



Corporate Report

Report from Parks, Recreation and Culture Services, Director and Transportation and Environmental Services, Engineering and Construction

Date of Report: November 9, 2015

Date of Meeting: November 30, 2015

Report Number: PRCS-321-2015

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Subject: Seymour-Hannah Rink Rehabilitation (Early Budget Approval for 2016/2017)

Recommendation

That Council approve the recommendations in the report to initiate the Seymour Hannah rehabilitation works, the issuance of a Request for Proposal (RFP) for rink repairs as stipulated within the report; and

That Council authorize early budget approval the inclusion of \$2 million in the 2016 Capital Budget, and \$2 million in the 2017 Capital Budget to complete the necessary repairs to the facility; and

That the City Solicitor prepare the necessary by-laws and agreements. FORTHWITH

Summary

The Seymour Hannah Sports and Entertainment Centre was constructed as a four pad, year round ice facility. Issues were realized shortly after commissioning with regard to the underfloor heating system. A recorded loss of glycol was ultimately diagnosed to be due to a leak in the underfloor heating system. Following several attempts to isolate the leak, the City elected to isolate and disconnect this underfloor heating system in an attempt to minimize further damage and loss of glycol into the ground.

This report identifies the options for resolution, the associated budget estimates and timelines for the implementation of those options and recommendations for best facility operating practices/procedures moving forward.

Staff are recommending to initiate the Seymour Hannah rehabilitation works, the issuance of a Request for Proposal (RFP) for rink repairs as stipulated within the report at an upset approximate cost of \$4 million.

Background

During the course of the 2014/2015 ice season staff noticed an issue with the concrete pad in rink 4. As a result, the ice from rink 4 was removed at the end of the season in order to investigate. Once removed staff discovered that the concrete pad was heaving in sections.

At that time the decision was made to discontinue ice operations until the cause of the problem has been identified. Kalos Engineering Inc. has been engaged to conduct a technical assessment and provide recommendations to resolve the issues with rink pad 4. The following report addresses the consultant's findings and remedial recommendations providing a project implementation schedule and budget estimate.

Report

The City retained the services of a Kalos Engineering to assist with the review of the design of the existing systems, their current operations and the cause to all issues that the facility is currently experiencing and any other potential problems that may result in the future. The report identifies the options for resolution, the associated budget estimates and timelines for the implementation of those options and recommendations for best facility operating practices/procedures moving forward.

The scope of work for the study included:

- An overall review of the design for the existing ice plant systems, including but not limited to the main refrigeration equipment, distribution, ice pad design, under floor heating, etc.
- An overall review of the design for the environmental controls in the facility and their effects of the ice plant and programming. (eg: Heating, Cooling, Ventilations, etc.)
- Recommendations and options for resolutions to the existing deficiencies taking into account the current use of the facility and potential changes in use of the facility. (ie, 12 months vs 8 months operations, dry floor activities, ice activities, etc.)
- Recommendations for improvements to the existing systems and facility to improve operations, overall maintenance and energy efficiency of the systems.
- Detailed project cost estimates for all potential rehabilitation options.
- Timeline for implementation of all potential rehabilitation options.

Report Findings

The results of the review conducted by Kalos Engineering identified that there are multiple deficiencies in the facility. Some of the deficiencies are critical to the current operations of the facility and will require immediate attention, while others can be addressed when the various components have reached the end of their service life and require replacement.

Refrigeration and Underfloor Heating Systems:

The size of the refrigeration equipment installed in the facility is large enough to produce 12 months of ice in all pads however the design intent for the facility was to have 12 months of ice in Pads 1 and 4 and eight (8) months ice in pads 2 and 3. This pattern would be alternated every year.

The piping for the refrigeration and underfloor heating systems follow the same path of travel and trenches. Pads 1 and 4 share piping, and pads 2 and 3 share piping. The primary feeds come out of the refrigeration room and feed pads 4 and 3.

From there the feeds continue through 4 onto pad 1 and through 3 onto pad 2 respectively. While the refrigeration to the pads can be controlled independently, the underfloor heating cannot.

There are currently leaks in the underfloor heating systems. The leaks are located in pads 1 and 3. Due to the inability to isolate the pads, all of the underfloor heating in the facility has been abandoned.

The underfloor heating in this facility works off of dedicated boilers and does not reclaim waste heat from the refrigeration plant. Reclaimed heat is a standard practice in most energy efficient arenas today. Further investigation with the suppliers would be required to determine if our system would be capable of being converted to reclaimed heat systems.

It is the recommendation of the consultant that the refrigeration and underfloor heating systems be reworked so that the pads may be isolated for better control, future maintenance and repairs to the systems and to avoid similar issues in the future.

Ice Pads:

All of the ice pads were designed with refrigeration piping and associated headers embedded in concrete to allow for dry surface events and underfloor heat piping and associated headers embedded in a sand bedding, below the concrete pad and rigid insulation. The underfloor heating helps to prevent the penetration of frost below the concrete slab. Frost penetration results in the heaving of the concrete slab, leading to damage of both the concrete surface and refrigeration piping. The buildup of frost could also lead to the structural damage of the foundations for the facility.

There is currently no underfloor heating in any of the ice pads in Seymour Hannah due to leaks in pads 1 and 3. These systems have been abandoned for several years which has led to the heaving of the pads 3 and 4. Pad 4 was abandoned in the spring of 2015 and a survey of the concrete surface has identified a hump of over 60 mm. It is suspected that pad 3 is in similar condition however this pad is still in operation. It does not appear that pads 1 and 2 are experiencing any heaving at this time.

It is the recommendation of the consultant that pad 4 be replaced along with all associated piping, followed by the replacement of pad 3 in the following calendar year.

