

DESIGN REVIEW FOR CHILLER PLANT PHASE II

Working drawings are underway for a project to upgrade existing North and Southwest Chiller Plant equipment, install the necessary thermal distribution networks to connect both plants, provide distribution to existing buildings, and integrate buildings into the chilled water loop. Primary areas of work include the North Chiller Plant (located at the intersection of Stanger and Barger Streets), and the Southwest Chiller Plant (located to the west of parking lot P20, off Duck Pond Drive). New chilled water mains will be installed to interconnect the North Chiller Plant and the Southwest Chiller Plant, primarily along West Campus Drive and Perry Street and a few other select locations. A Design-Bid-Build procurement method is being utilized to construct the project. Construction is targeted to begin in winter/spring 2019, and project completion is anticipated for late fall 2021.

This \$41.3 million project is the second phase of the university's efforts to enhance its chilled water capacity. The project was first included on Virginia Tech's 2006-2012 Capital Outlay Plan. The Virginia General Assembly first authorized and appropriated planning funding during its 2016 session. The project is funded with both state and university resources.

Capital Project Information Summary – Chiller Plant Phase II

BUILDINGS AND GROUNDS COMMITTEE

November 4, 2018

Title of Project:

Chiller Plant Phase II

Location:

The project spans all of main campus between downtown Blacksburg and US Route 460. Primary areas of work include the North Chiller Plant (located at the intersection of Stanger and Barger Streets), and the Southwest Chiller Plant (located to the west of parking lot P20, off Duck Pond Drive). New chilled water mains will be installed to interconnect the North Chiller Plant and the Southwest Chiller Plant, primarily along West Campus Drive and Perry Street. Additionally, new chilled water mains will be installed to serve the College of Veterinary Medicine, and around the south and east side of campus generally from Wallace Hall to Moss Arts Center. Plans also include interconnection of several existing buildings to the system.

Current Project Status and Schedule:

The project is nearly complete through working drawings. A bid process is planned for late fall 2018 with groundbreaking targeted for winter/spring 2019. Completion is targeted for late fall 2021.

Project Description:

The project includes the phased upgrade of the campus chilled water system and addresses the following four key strategic goals for shifting the campus to a lower resource-consuming cooling system:

- Replace outdated, inefficient existing non-centralized chilled water capacity on campus.
- Update and add equipment in existing central plant facilities to maximize the existing plant footprint and optimize refrigerant use.
- Install the necessary thermal distribution networks to accommodate campus growth and retirement of the non-centralized facilities throughout the campus to include provisions for the installation of an above-ground chilled water thermal energy storage system connected to the district cooling loop.
- Make provisions for chilled water distribution to future development in the North Academic and 21st Century Living – Learning Districts. The 21st Century Living – Learning District will be located at the existing golf course.

Brief Program Description:

The program includes the following elements:

- Replace outdated chilled water equipment in the North Chiller Plant with two new, approximately 3,000 ton chillers, packaged cooling towers adjacent to the existing cooling tower, and packaged equipment and transformers along Barger Street. Work also includes a screen wall along the Stanger Street elevation, and installation of new overhead doors to support removal and installation of equipment. A new egress path will be added on the west side of the plant through the existing cooling tower yard.
- Install 1,500 ton chiller increments (chiller, pumps, and cooling tower) at the Southwest Chiller Plant to increase system capacity and provide for future thermal energy storage.
- Install new chilled water distribution piping to interconnect the two chiller plants, increasing overall system operating efficiency and reliability.
- Extend new chilled water distribution piping to several existing campus facilities. Retire the existing stand-alone chilled water production equipment in those facilities.
- Accommodate, upon completion, federally mandated and LEED refrigerant requirements by replacing outdated, inefficient chilled water capacity with new equipment that utilizes compliant refrigerant types.

Contextual Issues and Design Intent:

The notable architectural element for the project occurs at the North Chiller Plant in the form of the screen wall and revisions to the northeast facade.

The architectural design of the screen wall around the cooling tower yard responds to the character of the campus and is consistent with other screening elements already in use. While the height of the wall will not fully screen the cooling towers and chiller plant, it will provide an element with pedestrian scale and a more uniform appearance from multiple approaches along Stanger Street. The screen wall piers will be faced with Hokie Stone and capped with architectural precast concrete. Connecting the piers will be a painted steel slat system, similar to the screen enclosure to the north of Pearson Hall. Additional landscaping is proposed.

