UNIVERSITY MECHANICAL CONTRACTORS, INC.

We Build Value

STATE OF WASHINGTON DEPARTMENT OF ENTERPRISE SERVICES

REQUEST FOR QUALIFICATIONS RESPONSE PROJECT NO. 2013-133

February 22, 2013

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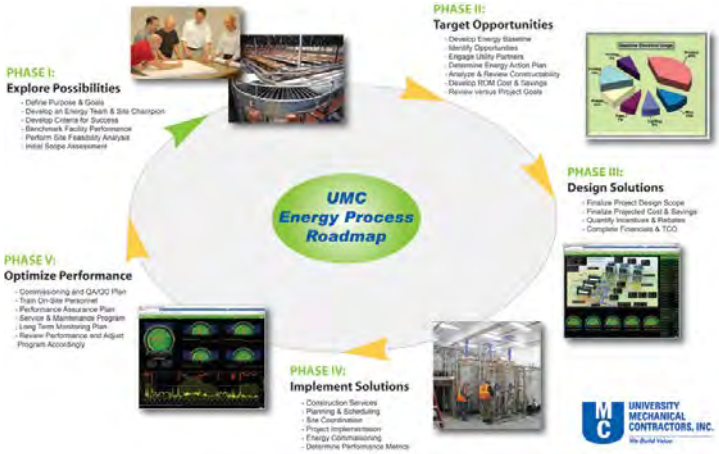
SECTION 1: EXECUTIVE SUMMARY

UNIVERSITY MECHANICAL CONTRACTORS, INC. (UMC) is pleased to submit our response to the Request for Proposal issued by the State of Washington Department of Enterprise Services Division of Engineering & Architectural Services for ESCO Consulting Services. As a company with a long local history of delivering great value to our customers, we are excited to have the opportunity to utilize our expertise to meet the conservation and sustainable infrastructure needs for the State of Washington.



We take great pride in being a local company (headquartered in Mukilteo, WA) that has served the Pacific Northwest continuously since our founding in 1920. We can provide sole-source accountability for all facets of your energy upgrade project – including auditing, development, energy & engineering analysis, design, project management, construction, commissioning & re-commissioning, training, M&V, performance assurance, ongoing service and preventative maintenance. UMC continues to be recognized by industry as one of the most capable and trusted design-build firms in the region.

Our team provides extensive knowledge in all phases of developing projects for critical facilities, working through all design requirements, maximizing funding options, sourcing & securing the most appropriate equipment and setting in place an ongoing operations & maintenance plan that will ensure continued savings for our customers.

Our commitment to sustainable design is evident in our daily work; and a large part of our resource conservation focus can be seen in our resume of energy related projects. Given our history, experience and qualifications, coupled with our local roots, we truly believe that we provide a unique opportunity for customers within the state of Washington. UMC has the size, depth and capability to deliver the largest and most complex projects in the state; and yet we are small enough to understand the value of local relationships that depend on advantageous pricing and local decision making.

On behalf of UMC Energy Services and our entire team, we look forward to an opportunity to demonstrate our capabilities as your Energy Services Partner on this project!

Sincerely,

SCOTT R LOCKE

Scott R Locke, PE, LEED AP
Manager, Energy Services
University Mechanical Contractors, Inc.
(206) 368-6974

SECTION 2: EXPERIENCE

DEVELOPMENT OF ENERGY AND UTILITY CONSERVATION PROJECTS

UMC has a dedicated Energy Services Team that brings a combined 60 years of experience successfully implementing energy savings performance contracting (ESPC) solutions to public, private and federal sector customers in the State of Washington and around the Pacific Northwest. Our team is well versed in providing technical energy audits, identifying utility conservation opportunities, calculating guaranteed utility savings, providing energy based commissioning, performing building and equipment energy modeling, conducting industry standard measurement and verification procedures, performing risk management, managing complex ESPC projects and working with customers to provide sound financially engineered solutions.

