

File Note

Project title: University Hospital Kerry (UHK) – Flue Chimney Demolition
Job number 603143-22
File reference
cc Paul Reynolds, Paul McEvoy
Prepared by: E O’Connor, J Collins, P Hegarty, R O’Neill, K O’Shea, J Purcell
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Subject Arup Site Survey – Summary of Findings - 26 Sept 2022

One Albert Quay Cork T12 X8N6 Ireland
t +353 21 4223200 d 0035 21 422 3308
arup.com



1. Summary

The HSE would like to demolish either part of or the entire boiler flue structure at University Hospital Kerry, to remove the risk of a section or section coming loose and been blown or falling from the structure.

Arup were requested by the HSE to visit University Hospital Kerry to review the existing boiler flues and support structure and advise on the existing status and on possible demolition options.

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The purpose of this document is to summarise the site survey findings and highlight the primary demolition risks.

2. Mechanical

- There are 4 No. vertical boiler flue stacks supported by a primary concrete, secondary steel structure it is proposed to demolish these flue's and supporting concrete and secondary steel structure. 3No. 600mm Ø flue stacks are from the existing diesel fuel oil boilers which were recently removed from the boiler house. The fourth flue stack is from an old Incinerator which was removed a few years ago. The size of this Incinerator flue appears to be in the order of 500mm Ø.
- All 4 No. flues appear to consist of flanged steelwork pipework which are wrapped with a fibre rockwool type insulation and externally clad in stainless steel cladding.
- Small section of stainless steel cladding and insulation have blown off on some of the vertical flue stacks which are becoming a major concern/risk on windy days as these falling materials could cause hazards in the vicinity of the chimney stacks.
- T. Bourke are due to remove the indoor sections of these 4 No. Flues within the Boiler House. Rainwater can enter the top of the vertical flue stacks and drain all the way down into the boiler house. T Bourke are proposing to cut back the flues to outside the boiler house facade cladding within the next few weeks.
- The internal of the 500mm Ø Incinerator flue appears to be lined with a type of cement coating which should be checked/verified, to ensure there is no asbestos present, the gaskets between flanged joints of the flues should also be checked for asbestos. The HSE will need to verify this prior to any demolition work been undertaken. Refer to section 4 of this memo.
- We observed a fifth redundant flue stack which is mounted on the side of the adjacent electrical room which will need to be removed. This flue terminates above the level of the boiler house roof and appears to be in the order of 250mm Ø and is wrapped with a fibre type insulation and externally clad in stainless steel cladding. This redundant generator flue is cut back just inside the electrical room brickwork wall and appears to be around 5 meters high (TBC)

3. Electrical

- We observed a large power cable exiting the adjacent electrical room which is tied onto a section of the steel handrail of the concrete structure this will need be isolated, removed and rerouted to allow the demolition works to take place.

There is an existing security camera and TV Ariel mounted on the side of the concrete structure, all of which will need be isolated, removed and relocated on site including any associated cabling.

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4. Structural

The structural survey could only be carried out from Ground Level and the First landing level of the structure as access to the upper levels was via a ladder fixed to the concrete structure and whose condition and the condition of its connection to the concrete was unknown. There is an area of significant spalling at the first landing with evidence of a recent concrete spall sitting on the steel grating. There is also evidence of other areas of the structure where the reinforcement can be seen protruding from the concrete, these areas will worsen in time and the concrete will spall. As the upper levels of the structure were not safely accessible due to the visible spalling at the access ladder connection at the lower platform, see Figure 3, there may be more significant spalling which is not visible from the lower levels. Due to the large area of recent spalling noted the area around the structure should be cordoned off as falling concrete could bounce away from the structure and cause injury or damage. We noted some cracking in concrete beams which will lead to water ingress and corrosion of the reinforcement and eventually spalling will occur.



Figure 1: Image showing spalled concrete on the steel walkway

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Figure 2: Image shows loose concrete



Figure 3: Image shows spalled concrete at the access ladder connection

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Figure 4: Image showing piece of fallen concrete and a crack in concrete beam

5. Health & Safety

- The status of the existing asbestos survey is unknown. A refurbishment/demolition asbestos survey (RDAS) is required for this scope of works. It is noted that T Bourke are due to remove parts of the flues as part of their works in the boiler house.
- The flue chimney is bounded closely on all four sides by plant and occupied areas that need ongoing access by the client – north (ambulance base), west (boiler house), south (generator building), east (generator fuel tank). Administration buildings and kitchens also back onto the service yard in which the chimney is located.
- It is envisaged that a significant amount of temporary works would be required included access scaffolding, protection decks, propping of unstable elements, exclusion zones, traffic/pedestrian management, etc.
- A high level of risk would be posed by falling materials during demolition and/or lifting operations. Materials could potentially land a relatively large distance from the chimney due to its height and influence of wind.
- Dust released during demolition poses an Aspergillus risk to the hospital.
- Electrical cables were tied to handrails on the first level of the chimney. Further investigations and diversion are required.

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- An extension project is proposed within the service yard in close proximity to the chimney. If this project overlaps with the chimney demolition this will further reduce space and increase risk.
- The boiler house upgrade is currently being completed by T Bourke and could be ongoing until Nov/Dec. It is recommended to reduce overlaps with other construction projects where feasible.
- The chimney has stepped access to only the first level with vertical ladder access beyond that point. Use of ladders for moving personnel, tools, materials pose a significant hazard. Consider alternative means of access e.g., scaffold.
- The chimney was inspected at the first level only. There is a risk that unsafe conditions could be present at higher levels e.g., damaged ladders/handrails.
- Aspergillus risk to be reviewed and managed during the works.
- HSE rules for contractors operating at the hospital to be advised and communicated to the contractors.

6. Planning

- Planning permission requirements to be considered prior to demolition of the concrete structure, the structure is greater than 15m in height.

7. Ecology

- Ecological survey to be considered. Is the concrete structure used for roosting by any protected species?

8. Necessary information

8.1 Asbestos Reports

Required to be provided in Tender packages. Identification of Asbestos during construction is too late and would cause delay and additional cost.

9. Suggested Demolition Methods

We engaged with a Demolition company for advice on approaches to safely demolish the reinforced concrete structure, their view is that there are 2 possible solutions to carry out the works.

9.1 Steel Hopper

- A steel hopper would need to be constructed and a crushing machine used to demolish the reinforced concrete structure down into the hopper for removal at the base level.
- The flue and associated steel platforms etc. would be removed prior to the crushing the concrete.

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9.2 Cutting and Crane Removal

- The reinforced concrete frame would be cut in sections that are removed by crane.
- The flue and associated steel platforms etc. would be removed prior to the crushing the concrete.

9.3 Waste Removal

All materials removed would have to be disposed of under licence.