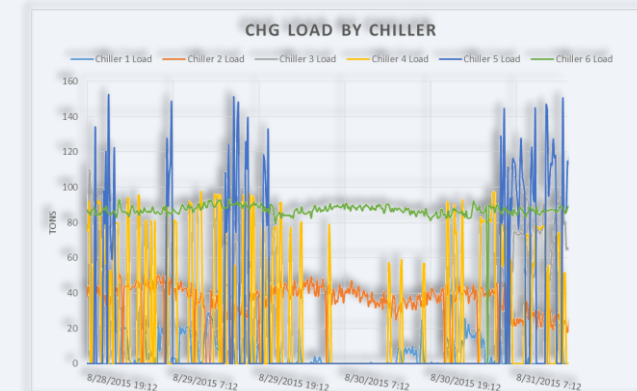
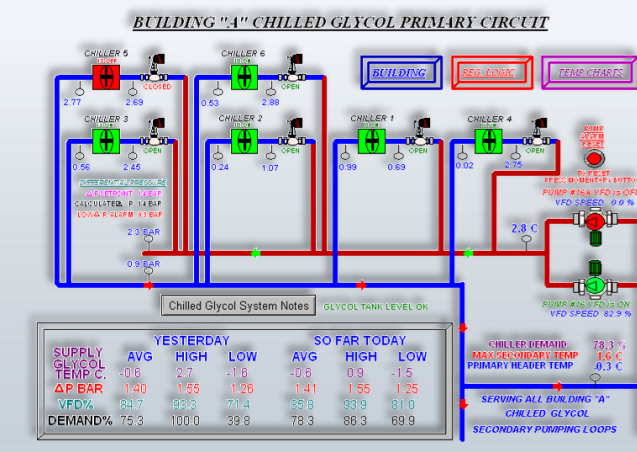


Evaluation of Existing Plant Capacity & Upgrade Economics



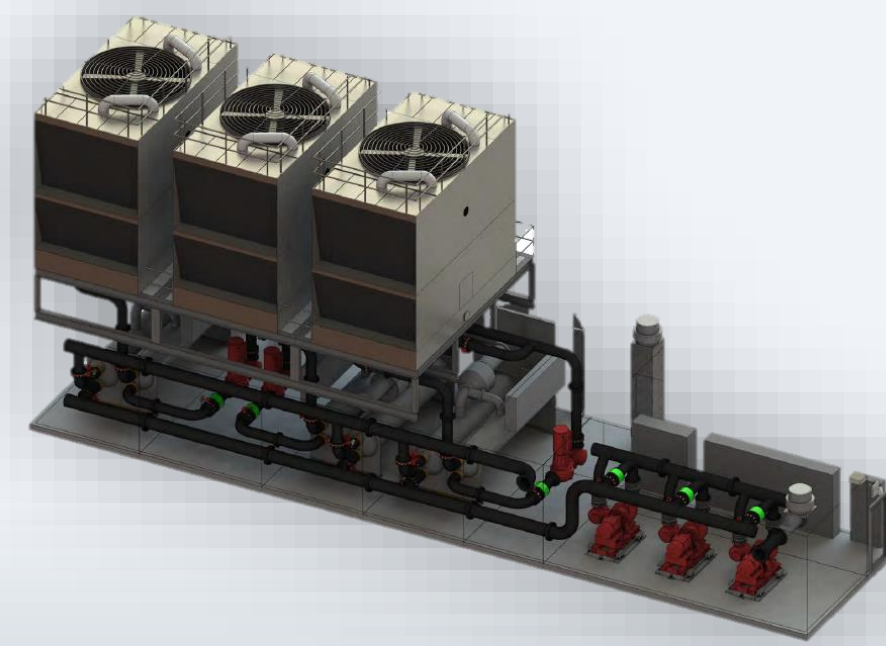
- Developed future annual load profile based on trend data and projections for future production and HVAC improvements
- Analyzed the feasibility and economics of four options with varying efficiencies, configurations, and costs



