



**JTK ENGINEERING**

HVAC | PLUMBING | ENERGY



## CASE STUDY: TULALIP RESORT CASINO

### STAYING AHEAD OF THE GAME CASINO INFRASTRUCTURE MODERNIZATION





## THE OBJECTIVE

The overall project objective was to provide an HVAC infrastructure upgrade to replace aging equipment while increasing cooling capacity and system redundancy in conjunction with a complete interiors renovation of the existing casino. This case study provides an overview of the process and final result.

## FACILITY HISTORY

Understanding the history of the building is a key component in properly addressing future infrastructure needs.

- Reviewing the original drawings helps us determine the original capabilities of the buildings' systems
- Review of tenant improvement projects since the building opened to see how these systems have been changed or impacted
- Working collaboratively with the facilities staff to fill in knowledge gaps and undocumented changes
- Condition assessment of existing equipment and remaining useful life
- Maintenance history and ongoing performance issues

Tulalip has had multiple projects that have resulted in changes in space uses from when the building was first opened. A few examples are:



VIP LOUNGE  
(FORMERLY GAMING)



TULA BENE  
(FORMERLY ENCLOSED NOW OPEN TO GAMING FLOOR WITH SEPARATE AIR HANDLING SYSTEM)



DRAFTKINGS SPORTSBOOK  
(FORMERLY GAMING)



SALISH SUN  
(FORMERLY BUFFET NOW GAMING FLOOR AND TWO FOOD VENUES)

## KEEPING IT COOL

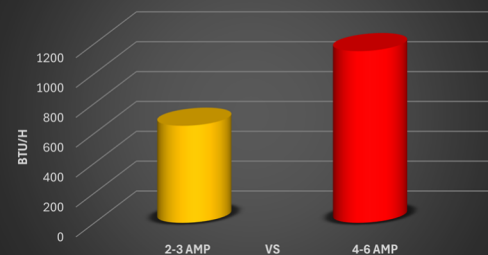
One of the most critical factors in assessing a casino's HVAC infrastructure requirements is the quantity and type of gaming machines.

As gaming machines have adapted to more modern display technologies over the years they have increased their power demand and in turn the amount of heat they dissipate into the casino.

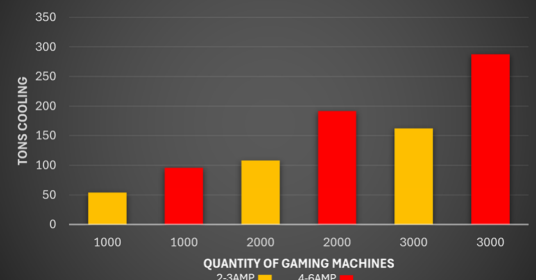
Older 2-3 amp machines dissipate half the amount of heat into the casino that newer 4-6 amp machines do. This can have a significant impact on keeping the indoor environment comfortable and customers happy.

Increasing the cooling demand for a facility is not insignificant and the impacts need to be considered when looking to upgrade or add gaming machines to any casino.

### HEAT GAIN PER GAMING MACHINE



### TOTAL GAMING MACHINE HEAT GAIN



## PLANNING FOR THE FUTURE

In gathering all this knowledge we are able to understand the current conditions as we look to the future of the facility. In the case of Tulalip the central chilled water plant and piping distribution systems were designed for future building expansions.

This ended up being a benefit to our infrastructure upgrade requirements. Instead of covering the additional needs of building expansions we could utilize this infrastructure to address the increased cooling demand on the existing casino from the added heat dissipated into the gaming area from the new and additional gaming machines.

Of course we still need to address the condition of the main equipment, its remaining useful life as well as the equipment's ability to meet the increasing demands of the facility.

Energy modeling and a detailed assessment of the facilities HVAC systems was completed and in collaboration with the facilities team a multiyear equipment replacement plan was developed.

To address the increasing cooling demands and to maintain system redundancy the following equipment was added to the central plant:

- Chiller and associated pumps
- Cooling Tower

Luckily since the central cooling plant was originally designed to accommodate future expansion the space was already accounted for to add the additional equipment easily as can be seen in the two photos below.



TULALIP CASINO ROOF



COOLING TOWERS

(SHOWING SPACE FOR EXTRA COOLING TOWER)



CHILLER PLANT

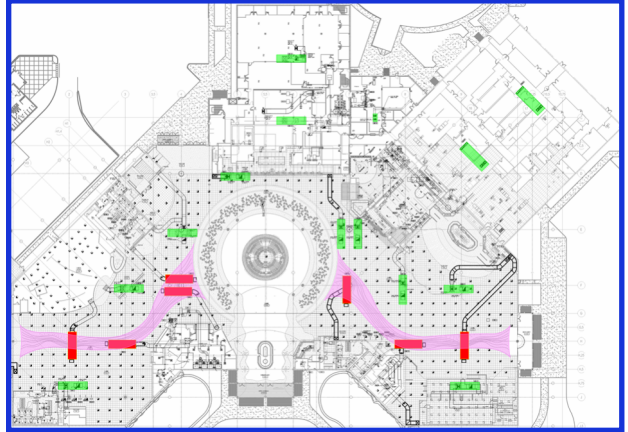
(SHOWING SPACE FOR EXTRA CHILLER)

The individual air handlers which although in good condition due to the facilities maintenance program where beyond their useful life and determined to be unable to keep up with the increased cooling demand of the casino as gaming machines are upgraded and quantity increased. The air handlers would need to be replaced and cooling capacity increased as part of the multiyear replacement and upgrade plan.

## BRINGING IT TOGETHER

The next step in the process was incorporating the multiyear equipment replacement plan and central cooling plant upgrades into the casino interiors renovation project. Rarely do phased interior renovations and equipment replacements align neatly and this project was no different.

As can be seen in the image to the right there were several air handlers that were aligned with the new ceiling features of the casino. This drove which air handlers would be prioritized for replacement as doing so later would be difficult.



Another key element was selecting the air handlers themselves. The need to increase cooling capacity generally means heavier equipment on the roof. In researching multiple manufacturers we found our solution, Annex-air. These air handlers utilize a unique composite construction that has many benefits, one of which is being lighter than steel. This reduction in weight on the general construction of the air handler meant we could increase the equipment capacity and not require structural upgrades to the building. Additional unique features of the product include:

- Washdown construction
- Ecofriendly utilizing recycled plastic bottles for insulation
- Non corrosion and antimicrobial materials
- More rigid and less weight than steel



Informational video by Annexair  
(No affiliation to JTK)

Other improvements over the original equipment include energy recovery core instead of a wheel, return air capability and energy recovery bypass. The original air handlers were 100% outside air due to them serving a smoking environment but with the casino no longer allowing smoking the new air handlers could be configured with additional modes of operation. This approach is anticipated to reduce the heating requirement for the building by up to 45% once all the air handlers are replaced.

The overall result is an HVAC infrastructure upgrade that:



- Can be installed in conjunction with the interiors renovation
- Will serve the building into the future
- Reduces energy consumption
- Improves thermal comfort
- Reduces maintenance
- Reduces operational costs
- Adds system redundancy
- Reduces carbon emissions



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