



November 16, 2017

## **ENGINEERING SERVICES**

*proposal for:*

### **CITY OF DULUTH & DULUTH ENERGY SYSTEMS**

*Mechanical Design and Engineering Services For Building Conversions  
(RFP #17-0610)*

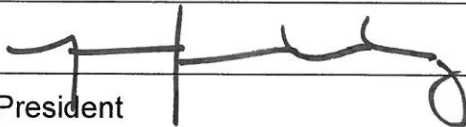
*prepared by:*

**Karges-Faulconbridge, Inc.**



**Karges-Faulconbridge, Inc.**  
*Engineers*

**ATTACHMENT D - PROPOSAL COVER SHEET  
CITY OF DULUTH  
RFP# 17-0610**

<b>Proposer Information:</b>	
Proposer Name	Karges-Faulconbridge, Inc.
Mailing Address	670 County Road B West, St. Paul, MN 55113
Website	www.kfi-eng.com
Contact Person	James Faulconbridge, PE
Contact Person's Phone Number	651.771.0880
Contact Person's Fax Number	651.771.0878
Contact Person's E-Mail Address	jafaulconbridge@kfi-eng.com
Federal ID Number	411856291
Authorized Signature	
Title	President



**CITY OF DULUTH**  
PURCHASING DIVISION  
Room 100 City Hall  
411 West First Street  
Duluth, Minnesota 55802-1199  
218/730-5340  
[purchasing@duluthmn.gov](mailto:purchasing@duluthmn.gov)

**Addendum 1**  
**File # 17-0610**

**Mechanical Design and Engineering Services For Building Conversions**

This addendum serves to notify all bidders of the following changes to the solicitation documents:

Answers to questions submitted at the pre-bid meeting are attached.

PLEASE NOTE - Pre-proposal site walkthroughs will take place on Monday November 13th, 2017 at 9:00AM. We will meet at the Beal Building, 301 W Superior Street.

Please acknowledge receipt of this Addendum by including a copy with your proposal.

Posted: 11/9/17



**CITY OF DULUTH**  
PURCHASING DIVISION  
Room 100 City Hall  
411 West First Street  
Duluth, Minnesota 55802-1199  
218/730-5340  
[purchasing@duluthmn.gov](mailto:purchasing@duluthmn.gov)

**Addendum 2**  
**File # 17-0610**

**RFP for Mechanical Design and Engineering Services for Building Conversions**

This addendum serves to notify all bidders of the following changes to the solicitation documents:

1. The project building list and secondary side conversion notes are available for review at the DES office during business hours, the DES office is located at 1 Lake Place Drive. Building conversion information shall not be photographed or reproduced.
2. Answers to questions submitted after the pre-bid meeting are attached.

Please acknowledge receipt of this Addendum by including a copy with your proposal.

Posted: 11/14/17

Dear Ms. Ashbach,

Karges-Faulconbridge, Inc. (KFI) is pleased to present this engineering proposal for your consideration. We are in receipt of the RFP (File #17-0610), Addendum 1 dated 11/9/17 and Addendum 2 dated 11/14/17. We understand the scope of work and overall project schedule and believe this response has been prepared in accordance with your request.

### **PROJECT UNDERSTANDING & APPROACH:**

Duluth Energy Systems (DES) is planning to convert its existing steam-based district energy system to a hot water-based district energy network. This work has been separated into two phases – with Phase I comprised of 26 Energy Transfer Stations (ETS) within 18 existing customer buildings; Phase II includes an additional 14 ETS units within 8 additional customer buildings. The new hot water district energy system will serve customers heating water, domestic hot water systems, and one (1) pool heating system. The focus of this engineering effort is the installation of the ETS units in the mechanical buildings of the respective customers' buildings.

We will bring a first run of the work plan to the kickoff meeting, where we will collectively set dates, times and topics for all meetings in the project. We will also set the milestone dates for deliverables. The work plan will go beyond design, providing phasing information and tie-in schedules where it is important to facilitate minimal downtime for cutovers.

A key element of this project will be an accurate Opinion of Probable Cost (OPC), generated for each of the twenty-five Customer mechanical rooms. Our estimates are performed at each step of the project, including the beginning, to constantly track the value of changes. We understand the needs of Ever-Green Energy for proper budgeting, including year-on-year price increases, materials escalation and labor impacts.

### **SCOPE OF WORK:**

1. **Existing Drawing/Documentation Review:** Where possible, we will obtain from EGE/EP any existing mechanical data useful for the new design and installation coordination work. Helpful mechanical data is related to any area where conversion is to occur. Examples are:
  - a. Mechanical room drawings
  - b. Piping drawings (service entrances and mechanical rooms only)
  - c. Piping schematics
  - d. Specifications and design standards relevant to this Project
  - e. Building/system loads for each customer
  - f. ETS unit information

**November 16, 2017**

Ms. Amanda Ashbach  
City of Duluth  
411 West First Street, Suite 100  
Duluth, MN 55802

Re:  
Proposal for Mechanical Design  
and Engineering Services For  
Building Conversions

### **KFI PROJECT CONTACT:**

Mr. James Faulconbridge, PE  
President  
jafaulconbridge@kfi-eng.com  
651-771-0880



2. **Field Work:** Gather field information for each mechanical rooms within the customers' buildings. Typical work includes:
  - a. Recording field isometric sketches for each room based on 'Normal', 'Moderate' and 'Challenging' conditions described in **Item 4**. These sketches will record general pipe sizes, lengths & relative distances to each other and appurtenant items. We will also note relevant device & equipment counts & locations.
  - b. Forming ideas for proposed new HWS/HWR exterior distribution pipe branch locations (provided by DES) to correlate with our work in the mechanical rooms.
  - c. Assessment of Customer equipment connecting to the new hot water system (within the mechanical areas), and advising DES where service or replacement might be warranted.
  - d. Identify abandoned equipment, piping and associated devices slated for removal, where applicable.
  - e. Formulate phasing ideas and tie-in points that minimize impact to operations.
3. **Opinion of Probable Costs (OPC):** We will generate an estimate of retrofit/upgrade costs associated with the connection and conversion for each mechanical room from the current steam system to the new hot water heating system.. This estimate will include costs of piping, fittings, valves, accessories, metering, etc. Labor & CM estimates will also be included, with field conditions described in Item 4 used as a basis for time required for each install/cutover.
4. **Design & Construction Documents:** KFI will develop construction documents for the project. The plan set will (typically) incorporate a single sheet for each mechanical room. This sheet will depict, at minimum, a plan & elevation view for the area of install. Section and isometric views will be added as needed for clarity. A general description of conditions driving the design work required for each room according to space constraints and other concerns are as follows:
  - a. **'Normal' rooms:** Reasonable amount of space is available to install new piping & devices, and general room layout lends itself to ease of both install and ideal service entry for new HWS/HWR piping. It is expected that these rooms could accommodate a 'skid-mounted' device & piping pre-fab assembly with quick connect in the field.
  - b. **'Moderate' rooms:** Some amount of space is available to install new piping & devices; however a unique pre-fab option may or may not be possible. General room layout may require device and piping to be located where it can fit instead of ideal placement near the ideal service entry for new HWS/HWR piping.
  - c. **'Challenging' rooms:** Restricted amount of space available to install new piping & devices. Pre-fab options are not expected to be applicable in these areas. High likelihood of having to relocate existing Customer equipment to accommodate new devices & piping **OR** propose build outs to increase mechanical room area.

We have familiarized ourselves with your Standard Specifications, and will incorporate them into the project.
5. **Project Meeting Participation:** KFI Project Manager/Project Engineer will attend up to three in-person design review meetings with DES and EGE project staff.

#### **WORK BY DULUTH ENERGY SYSTEMS (DES):**

Please make available to us the following:

1. All available drawings/documentation of the Customer mechanical areas related to the conversion work.
2. ETS information – including dimensioned drawings, performance data, equipment capacities, piping connections and controls information.