- Provided recommendation for modular high efficiency central plant upgrade

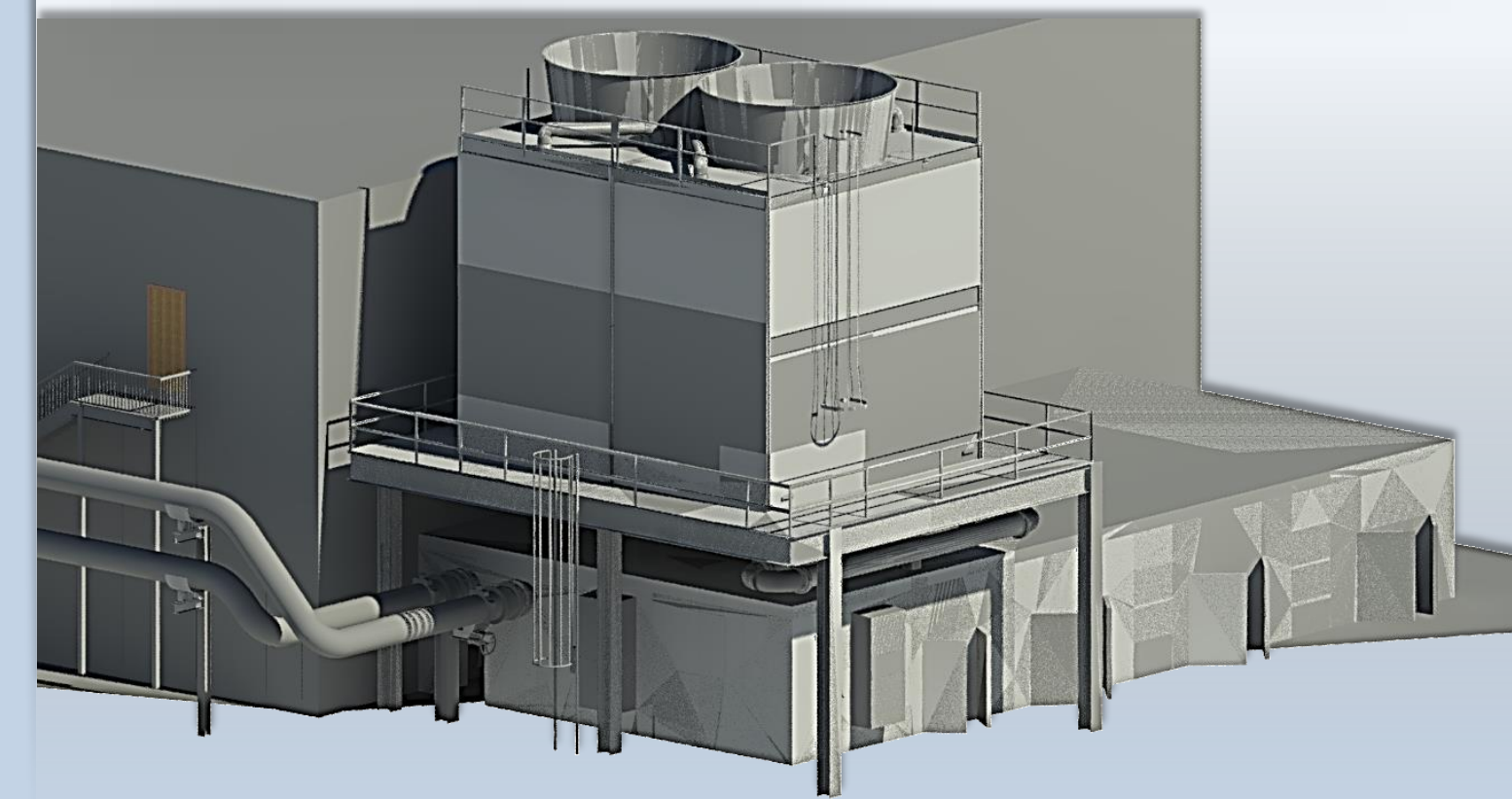
Evaluation of Alternatives

- Facilitated the evaluation of three modular chilled water plant packagers and centrifugal chiller manufacturers
- Conducted reference facility & manufacturing plant tours
- Assisted with bid review and provided recommendation

