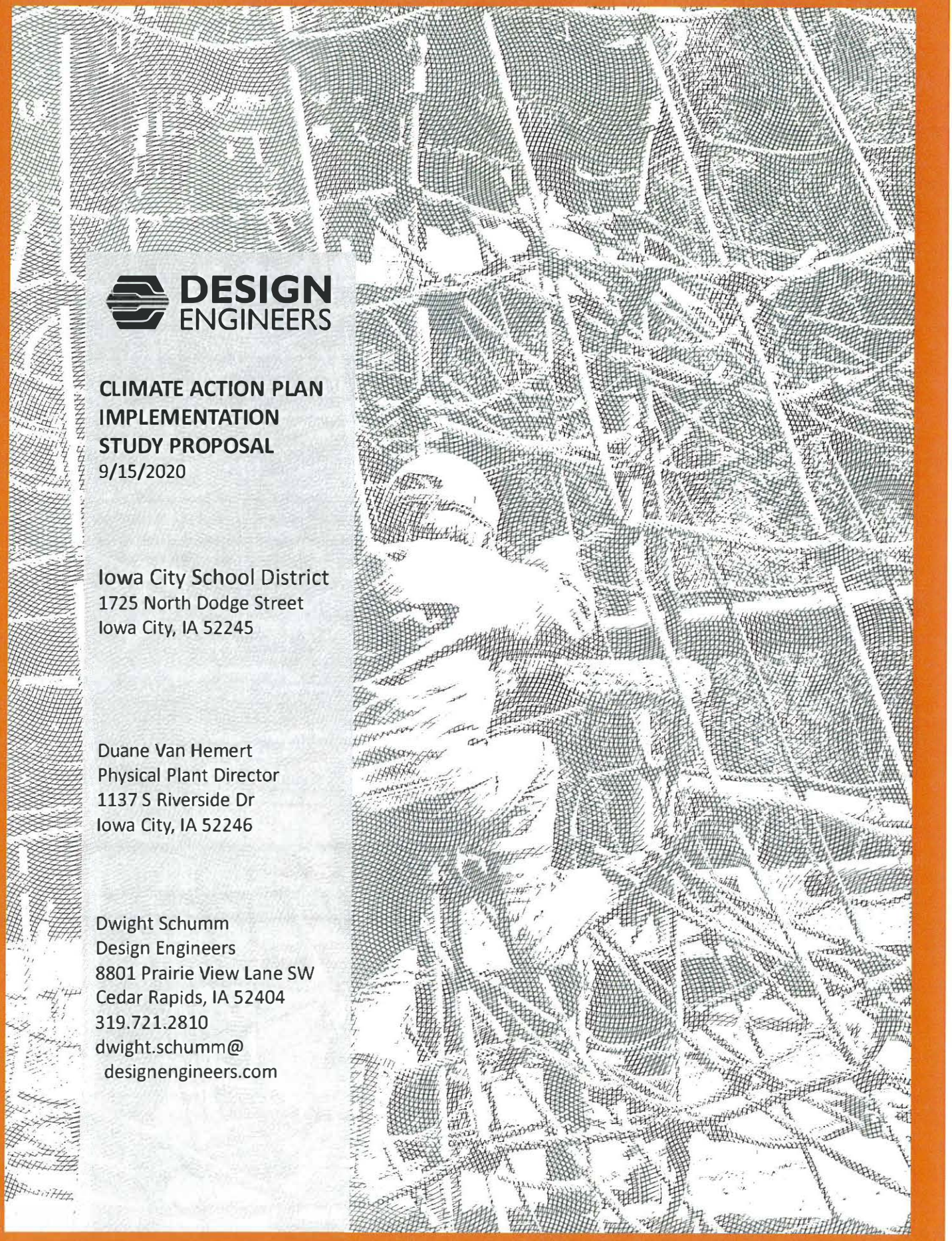

DESIGN ENGINEERS

CLIMATE ACTION PLAN IMPLEMENTATION STUDY PROPOSAL

9/15/2020

Iowa City School District
1725 North Dodge Street
Iowa City, IA 52245

Duane Van Hemert
Physical Plant Director
1137 S Riverside Dr
Iowa City, IA 52246

Dwight Schumm
Design Engineers
8801 Prairie View Lane SW
Cedar Rapids, IA 52404
319.721.2810
dwight.schumm@
designengineers.com

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DESIGN ENGINEERS
MECHANICAL & ELECTRICAL CONSULTANTS

PROACTIVE | COLLABORATIVE | TENACIOUS

We provide **proactive** engineering excellence in Mechanical, Electrical, Plumbing and Technology system design. We are **collaborative** researchers, planners and designers of efficient, sustainable, and durable building systems. We are **tenacious** problem solvers, energized by complex challenges.

Insightful Engineers
We serve our clients by proactively identifying clear solutions to complex challenges. We do this by listening carefully, researching comprehensively, anticipating project needs, designing creatively, recommending thoughtfully and executing beyond expectations.

Sustainable Partners
We are committed to collaborative, sustainable design. The key to sustainable design, in all its meanings, is collaboration and integration among all members of the project team and with the environment at large. Our responsibilities for projects are shared, as are our successes.

Problem Solvers
We are tenacious problem solvers working together in a culture of accountability where we accept responsibility and take ownership in our projects. We think innovatively to improve existing systems to perform beyond expectation and to make new systems that measurable improve on the past. We are committed to remaining actively involved in our projects until these goals are realized.

Integrated Design Excellence
We are your best choice for your most challenging engineering projects. Since 1983 we have built a team of 47 talented and professional individuals, including 16 Mechanical Engineers and 11 Electrical Engineers. Our team's credentials include 16 PE, 10 LEED AP, 1 RCDD, 2 LCs, 1 CTS, and 1 BEMP.

Design Engineers has been doing exceptional work for more than 33 years. We hire only the best and are committed to working with owners, architects and contractors to create design solutions that are efficient, reliable, sustainable, intelligent, and beautiful.