Our Energy Services Team builds upon the traditional UMC foundation. ***We are focused on delivering technically sound projects to our customers while operating with the highest integrity***. UMC provides guaranteed maximum (GMAX), fully transparent pricing to our customers. We are recognized within the industry as a trusted partner, priding ourselves on maintaining product and vendor neutrality and soliciting multiple sub-contractor bids in an effort to provide the best value to our customers.

Having recently celebrated our 90th year of business serving Washington State, UMC provides a multitude of services that include mechanical and plumbing construction services, energy services, design-build, design assist, LEED design, commissioning, and HVACR service & maintenance. We provide these services to both small to large commercial, public sector, federal, healthcare, high tech, educational and industrial customers throughout the Northwest.

In order to best convey our depth of experience we have provided the following table showing a sample of the recent projects performed by UMC locally that have focused on conservation and sustainable development.

Project	Description	Contacts
Bellevue Place – Corner Building & Bank of America $2.2 million Completed 2012	• Customized Chiller Plant Upgrades (converted 2 separate plants to full variable flow), Central Plant Controls Upgrade, Efficient Re-design of Make-up air system	Contact: Tim Chew 425-949-9325
Good Samaritan Hospital-Puyallup $ 54 Million Completed 2012	• Major hospital project that consists of nine stories, roughly 350,000 sq. ft., hospital tower, a central utility plant upgrade with a connecting tunnel between the CUP and the new hospital building and a parking garage.	Contact: Chip Smith (206) 726-8000
Group Health – Puyallup $3.9 Million Completed	• Variable Refrigerated flow system with ground source heat exchanger and dedicated outside air system. • Water Cooled VRF System • Green Roof • LEED Gold	Contact: Todd Karr (425) 452-1803

Project	Description	Contacts
Federal Center South - Seattle $8.5 million Completed 2012	• Natural Day Lighting controls • Rainwater collection and storage for use in toilet flushing, irrigation, cooling, and landscaping • Geothermal energy wells for ground loop water for cooling and heating • Thermal energy storage for cooling • HVAC system under-floor air distribution • Chilled Sails • Energy Dashboard for Benchmarking and Education	Contact: Doug Pentin (206) 743-1322
King County Regional Communication and Emergency Coordination Center $933,859 Currently in Development	• Energy Audit focused on Data Center Upgrades, High Efficiency Boiler, Energy Based Re-Commissioning and Water Conservation	Contact: Maureen Thomas (206) 296-0238
Old Capitol Building – Phase II $ 640,000 Completed 2011	• HVAC System Upgrades, Energy Based Re-commissioning, Water Conservation and Controls Upgrades	Contact: Jim Hayes (360) 902-7281
State Modular Building $429,000 Currently in Development	• Lighting system upgrades • Pneumatic to DDC upgrades • Indoor Air Quality improvements	Contact: Jim Hayes (360) 902-7281
Dolliver Building $428,000 Currently in Development	• Installation of new high efficient boiler • Redesign of existing HW boiler pumping & piping system • Installation of new boiler stack to allow for high efficiency condensing • Install new OA dampers at all heat pumps to provide better control of temperature • Installation of new booster to improve heat distribution	Contact: Jim Hayes (360) 902-7281
ZymoGenetics – Phase I $1,628,410 Completed 2013	• Chiller Plant Optimization, Converted Lab Air System to VAV, Water Conservation, Lighting Upgrades, Heat Recovery, CO Control of Parking Lot Exhaust Fans	Contact: Phil Weight (206) 515-4933
ZymoGenetics – Phase II $483,430 Currently in Progress	• Chiller Plant Optimization, Converted Lab Air System to VAV, Water Conservation, Lighting Upgrades, Heat Recovery, CO Control of Parking Lot Exhaust Fans	Contact: Phil Weight (206) 515-4933
Orcas Island school District Phase IV $2.4 million Currently in Development	• Energy Conservation Upgrades. Projects include energy efficient lighting upgrades, energy based re-commissioning, water conservation, and occupancy based HVAC/lighting controls and weatherization	Contact: Cathy Ferran (OISD) (360) 376-2284