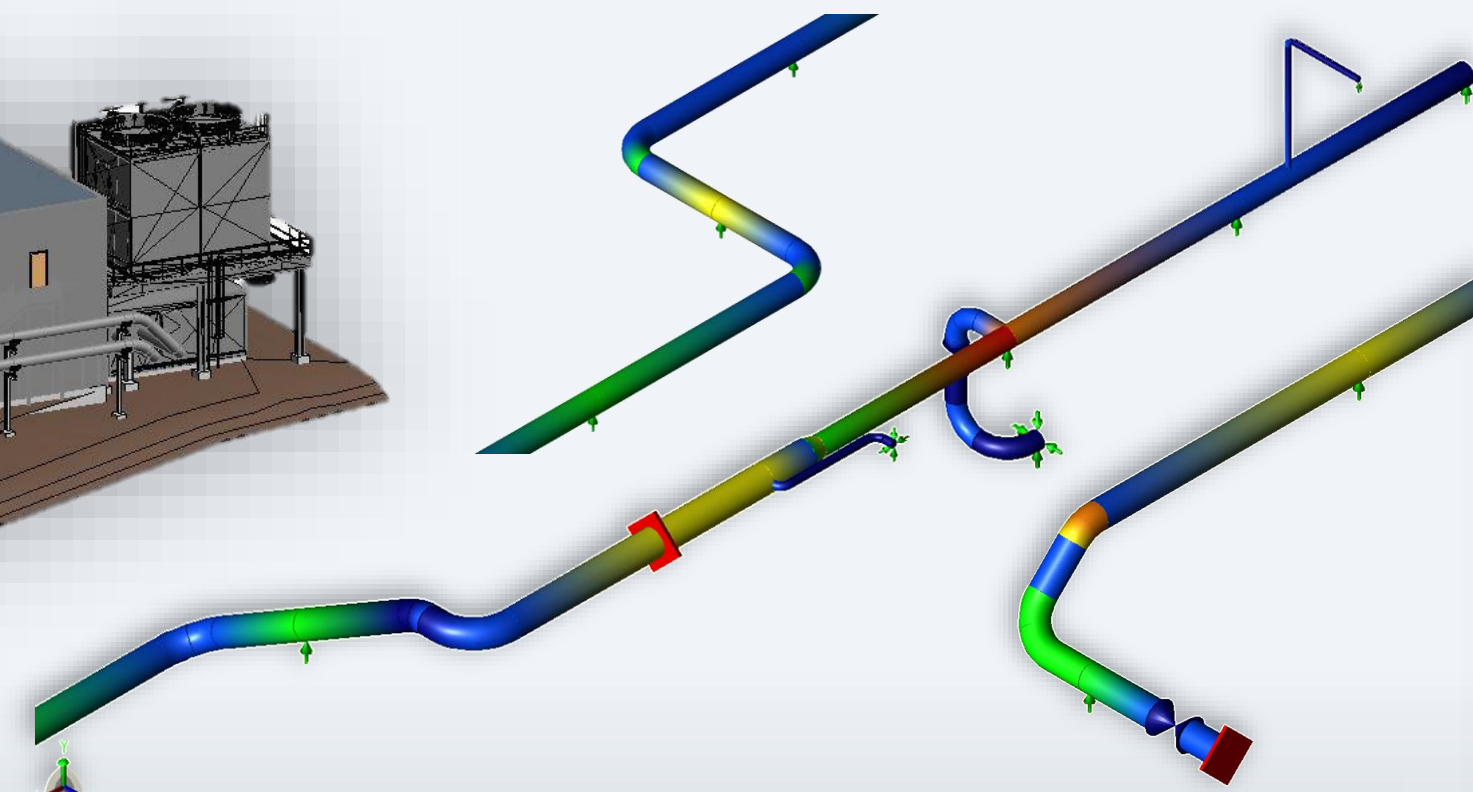