DESIGN ENGINEERS IOWA
DESIGN ENGINEERS WISCONSIN

8801 Prairie View Lane SW, Suite 200, Cedar Rapids, IA 52404 319.841.1944
437 S. Yellowstone Drive, Suite 110, Madison, WI 53719 | 608.424.8815

DESIGN ENGINEERS

MECHANICAL & ELECTRICAL CONSULTANTS

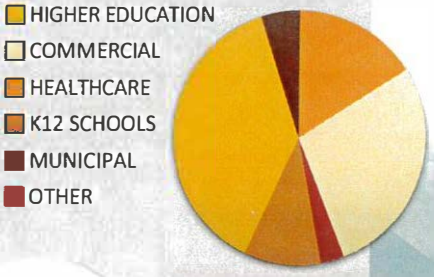
> I don't think there is a day that goes by that I don't learn something new or have discussions with other engineers in the office that gives me a different perspective. There aren't many jobs that encourage continuously learning and evolving, but DE really pushes its people to do so.
>
> **Stephanie Riggan, Mechanical Engineer**

Who We Are

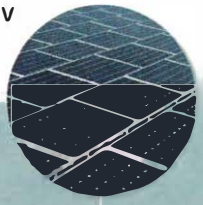
- 16 MECHANICAL ENGINEERS
- 11 ELECTRICAL ENGINEERS
- 10 LEED ACCREDITED PROs
  Sustainability
- 5 TECHNOLOGY-SPECIFIC
  - RCDD Communications
  - LC Lighting Design
  - CTS Audio/Visual
  - BEMP Energy Modeling
- 15 LICENSED & BRILLIANT PROFESSIONAL ENGINEERS
- 15+ BIM TECHNICIANS

DESIGN ENGINEERS has been a driving force in the built environment since 1983. Starting with one guy and an idea, we've grown to over 45 talented and driven people with a whole lot of great ideas, shiny awards, and our own softball team.

What We Do



WE PUT RESEARCH INTO PRACTICE
Our own HQ has a 360-panel PV system that single-handedly offsets all of our energy use.



20+ million square feet of better spaces

energy design consistently **42% better** than code

DIRECT DIGITAL CONTROLS
automation and monitoring

FUTURE-CENTRIC ELECTRICAL
- LED Lighting
- Robust Data
- AV Integration

SMART-SIZEDH VAC
~~Energy-efficient designs~~ that save and last longer

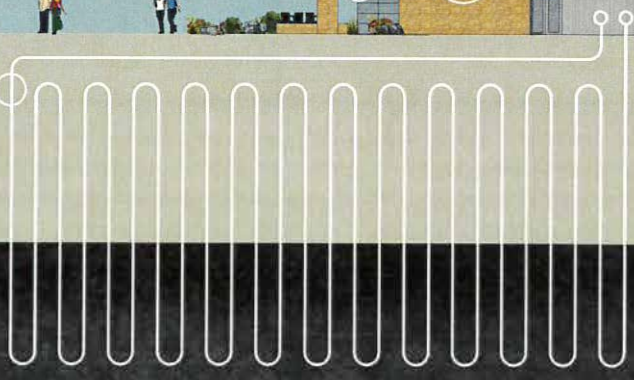
PHOTOVOLTAIC ARRAYS

ZERO ENERGY CERTIFICATION

SECURITY & FIRE SYSTEMS

5+ million square feet geothermal

GEOTHERMAL
heating and cooling



Where We Are Going

We are champions of smart buildings; allies of **beautiful and thoughtful design**. Our work makes better buildings, **happier people**, and an energy-effective world.

Everything works **better** together when DE's behind it.

PROACTIVE | COLLABORATIVE | TENACIOUS

8801 Prairie View Lane SW, Cedar Rapids, IA 52404
437 S. Yellowstone Drive, Suite 110, Madison, WI 53719

DESIGN ENGINEERS
MECHANICAL & ELECTRICAL CONSULTANTS

DWIGHT C. SCHUMM – PE, LEED AP

MANAGING PRINCIPAL / SENIOR MECHANICAL ENGINEER
Project Role: Principal-In-Charge & Project Manager

Education

B.S. Mechanical Engineering, 1988
Washington University
St Louis, Missouri

B.A. Pre-professional Studies, 1988
Earlham College
Richmond, Indiana

Employment

Design Engineers
Cedar Rapids, Iowa
2009 + Managing Principal
2001–2009 Principal
1993–2001 Mechanical Eng.

Titronics
Iowa City, Iowa
1991–1993 Energy Division Mgr.

Deaconess Hospital
Saint Louis, Missouri
1988–1990 Facilities Engineer

Professional

Registered Professional Engineer
Iowa, Missouri, Illinois
Idaho, Wisconsin, Texas,
Pennsylvania, Utah

LEED AP – USGBC

Member – ASHRAE

Awards & Publications

ASHRAE Technology Awards
2014 Region VI - CR Public Library
2018 Region VI - UI Voxman
2019 Society - Indian Creek NC
2019 Region VI – Kirkwood Hotel
2019 Region VI – DE Office Net 0
2019 Region VI – Liberty HS
High Performing Buildings
Spring 2019 - Tuning Into Nature

As Principal-In-Charge and Project Manager Dwight will serve as the primary point of contact and guide the work of the DE team throughout the project to ensure its alignment with the district's goals. His experience is focused on high-performance buildings including on-site renewable energy generation, ultra-high energy efficiency, precise environmental control requirements, stringent acoustical standards and other demanding needs. Dwight has been principal-in-charge on numerous LEED projects including 2 platinum and 12 gold as well as four Living Building Challenge projects. His school experience includes more than 100 projects spanning 25 years, including over 70 with ICCSD.

HIGHLIGHTED PROJECTS

Design Engineers Offices – Cedar Rapids, Iowa
Principal-in-Charge and PM for Iowa's first certified Zero Energy Building including geothermal heat pumps and 103 kW PV system.

Olin Schools Photovoltaic System – Olin, Iowa
Principal-In-Charge for 100 kW grid-tied solar electricity system.