Project	Description	Contacts
Everett Waste Water Treatment Plant $ 9.1 Million Completed 2007	• Process Mechanical, Structural Steel and Misc. Metals, including piping, ducting, equipment installation, steel/metals installation, and associated demolition, excavation, backfill, and structural concrete. Subcontractor to Hoffman.	Contact: Bryan Shirley (206) 465-6736
Chambers Creek Wastewater Treatment Plant Upgrade $ 250,000 Completed 2012	• General Contractor to replace two 500 HP blowers with County furnished 300 HP high efficiency blowers. Includes piping, electrical and controls.	Contact: Jack Niehuser (253) 798-2257
Spokane County Regional Water Reclamation Facility $ 11.6 Million Completed 2012	• Mechanical for new wastewater treatment facility. Scope includes process and utility piping and equipment installation, foul air ducting, and HVAC. Subcontractor to CH2M HILL.	Contact: Dennis Nelson (406) 470-1713
Cedar River Water Treatment Facility – LEED Silver $ 12.6 Million Completed 2004	• $12.6 Million, Design, build and operate a new 180 mgd water treatment plant which utilized Ozone and UV treatment technology, energy modeling (Trane Trace 700), natural lighting, passive ventilation, low flow water fixtures, energy efficient HVAC system design & EMS control sequencing	Contact: Dan Reynolds (425) 453-5000
Brightwater Treatment Plant $47.4 Million Completed 2011	• Mechanical for new wastewater treatment facility. Scope includes supply and installation of yard piping for first phase of new wastewater treatment plant, pipe diameters range from 30 in. to 84 in., all with welded joints, process and utility piping and equipment installation, foul air ducting, and HVAC. Subcontractor to Hoffman & Northwest Construction.	Contact: Dave Johnson (206) 438-2762
Hanford 200 West Pump & Treatment $ 22 Million Completed 2012	• Mechanical for new process facility that treats groundwater and returns treated water to the aquifer. Scope includes piping, equipment installation, vapor ducting and HVAC. Subcontractor to Skanska USA.	Contact: Bill Dettman (206) 494-5470
Naval Air Station – Whidbey Island $1.45 Million Completed 2011	• Turn-Key energy conservation project focused on 25 facilities. Projects include heat recovery, VAV conversion, controls upgrades, energy based re-commissioning, and demand control ventilation •	Contact: Jeff Peterson (PSE) (425) 456-2732
Port of Seattle – SeaTac Airport $2.4 Million Currently in Construction	• Energy Conservation Upgrades. Projects include VAV conversion in Main Terminal, chiller plant upgrades	Contact: Mike Smith (Manager Mechanical Systems POS) (206) 248-4815