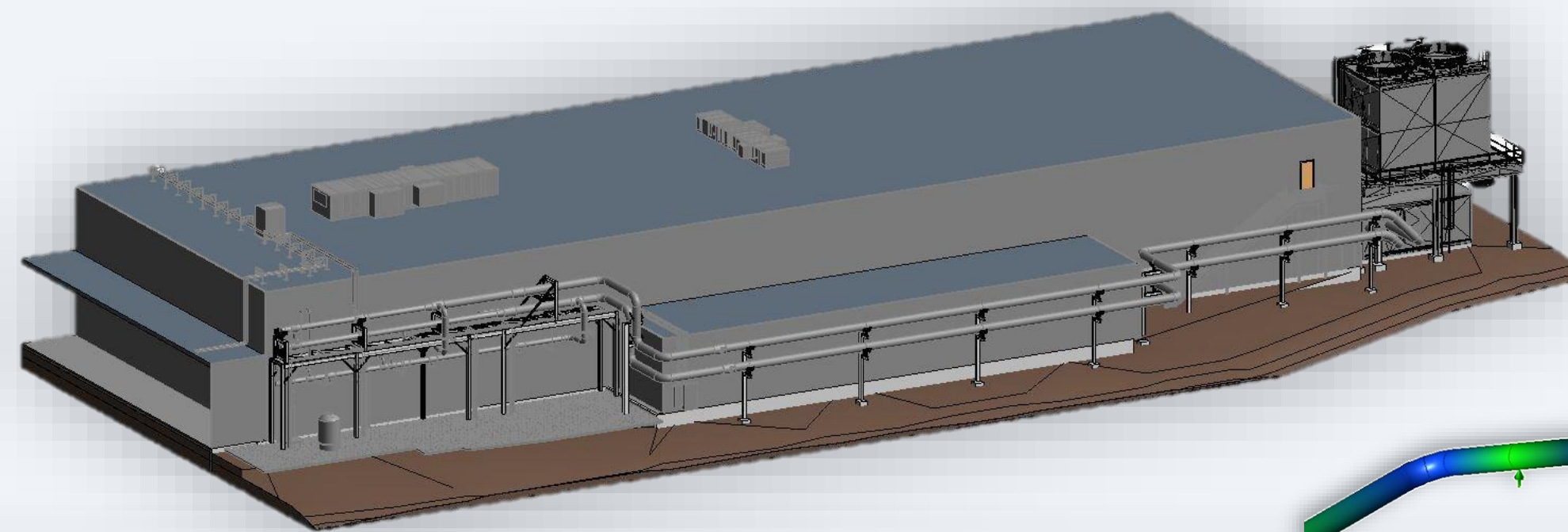