Mechanical systems:

A brief review of the mechanical units was undertaken to determine their capacity and adequacy for the current operations in the facility and to help address some concerns with energy efficiency in the facility.

It was identified that there are some concerns with regards to the size and distribution of the dehumidification in the facility and that designated units for each pad along with better distribution would help resolve some of the issues that the facility is currently experiencing. These deficiencies are not an immediate concern and could be implemented at the end of the each unit's service life.

There are also some deficiencies with the ventilation, heating and cooling systems in the facility but these deficiencies are minor in comparison to the other issues the facility is facing. They are also typical for a facility of this age and should be addressed as systems are replaced at end of life.

Options:

The consultant has identified the following options for consideration by the City:

- 1) Do Nothing – Which would result in the further damage to the existing pads and the permanent decommissioning of Pad 4 and eventually Pad 3.
- 2) “Leak Seal” the underfloor heating – This is a product that is run through the underfloor heating pipes to try and seal the leak. This is a temporary solution but it will not address the issues currently faced with in Pads 4 and 3.
- 3) Repair Leaks to underfloor heating - Repair is extremely difficult due to the construction of the pads. If repair is not successful then replacement will be required or 12 month operations will need to be revisited.
- 4) Isolated heating systems – This would allow each pad to be operated independently and improve maintenance and repair. If the pads are replaced this solution is highly recommended.
- 5) Replacement of ice pads – Pad 4 cannot be used in its current condition and will require replacement. Pad 3 is suspected to be in a similar condition. This solution will allow for improvement to the system and longer service life. The estimated time to replace the pads is up to six months and will require that both pads 4 and 1 be shut down for the upgrades in the first year. Pads 3 and 2 will need to be shut down the following year to complete their repairs.

Based on the assessment staff recommend to replace ice pads 4 and 3 completely, installing a new heating system, with individual rink controls. In an attempt to minimize further damage to pads 1 and 2, staff would also recommend the immediate addition of Leak Seal to the underfloor system to temporarily bring the system back into operation.

Isolation of the heating system is recommended to provide the best operation control of the system. This is independent of the rink slab replacement.

Ice pad replacement will need careful planning as the removal of one pad will require the removal of ice from the associated (and connected) adjacent slab. Staff would recommend that Rink 4 be scheduled for replacement during the summer of 2016 (requiring shutdown of Rink 1) and Rink 3 (with Rink 2) in the following year.

Improvements to the building HVAC system are possible and can be staged, subject to funding and facility programming. These improvements include exhaust air from Zamboni room, ice pad dehumidification and ice pad ventilation, heating and cooling.

Financial Implications

The cost to implement the recommendations of the consultants are summarized below:

- 1) The cost to isolate the underfloor heating systems for each pad would be approximately \$200,000.

- 2) The costs to replace each pad along with all associated piping would cost approximately \$800,000. Included in these costs are the engagement of a consultant for the design and contract administration, removal and reinstallation of the boards and glass, demolition of existing pads and piping, and replacement of pad and piping.
- 3) The costs to isolate the refrigeration piping and headers for each pad would be \$200,000. (This would eliminate having to shut down two pads if Pads 3 or 4 ever required replacement in the future)
- 4) The costs to attempt to repair the leak in the underfloor heating of Pad 1 is approximately \$60,000 - \$100,000. (If this is unsuccessful then operations would need to be revised to 8 month ice or the pad would need to be replaced in the future)

It is the consultant's recommendation that the work for pads 4 and 1 be completed in 2016 and the work on pads 3 and 2 be complete in 2017.

In order to complete the work on pads 4 and 1, it is recommended that a budget of \$1,700,000 be allocated in the 2016 budget. The work on pad 1 would include isolating the heating for \$200,000, isolating the cooling for \$200,000 and attempted repairs to the underfloor heating of \$60,000 - \$100,000. The work for pad 4 would include pad replacement for \$800,000, isolating the heating for \$200,000 and isolating the cooling for \$200,000. As these are estimates staff would recommend an early budget approval of \$2 million to provide a contingency for unforeseen issues that could result once the repair works are initiated.

In order to complete the work on pads 3 and 2, it is recommended that a budget of \$1,600,000 be allocated in the 2017 budget. The work on pad 2 would include isolating the heating for \$200,000 and isolating the cooling for \$200,000. The work for pad 3 would include pad replacement for \$800,000, isolating the heating for \$200,000 and isolating the cooling for \$200,000. As stated above staff would recommend an early budget approval of \$2 million to provide a contingency for unforeseen issues that could result once the repair works are initiated.

Conclusion

The Seymour Hannah Sports and Entertainment Centre was constructed as a four pad, year round ice facility. Issues were realized shortly after commissioning with regard to the underfloor heating system. A recorded loss of glycol was ultimately diagnosed to be due to a leak in the underfloor heating system. Following several attempts to isolate the leak, the City elected to isolate and disconnect this underfloor heating system.

Since this decision, the glycol leaks have abated but now the facility is operating without the underfloor heating. The situation at the Seymour Hannah Facility is an example of the types of issues that can result when facilities do not have appropriate controls and budgeted amounts for the maintenance, repair and planned building improvements.

The maintenance and repair of a building looks at the overall upkeep and servicing of existing building components. Planned building improvements look at the repair or total replacement of a building component that has reached the end of its service life.

City facilities are currently at a point where staff are in a reactionary mode dealing with problems as they arise. In the ideal state, additional funds are budgeted or held in reserve to allow staff the opportunity to address building deficiencies in a proactive manner through scheduled preventative maintenance.

In order to have a sustainable system for the maintenance and repair of municipal buildings, staff would recommend that a target of 4% of the overall replacement value be budgeted annually. This is based on the average useful life of building components at approximately 25 years.

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