Project	Description	Contacts
Orcas Island School District Phase I $455,000 Completed 2011	• Energy Conservation Upgrades. Projects include energy efficient lighting upgrades, energy based re-commissioning, water conservation, and occupancy based HVAC/lighting controls and weatherization	Contact: Cathy Ferran (OISD) (360) 376-2284
Old Capital Building Phase I(Olympia) $515,000 Completed 2011	• High efficiency boiler upgrade in historic landmark facility.	Contact: Contact: Jim Hayes (360) 902-7281
Bangor Naval Station $600,000 Completed 2010	• Building 7000 – Industrial Facility Chiller Plant Energy Upgrade. Project included Turbocor retrofit of two, 140 ton McQuay chillers, new Kiltech chiller controls, new VFD controlled cooling towers, new CHW & CW pumps and addition of chemical free CW treatment.	Owner: BPA for US Navy Contact: Bonneville Power Authority -Mr. Michael Huber (206) 220-6778
Bangor Naval Station $1.8 Million Completed: 2011	• Buildings 2800 & 6400 – **District Heating Plant Energy Upgrade**. Project included the design/development & installation of five, 2-stage stack heat recovery systems & controls at two separate district heating plants.	Owner: BPA for US Navy Contact: Bonneville Power Authority -Mr. Michael Huber (206) 220-6778
Western Washington University $65,000 Completed: 2010	• **Biomass Gasification Plant Feasibility Study**. Analyses of campus district heating upgrade opportunities. Alternatives analyzed include: biomass gasification, cogeneration, stack heat recovery, thermal storage, campus steam to hot water conversion and district heating options	Contact: John Furman (WWU Director of Facilities) (360) 650-3496
Orcas Island school District Phase II $1.47 Million Completed 2012	• Energy Conservation Upgrades. Projects include new VAV system in Elem School, ventilation upgrades, controls upgrades, , energy efficient lighting upgrades, DW system upgrades, water conservation, and occupancy based HVAC/lighting controls	Contact: Cathy Ferran (OISD) (360) 376-2284
Bangor Naval Station $750,000 Completed: 2010	• Building 6400 – **District Chiller Plant Energy Upgrade**. Project included Turbocor retrofit of two, 180 ton Trane chillers, new Kiltech chiller controls, new VFD controlled cooling towers, new CHW & CW pumps and addition of chemical free CW treatment.	Owner: BPA for US Navy Contact: Bonneville Power Authority -Mr. Michael Huber (206) 220-6778
Bangor Naval Station $900,000 Completed: 2010	• Building 1100 – Data Center Chiller Plant Energy Upgrade. Project included the replacement of two, 60 ton Bohn water-cooled chillers with one, new 120 ton Smardt air-cooled chiller, removal of CW system and fluid coolers, and new CHW pumps.	Owner: BPA for US Navy Contact: Bonneville Power Authority -Mr. Michael Huber (206) 220-6778

Project	Description	Contacts
Bangor Naval Station $500,000 Completed: 2010	• Building 7074 – Chiller Plant Energy Upgrade. Project included the installation of one new 140 ton Multistack/Turbocor chiller, the Turbocor retrofit of one, 160 ton McQuay chiller, new Kiltech chiller controls, new VFD controlled fluid towers, new CHW & CW pumps and addition of chemical free CW treatment.	Owner: BPA for US Navy Contact: Bonneville Power Authority -Mr. Michael Huber (206) 220-6778
Seattle Steam Company $11.35 Million Completed: 2010	• Installation of a new 230 MMBtuh biomass wood fired boiler, economizer, bag houses, breeching modifications, fuel and ash conveying and a complete wood fuel handling facility for service to Seattle Steam's District Heating Plant. Boiler was installed in existing building at the downtown Seattle waterfront.	Mechanical Contractor: University Mechanical Contractors, Inc. Owner: Seattle Steam Stan Gent (206) 658-2024
Seattle Children's Bellevue Clinic $8.9M Completed: 2010	• 80,000 square foot clinic and surgery center in downtown Bellevue. The new facility will feature outpatient surgery, urgent care, radiology, pharmacy, lab, sports therapy gym and more than 15 clinics from orthopedics and sports medicine to general surgery. • Targeted EUI of 150,000 Btu/sqft • Integrated Project Delivery	GC: Sellen Construction Owner: Seattle Children's Hospital Lead Design Engineer: AEI
Swedish Issaquah $40M Completed 2012	• The new Swedish/Issaquah campus will provide a broad range of inpatient and outpatient medical services including oncology, cardiac care, obstetrics, pediatrics, primary care, emergency services, intensive care and a host of other medical and surgical services and specialists. • Core components of the new energy efficient facility will include hydronic heating, high-efficiency heat-recovery chillers, high-efficiency variable air volume systems, and advanced boilers. • Targeted EUI of 150,000 Btu/sqft • Integrated Project Delivery	GC: Sellen Construction Owner: Swedish Medical Center Lead Design Engineer: CDI
Block 26 & 32 (Amazon SLU) $6.2M Completed 2011	• Targeted LEED Silver • 400,000 sq. ft. new office campus for Amazon.com in South Lake Union. Building features include: Energy-efficient AC-system, ultra-low water consuming plumbing fixtures, restaurant-ready infrastructure, and high-density conferencing facilities.	GC: Sellen Construction Owner: Vulcan
Wheeler DIS $23.8M Completed: 2011	• 63/20 Financed Project • Approximately 461,000 sq. ft. 63/20 financed project consisting of two office buildings to house the headquarters for the Department of Information Systems, as well as a data center complex.	GC: Howard S. Wright Owner: Wright Runstad for Washington State