Central Plant Design and Location

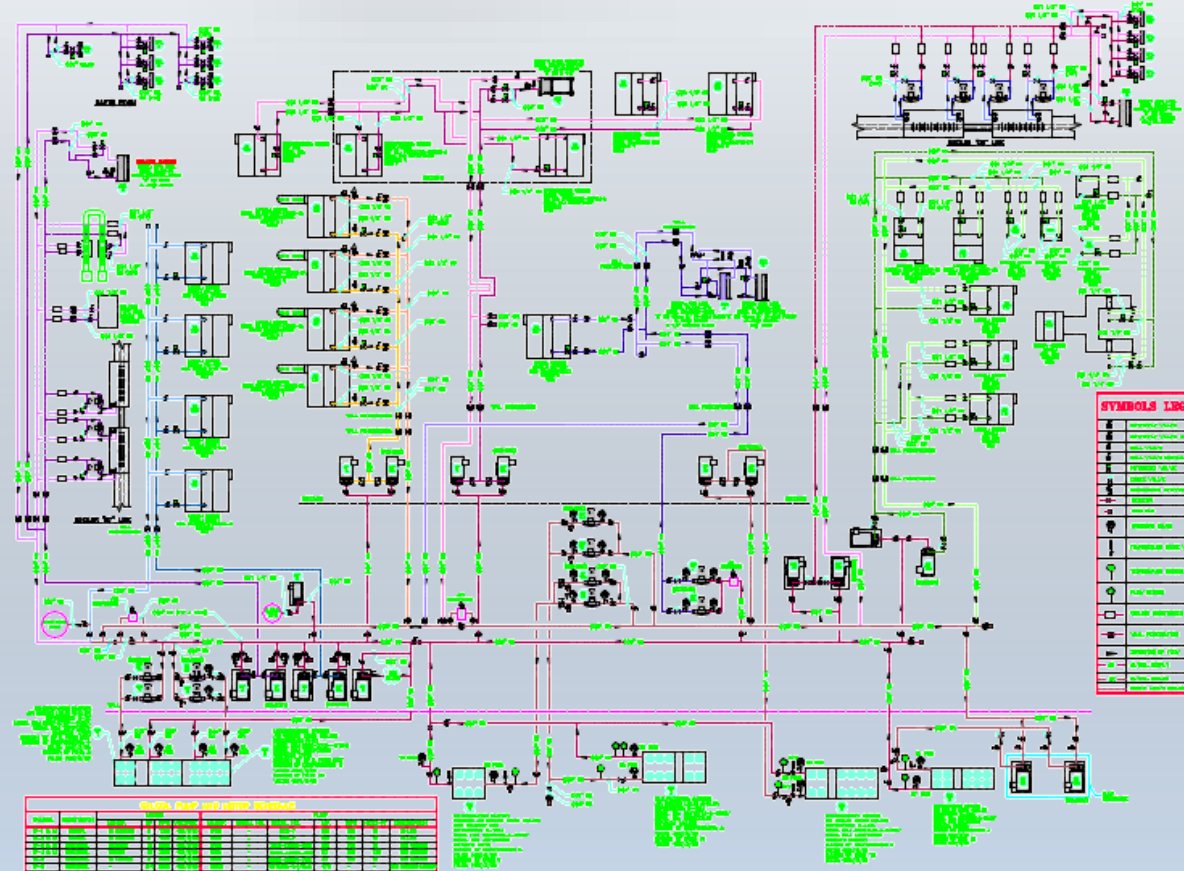
- Evaluated the feasibility of multiple central plant locations based on utility interconnection feasibility, size constraints, fire access, sound generation, and aesthetics
- Supported the design of the chilled water plant including equipment selection and layout



Plant Interconnection & Pumping Optimization



- Designed the interconnection piping between the new central plant and existing building primary loop as well as all plumbing & fire protection utilities
- Performed pipe stress analysis for operating, sustained, thermal, and dynamic load cases to optimize the pipe support spacing
- Generated interconnection phasing plans to reduce production downtime and 3D models used by the interdisciplinary project team
- Produced an as-built plant primary-tertiary pumping process & instrumentation diagram for record



Construction Administration



- Provided support from feasibility evaluation through construction and commissioning
- Supported Owner elected value engineering efforts
- Performed comprehensive design and construction documentation reviews

Centralized Chilled Water Plant



Project Goals

- ü Increase capacity to meet future load projections
- ü Improve system energy efficiency
- ü Minimize production downtime during installation
- ü Minimize total life cycle cost
- ü Improve system reliability
- ü Improve system maintainability
- ü Maintain existing aesthetic appeal and sound level

Project Highlights

- é Increased cooling capacity by **363%** or **1,795-tons**
- é Reduced annual electricity consumption by **49%**
- é Reduced operating costs by **\$489,000 per year**
- é **Increased** facility total production output capacity
- é Designed the central plant with **33%** redundancy
- é Completed construction in **2-phases** to eliminate the need for an unplanned production outage
- é Consolidated **6** standard efficiency air-cooled chillers into **3 high efficiency** centrifugal chillers
- é **Optimized** central plant controls to maximize energy efficiency
- é **Improved** system overall maintainability & reliability

B2Q conducted a detailed economic and feasibility study that led to the comprehensive design and installation of a turn-key modular high efficiency chilled water plant sized to support future production