3. DES project specifications and design criteria that are relevant to the project.
4. Contact information for us to have access to the Customer mechanical areas related to the conversion work.

**PROJECT SCHEDULE:**

Included in the attachments is a first draft of a project work plan. We are prepared to begin work immediately and anticipate Phase I engineering documents will be complete within 10 weeks, if information is readily available and we have unfettered access to the customer spaces.

Thank you for the opportunity for us to execute this important project for DES. It is a scope with which we are very comfortable and experienced. We request the opportunity to discuss the work with you at your earliest convenience. Please contact me at 651-771-0880 if you have questions or require further information.

Respectfully,  
**KARGES-FAULCONBRIDGE, INC.**



James A. Faulconbridge, PE  
PRESIDENT

Attachments:

Proposed Work Plan  
Project Organizational Chart and Resumes  
Firm Qualifications and Relevant Experience

Submitted Separately:

Cost Proposal  
2017 Professional Services Rate Sheet

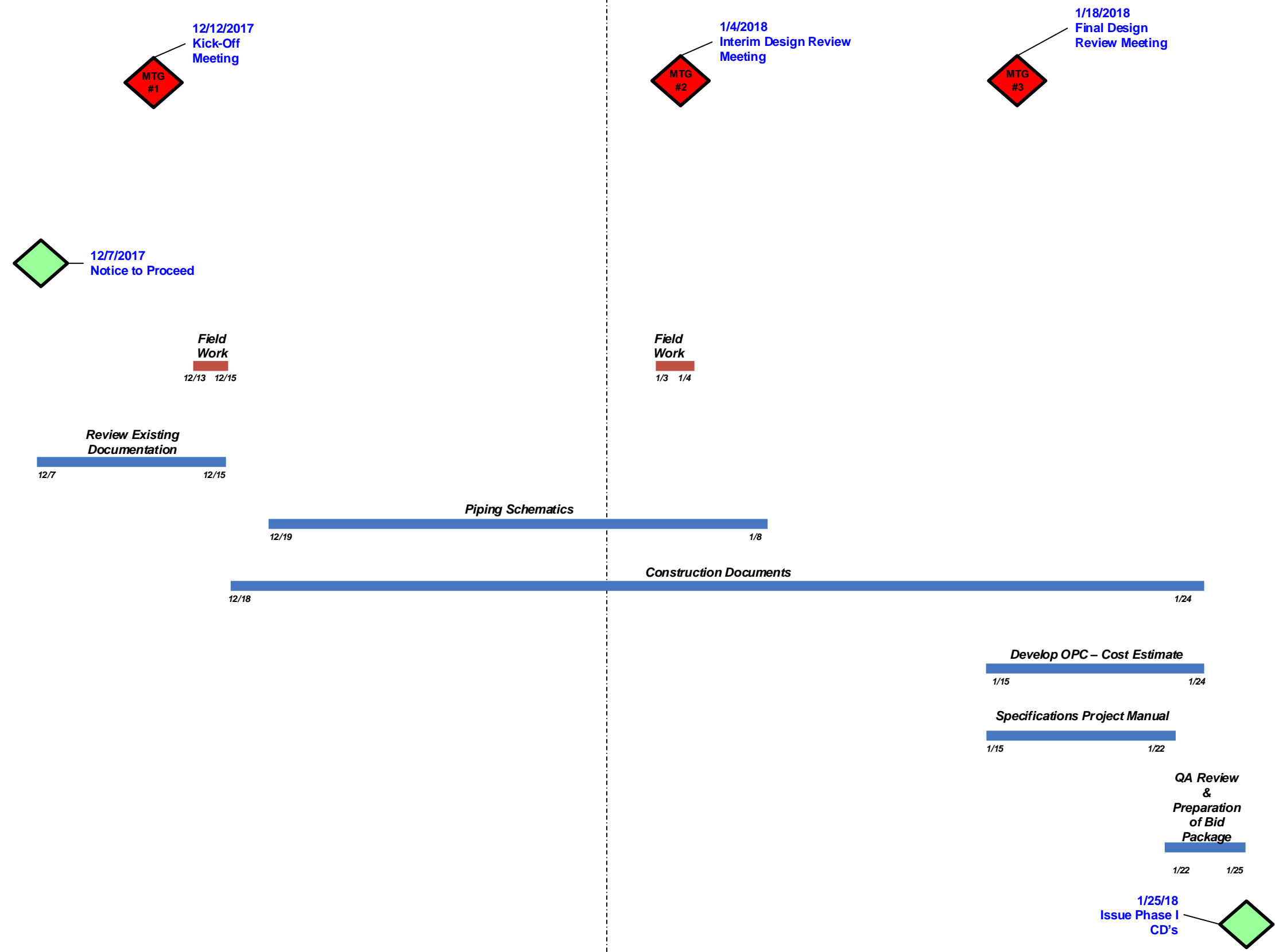


ATTACHMENTS



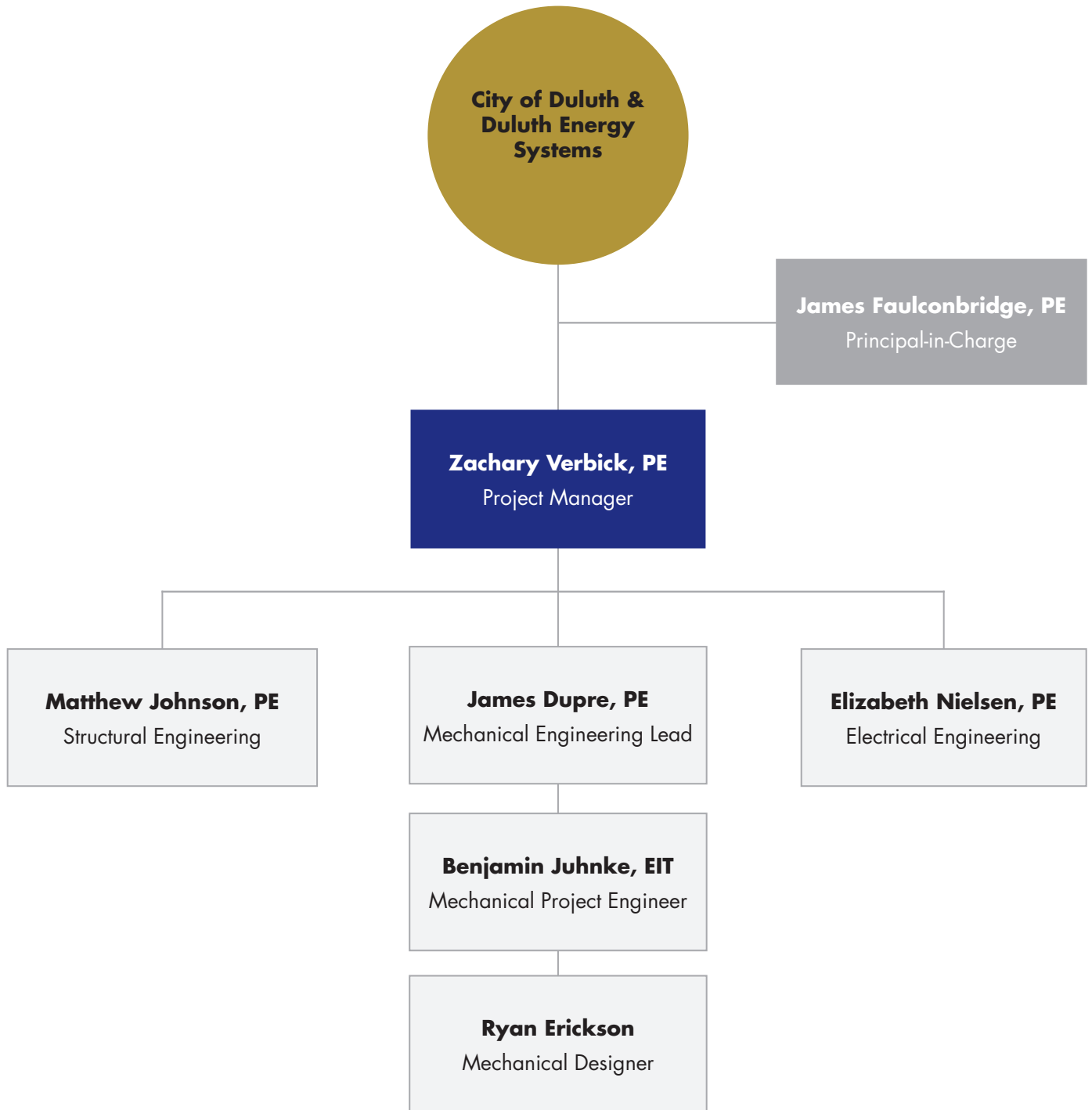
REVISED 11/28/17

**Meetings**



MONTH NOV 1 2017 DEC 1 JAN 1 2018 FEB 1

## PROJECT ORGANIZATIONAL CHART AND RESUMES



**Jim Faulconbridge** is one of the founders of KFI, and is responsible for all engineering operations at the company. He has over 24 years of mechanical engineering, field work and project management experience in mission-critical systems design. He believes that KFI's company leaders best serve our clients by staying heavily involved in projects technically, leading by example and delegating administration to other specialists in that field. This has led to exceptionally high client retention and repeat business for our firm.

### **RELEVANT EXPERIENCE** **Utilities & Central Energy**

University of Notre Dame - Notre Dame, IN

- *Utility Masterplan, 20 year*
- *Combustion Turbines 5 MW CT1-2 with HRSG*
- *Boiler Makeup and Domestic Hot Water Regeneration*
- *Deaerator and Feedwater Piping, 500,000 lb/hr*
- *New Utility Tunnel Construction 5,000 L.F.*
- *Southeast and Southwest Tunnel Modifications 3,000 L.F.*
- *South Plant Domestic Hot Water Design*
- *Remote Chiller Plant Facility Construction*

University of Minnesota Northrop Hall Chiller Addition - Minneapolis, MN

College of St. Benedict - St. Joseph, MN

- *Utilities Master Plan*
- *New Central Energy Plant and Distribution System*
- *2400 ton Chilled Water Plant*
- *55,000 #/hr, 100 psig Steam Plant*

The Mayo Clinic Hospital, St. Mary's Campus - Rochester, MN

- *Chilled Water Flow Analysis*
- *Chiller Plant Expansion*
- *Utility Flow Meter Phase II*

The Mayo Clinic, Mayo Building Tempered Water Piping Replacement - Rochester, MN

Hutchinson Technology, Inc. Central Steam and Hot Water Generating Plants >400,000 MBH - Multiple Locations

Hutchinson Technology, Inc. Multiple Locations, Chilled Water Plants Totaling Over 15,000 tons - Multiple Locations

LTV Steel Mining Company - Hoyt Lakes, MN

- *100MMBtuh Hi-temp Hot Water, 250 psig, 350F*
- *New Central Plant*

Heartland Corn Products - Winthrop, MN

- *CO2 and Emissions Control Project, 5 MW CT HRSG*
- *New Central Steam Plant 200,000 lb/hr, 120 psig sat.*