Kirkwood Renewable Energy Study – Cedar Rapids, Iowa
Principal-In-Charge for campus-wide micro-grid study to analyze use of 3 MW solar, wind and battery technologies to reduce overall utility costs and improve renewable energy utilization.

Unitarian Universalist Society of Iowa City – Coralville, Iowa
Principal-In-Charge for $7M net zero energy church with 160 kW PV system.

Indian Creek Nature Center – Cedar Rapids, Iowa
Principal-In-Charge for construction of new 12,000 sf Living Building Challenge certified zero energy nature center with 80 kW PV system.

Kirkwood Johnson County Regional Center – Coralville, Iowa
Principal-in-Charge for a new LEED certified 101,000-sf career training and STEM education building with an 88 kW PV system.

Johnson County Ambulance – Iowa City, Iowa
Principal-In-Charge for LEED certified building with 66 kW grid-tied roof-top PV system.

Ames High School – Ames, Iowa
Consulting Principal for new $117M, 370,000-sf comprehensive high school including classrooms, gymnasiums, swimming pool, auditorium, music, food service support spaces and instructional PV array.

Liberty High School – Principal-in-Charge
New $40M 250,000 sf facility with instructional spaces, athletic spaces, cafeteria with full kitchen, large auditorium and 28 kW PV system.

Dubuque Senior High School Addition – Principal-In-Charge
2014 $25M comprehensive renovation

DESIGN ENGINEERS
MECHANICAL & ELECTRICAL CONSULTANTS

TIMOTHY R. LENTZ – PE

MECHANICAL ENGINEER
Project Role: PV Engineer

Education

B.S. Mechanical Engineering, 2008
Iowa State University
Ames, Iowa

M.S. Mechanical Engineering, 2010
Iowa State University
Ames, Iowa

Employment

Design Engineers
2010 + Mechanical Engineer
Cedar Rapids, Iowa

Iowa State University
2008-2010 Graduate Research Assistant– Solar Decathlon Lead
Ames, Iowa

A.Y. McDonald Mfg. Company
2007 Product Engineering Intern
Dubuque, Iowa

Professional

Registered Professional Engineer
Iowa Certificate No: 22233

American Society of Heating, Refrigerating, and Air- Conditioning Engineers (ASHRAE), Member, Cedar Valley Chapter President

Awards & Publications

ASHRAE Technology Awards
2019 Society - Indian Creek NC
2019 Region VI – DE Office Net 0
High Performing Buildings
Spring 2019 - Tuning Into Nature

As PV Engineer, Tim will perform analysis of PV opportunities and costs. He has leveraged his solar power research during his graduate studies to lead Design Engineers' photovoltaic projects. Since joining Design Engineers in 2010 he has been an essential team member on challenging energy-focused projects including all photovoltaic installations.

HIGHLIGHTED PROJECTS

Seamans Center for Engineering Arts & Sciences
University of Iowa, Iowa City, Iowa
PV Engineer: $25M 68,000-sf addition included classrooms, offices, conference rooms, studios and roof-top 62 kW PV array.

Indian Creek Nature Center – Cedar Rapids, Iowa
Lead Mechanical Engineer for construction of new 12,000-sf Living Building Challenge Petal nature center and 100 kW PV system.

Design Engineers Photovoltaic System – Cedar Rapids, Iowa
PV Engineer for 103 kW grid-tied photovoltaic system. Roof-top 6,500-sf install invisibly offsets annual energy use.

Ames High School – Ames School District, Ames, Iowa
Mechanical Engineer for new $117M, 370,000-sf comprehensive high school including classrooms, gymnasiums, swimming pool, auditorium, music, food service, and small instructional PV array.

Johnson County Ambulance – Iowa City, Iowa
PV Engineer for 66 kW grid-tied roof-top PV system.

Unitarian Universalist Society of Iowa City – Coralville, Iowa
Lead Mechanical Engineer for $7M new church with 160 kW PV

Olin Schools Photovoltaic System – Olin, Iowa
PV Engineer for 100 kW grid-tied solar electricity system.

Johnson County Regional Center – Coralville, Iowa
PV Engineer: LEED Energy Model for new 101,000-sf career training and STEM education building featuring an 88 kW PV system.

Kirkendall Public Library & Council Chambers – Ankeny, Iowa
Lead Mechanical Engineer for 55,000-sf, $15M multi-use community resource center with Council Chambers and a new Public Library.

Visual Arts Building – University of Iowa, Iowa City, Iowa
Project Mechanical Engineer: $56M new 126,000-sf studio arts building with both industrial spaces and classroom spaces.

Waukee APEX/CAPS – WCSD, Waukee, Iowa
Lead Mechanical Engineer for 70,000-sf dynamic-use classrooms, workshops, bioscience labs, teaming and admin spaces.

American Enterprise Group HQ – Des Moines, Iowa
Mechanical Engineer: $30M project to restore and renovate iconic Gordon Bunshaft structure, cutting utility costs over 40%.

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JONATHAN C. GETTLER – PE

ASSOCIATE PRINCIPAL / SENIOR ELECTRICAL ENGINEER
Project Role: Lead Electrical Engineer

Education
B.S. Electrical Engineering, 2005
Iowa State University
Ames, Iowa

Employment
Design Engineers, Cedar Rapids
2016 + Associate Principal
2013 + Associate
2010 – 2013 Electrical Project Eng.
2005 – 2010 Electrical Engineer

Professional
Registered Professional Engineer
Iowa Certificate No: 19966

As Lead Electrical Engineer, Jonathan will evaluate electrical systems for interconnection with PV, electric vehicle charging infrastructure and service capacity for conversion of natural gas systems to electric. His experience includes athletic venues, health care, educational, corporate, high-rise, and performing arts projects and includes of 80 K12 school projects including over 50 at ICCSD.

HIGHLIGHTED PROJECTS

Lester Buresh Community Wellness Center – Mount Vernon, Iowa
Lead Electrical Engineer for new $5.7M Recreation Center including gym, fitness studios, lockers, and track. AIA People's Choice 2020

Liberty High School – PM/Lead Electrical Engineer
New $40M 250,000-sf facility. Includes performance gym, auxiliary gym and locker room support spaces including training rooms and cardio spaces. The design included a Commons overflow area for extension of the athletic venues during high volume times.

