GUIDE ONLY

– Thomas Edmonds Band Rotunda –
Architectural and structural engineering considerations for the inclusion of a workable basement to incorporate a commercial kitchen – Guidance provided by CCC's Project Manager

Architectural comment on the basement

The use of the rotunda and basement as a publically used building will require compliance with the disabled access and fire requirements.

Accessible requirements will be challenging, as will be the requirement for public and disabled accessible toilets that would need to be accommodated within the basement. Fire separation will cause loss of floor space when creating a complying fire separation between the two floors. The previous structure was built over 20 years ago in a manner that is unacceptable to today's code compliance.

- Requirements would include ramp access to the basement which will be 12 metres long plus landings top and bottom to suit the approx 1.0 metre depth of ground to basement floor level. The original ramp was about half this length.
- If the rotunda is to have a public use, the rotunda floor as well as the basement will require disabled access by ramp, stair climber or hoist.
- Public and accessible toilets will be required which would most likely need to be in the basement. This removes a significant part of the useable space of the basement, and as a guess, space requirements would be 4m x 3.5m plus access space. Whether public access by exiting the rotunda and using the external basement ramp is acceptable would need to be resolved. If internal access were required this would require a stair climber on the internal stairs or a lift.
- Depending on use, an internal stair between the rotunda floor and basement may be required. Previously, this was narrow and steep and wouldn't comply with the code for an accessible stair. Hence, more space than previously occupied by the stair would be required.
- Basement use may impose further requirements. E.g. if a commercial kitchen, mechanical extract discharge will be required to be integrated into the perimeter of the reconstructed rotunda base that will have implications on the heritage values of the rotunda.
- To resolve the fire separation three fire exits would be required. An exit in the basement directly to the outside, an external fire exit at the top of the stair to the outside of the building and an internal fire door within a fire cell at the top of the stair to the public space. A fire engineer should be consulted once possible uses are known. The basement exit will include a stair up to the external ground level and involve waterproofing as it begins below the water table.
- The proposed use of the rotunda will determine the extent of effects on the heritage values of the building. For example, if it is to be reinstated as an enclosed restaurant with commercial kitchen, the accessible, toilets, commercial kitchen and enclosure of the rotunda would be significant, and more so than the situation that existed previously due to more stringent code compliance requirements.

Structural Engineering comment on the basement

Geotechnical

- Dense gravel is located at 3m depth
- Ground water level is approx. 1.4 to 1.6m deep at approx. the same level as the Avon River.
- Previous design has steel screw piles into the gravel

- There is potential for lateral spreading in large earthquakes in the sands above the gravel layer

Heights and depths

- Historic raised ground floor level is approx. 1.7m above ground level
- Ground floor thickness is 300mm minimum (i.e. has falls)
- Old basement only had approx. 2.1m head height which really compromised the space
- If you build a basement then at least 2.4m clear head height is recommended, meaning basement floor is approx. 1.0m below ground level (more head height would be better to suit drainage services and ventilation services)

Basement construction

- Possibly a waterproof tanked basement if it is to be used as a working space
- Floor slab will probably be 300 to 400 thick slab to resist buoyancy uplift pressures
- So that means that the underside of the basement floor will be about 1.4m below ground (i.e. just at ground water level)
- You could continue with steel screw piles into the gravel, but they will be really short at about 2.5m depth below the underside of basement or
- You could drill and place simple in-situ concrete piles down on top of the gravel about 1.7m deep, or
- You could dewater the site, excavate to 3m depth (to gravel layer) and construct 1.6m deep engineering fill raft below the new basement floor

Effects of any proposed design to heritage features – new glazing, handrails (utilising existing stairs)

- The piling options could retain the existing stairs, but they may require some underpinning given the deeper excavation for a basement
- The gravel raft option would probably require removal of the existing stairs and reinstatement (It may be that they could be carefully lifted to one side then lifted back)
- Stairs to the basement will be longer to serve the deeper basement floor that will be approx. 500mm lower than the previous basement floor
- Cellar pump and sump will be required to drain the stairs and landing to the basement door.

The basement is seen to be structurally achievable and reasonably straightforward from a build perspective.

<u>In summary the key issues are:</u>

1. The loss or significant modification to the heritage external stair and potential detailing abutting existing heritage fabric where required to make the spaces fit for purpose.
2. To make the basement kitchen work there is a loss of floor space at both levels due to compliance that will compromise these floor spaces for their proposed use.
3. Building waterproof and making those elements compliant to current code.