Project	Description	Contacts
Harborview Ninth & Jefferson Building $14.9 Million Completed: 2010	• **LEED Gold Certification** • Includes fourteen floor multi-use facility for office, lab, and retail with five floors of underground parking • Energy Modeling (Trane Trace 700) • Facility incorporates low flow water fixtures, & energy efficient HVAC system design & EMS control sequencing • Design/Build Mechanical/Plumbing/HVAC/Controls for all facility systems including medical gases, fume exhaust, generator exhaust, fuel oil piping	General Contractor: Wright Runstad Owner: NJB Properties Mr. Art Stoutenberg (206) 341-4447

UMC works directly with many Municipal clients throughout the State of Washington. The following table lists a sampling of State and Federal Municipal entities with which we have worked.

State of Washington Public Sector Customers

Local State / Federal - Customers	Category	Local State / Federal - Customers	Category
Brookside Elementary Attic RM	School District	Juanita High School	School District
Central Washington University	Higher Education	Kellogg Middle	School District
City of Edmonds WTP	City	King County	County
City of Seattle	City	Lake Washington High School	School District
Everett Naval Station BEQ P-155	Federal	Maple Lane School	School District
FBI- HQ-1110	Federal	Monroe Corrections Facility	State Correctional Facility
Federal Detention Center-Seatac	Federal	Monroe School District	School District
Hanford Nuclear Plant Steam System Upgrade	Federal	Mountlake Terrace City Hall	City
Highline Community Hospital	State Medical Facility	NAS Whidbey Steam Eye Project	Federal
Keyport Naval Station Energy Upgrades	Federal	Northshore YMCA	Non Profit
Pacific Crest School	School District	Port of Seattle	City
Seattle Community College	Higher Education	SeaTac Airport	IA
Bellevue City Hall	City	SeaTac IWTP Impr./IWS Pump St.	IA
Mukilteo School District	School District	Seattle Center Central Utility Plant	City
Bellevue Police Department	City	Seattle City Light	City
Brightwater WWTP Misc. Items	City	Seattle Civic Square	City
Chainlake Elementary School	School District	City of Bellevue	City
West Point WWTP	City	Seattle University	Higher Education
City University - Fife	City	St Monica School	School District
DSHS Laundry Buckley	State of WA	Stadium High School	School District
DSHS Laundry Medical Lake	State of WA	University of Washington	Higher Education
Einstein Middle School	School District	UW School of Medicine	Higher Education
Everett Community Cancer Center	State Medical Facility	Valdez Community Hospital	State Medical Facility
Everett High School	School District	WA Corrections Center for Women	State Correctional Facility
Federal Reserve Bank	Federal	Washington State DOT	State of WA
Forest Ridge School	School District	Wenatchee Valley College	Higher Education
Good Samaritan Community Healthcare	State Medical Facility	US Coast Guard	Federal

RANGE OF SERVICES

UMC Energy Services works directly with customers to provide a wide range of services. We have the engineering and construction management depth and expertise to handle any size or complexity of project; from consulting services…to LEED certification…to energy scope development…to engineering design…to construction management…to ongoing commissioning and performance assurance. Specifically related to energy services performance contracting, UMC provides a comprehensive program that delivers the solutions and services as described below.