Liberty High School Athletics– PM/Lead Electrical Engineer
New $15M facility including all exterior improvements for an athletics complex. Fields included Football/Track, Baseball, Softball, Soccer, Tennis and Practice Fields. Fields were lighted and included multiple ticket booths, concessions, and grandstand seating areas.

Prairie High School – Cedar Rapids, Iowa
Lead Electrical Engineer and Project Manager for a comprehensive renovation of a 400,000-sf high school. Athletic venues included multiple locker rooms for Junior Varsity and Varsity as well as multiple specialty spaces for referees.

Multiple New Elementary Schools – Iowa City Community SD
Project Manager and Lead Electrical Engineer for multiple $10M+ new elementary schools. All schools included gymnasiums and associated support spaces.

Multiple Exterior Athletic Improvements – Iowa City Community SD
PM/Lead Electrical Engineer for multiple $500k+ athletic venue improvements. This includes work at West High School and City High School. Most project was lighting improvements at Bates Football Field. Scope of work required closely working with the Athletic Director and balancing the needs of multiple interested parties.

United Township High School – East Moline, Illinois
Lead Electrical Engineer for 32,000-sf renovation and addition with new secure entrances, student commons, updated cafeteria and reimagined media center and offices. AIA People's Choice 2020.

ICCSD District-Wide Safety and Security Upgrades – Iowa City
Lead Electrical Engineer and project manager for district-wide improvements to access control, surveillance, fire alarm and intrusion detection systems over 19 buildings and 1,250,000-sf.

DESIGN ENGINEERS
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DESIGN ENGINEERS HEADQUARTERS

Cedar Rapids, Iowa

Cost

Construction: $4,800,000
MEPT Construction: $1,500,000
Size: 28,000-sf
MEPT $/sf: $53.57 (2008)
EUI: -0.8 kBtu/sf w/ PV
30.2 kBtu/sf w/o PV

Owner

DE-PC Properties
Cedar Rapids, Iowa
Steve Foster, President
319. 841.1944

Team

Principal in Charge
Dwight Schumm, PE, LEED AP

Project Manager
Dwight Schumm, PE

Mechanical Engineer
Justin Opperman, PE, LEED AP

Electrical Engineer
Marc Foster, PE, LC

Architect
OPN Architects
Cedar Rapids, Iowa
Bradd A. Brown, AIA, LEED AP
319.730.2807
bbrown@opnarchitects.com

Project History

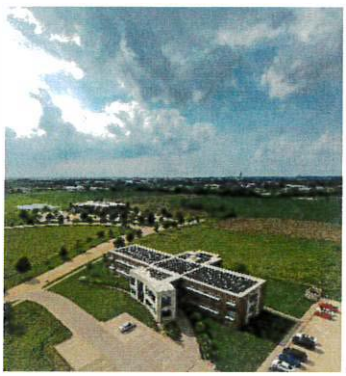
Design Engineers all-new, two-story 28,000 square foot office building is a state-of-the-art showcase of sustainable technology and with a beautiful and inspiring open-plan design. The project achieved LEED Gold certification, including the maximum 10 points available for the optimization of energy performance plus 1 additional innovation point.

Mechanical Design

The mechanical scope of work includes a water-efficient plumbing system with waterless urinals, dual-flush sensor-operated water closets and low-flow sensor-operated lavatories. The entire facility is protected by an automatic sprinkler system. The HVAC system consists of a network of water to air heat pumps connected to a vertical ground heat exchanger, an energy recovery unit to provide outdoor air for ventilation and fully networked direct digital controls (DDC).

Electrical Design

Energy-efficient lighting with integrated day lighting controls and occupancy sensors with building-wide low-voltage lighting controls resulted an average lighting power density of 0.4 W/sf as compared to average 1.7 W/sf for a similar building. In addition to a structured cabling plant for telephone and data, the telecommunications scope of work includes access control and burglar systems as well as AV systems for conference rooms.



Sustainability Achievements

The completed building uses 55% less energy than a code compliant building. The water conservation features will save over 30% of the water of a standard building.

DESIGN ENGINEERS
MECHANICAL & ELECTRICAL CONSULTANTS

DESIGN ENGINEERS HEADQUARTERS
Cedar Rapids, Iowa

Net-Zero Design Process

1. Site Design
2. Envelope Design
3. Geothermal HVAC
4. Solar Management
5. Sensors & Timers
6. Photovoltaic Array
7. LED Lighting
8. Systems Tuning
9. Certification

Annual Savings & CO2 Offset

Avoided Energy Cost: $17,810
Offset CO2: 8.4 homes

Measures & Certifications

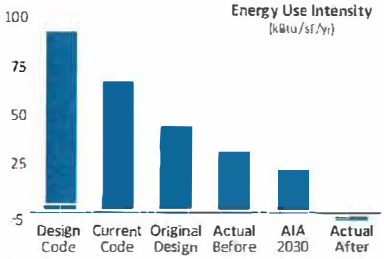
LEED Gold Certified
Energy Star Rating 98/100
Living Building Challenge:
- Net-Zero Energy Registered

Integrated & Adaptive Design from Day One

Energy-effective buildings use an integrated approach to design, weighing a technology's potential against its impact, up-front cost, and durability to find the best solutions as they arrive.

The path to our net zero energy office began with the fundamentals of good design. The building size and orientation maximize north and south glazing, sun shades minimize summer heat gain and maximize winter heat gain, while light shelves direct illuminate the core of the buildaing. A geothermal HVAC system exchanges heat from the earth while heat pumps manage air distribution for combustion-free heating and cooling. An energy recovery unit recaptures heat and moisture typically lost to venting while pre-treating fresh air.