Great River Energy Spiritwood Station Utility Metering Facility - Spiritwood, ND

**JAMES A. FAULCONBRIDGE, PE**  
President



### **Education**

B.S. Mechanical Engineering  
North Dakota State University

### **Licensure**

Minnesota #25160, Colorado #0041434, Illinois #062060158, Indiana #10809363, Iowa #18540, Kansas #19491, Kentucky #25505, Maryland #36991, Missouri #2007025510, Nebraska #E12296, New Mexico #18246, North Dakota #3774, Oklahoma #22906, Pennsylvania #078553, South Dakota #9306, Texas #99882, Virginia # 0402046170, Wisconsin #39122-6, Wyoming #12887, Washington DC #905370

Canada:

Manitoba, Saskatchewan, Ontario, Alberta

### **Affiliations/Credentials**

ASHRAE

ASME

CIBO

### **Patents**

U.S. Patent # 7776218, #8336226, #7857975, #8323500

System for Liquid Extraction and Methods  
Issued dates: 8/17/2010, 12/25/12, 12/28/10, 12/4/12

U.S. Patent #8581673, #9260676  
Method for Extracting Oil from a Water and Solids Composition  
Issued date: 8/27/13, 2/16/16

India Patent #220743  
A Process for Drying Solids Initially with Wet Water  
Issued date: 12/19/03

Canada Patent #2542802  
System for Liquid Extraction and Methods  
Issued date: 5/22/12

**Zachary Verbick** is a licensed mechanical engineer and senior project manager specializing in KFI's industrial and utility projects. Zach has extensive utility and central energy experience and has contributed to a vast number of KFI's large projects. He brings effective communication and fresh ideas to each project, which makes him a vital component of the project team. Zach's overall experience includes higher education, commercial and government projects.

### **RELEVANT EXPERIENCE** **Central Energy and Utilities**

University of Notre Dame - Notre Dame, IN

- *Combustion Turbines 5 MW CT1-2 with HRSG*
- *South Plant Domestic Hot Water Design*
- *Tunnel Domestic Hot Water Expansion Design*
- *Condenser Water Piping Chillers 6 & 7*
- *Utility Long Range Planning Study*
- *Utility Plant Heat Recovery Study*
- *Boiler Makeup and Domestic Hot Water Regeneration*
- *70 lb Extraction Loop Addition*
- *East Campus Utility Tunnel*
- *South Campus Utility Tunnel*
- *South Campus Geothermal Plant Design*
- *South Tunnel Piping Thermal Expansion*
- *Steam Main Piping Modifications*
- *Hydro Plant Detailed Design*
- *Redundant and High Pressure Natural Gas Services Design*
- *Ricci Geothermal Central Plant*
- *Utility Tunnel System Audit*
- *Chilled Water Pumping Station*
- *Remote Chiller Plant Facility*

University of Minnesota Steam and Condensate Anchor Repair Design - Minneapolis, MN

The Mayo Clinic Hospital St. Mary's Campus Chilled Water System Hydraulic Model - Rochester, MN

Ever-Green Energy Hennepin Energy Recovery Center Snowmelt Mechanical System Design - Minneapolis, MN

ZACHARY T. VERBICK, PE  
Senior Project Manager



#### **Education**

B.S. Mechanical Engineering  
Milwaukee School of Engineering

#### **Licensure**

Minnesota #52637

#### **Affiliations/Credentials**

ASME

**Jim Dupre** has over 26 years of experience in detail design, installation, start-up and project leadership in industrial and commercial building design; industrial oven, furnace and incinerator design; process and mechanical utility system design for agri-products processing, food and grain-handling, aerospace, pharmaceutical, electronics and chemical industries.