UMC Energy Services – Range of Services				
Energy and Environmental Consulting Services	**Design / Build of Conservation Technologies**	**Energy Services & Performance Contracting**		**Preventative Maintenance & Service**
Full Service Energy & Utility Usage Analysis	Energy Conscious Systems Design & Retrofit	Utility & Energy Baseline Development	New Project Commissioning	HVAC
Energy & Utility Systems Monitoring and Metering Applications	Lifecycle Cost Analysis	Facility Auditing Services	Energy Based Re-Commissioning	Refrigeration
Energy Based Systems Auditing	Facilitate Rebates & Incentives	Energy Analysis & Scope Development	Project Support Training	Plumbing
LEED Certification	Danfoss Turbocor Retrofit Specialist	Design Engineering	Financing Conduit	Medical Gas
Energy Master Planning		Construction Management	Measurement & Verification	Drain Cleaning
Training		Project Construction Services	Facilitate Utility Rebates & Incentives	

As it relates specifically to Energy Services Performance Contracting, UMC Energy Services will be the prime point of contact for the Customer throughout the entire process. If and when additional support and expertise is required, UMC will look to qualified designers, installers, and sub-consultants that will provide the best value for the customer. In all cases, UMC will maintain the role of primary ESCO – providing leadership and accountability for the project. Following are additional details of how UMC proposes to provide these specific services.

Utility & Energy Baseline Development

The development of the utility baseline begins with the site verification of existing utility service meters (electrical, natural gas, water/sewer, etc.) that serve each facility. Each of these meters is reviewed to check service areas to make sure that areas of all facilities have been accounted for from a utility account perspective. Up to three years of historical, monthly energy usage is then compiled for each utility account. Analysis of this utility information performed to identify trends and anomalies that need to be accounted for prior to establishing the utility usage baseline.

In addition to the utility baseline, a baseline of mechanical/electrical systems must be established to confirm the current operation of each system that could be affected by the implementation of the proposed project. Once these system baselines have been developed, they are compared to and balanced against the historical utility baselines to verify the accuracy.

UMC utilizes various methods for computing the system baselines. Primarily, we utilize hand held measurement & metering equipment, portable trending devices, existing BAS control systems (if available) in conjunction with in-house developed modeling spreadsheets and industry accepted modeling software programs to establish building or equipment annual baseline usage. UMC utilizes sound engineering principles, industry accepted engineering methodology and software modeling programs in the development of these baselines. In an effort to provide the best value to our customers and prevent unnecessary risks, we tend to error on the conservative side when projecting savings.

Facility Auditing Services

One of the initial steps in any Energy Services Project is the facility audit which sets the tone for the project that will follow. As such, it is important to have the facility operations and maintenance staff fully engaged early on during the audit process as they are a key resource in understanding current operating practices and facility issues. Also, this facility audit needs to be closely coordinated with the results of the Utility Baseline Audit that typically occurs in parallel. This is so that historical utility usage & EUI benchmarking data can be taken into account for operational insight during the audit.

During the initial audit we will conduct a preliminary walk through of the facility, focusing on the central plant(s) and buildings identified by facilities staff as either having the greatest opportunities or the most need for improvements. Based on this preliminary survey, we will review mechanical, electrical, architectural plans, interview facility staff and review any other relevant data in order to direct our efforts maximize our auditing efficiency. Key outputs of this initial audit include an inventory of relevant energy systems and equipment, an understanding of current system operating practices, an understanding of the original design of appropriate systems, current issues that need to be resolved, and customer goals and expectations for the proposed project.