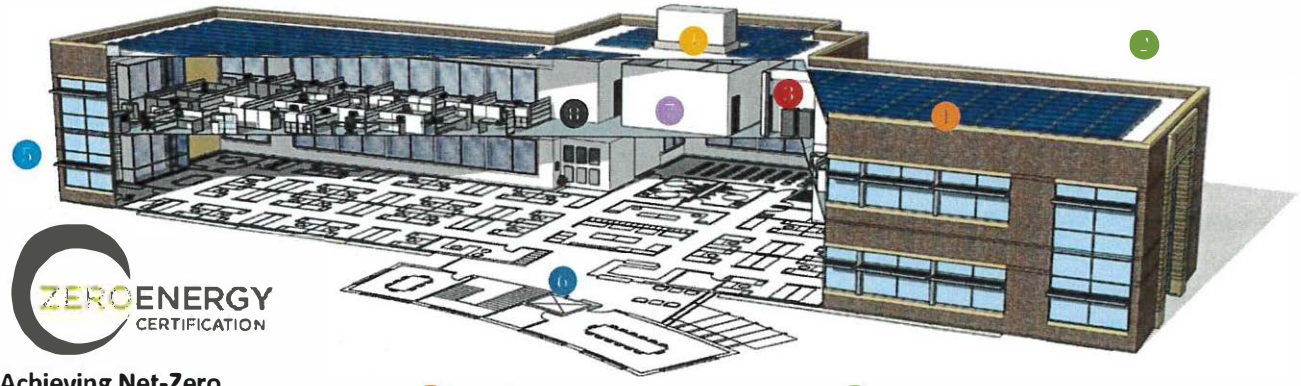
Fine tuning improvements to our HVAC and lighting systems coincided with the installation of a 6,500-sf, 103 kW photovoltaic array on the roof. Hidden from view and silent, it is offsetting 100% of the office's energy use, qualifying the office for Net Zero Energy certification.



Net-Zero Building Meets Four-Season Climate

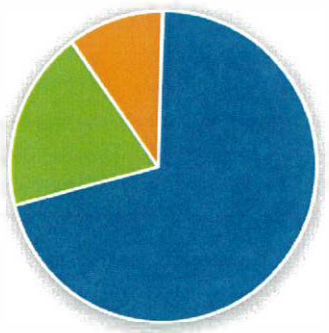
The array creates more power in summer than winter and is grid-tied to our utility provider. This flexible relationship helps even-out seasonal utility loads while minimizing system complexity.

Net-Zero Systems Diagram



ZERO ENERGY CERTIFICATION

Achieving Net-Zero



◆Conservation ◆Geothermal ◆PV

1. **103 kW Solar Panel Array**
   360 Panels, 6 Inverters
   180 Optimizers
2. **Geothermal HVAC**
   Vertical Ground-heat Exchangers
3. **Heat Pump Network**
   Zoned water-to-air pump
4. **Energy Recovery**
   Total Energy Recovery Unit
5. **Light Shelves & Sun Shades**
   Interior & exterior harvesting
6. **Occupancy Sensors**
   Ultra-sonic & Infra-red
7. **LED Lighting Conversion**
   Under 0.36W/sf
8. **Direct Digital Controls**
   Individual, room-adjustable

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RENEWABLE ENERGY STUDY

Kirkwood Community College, Cedar Rapids, Iowa

Project Summary

Reconfiguring connection of wind turbine to utility grid will save $49,000 per year

Commercial PV Cost Trends:
2010 US Avg. - $5.36 / DC watt
2018 Iowa Avg. - $2.25 / DC watt

Battery paybacks viable inside next 5 years.

Lithium-ion battery costs have fallen 35% within the past year.

Owner

Kirkwood Community College
Cedar Rapids, Iowa
Mick Starcevich, President

Kirkwood Community College
Cedar Rapids, Iowa
Tom Kaldenberg
Director of Facilities
319.398.5561
tkalden@kirkwood.edu

Project Team

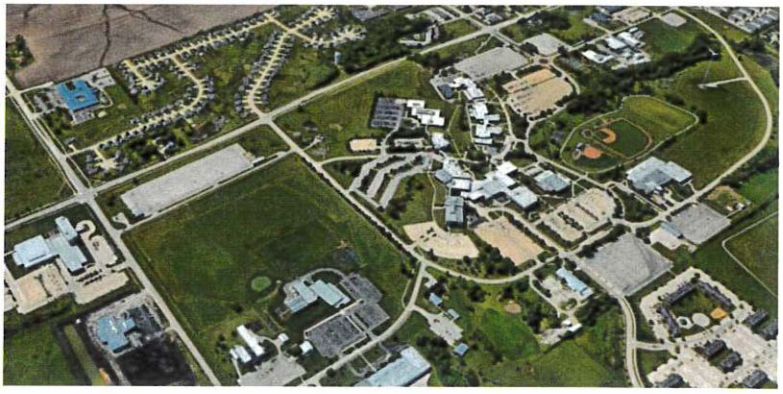
Principal-In-Charge
Dwight Schumm, PE, LEED AP

Project Manager
Dwight Schumm, PE, LEED AP

Electrical Engineer
Marc Foster, PE, LC

Energy Engineer
Joe Chappell, PE, CMVP, BEMP

PV Engineer
Tim Lentz, PE



Campus-wide Micro-Grid Analysis and Sustainable Energy Planning

Kirkwood contracted with Design Engineers to analyze opportunities for adding photovoltaic (PV) systems and battery storage systems tied into Kirkwood's distribution system. Use of renewable energy technologies requires careful coordination with utility rate structures to evaluate how energy production coincides with peak demand charges to ensure the best return on investment and minimum initial capital.