### **RELEVANT EXPERIENCE**

#### **Utilities and Central Energy**

University of Notre Dame Utilities Distribution Systems Study - Notre Dame, IN

University of Minnesota - Minneapolis, MN

- *Northrop Auditorium Chiller Plant and Cooling Tower Replacement*

HealthEast CareSystems Bethesda Heating Plant Infrastructure Implementation - St. Paul, MN

The Mayo Clinic Hospital, St. Mary's Campus - Rochester, MN

- *Chiller Plant Study*
- *Mary Brigh Building Hot Water Piping to Surgical Suites AHU's*

The Mayo Clinic Assisi Heights - Rochester, MN

- *Central Chiller Plant*
- *Steam Plant, Hot Water Converters and Piping Distribution*

The Mayo Clinic Mayo Building, Tempered Water System - Rochester, MN

Park Nicollet Health Systems, Methodist Hospital - St. Louis Park, MN

- *3900 Building Chilled Water Plant Design*
- *Chilled Water System Study and Design*
- *Hospital Boiler Study*

Hines 20 Washington Square Well Water Conversion - Minneapolis, MN

Northstar Center Chilled Water Plant Replacement - Minneapolis, MN

#### **Manufacturing**

St. Jude Medical - Plymouth, MN

- *Central Hot Water Boiler Plant and Piping Distribution*
- *Central Chiller Plan and Piping Distribution*

Hutchinson Technology - Eau Claire, WI

- *Central Hot Water Boiler Plant and Piping Distribution*
- *Central Chiller Plant and Piping Distribution*

**JAMES R. DUPRE, PE**  
Senior Mechanical Engineer



#### **Education**

M.B.A.  
*University of St. Thomas*

B.S. Mechanical Engineering  
*University of North Dakota*

#### **Licensure**

Minnesota #21855

#### **Affiliations/Credentials**

ASME

OSHA 10-Hour Training

**Benjamin Juhnke** is a mechanical engineer who has been with KFI for over four years. As a graduate of Iowa State University, Ben joined KFI's building performance group. While in the performance group, Ben gained valuable insights into the performance and pitfalls of various complex systems. Now, he specializes in the design of projects. Ben has experience performing all aspects of projects beginning with energy modeling and pre-design, followed by construction and commissioning tasks he conducted in our performance group. This well rounded background and experience make him a valuable addition to any project team.

## **RELEVANT EXPERIENCE**

### **Higher Education**

University of Notre Dame - Notre Dame, IN

- *Boiler Makeup and Domestic Hot Water Regeneration Design*
- *Combustion Turbines 5 MW CT1-2 with HRSG*
- *Boiler MACT and NAAQS Compliance Study and Design*
- *South Bend Dam Hydroelectric PLANT*
- *South Campus Geothermal Plant Design*
- *Utility Tunnel Audit*
- *Remote Chiller Plant Facility Construction*
- *Redundant and High Pressure Natural Gas Services Design*

Iowa State University - Ames, IA

- *Hilton Coliseum Maintenance Boilers Study*
- *Richardson Court Association (RCA) South Phase 2 Steam Line Replacement*

University of Iowa - Iowa City, IA

- *Power Plant Upgrade Dust Collection Systems*
- *Power Plant Boiler 10-11 Air Regulations Compliance Boiler MACT Commissioning*

**BENJAMIN W. JUHNKE, EIT**

Mechanical Engineer



### **Education**

B.S. Mechanical Engineering  
*Iowa State University*

### **Licensure**

Engineer-in-Training

### **Affiliations/Credentials**

OSHA 10-Hour Training

## FIRM QUALIFICATIONS AND RELEVANT EXPERIENCE

Karges-Faulconbridge, Inc. (KFI) provides industry leading mechanical, process, and electrical engineering, commissioning, and construction management services for process and facility infrastructure projects across North America.

KFI is registered and has successfully completed projects in all 50 states and four Canadian provinces. We maintain a staff of licensed master trades people in the fields of plumbing, sheet metal, electricity, gas, hot water, and high and low pressure steam.

KFI has several distinguishing features that differentiates us:

- 1) An established team of mechanical and electrical engineers along with experienced estimators on staff to assist in developing budget estimates
- 2) Extensive project experience with central boiler and chiller plants and associated piping distribution
- 3) Expertise with challenging plant expansions using our proven “boots on the ground” approach
- 4) A reputation for solving unique engineering problems with creative designs, and balancing life-cycle costs within project budget limitations
- 5) Development and dedication to our detailed schedules and phasing plans
- 6) Experience driving projects from master planning and concept development through the construction and commissioning phases

KFI has focused its business plan on the goal of being the premier engineering firm for central energy and utility systems. To that end, we have created a team that is strong in design, energy analysis, construction management, commissioning, estimating, and forensic engineering.

Why is KFI so versatile? By adhering to our core competencies, a good work ethic and an emphasis on mass and energy transfer, psychrometrics, and engineering fundamentals. All are coupled with our extensive field experience and project management skills.

Unlike other engineering firms, we regularly manage projects end to end and know how to read a balance sheet from a business owner’s perspective. We are skilled project drivers. We work with our clients to ensure that the project goes smoothly, and that it is completed on schedule and within budget, no exceptions.

Additional information is available on our web site at [www.kfiengineers.com](http://www.kfiengineers.com)

### **KFI has extensive experience in the following areas:**

- Mechanical Engineering
- Electrical Engineering
- Chemical Engineering
- Commissioning and Recommissioning
- Procurement Services
- Testing & Modeling
- Construction Administration
- Energy Management
- Energy Modeling
- Estimating/Budgeting
- Materials Handling Systems Design
- Process Piping Design
- Testing & Troubleshooting
- Pre-Design & Master-Planning
- Field Engineering
- Tunnel Design
- Project Management

## FULL SERVICE CAPABILITIES

KFI is a full service firm that leads and performs all project types including:

- Master Plans
- Pre-Design/Studies
- Facility Expansions/Upgrades
- Equipment Upgrades/Replacements
- Shutdowns/Turn-Arounds
- Greenfield Facilities
- De-Bottlenecking
- Start-up Commissioning

KFI provides central energy and utility services in the following markets

- Biofuels
- Agribusiness
- Manufacturing
- Higher Education
- Healthcare
- Food and Beverage
- Transportation
- Municipalities
- Entertainment
- Commercial
- Galleria
- Exhibition Centers
- Aviation





Our clients include:

- 3M
- Al-Corn Clean Fuel
- Bunge
- Cargill
- Carlton College
- CHS
- College of St. Benedict
- Doosan Bobcat
- Ever-Green Energy
- General Dynamics
- Grand Forks International Airport
- Great River Energy
- Heartland Corn Products
- Hines
- Hutchinson Technology, Inc.
- Iowa State University
- Mall of America
- Metropolitan Airport Council
- North Dakota State University
- Pennsylvania State University
- Park Nicollet Health Services
- The Mayo Clinic Hospital
- HealthEast Care System
- Simon Property Group
- St. Jude Medical
- State of Minnesota
- State of Iowa
- University of Iowa
- University of Minnesota
- University of Notre Dame
- Xcel Energy



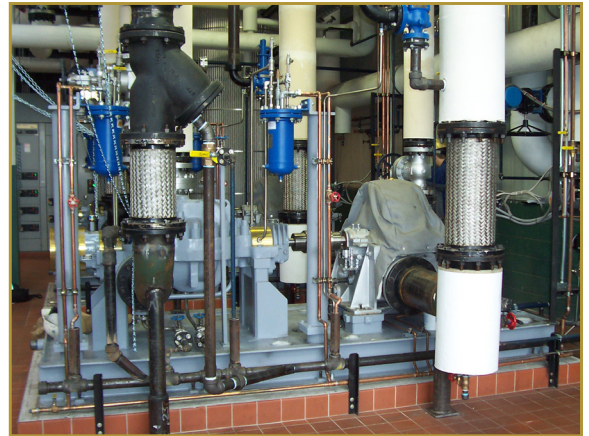
## CENTRAL ENERGY AND UTILITIES EXPERTISE

KFI has extensive boiler and chiller plant design, inspection, and commissioning experience – including new boiler and chiller installations, central energy plant expansions, and the replacement, retrofit and repair of chilled water systems, high-pressure steam, low-pressure steam, and hot water boilers.

Our boiler project expertise includes multiple fuels (solid fuel, natural gas, propane, fuel oil, etc.) and boiler systems with capacities in excess of 500,000lb/hr and operating conditions up to 900-psig, 1200F, for campus heating and process/manufacturing facilities.