Energy Analysis & Scope Development

Once the Baselines have been developed and the initial audit is complete, our Energy Services Team will focus all resources towards analyzing the current operating systems. Our energy engineers will begin to develop facility improvements and utility conservation opportunities that will meet the project goals. This process requires a significant amount of engineering resources working through a series of scope development steps in an effort to provide the best and most cost effective project available. These steps include, but are not limited to, the following.

- ☑ Measurements and monitoring of equipment operation to determine potential savings associated with upgrades
- ☑ Conceptual design development
- ☑ Energy engineering analysis
- ☑ Estimates of energy, utility, and equipment savings
- ☑ Develop project costs
- ☑ Engage local utility for input
- ☑ Facilitate utility rebates and incentives
- ☑ Develop life-cycle cost analysis
- ☑ Multiple scope reviews with customer to solicit input and take direction

Throughout the entire energy analysis and scope development, we work extremely closely with the customer to make sure the project stays on track and meets the identified primary goals.

Design Engineering

UMC has been providing engineering services for select customers since its inception in 1920. Today, our group of Professional Engineers (PE) and LEED accredited professionals provide innovative and cost-effective engineering and commissioning services for HVAC, plumbing, and process piping systems. UMC assumes full responsibility for providing a system that meets the

owner's needs, is within budget, meets all codes, regulations and guidelines and is delivered on time.

UMC Design Services – Areas of Expertise Design Services Provided		
Mechanical / HVAC Systems	Mechanical System Simulation	Process Piping Systems
Energy Modeling	Plumbing / Piping Systems	Medical Gas Systems
Industrial Ventilation	Industrial Water Systems	Central Plants (HW / CHW / Steam)
Thermal Storage	Control Systems (Direct Digital Control)	Sub-metering / Monitoring Systems
LEED Projects	Sustainable Design	Energy Management Control Systems
Renewable Energy Technologies	Heat Recovery Systems	Domestic Water Systems
Water Conservation Technologies	Efficient Building Envelope Upgrades	Lighting Retrofits & Controls
Market Sectors		
Public / Private Office	Medical / Biotech	High Tech / Laboratory
High Rise	Industrial	Airport
Higher Education	Prison / Detention Facilities	Federal Military Bases
Campus Settings	Education (K-12)	Retail Spaces

Project Construction Services

Once the actual construction project begins, things begin to happen fast and owners need an experienced and dedicated project manager to maintain control, coordinate installation schedules, oversee quality control, safety requirements, and communicate effectively and efficiently on a daily basis. UMC maintains a staff of over 25 highly qualified project managers that convey these capabilities. In addition we have 20 dedicated construction support engineers and administrators to provide the support needed to these Project Managers.

Experienced and capable project management skills are essential in assuring the customer that they are receiving a project that provides the best value and functionality as promised. Once a project manager is assigned to a project he becomes a focal point of contact for the customer during implementation. Our project managers will maintain control of all aspects of project implementation and continually update the customer on specific and important issues as they arise. To this point, a regular schedule for update meetings is typically implemented at the project kick-off meeting for customer/contractor coordination and communication. UMC provides the following construction services for our customers.

UMC Construction Services
✓ Implement & Maintain Project Schedule
✓ Manage Construction Budget
✓ Coordinate Project Mobilization
✓ Finalize Design Development Documents
✓ Material Acquisition
✓ Manage Contractor / Vendor Contracts
✓ Execute Construction Process
✓ Manage Commissioning Process
✓ Manage Final Project Acceptance and Close-Out Requirements
✓ Implement Measurement & Verification Process
✓ Provide & Execute All Training Requirements

Mechanical Installation Contractor

One of UMC's core capabilities is that of the prime mechanical contractor. Since the inception of the business in 1920 up through today, we have been considered as one of the most competent and valued mechanical contractors in the Northwest, completing over $100M worth of installed projects in 2012. As such we have the opportunity to bring this capability and expertise to the table as part of any project.