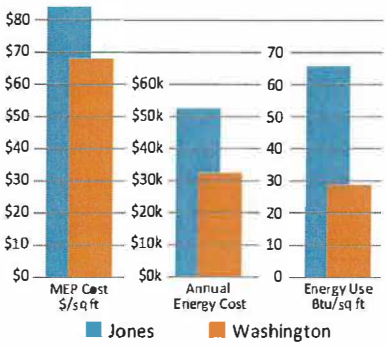
Technologies Comparisons & Energy Modelling

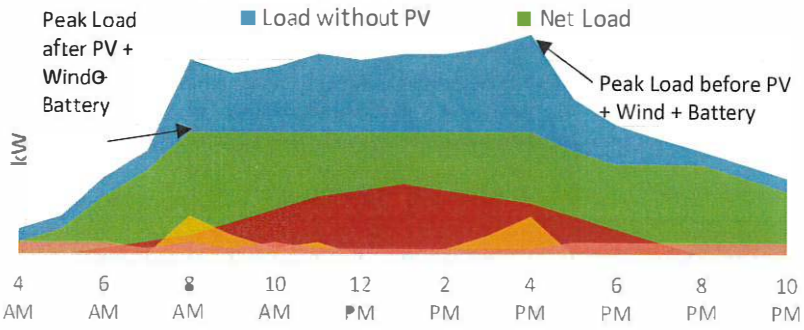
Design Engineers report included industry-status for key technologies, including large-scale Lithium-ion batteries, load shifting, energy arbitrage, and frequency regulation.

The study provided a renewable and battery technology brief and considered metered campus electric load data on a sub-hourly, weekly, and monthly basis. HOMER Grid software was used to predict PV system generation and calculate behind-the-meter energy cost reductions by considering the complete utility tariff, capital costs, maintenance costs, and tax benefits. The software also considered the campus' existing 2.3 MW wind turbine credits.

Study Results

Results were optimized based on simple payback period, life cycle cost and return-on-investment and considered multiple financing options. Kirkwood was able to better understand the true utility cost impact of the renewable technologies considered. The study uncovered an opportunity to tweak Kirkwood's wind turbine to save the college $49,000 per year in utility costs.





DESIGN ENGINEERS
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Highlighted PV Projects

Design Engineers Offices
103 kW | 2016
University of Iowa
Seaman's Center
College of Engineering
62 kW | 2017
Cambus Rooftop Array
38 kW | 2010
Solar Charging Station
70kW | 2011
Campus Solar Study, 2015
Indian Creek Nature Center
100 kW | 2016
Unitarian Universalist Church, IC
160 kW | 2017
Kirkwood Community College
Johnson County Reg PC
88 kW | 2016
Olin Schools Photovoltaic Array
100.2 kW | 2016
Johnson County Ambulance
66 kW | 2017
Farmer's Electric Coop Study
800 kW | 2014

Installation Types

Rooftop
Building-integrated
Ground-mounted

Optimal Facility Types

Municipal Admin & Utility
College Campuses
Libraries
Museums
Wellness & Athletic Centers
Stadiums & Athletic Fields
Theaters & Auditoriums
Hospital Campus
Corporate Campuses
Office Buildings/Parks
Residence Halls
Dining Centers
Central Plants
Data Center
Hotel & Conference Centers
Restaurants

Lowering Energy Costs and Reducing Emissions

Design Engineers work makes buildings more energy-effective by improving their efficiency and maximizing their capabilities and capacity. Our Cedar Rapids headquarters hosts a 6,500 square foot, 102.6 kW photovoltaic array on the roof. Hidden from view and completely silent, it offsets 100% of the office's energy use.

Photovoltaic systems generate electricity directly with no moving parts whenever there is light, even with overcast skies. That electricity can be used immediately on-site, or fed back into the grid to directly offset ongoing electricity costs.

Photovoltaic Market Analysis

Worldwide growth of PV has been an exponential curve for more than 20 years. Recent shifts in the PV market have made it more viable to facilities of all sizes and site types, making it one of the least expensive distributed generation resources available. The average price in 2017, in Iowa, was $2.25 per DC watt, installed. A similar trend has emerged with large-scale battery technology, increasingly paired with technologies like PV arrays for storing renewably produced energy.

Design Engineers has completed photovoltaic projects for clients including churches, K12 schools, community education centers, and even an Electric Vehicle Fleet Charging Station at the University of Iowa. Our clients have realized PV's ability to:

- Reduced overall electricity costs
- Reduce local CO2, NO, and sulfur production

Our own office is a live demonstration of the environmental impacts of good design and available off-the-shelf technologies. By entirely offsetting our energy use, DE is responsible for reducing emissions at the power plant by 212,652 pounds of carbon dioxide, 438 pounds of sulfur dioxide, and 240 pounds of nitrogen oxides annually. We're preventing the combustion of 68 tons of coal, annually, for at least 25 years; the warranted period of the array.

DESIGN ENGINEERS
MECHANICAL & ELECTRICAL CONSULTANTS

CONSULTANT SERVICES AGREEMENT

Date: September 8, 2020

Duane Van Hemert
Physical Plant Director
1137 S Riverside Dr
Iowa City, IA 52246

PROJECT: CLIMATE ACTION PLAN IMPLEMENTATION STUDY

Dear Duane,

We are pleased to offer our services as Mechanical and Electrical Consultants for the project noted above. Our interpretation of the scope of the project is as follows.

BACKGROUND

A. The district has adopted a resolution to address climate change including the following components:
   1. Conduct an inventory of baseline Greenhouse Gas (GHG) emissions. This was completed by the UNI Center for Energy and Environmental Education in January of 2020 using 2018 data (the most recent available).
   2. Set GHG reduction targets consistent with IPCC standards. The UNI report identifies achieving a 45% reduction below 2018 GHG emissions by 2030 and net-zero emissions by 2050 as the district target.
   3. Set targets to increase district use of renewable energy.
   4. The resolution includes components related to climate advocacy, climate curriculum, recycling, sustainable agriculture, water use, food waste and pest management which are beyond the scope of this implementation study.

B. The UNI study, titled *ICCSD Greenhouse Gas Emissions Inventory (2018) and Climate Action Plan*, includes the following:
   1. Establishes the district's 2018 baseline GHG emissions as 16,599 metric tons of CO2 equivalent.
   2. Projects that emissions will be reduced to 6,142 tons by 2024 through a combination of completing current master plan projects (most notably conversion of heat systems from natural gas to geothermal electric heating) and utility company's stated renewable goals.
   3. Outlines the following strategies to achieve net zero GHG emissions:
      a. Install photovoltaic electricity generation capacity sufficient to offset electricity purchased from non-renewable sources (estimated to be 2,091590 kWh/yr).
      b. Implement additional energy efficiency measures to reduce electrical usage by 20%.
      c. Convert all natural gas equipment to electric.
      d. Convert bus fleet from diesel to electric.