### Boiler Plant Experience

- Greenfield Central Boiler Plant Design
- Boiler and Plant Expansions
- Boiler Fuel Conversions
- Boiler Replacements
- Process Dryer Burner Replacement Distribution Systems
- Boiler Plant Commissioning
- Steam and Condensation Return Systems
- Boiler Inspections and Repairs
  - *MACT Compliance*
  - *Re-tubing*
  - *Casing Repair and Replacement*
  - *Refractory Repair and Replacement*
  - *Drum Repairs*
  - *Steam Separators*
  - *Boiler Plant Piping*
  - *Stack and Breeching Repair and Replacement*
- Deaerator and Boiler Feed Water Systems
- Boiler Plant Water Treatment
- Boiler Plant Controls Systems Upgrades
- Hot Water Boiler Plant Design
- Hot Water Piping Distribution Systems
- Fuel Gas Systems
- Steam Pressure Conversions
- Heat Recovery



### District Energy Projects

- St. Paul District Energy Controls Study
- Ever-Green Energy District Energy Study
- Ever-Green Energy Project Support & Engineering Services
- Ever-Green North Loop Development Support
- Ever-Green Energy Hennepin Energy Recovery Center (HERC) Snowmelt Mechanical System Design
- Ever-Green Energy Kellogg Square Study
- Ever-Green Energy North Loop Pre-Engineering Assistance
- HERC Outage Support

### Chilled Water Plant Experience

- Chilled-Water Generation
  - *Air Cooled Chillers*
  - *Screw Chillers*
  - *Centrifugal Chillers*
  - *Closed Loop*
- Chiller Plant Expansions
- Chiller Replacements
- Chiller Testing and Evaluations
- Chiller Plant Commissioning
- Cooling Tower Design
- Air and Water Cooled Condensers
- Evaporators
- Chilled Water Plant Controls
- Cooling Tower De-Scale

### Utility Distribution Experience

- Utility Tunnels and Direct-Buried Utilities
- Steam Generation and Distribution
- High-Voltage Electrical Distribution
- High-Temperature Hot Water Systems
- Piping Distribution Systems
- Thermal Storage Systems
- Compressed Air and Gas Systems



**Water Treatment Experience**

- Tempered Water Systems
- Condensate and Water Management
- Storm/Sanitary Sewer Systems
- Chemical Treatment Systems
- Water Treatment Systems

**Renewable Systems**

- Cogeneration
- Geothermal
- Solar Thermal
- Photovoltaic
- Wind Turbine



## Hennepin County Home School Electrical and Heating Systems Upgrade

The Hennepin County Home School is a juvenile detention and education facility in which the residents live in seven cottages while attending High School, all on a secure site.

The separate buildings are supplied with 13.6KV electrical power and 180-degree hot water for heat via underground distribution systems from a central location.

These distribution systems had exhibited their state of deterioration by experiencing several power failures. KFI was retained to inspect, study, and produce a repair plan and budget. A critical aspect of this project was to maintain the secure environment for the residents and staff on a 24/7 basis while the repairs were made.

The work began with KFI completing the mapping of the site, including topography, structures, pavement, landscaping, and all underground utilities. From this map, a plan to replace the underground distribution systems and electrical switchgear progressed from Schematic Design and Design Development Reports, to Construction Documents, Bid/Award, and Construction Administration.

Features of this work included factory insulated and HDPE jacketed pipe directly buried in hilly terrain and temporary electric generators. All work was successfully completed while maintaining security and services 24/7.

### Location

Minnetonka, Minnesota

### Owner

Hennepin County

### Construction Cost

\$2,000,000

### Square Footage

### Completion Date

October 2004



## University of Notre Dame - Deaerator and Boiler Feedwater Pumps Installation

KFI recently provided ongoing engineering support at multiple campus buildings for the University of Notre Dame Utilities Department. These projects range from energy conservation to performance improvements to innovative technology implementation. One of the projects recently performed for the University included the detailed design for the installation of boiler feedwater pumps in the University boiler house.

The deaerator project included the design and installation of a 500,000 lb/hr deaerator and boiler feedwater system. KFI provided the detailed piping design, control system design, and also assisted with the procurement of the new equipment. The new equipment included steam-driven boiler feedwater pumps, as well as the deaerator itself. KFI designed the new system to integrate with the existing campus power house utility infrastructure with minimal disruption.

### Location

Notre Dame, IN

### Owner

University of Notre Dame

### Construction Cost

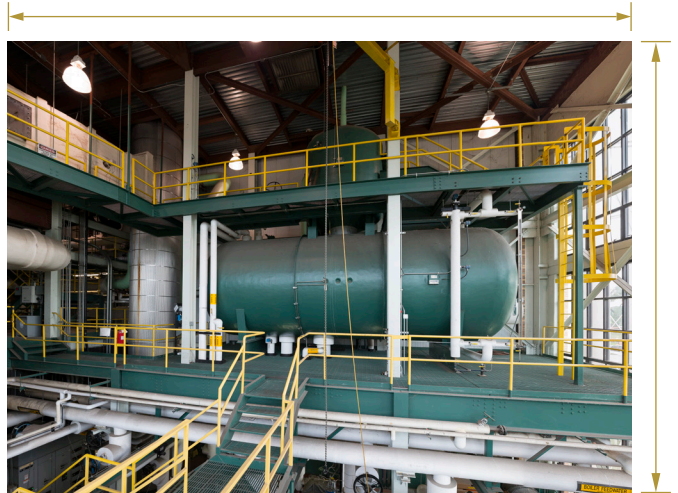
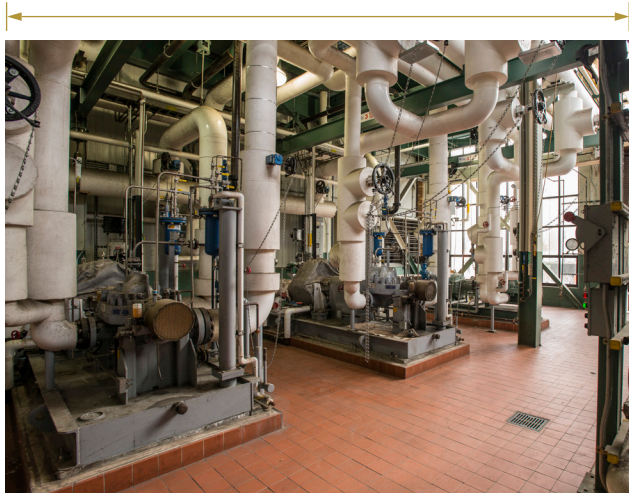
Confidential

### Completion Date

2010

Other recent projects performed for the University's Utilities Department include:

- Central energy and utilities long range planning
- Steam distribution piping (utility tunnels)
- Utilities distribution study
- Utility tunnel system condition study



## University of Notre Dame - Tunnel Projects

Based on the outcome of a long-range utility plan, KFI was contracted to provide design services for the utility distribution modifications on the University of Notre Dame campus. KFI provided the design for approximately 5,000 linear feet of utility tunnel, direct-buried piping, underground vaults, powerplant connections, and surface restorations. The utilities run from the central utilities plant to an existing tunnel near the new building. Included in the design was 10 psig steam, 70 psig steam, low pressure condensate, domestic hot water and domestic hot water return piping, lighting, and several significant tunnel/utility crossings of roads. In addition to the tunnel, 24-36" chilled water supply and return lines, the campus primary electric duct bank, and low voltage are direct buried.

KFI provided the design and construction documents necessary to complete this project. On-site field work was necessary to verify piping tie-in locations, existing conditions, and proper routing and elevations for the new piping. KFI participated in design coordination meetings to ensure a smooth transition during construction.