The northeast facade of the chiller plant will be modified to provide two new electrically operated 14' x 14' overhead coiling steel doors and aluminum storefront windows above.

Funding:

This \$41.3 million project is the second phase of the university's efforts to enhance its chilled water capacity. The project was first included on Virginia Tech's 2006-2012 Capital Outlay Plan. The Virginia General Assembly first authorized and appropriated planning funding during its 2016 session. The project is funded with both state and university resources.

Architect/Engineer:

Affiliated Engineers, Inc. in association with Glavé & Holmes Architecture

Construction Manager:

To be determined

November 4, 2018



CHILLER PLANT PHASE II



Board of Visitors Design Review

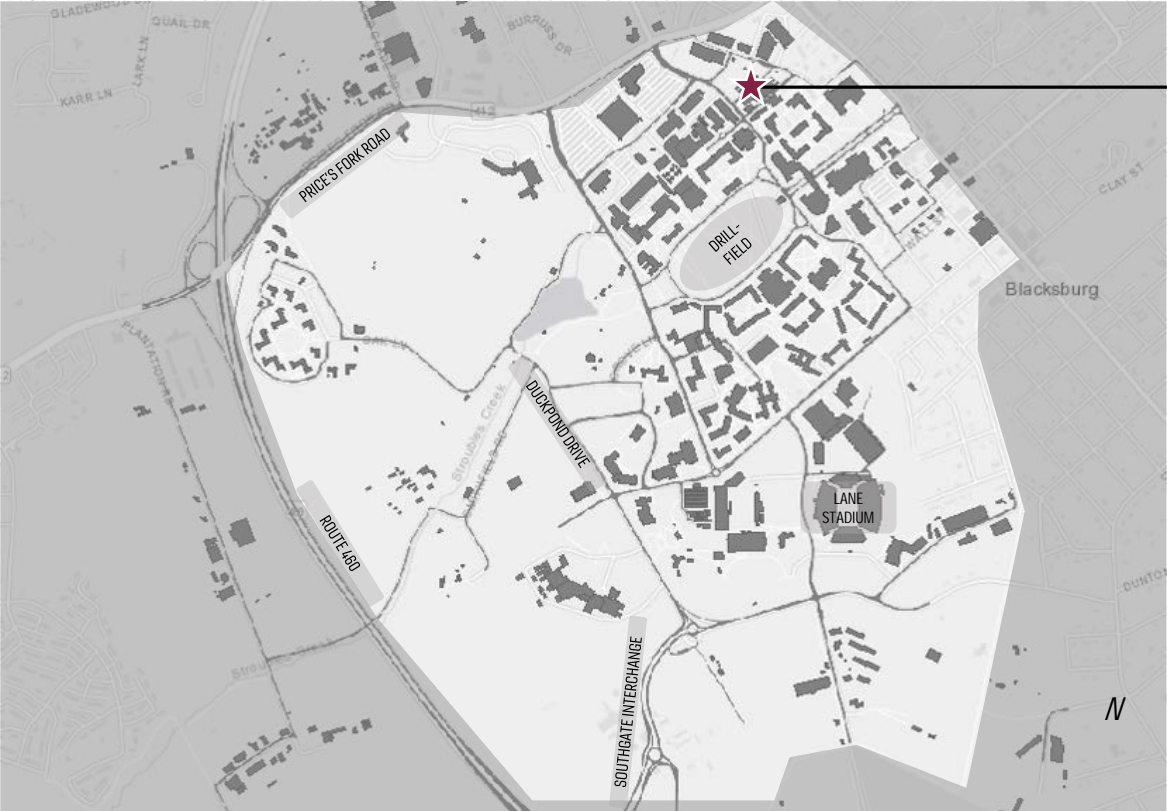
■ Chiller Plant Phase II

Project Information

Scope:	4.5 Miles of Pipe
Delivery Method:	Design-Bid-Build
Funding (Max. Authorized):	\$41.3 Million
Design Phase:	Working Drawings
Construction Start:	Winter/Spring 2019
Targeted Completion:	Late Fall 2021