C. The district commissioned a structural study in October 2019 to evaluate the ability of existing roofs to support photovoltaic systems. The conclusions indicated the following:
   1. Seventeen buildings have roofs that are feasible to accommodate PV systems totaling 221,670 sq-ft available for PV panels.
   2. Four district buildings have roofs that would be feasible with roof replacement totaling 77,120 sq-ft available for PV panels.

3. Two district buildings have roofs that would be feasible with structural reinforcement totaling 25,410 sq-ft available for PV panels.
4. Seven district buildings are not feasible for roof -mounted PV systems due to structural constraints.

PROJECT DESCRIPTION

A. Evaluate feasibility of incorporating PV systems on buildings identified in the 2019 structural study in sufficient quantity to reach net-zero GHG emission goal.
   1. Define required electrical system interface.
   2. Estimate potential generation capacity.
   3. Estimate energy cost savings at current utility rates.
   4. Evaluate option to include battery storage in conjunction with PV systems.
   5. Estimate construction cost.

B. Identify energy efficiency measures to achieve 20% reduction in electrical usage
   1. Prioritize buildings served by Alliant and Linn County REC since they do not have plans for 100% renewable electricity generation.
   2. Develop estimated construction cost of energy efficiency measures.

C. Develop plan to convert all natural gas equipment to electric.
   1. Complete an inventory of existing equipment directly producing GHG emissions including the following:
      a. Natural gas-fired space heating equipment.
      b. Natural gas-fired domestic water heating equipment.
      c. Natural gas-fired cooking equipment.
      d. Diesel powered buses used for student transportation.
      e. Other district-owned diesel and gasoline powered vehicles.
   2. Identify replacement equipment types.
   3. Estimate capital cost of conversion.
   4. Estimate incremental energy cost at current utility rates.

D. Develop plan to convert all district vehicles to electric.
   1. Complete inventory of all existing vehicles and annual miles driven and expected replacement date.
   2. Identify replacement vehicles including consideration of bus routes and associated range requirements.
   3. Evaluate charging infrastructure requirements.
   4. Estimate cost of replacement.
   5. Evaluate potential for vehicle-to-grid use of EV batteries (especially in summer) including estimated savings based on existing utility rates.

E. Develop capital investment timeline.
   1. Develop one option to be consistent with current goal of 45% reduction by 2030 and net-zero by 2050. Note that the current projection based on plans already in process results in a 63% reduction by 2024 so the district is on track to beat their 2030 goal without any additional action. In this option all investment in additional emissions reducing strategies would occur after 2030.
   2. Develop an accelerated timeline based on discussions with district and in conjunction with other capital improvement plans.

BASIC SERVICES

A. Visit sites as required to analyze existing conditions.
   1. Electrical service at potential PV and EV charging sites.
   2. Natural gas equipment inventory.
   3. Work with district personnel to identify best opportunities for energy efficiency improvements.
B. Attend meetings with district personnel as required.
C. Research available equipment and systems required to achieve goals defined above.
D. Conduct energy analysis as required to estimate renewable energy production and potential energy cost savings.
   1. PV electricity production estimates will be based on computer models of potential PV sites.
   2. Estimates of energy and cost savings associated with efficiency measures will be based on performance of similar systems. Detailed computer energy models of these measures is not included.
E. Assemble capital cost estimates for all proposed investments.
F. Provide draft report and summaries for review at appropriate intervals.
G. Provide final report and present to district personnel as required.

COMPENSATION

A. Basic Services: We propose to provide the services indicated for fixed fee of forty-five thousand dollars, ($45,000.00) to be invoiced on a monthly basis for the work completed that month.
B. Additional Services: to be negotiated as a fixed amount or invoiced on an hourly basis as determined by project requirements.
C. Reimbursable Expenses: None anticipated.

TERMS OF AGREEMENT

A. Terms are net 30 days. After 30 days, 1-1/2% per month will be added to the unpaid balance.

OTHER CONSIDERATIONS

A. The following will be needed from you:
   1. Copies of utility bills for 24 months.
   2. Documentation of all district operated vehicles including annual mileage driven, expected life, fuel costs, maintenance costs.
   3. Access to existing building sites.

As part of this proposal, Design Engineers Standard Terms of Agreement, Appendix A, shall apply. Please acknowledge agreement by signing and returning one copy to our office. We look forward to working with you on this project.

Respectfully submitted,
DESIGN ENGINEERS, P.C. (Consultant)

Dwight C. Schumm
Managing Principal

Accepted,
IOWA CITY COMMUNITY SCHOOL DISTRICT (Client)

DocuSigned by:
Shawn Eyestone
9709244DC73044D...

Shawn Eyestone,
Board President

APPENDIX A
STANDARD TERMS OF AGREEMENT STUDY

These 2 pages will be affixed to and become a part of Design Engineers' proposal for engineering services, hereinafter referred to as the Consultant.

ARTICLE 1. THE CONSULTANT'S BASIC SERVICES

1.1 The Consultant shall provide professional services for the Project in accordance with the Terms and Conditions of this Agreement.

1.2 The Consultant shall attend meetings with the Client's representative as may be necessary for the timely performance of all services.

1.3 The Consultant shall work with the Client's representative in the development of the time schedule for the Consultant's services and shall agree to maintain the schedule so established. The Consultant shall not be responsible for delays caused by failure of the Client's representative to maintain the schedule.

1.4 The Consultant shall provide copies of project documents at timely intervals for review by the client.

1.5 The Consultant shall investigate existing conditions in the existing building and utility services.

1.6 The Consultant shall not be responsible for the acts or omissions of the Client's representative, other consultants, or any other persons performing any of the work.