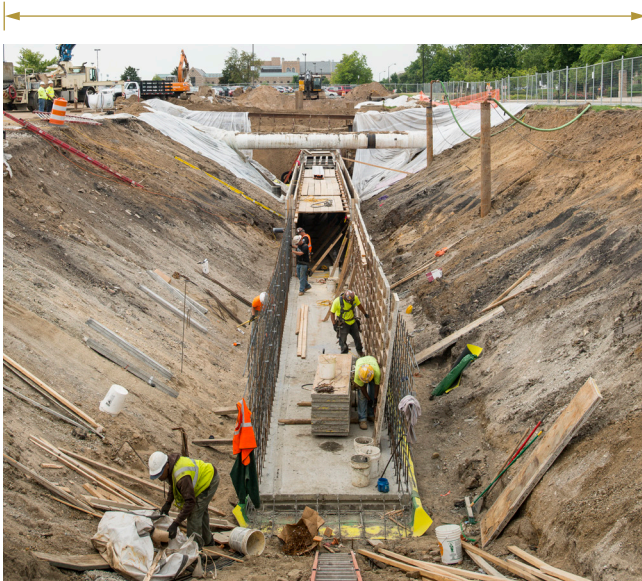
**Location**  
Notre Dame, IN

**Owner**  
University of Notre Dame

**Construction Cost**  
Confidential

**Size**  
5,000 Linear Feet

**Completion Date**  
March 2015



## College of St. Benedict Central Energy Plant Expansion

KFI was contracted to perform a study and design project on the St. Benedict's Campus. The project included a master plan of 26 buildings, campus heating load, and air conditioning, analysis of distribution lines and projected boiler capacities, evaluation of present and future steam, domestic cold and hot water, and chilled water consumption to forecast the need for boiler and chiller replacement and addition.

The plant firm capacity is 30,000 lbm/hr, 100 psig sat, plus low pressure summer use. Also considered were absorbers and centrifugal chillers, steam turbines and geothermal energy.

The project included the design and installation of new pre-purchased 30,000 lbm/hr Cleaver-Brooks D-type watertube boiler, ultrasonic inspection of existing 50,000 lbm/hr watertube boiler, deaerator, economizer and the first two 600-ton chillers of a 2,400 ton plant, towers and associated primary/secondary pumping.

The distribution system included a complete chilled water, steam and domestic water system, interlaced with existing electrical and storm/sanitary sewers. A five-year extension and replacement plan was set for coincidental construction with new building construction. Building loads were modeled to determine utility demand and utility costs.

### Location

St. Joseph, Minnesota

### Owner

College of St. Benedict

### Construction Cost

\$4,500,000

### Completion Date

July 2001





## Mayo Clinic Hospital - Saint Marys Campus Steam and Chilled Water Meters

In 2010, KFI was contracted by the Mayo Clinic to perform a utilities study. The purpose of this study was to develop a metering plan to improve the ability to track flows, temperatures, and pressures at an appropriate level of granularity to sufficiently manage utility costs. A subsequent chilled water flow model was developed to calibrate utility meter data, and assist in future predictive modeling for planning purposes.

Throughout this study, KFI gathered information on the existing meters which included current status, last calibration date and age. KFI also investigated the steam, condensate, and chilled water lines to evaluate the conditions, routing and locations of meters. KFI then worked with the operations team to get input for developing metering type, locations, and quantities. A report was delivered to the Mayo Clinic which showed locations, costs and logic behind KFI's recommendations.

In 2012 KFI was again contracted by the Mayo Clinic to provide the detailed design for the previously completed detailed utility meter study. KFI's work for this portion of the project included the specification and price solicitation for seven chilled water, and seven steam meters. Locations were shown on plan drawings created by KFI, and were also tagged in the field. Installation diagrams and details were developed for contractor's use in the field. The facility is now able to accurately track temperature, flow, and pressure.

**Location**  
Rochester, MN

**Owner**  
Mayo Clinic

**Construction Cost**  
\$365,000

**Square Footage**  
15,000,000

**Completion Date**  
July 2013



## Mayo Clinic - Assisi Heights

Assisi Heights is an architectural gem consisting of 350,000 square feet on four levels. KFI was retained to modernize the central utility plant, changing distribution pressure on the steam system and adding a central chilled water plant and core distribution.

KFI's scope of work consisted of a HVAC load analysis for the facility, anticipating new ventilation loads, air-conditioning and domiciliary concerns. The end-result was the installation of a central chiller plant, distribution piping throughout the basement of the facility for future connections, main fire protection piping distribution system, and the conversion of the central boiler plant from high to low pressure. A new central campus electrical service was added to service the increased load for the buildings.

Aesthetics was a close second to the primary cause of total life cycle costs and safety. The design team placed special emphasis on noise generation from mechanical equipment, line-of-sight barriers to block the view of mechanical systems from occupants, and the carefully chosen routes for fire protection standpipes, electrical switchgear and main pipe routes.

### Location

Rochester, Minnesota

### Owner

Mayo Clinic

### Construction Cost

\$4,500,000

### Square Footage

350,000

### Completion Date

January 2007



## Mayo Clinic Hospital Tempered Water System

The Franklin Heating Station at the downtown Methodist Campus is charged with providing virtually instantaneous tempered water to its campus of 25 buildings for surgery, exam rooms and laboratories. KFI was assigned the task of masterplanning and designing the replacement of the generation and piping system.

The project consisted of twelve (12) phases of piping changeouts, the design of a filtration system to ensure sanitary conditions during cutover, and the replacement of heat exchangers and water softeners. Cutover time between phases was limited to under three hours duration.

The results of the project were an on-time, on-budget project with nearly zero change orders. This was arrived at through the focus of the entire team with proper up-front planning, document review and budgeting.

### Location

Rochester, Minnesota

### Owner

Mayo Clinic

### Construction Cost

\$2,400,000

### Completion Date

September 2003



## St. Jude Medical Center Plymouth Expansion - Central Plant

KFI recently performed design services for the expansion of the St. Jude Medical Facility in Plymouth, Minnesota. The expansion more than doubled the existing square footage, creating a 480,000 square-foot facility.

A substantial portion of this project surrounded the facility's central plant. It was necessary to replace the existing central plant in order to meet the new the required capacities. The new chilled water system uses three high-efficiency, variable speed, air-cooled screw chillers to produce chilled water. The new hot water heating system is comprised of four direct vent natural gas fired high efficiency condensing boilers to generate the hot water required for process heating and HVAC loads. Extensive heating and chilled water piping was also part of the project.

Key features included in the project were redundant mechanical and electrical infrastructure for critical processes, including utility systems, and a high efficiency low temperature chilled water and boiler plant. The building also employs an energy recovery system with simultaneous free heating and cooling in the process ventilation equipment.

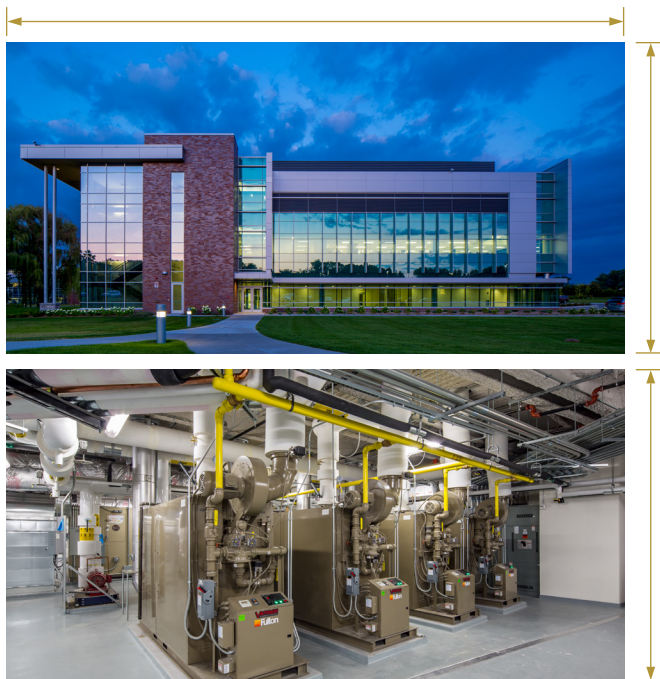
**Location**  
Plymouth, Minnesota

**Owner**  
St. Jude Medical Inc.

**Construction Cost**  
Confidential

**Square Footage**  
480,000

**Completion Date**  
July 2013



## Hutchinson Technology, Inc. Facility Expansions

In support of the rollout of new production methods for HTI, KFI was given the responsibility to design several key plant expansions at several HTI production facilities.