Chiller Plant Phase II

Project Location



Site

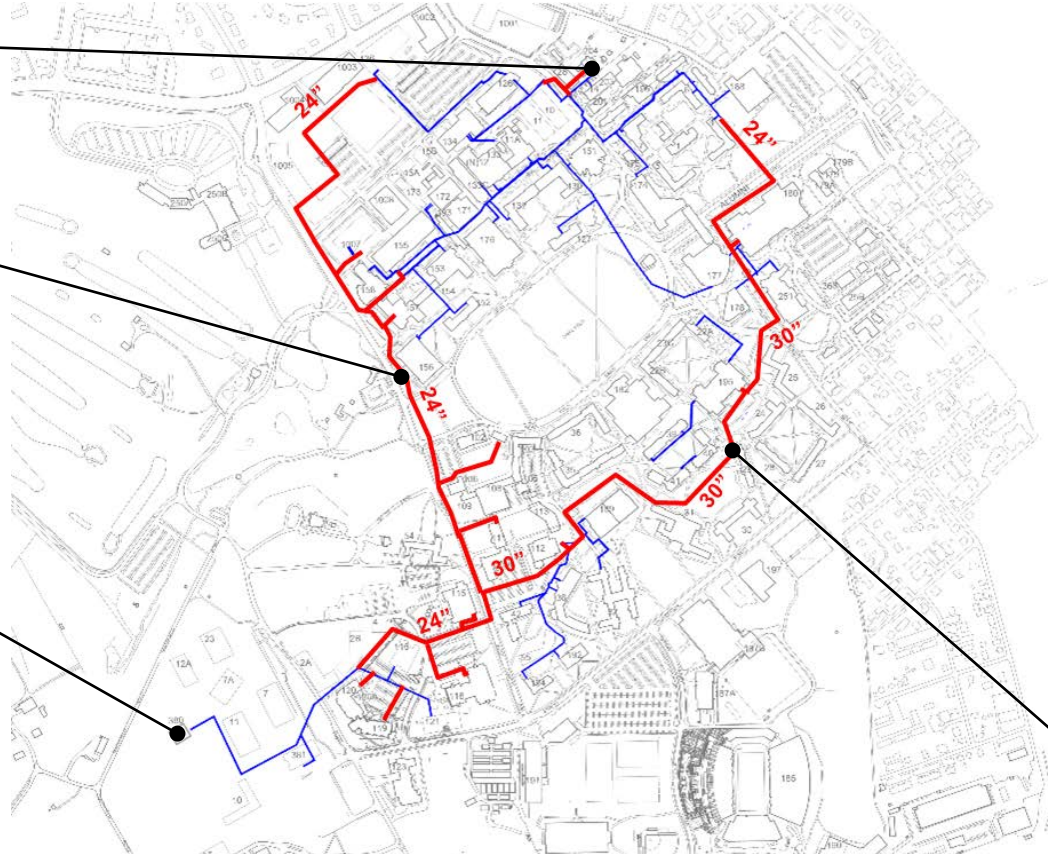
■ Chiller Plant Phase II

Distribution

North Chiller Plant

West Campus Loop

Southwest Chiller Plant



Existing CW Lines

Future CW Lines

Buildings Include:

- Owens
- Squires
- Dietrick
- Cheatham
- Litton-Reaves
- Steger North & South
- Wallace
- Fralin

