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| Committee(s): | Date(s): |
| Markets | 19 September 2014 |
| Subject: Smithfield Market – Condenser Water Cooling System – update | Public |
| Report of: The City Surveyor CS 319/14 | For Information |

Summary

This report provides Members with an update on the performance of Smithfield Markets' Condenser Water Cooling System, which serves Tenants' refrigeration equipment, and the works currently being undertaken to improve the system.

The performance of the condenser cooling system is currently satisfactory, maintaining a water temperature of 20°C, compared with an original system design temperature of 28.5-30°C. However the temperature rose above this low level, reaching 24-25°C during hot weather in July causing problems for a number of fridges, including those previously identified by the City as being at risk due to undersized condensers.

The City was pleased to see that some Tenants have replaced their fridge condensers in East and West Markets with uprated units, giving immediate benefits. In the City's view this is addressing the root problem with the refrigeration equipment and it is hoped that other tenants will take note and follow suit.

Phase 3 of the City's improvement works are progressing, albeit with some delay, and should be completed by October.

The City will continue to monitor the system closely and complete the Phase 3 works as soon as possible.

Recommendation(s)

Members are invited to:

- Note the contents of this report.

Main Report

Background

1. The Market's condenser water cooling system removes waste heat from 120 tenants' refrigeration units in East, West and Poultry Markets and dissipates it to the atmosphere via five cooling towers located in the Poultry Market. The system is operated and maintained by the City Corporation.
2. Over the last four years the City Corporation has been undertaking a programme of works to improve the system in East and West Markets. The first two phases are complete.
3. A third phase of work is now underway on site intended to address dirt contamination in the system. This involves work in East, West and Poultry Markets.

Current Position

4. The cooling system is currently working well supplying water at 20°C to the Tenants' fridges. Hot weather experienced in July caused the water supply temperature to rise above its currently set level of 20°C on several days, reaching 24-25°C. Several fridges experienced problems as a result, despite originally being specified to operate with cooling water at 28.5/30°C. The exact number of fridges is not known, but may have been up to 20-30, and included those previously identified by the City as being at risk due to undersized condensers.
5. In May the City wrote to Tenants whose fridges were observed during recent inspections to be exhibiting signs of stress (indicated by higher than normal refrigerant pressure and/or temperature), pointing out these fridges could be at risk in hot weather, and recommending condenser ratings were checked.
6. The City was pleased to learn recently that four Tenants in East and West Markets (three being recipients of the City's letter) had decided to replace their fridge condensers with higher capacity units. This was carried out in July-August by one of the fridge maintenance contractors who reported immediate improvements in all cases, maintaining desired stall temperatures continuously. At the time of writing, two further condensers are due to be changed.
7. In the City's view this is finally addressing the root problem with refrigeration equipment which prevents stall temperatures being achieved and it is very much hoped that other tenants will take note and follow suit.
8. The City is continuing its work to service cooling tower fans. With lower ambient conditions, this work can be accommodated without affecting the temperature of water supplied to the system or its flow rate.
9. The City is also reviewing the control of system pumps to improve reliability, following past incidents which have led to disruption.
10. Phase 3 of the improvement works, intended to address dirt contamination problems in the system, is progressing on site. The Contractor is Hanmar Environmental Ltd. Various setbacks have been encountered and the works are constrained by the need to carry out many operations within 5 hour fridge

shutdown periods. The internal condition of the Poultry Market pipework, which is around 50 years old, was unknown.

11. The works were scheduled to be complete by the end of July but are behind programme as a result of the contractor underestimating the nature and difficulty of the work, problems achieving satisfactory isolations of incoming cooling water supplies to individual Poultry Market stalls, and concerns expressed by the Market Tenants Association about the effects of 5 hour fridge shutdowns on stall temperatures. A more detailed report on each section of the work is given in Appendix 1.
12. Three attempts have so far been made to remove a redundant in-line strainer in the Poultry Market supply, all unsuccessful as valves are letting by when closed, preventing full isolation. It is likely a pipe freezing method will be needed to overcome this.
13. Stall temperature tests carried out to assess the impact of shutting down the condenser water system have indicated surprisingly rapid increases in stall temperatures in some stalls in the West Market, so the Tenants Association has requested that shut downs in that area be postponed. The contractor is currently prevented from installing two filtration units in West Market while the reasons for the rise are investigated. If that can be resolved, the work should be completed by October. The City had assumed that 5 hour shutdowns, used throughout the previous phase, would continue to be permitted. Regular contact has been established with the Market Tenants' Association to agree shutdown conditions and this has been helpful in planning the works and communicating with tenants.
14. Consideration is being given to raising the system operating temperature above 20°C in stages once the phase 3 works are complete, to reduce stress in the system which currently has to run all five towers at full speed much of the time to achieve this artificially low flow temperature.
15. No further individual meetings with Tenants have been requested since last year, and no further meetings with the Meat Hygiene Inspector have taken place .

Corporate & Strategic Implications

16. The system supports the following Strategic Aims:
 - To provide modern, efficient and high quality local services and policing within the Square Mile for workers, residents and visitors with a view to delivering sustainable outcomes.
 - To provide valued services to London and the nation.

Implications

17. The cooling system provides a critical service for Tenants' refrigeration equipment and the City continues to monitor its performance closely. A failure of the system may expose the City to claims for loss or damage suffered by tenants as a result of loss of cooling to stalls.

18. The replacement of undersized condensers by tenants has demonstrated much improved fridge performance, and if other tenants follow suit, all parties should then have much more confidence in the system.

Conclusion

19. The performance of the condenser cooling system is currently satisfactory, maintaining a water temperature of 20°C. However the temperature rose above this setting during hot weather in July causing problems for a number of fridges.
20. Some tenants have replaced their fridge condensers with updated units, seeing immediate benefits. In the City's view this is addressing the root problem with the refrigeration equipment and it is hoped that other tenants will follow suit.
21. Phase 3 of the City's improvement works are progressing, albeit with some delay, and should be largely completed by October.
22. The City will continue to monitor the system closely and complete the Phase 3 works as soon as possible.

Background Papers:

Report of the City Surveyor (ref CS255/14) dated 16 July 2014 to Markets Committee: 'Smithfield Market – Condenser Water Cooling System - update'

Appendix 1:

Summary of progress on Phase 3 improvement works

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Appendix 1: Summary of progress on Phase 3 improvement works

| Section | Description | Position |
|---------|---|--|
| A | Installation of in-line duplex filters, removal of redundant strainers, internal inspection of pipework | <p>Poultry Market: complete apart from redundant strainer removal</p> <p>East Market: should be undertaken shortly, delayed by need for stall temperature test</p> <p>West Market: held up due to concern about effect of shutdown on stall temperatures</p> |
| B | Installation of new sidestream filtration unit in cooling tower circuit | Should start shortly |
| C | Installation of additional sidestream filtration unit to serve cooling towers 1 & 2 | Should start shortly |
| D | Opening up of pipework to East Market in car park for inspection, installation of additional isolating valves and dirt collection pockets | Complete |
| E | Installation of new valves on all individual branches in Poultry Market (total 26), jet cleaning and flushing of pipework, setting flow rates | <p>New valves: complete</p> <p>Cleaning/flushing: should start once redundant strainer removed</p> <p>Setting flow rates: following flushing</p> |
| F | Replacement of main flow meter in East Market circuit and new flow meter in Poultry Market circuit. | <p>East Market: should start shortly</p> <p>Poultry Market: complete, meter in service</p> |
| G | Installation of pressure sensor in Poultry Market circuit to monitor system pressure and control pump speed | Should follow section E |