Non-Disclosure Agreements prevent us from discussing details. However, we have received permission to highlight the following infrastructure features, and references are available:

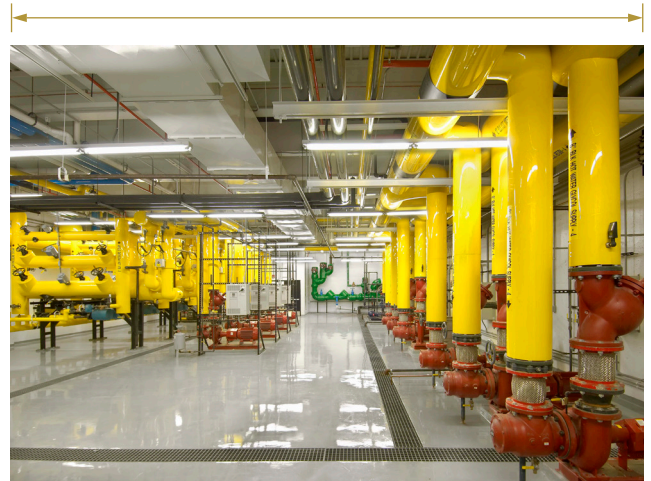
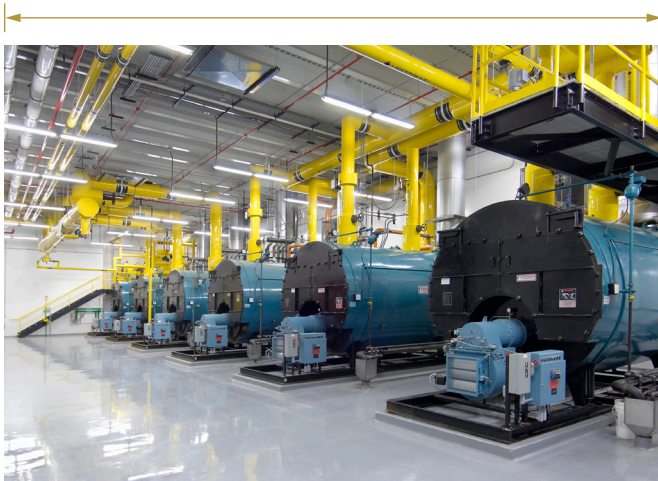
- Four central chilled water and evaporative condensing plants totaling >15,000 tons
- Emergency generators in excess of 5,000 kW
- Central steam and hot water generating plants > 400,000 MBH
- Hot water, steam, and chilled water piping distribution throughout more than 250,000 SF of facilities
- Mission-critical ventilation, exhaust and make-up systems
- Pure water (RO/DI) systems
- Heavy metal wastewater treatment systems
- Cleanroom environments

**Location**  
Multiple Locations

**Owner**  
Hutchinson Technology, Inc.  
(HTI)

**Construction Cost**  
Confidential

**Completion Date**  
August 2005



## Heartland Corn Products CO2 and Emissions Control Project - 5MW CT/HRSG

Facing upcoming Renewable Fuel Standard (RFS2) regulations from the EPA, in order to sell ethanol with Renewable Identification Numbers (RINs), Heartland Corn Products required a reduction in CO2 emissions. KFI was contracted to lead this reduction effort. Pump and thermal efficiency improvements throughout the plant help move the plant in the right direction, but it is still on the threshold required by the EPA. Because the CO2 footprint of a plant is based on both on-site combustion of natural gas and off-site generation of electricity, combining those functions was a sure fire way to reduce the emissions through cogeneration. Waste heat inherent to the off-site electrical production could be avoided by generating the power on-site and offsetting existing steam production by capturing the waste heat. Through the use of supplemental fired duct burners, the system efficiency was improved and approaches 90% of the natural gas fuel combusted. The plant is expected to see a 12.6% reduction in its carbon footprint based on the switch from primarily coal based electricity to half being generated on site with natural gas.

The cogeneration strategy provides redundancy which allows the plant to continue to operate if the connection to the electrical grid is lost. A single 5MW combustion turbine and heat recovery steam generator capable of covering about half of the power to the plant, was installed. In addition, the building and design made provisions for two larger turbines to meet future capacity requirements. When the three turbines are installed, the plant will have the option of disconnecting from the grid entirely, and if necessary will be able to bring a turbine down for maintenance, while continuing to run the ethanol plant at full capacity.

**Location**  
Winthrop, MN

**Owner**  
Heartland Corn Products

**Construction Cost**  
\$35,000,000

**Completion Date**  
December 2016



## Great River Energy Spiritwood Station Utility Design

KFI was contracted to provide the analysis and design for Great River Energy's new Utility Metering Facility. The facility will distribute 400,000 lbs/hr of 135 psi steam and condensate, treated process water, fire protection water, and cooling tower blow down water to the plant. The piping needs to cross Spiritwood Station's two rail roads, and county roadway. Analysis was conducted to investigate whether or not the utility lines should be routed on a new pipe bridge or direct buried.

Once cost estimates were delivered to GRE and a decision was made between an overhead and underground distribution method, KFI started the detailed design. In order to deliver the utilities across rail lines, it was decided to install a bridge to travel over the rail lines. The Steam and Condensate Return lines will cross the county road in an underground vault. The vault is 6ft wide x 5ft tall and pipe lines would run inside to cross the right of way. The vault would be crowned in the middle and slope to the east and west to direct water infiltration to the ends.

In addition to the utilities piping, KFI provided the mechanical and electrical engineering for the utility metering vault, and the 600 square foot utility metering facility.

### Location

Spiritwood, ND

### Owner

Great River Energy

### Construction Cost

\$4,500,000

### Size

400,000 lb/hr of steam and 400GPM of water

### Completion Date

December 2013



**From:** Mark Zimmerman, P.E.  
**To:** [Amanda Ashbach](#)  
**Subject:** RE: UPDATE City of Duluth RFP 17-0610 Mechanical Design Services for Building Conversions  
**Date:** November 28, 2017 3:42:13 PM  
**Attachments:** [image001.png](#)  
[P17-1046 DES Mechanical Engineering Design and Planning WP 11-28-17V2.pdf](#)

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Ms. Ashbach,

We have reviewed the schedule and our available resources – and have adjusted our staffing plan to utilize two field crews to complete the field work quicker and added another designer to assist with faster development of drawings. Therefore, yes we can meet the proposed schedule and have CD's completed by 1/25/18 date listed in the RFP. I have updated our project work plan to reflect this new plan and have attached it here for your review.

Please advise whether any additional information if needed.

Regards,

Mark

Mark Zimmerman, P.E. | **Karges-Faulconbridge, Inc.** | Director, Industry and Infrastructure | St. Paul, MN | **direct:** 651.254.6898 | **mobile:** 651.247.1877 | [KFlengineers.com](#)

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**From:** Amanda Ashbach [mailto:[aashbach@DuluthMN.gov](mailto:aashbach@DuluthMN.gov)]  
**Sent:** Tuesday, November 28, 2017 11:10 AM  
**To:** Mark Zimmerman, P.E. <[mazimmerman@kfi-eng.com](mailto:mazimmerman@kfi-eng.com)>  
**Subject:** RE: UPDATE City of Duluth RFP 17-0610 Mechanical Design Services for Building Conversions

Mark –

We have one follow-up question:

The specified date in the RFP is the contract completion date for the project; will you be able to meet the schedule requirement, yes or no? If yes, what is the change from your proposal that will ensure this?