ARTICLE 2. ADDITIONAL SERVICES

The following services are not included in Basic Services. Such additional services shall be paid for by the Client in addition to compensation for the Consultant's Basic Services, provided that such additional services have been authorized by the Client prior to their performance. Separate itemized billing shall be submitted for additional services. Such services include:

2.1 Providing construction related services including construction documents, bid analysis, construction administration, etc.

2.2 Providing design services relative to facilities, systems and equipment which are not intended to be included as part of the Project.

2.3 Providing planning surveys, site evaluations, environmental studies or comparative studies of prospective sites, and preparing special surveys, studies and submissions required for approvals of governmental authorities or others having jurisdiction over the Project.

2.4 Preparing to serve or serving as an expert witness on behalf of the Client or Owner in connection with any public hearing, arbitration proceeding or legal proceeding.

ARTICLE 3. THE CLIENT'S RESPONSIBILITIES

3.1 The Client's representative shall meet and confer with the Consultant as necessary to ensure complete understanding and communication relative to the needs and requirements of the Project. The Client's representative shall notify the Consultant of any change in the scope of the project.

3.2 The Client's representative shall furnish required information as expeditiously as necessary for the orderly progress of the work and shall provide copies of Architectural work at timely intervals for review by the Consultant.

3.3 The Client's representative shall review the Consultant's work for compliance with the Project's program and for overall coordination with the architectural and other engineering requirements.

ARTICLE 4. REIMBURSABLE EXPENSES

4.1 Reimbursable expenses are in addition to the compensation for Basic and Additional Services and include actual expenditures made by the Consultant in the interest of the Project for the expenses listed in the following subparagraphs:

4.2 Expense of reproductions, postage and handling of documents, excluding reproductions for the office use of the Consultant or Client.

4.3 Expense of transportation in connection with the Project beyond Iowa City; living expenses in connection with out-of-town travel; long distance communications; and fees paid for securing approvals of authorities having jurisdiction over the Project.

ARTICLE 5. PAYMENTS TO CONSULTANTS

5.1 Payments to the Consultant for Basic and Additional Services shall be made as specified in the quotation.

5.2 If, for any reason, the Client or Owner decides to abandon or postpone the project, the Consultant shall be paid for services performed prior to receipt of written notice from the Client's representative of such abandonment or postponement, together with Reimbursable Expenses then due.

5.3 If action on the Project is deferred for more than six months, the Consultant's compensation shall be subject to renegotiation for the uncompleted portion of the Project.

ARTICLE 6. TERMINATION OF AGREEMENT

6.1 This Agreement may be terminated by either party upon seven days written notice should the other party fail substantially to perform in accordance with its terms through no fault of the party initiating the termination.

6.2 In the event of termination due to the fault of parties other than the Consultant, the Consultant shall be compensated for services performed to termination date, including reimbursable expenses.

ARTICLE 7. INSURANCE

7.1 The Consultant shall effect and maintain insurance to protect the Consultant from claims under worker's compensation acts; claims for damages because of bodily injury including personal injury, sickness or disease, or death of any of their employees or of any person other than their employees; and from claims for damages because of injury to or destruction of tangible property including loss of use resulting therefrom; and from claims arising out of the performance of professional services caused by negligent acts, errors and omissions for which the Consultant is legally liable.

7.2 The Client and the Consultant shall, upon request, furnish to each other Certificates of Insurance evidencing the insurance carried in compliance with the requirements of Paragraph 7.1, including appropriate evidence that each type of insurance has been properly amended to include coverage for this specific Project.

7.3 This agreement shall not impose liability on the Consultant for claims, lawsuits, expenses, or damages arising from, or in any manner related to:

A. The dispersal, discharge, escape, release or saturation of smoke, vapors, soot, fumes, acids, alkalis, toxic chemicals, liquids, gases or any other materials, irritant, contaminant or pollutant in or into the atmosphere, or on, onto, upon, in or into surface of sub-surface (a) soil; (b) water or watercourses; (c) objects; (d) any tangible or intangible matter, whether sudden or not.

B. The exposure to, or the handling, manufacture or disposal of asbestos or asbestos products in any of its various forms.

ARTICLE 8. MISCELLANEOUS PROVISIONS

8.1 All documents produced by the Consultant under this agreement shall remain the property of the Consultant even though hard copy originals or electronic copies are in the possession of the Client. They may not be used by the Client for any other endeavor without the written consent of the Consultant.

8.2 Any claims or disputes between the Client and Consultant shall be first submitted to non-binding mediation. If agreement cannot be reached with this method, claims or disputes shall then be subject to and decided by binding arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association currently in effect unless agreed to otherwise.

8.3 The Client agrees, to the fullest extent permitted by law, to indemnify and hold harmless the Consultant from any damage, liability or cost (including reasonable attorneys' fees and costs of defense) to the extent caused by the Client's negligent acts, errors or omissions and those of the Client's contractors or consultants arising from the project that is the subject of this agreement.

8.4 The Consultant agrees, to the fullest extent permitted by law, to indemnify and hold harmless the Client from any damage, liability or cost (including reasonable attorneys' fees and costs of defense) to the extent caused by the Consultant's negligent acts, errors or omissions in the performance of professional services under this Agreement.

APPENDIX B
HOURLY BILLING RATES - 2020

CLASSIFICATION	RATE
Principal	$215.00
Associate Principal II	$200.00
Associate Principal I	$155.00
Senior Engineer III	$190.00
Senior Engineer II	$165.00
Senior Engineer I	$145.00
Project Engineer II	$135.00
Project Engineer I	$125.00
Business Manager	$145.00
Engineer II	$105.00
Engineer I	$ 90.00
BIM Manager	$110.00
Senior Designer III	$140.00
Senior Designer II	$110.00
Senior Designer I	$100.00
Designer III	$100.00
Designer II	$ 85.00
Designer I	$ 75.00
BIM Technician II	$ 70.00
BIM Technician I	$ 60.00
Clerical II	$ 85.00
Clerical I	$ 55.00

These rates are subject to annual adjustment (on or about January 1) and your contract will adjust accordingly.

Everything works together when DE's behind it.

DESIGN ENGINEERS