East Campus Loop

■ Chiller Plant Phase II

Site Plan

Existing Cooling Towers

Proposed Plantings



(3) New Cooling Towers

New Screen Wall

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Existing Conditions

*Existing
Towers*



Stanger Street

Barger Street

■ Chiller Plant Phase II

Floor Plan

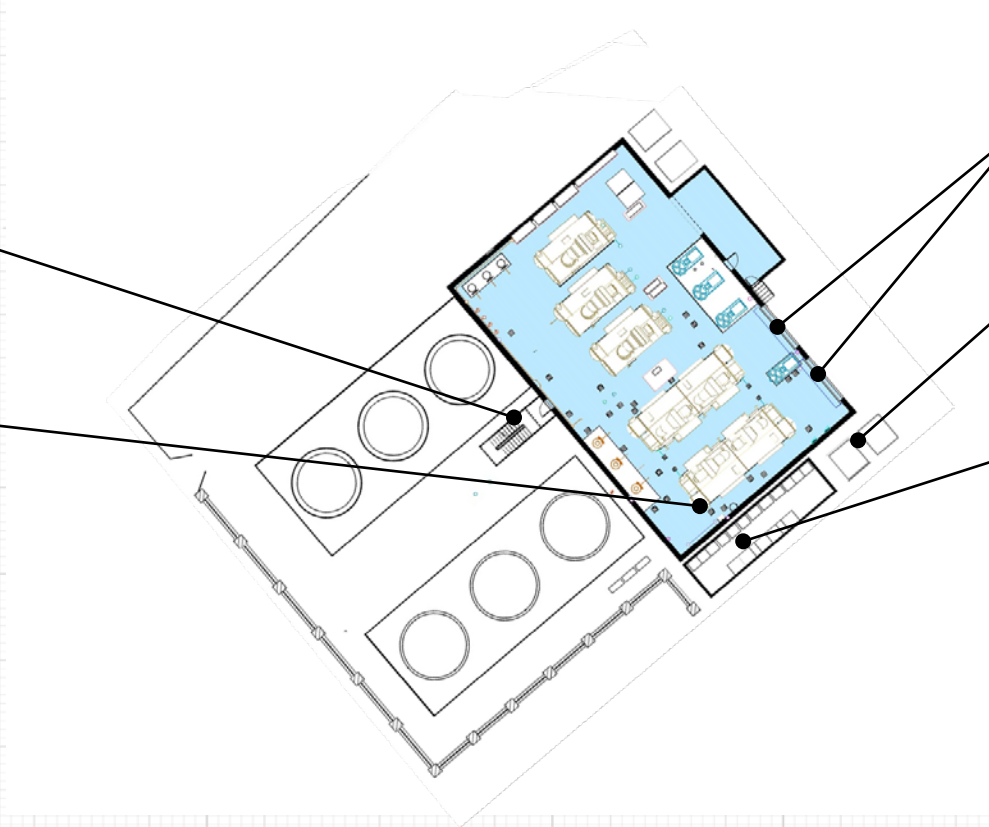
New Roof
Access Stair

Chillers

Overhead
Roll Doors

Electrical
Transformers

Equipment
Enclosure



■ Chiller Plant Phase II

Recommendation

That the Design Review graphics be approved, and authorization be provided to continue with the project design consistent with the drawings shown.

DESIGN PREVIEW/REVIEW FOR PACKAGE BOILER 12

Package Boiler 12, a 100,000 pound-per-hour boiler, will be installed in the university's Power Plant at the intersection of Barger and Turner Streets. The additional heating capacity to be provided by this boiler is an important component of the university's utility master plan. Additional heating capacity is needed to accommodate planned campus growth. In addition, use of a natural gas and oil-fired boiler represents a continuation of the university's efforts to emphasize sustainability and energy efficiency in campus operations by minimizing the use of coal as a fuel.

This \$6.8 million project is funded through university resources. Financing was acquired on the basis of future energy savings from more efficient operations. This expenditure does not derive from the capital outlay planning process. Instead, it arose as a result of discussions surrounding campus utility improvements. Funding was approved by the Board of Visitors in 2017.

Capital Project Information Summary – Package Boiler 12

BUILDINGS AND GROUNDS COMMITTEE

November 4, 2018

Title of Project:

Package Boiler 12

Location:

Package Boiler 12 will be installed in the university's Power Plant located at the intersection of Barger and Turner Streets. The new boiler will be connected into the existing plant's steam piping system to provide additional steam generation and supply to the campus.

Current Project Status and Schedule:

The project is in the working drawings phase; design completion is targeted by the end of calendar year 2018. Construction is anticipated to begin in summer/fall 2019 and will conclude in late fall 2019.

Project Description:

An existing, abandoned-in-place coal boiler will be removed from the existing Power Plant. A 100,000 pound-per-hour boiler is to be installed in its place. To facilitate both the extraction of the existing boiler and installation of the new boiler, one existing window assembly in the northwest wall of the Power Plant is to be removed. Once the installation of the major equipment is complete, a louver assembly will be installed within the same opening in the northwest wall.

Brief Program Description:

This project does not include assignable program space.

Contextual Issues and Design Intent:

The new louver will be a drainable, fixed mullion louver. The louver's heads, sills, jambs, and mullions will be constructed of aluminum members. Blades will be one-piece aluminum extrusions with gutter(s) designed to catch and direct water to jamb and mullion drains. Closed cell PVC compression gaskets will be provided between bottom of mullion or jamb and top of sill to insure leak-tight connections. Mullions will be exposed as indicated to match the existing window.

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Affiliated Engineers, Inc.

General Contractor:
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