Please respond by the end of the day today. Thank you –

Amanda

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**From:** Mark Zimmerman, P.E. [<mailto:mazimmerman@kfi-eng.com>]  
**Sent:** November 27, 2017 13:59  
**To:** Amanda Ashbach <[aashbach@DuluthMN.gov](mailto:aashbach@DuluthMN.gov)>



**Subject:** RE: UPDATE City of Duluth RFP 17-0610 Mechanical Design Services for Building Conversions

**Ms. Ashbach,**

**Please see our responses to your questions below in red text.**

**Let me know if you require any further clarifications, and thank you for the opportunity to submit a proposal for this project.**

**Thanks,**

**Mark**

**From:** Amanda Ashbach [<mailto:aashbach@DuluthMN.gov>]

**Sent:** Tuesday, November 21, 2017 4:36 PM

**To:** James A. Faulconbridge, P.E. <[jafaulconbridge@kfi-eng.com](mailto:jafaulconbridge@kfi-eng.com)>

**Subject:** UPDATE City of Duluth RFP 17-0610 Mechanical Design Services for Building Conversions

Mr. Faulconbridge,

DES has asked me to let you know that the deadline for your response should actually be next Wednesday, November 29<sup>th</sup>. My apologies for the error.

Amanda

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Mr. Faulconbridge,

The evaluation team has asked that I forward the following questions to you. Please respond at your earliest convenience, but no later than 5 PM tomorrow if at all possible.

1. KFI did not attend the pre-bid meeting or the building walkthroughs. Are you confident in your understanding of the scope of this project? **Unfortunately we were unable to attend the pre-bit meeting, but yes we are confident in our understanding of the project. We have also proposed on similar projects for Evergreen Energy in the past here in St. Paul (Energy Park area).**
2. Your proposal has your team starting a week before we can issue a notice to proceed. Your schedule also shows Phase 1 construction documents complete almost two weeks after the deadline. Will you be able to meet the schedule as laid out in the RFP? Can you meet a

Phase 1 construction document completion deadline of January 25th? I apologize for the 'early start' date, our work plan shows work beginning on 12/4 and the RFP clearly states a 12/7 notice-to-proceed date – my mistake. We believe the schedule as outlined in the RFP may be too aggressive as it only allows 7 weeks of work (including the holiday week of 12/25). This includes completing field work and developing construction document for 26 ETS stations in 18 customer buildings. Our proposal includes a 10 week duration, beginning the week of 12/4. We may be able to improve upon the completion date shown in the work plan, depending on how timely we receive information (existing drawings and ETS information), but 7 weeks is likely not a sufficient timeline to produce quality documents. We would be happy to discuss the project schedule in more detail if you desire.

3. The staffing plan shows a staff of four with a mechanical background. Will additional support staff be assigned to the project? If so, how many junior engineers, designers, technicians, etc. will be assigned to the project? We expect to have one (1) younger mechanical engineer – Ben Juhnke, EIT assigned to the project along with (2) piping designers. We'll add a CAD technician, if needed to assist with preparation of construction documents. We also have electrical and structural engineers that can support the project – at this time, it does not appear that this expertise will be needed.
4. Based on the schedule restrictions listed above, are you confident you can complete the scope of work on time and on budget? We are confident in our budget as we have developed a detailed task-based estimate of hours as the basis for our budget. As stated in #2 above, we believe 7 weeks is too aggressive for the schedule (in part due to upcoming holidays), but are confident that we can complete the work with 8-10 weeks as shown on the work plan included in our proposal.

Thank you –

Amanda

Amanda A. Ashbach, CPSM  
City Purchasing Agent  
City of Duluth  
411 West First Street #100  
Duluth, MN 55802  
T 218-730-5003 | [aashbach@duluthmn.gov](mailto:aashbach@duluthmn.gov)



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November 16, 2017

## **ENGINEERING SERVICES**

*proposal for:*

### **CITY OF DULUTH & DULUTH ENERGY SYSTEMS**

*Mechanical Engineering Design and Planning*

*prepared by:*

**Karges-Faulconbridge, Inc.**



**Karges-Faulconbridge, Inc.**  
*Engineers*

### **COST OF THE WORK:**

We propose to execute this work for a fixed fee of \$89,500.00. Note: this fee includes all reimbursable expenses for travel and production costs.

Phase I Engineering	\$58,500.00
Phase II Engineering	\$31,000.00
	\$89,500.00

### **EXCEPTIONS & CLARIFICATIONS:**

1. There is no electrical design component to this project. Wiring sizes and routing to power sources for the valves, accessories and metering equipment will be the responsibility of the Contractor.
2. OPCs will not include estimated costs associated with architectural expansion of Customers' mechanical areas. If expansion is determined to be necessary, KFI will call out minimum sizes needed for new equipment and will provide a general sketch of the new area as part of that particular mechanical room's layout drawing. KFI has the capability to provide additional Architectural Services if so needed and requested.
3. KFI will generally identify where pipe & device supports are required in the mechanical rooms, however KFI will not design custom pipe support & hanger solutions. This will be considered a Means & Methods responsibility for the Contractor. KFI has the capability to provide these additional Engineering Services if so needed and requested.
4. This proposal does not include any work on the underground distribution system or the Central Plant modification work.
5. Pricing does not include construction phase support services as directed in Addendum 1.

**November 16, 2017**

Ms. Amanda Ashbach  
City of Duluth  
411 West First Street, Suite 100  
Duluth, MN 55802

Re:  
**Cost Proposal** for Mechanical  
Design and Engineering Services  
For Building Conversions

#### **KFI PROJECT CONTACT:**

Mr. James Faulconbridge, PE  
President  
jafaulconbridge@kfi-eng.com  
651-771-0880





**KARGES-FAULCONBRIDGE, INC.**  
**Hourly Rates & Reimbursable Expenses**  
**Effective 01/01/17 through 12/31/17**

**Mechanical, Electrical & Chemical Engineering Staff**

Engineer IV	\$192.00
Engineer III	\$170.00
Engineer II	\$158.00
Engineer I	\$147.00
Senior Designer	\$158.00
Designer III	\$147.00
Designer II	\$133.00
Designer I	\$121.00
Project Manager	\$176.00
Assistant Project Manager	\$164.00

**Structural Engineering Staff**

Engineer IV	\$173.00
Engineer III	\$154.00
Engineer II	\$143.00
Engineer I	\$132.00
Senior Designer	\$133.00
Designer II	\$113.00
Designer I	\$103.00

**Testing & Commissioning Services**

Controls Design Manager	\$192.00
Controls Design Technician	\$158.00
Senior Technician	\$174.00
Technician II	\$158.00
Technician	\$147.00

**Ancillary Staff**

Principal in Charge	\$216.00
Energy Modeling Engineer	\$170.00
IT - Project Specific Services	\$133.00
Field Representative	\$164.00

*Estimating Services:*

Mechanical Estimator	\$174.00
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Project Coordinator	\$99.00
Administrative	\$82.00
Technician Aide	\$73.00

Note: If a single person serves in more than one role, the higher rate is used as the bill rate.

Delivery / Courier	Cost Plus 10%
Mileage	Federal Govt. Rate
Travel	Cost Plus 10%

*Meter/Equipment Rental:*

Data Loggers	\$100/per wk
Thermal Imaging	\$250/per day
Rented	Cost Plus 10%

**Our rates include:**

- Internal printing costs
- Postage, fax, long distance and cell phone
- Internet
- Truck and manual tool charges
- Calibration of Equipment
- Overtime

**Our rates do not include:**

- Printing costs for distribution sets
- Subconsultants
- Testing (other than KFI)
- Premium for legal assistance