upon exposure, a 15m long spine wall was found to be load bearing as no concrete beam had been provided or recorded.

NJP designed a series of steel "box frames" to support the floors above which, although increased the total steel tonnage by approximately £2000, did not require the construction of expensive and potentially disruptive new foundations within the existing building. The contractor reported that our solution prevented a delay to the project of five to six weeks.