Commissioning

Building Commissioning can best be defined as a systematic quality assurance process that spans the entire design and construction process. Building commissioning helps ensure that a new building's performance meets owner expectations by verifying and documenting that building systems and components are planned, designed, installed, tested, operated, and maintained to meet the customer and designers specifications, efficiency and operational requirements.

UMC will work directly with the customer to develop a project commissioning plan that best provides this quality assurance; whether it is a project directly commissioned by our on-staff commissioning personnel or through a third party commissioning agent. We will make sure that the scope and cost of the commissioning plan meets the budget and requirements of our customer. Each party involved with the project may be designated to provide insight and carry out tasks necessary for a successful commissioning project. Key commissioning team members may include the building owner or owner's representative, building staff, design professionals, contractors or manufacturer's representatives, testing specialists, and the LEED coordinator; all coordinated and managed by the lead commissioning agent.

Energy Based Re-commissioning

As systems age, so too does the associated control system. Particularly with older pneumatic and stand-alone electronic controls, the systems can become more and more cost inefficient over time. One option to address this issue is the implementation of a Re-Commissioning effort. This is a measure that has been gaining momentum with many state agencies over the past few years and is viewed as a very cost effective effort for improving system operating efficiency. A retro-commissioning effort usually uncovers significant energy savings opportunities and could potentially be included as a Utility Conservation Opportunity. In addition, some utilities now provide incentive programs to help fund and support retro-commissioning initiatives.

A follow up to any re-commissioning program offers the potential to implement a Continuous Commissioning Program. This can be implemented through the utilization of diagnostic software programs, dynamic trending in combination with engineering consultant reviews of the output of these programs to properly assess the on-going operation and make appropriate recommendations.

UMC supports these retro-commissioning options and can provide these services as part of any ESPC project. ***UMC is a Puget Sound Energy pre-qualified re-commissioning provider***.

Training

Training is an essential element in maintaining long term efficient building performance. Unless operators and managers have the right knowledge and skills, it will be impossible for the building to perform optimally over time. Training for building staff should occur throughout the project, starting during construction and prior to substantial completion. Training during construction gives staff the

best opportunity to learn about building systems and equipment. The staff's observation of commissioning and functional testing may be their first training experience in the new building.

The following table lists the typical training options that are included as part of an ESPC project.

Training Services
☑ Operation instructions and procedures
☑ Descriptions of building systems/equipment and their warranties
☑ Seasonal changeover and manual/automatic control
☑ Operation, adjustment, and maintenance of dampers, valves, and controls
☑ Adjustment instructions for maintaining operational parameters
☑ Emergency instructions and procedures
☑ Requirements and schedules for maintenance on all operation and maintenance-sensitive equipment
☑ Hands-on operation of equipment and systems
☑ Common troubleshooting problems, their causes, and corrective actions
☑ Indoor air quality, health, visual comfort, acoustic comfort, and safety issues
☑ Recommendations for special tools and spare parts inventory
☑ Review of operation and maintenance manuals, and their location onsite
☑ Building walk-through
☑ Review of related design intent documents
☑ Energy management control system (EMCS) operation and programming
☑ Control optimization sequences, strategies, and thermostat programming
☑ Relevant commissioning reports and documents
☑ When and how to retro-commission building systems
☑ Critical and ongoing energy management practices
☑ Operation of special equipment like scrubbers, fume hoods, or water features/fountains

UMC has the on-staff capability to perform customer training as required; or in the case of a specific piece of equipment or system that is supplied by an equipment manufacturer, we will coordinate the appropriate training as needed.

Measurement and Verification

As previously discussed in Section 4, UMC recognizes that the realized success of any energy services project is ultimately based on the applicability and reliability of the savings Measurement and Verification (M&V) program. As such, UMC works diligently to educate customers as to the options available for confirmation of the savings. UMC follows the typical protocols designated by the International Performance Measurement and Verification Protocol (IPMVP) for defining specific utility baselines as well as calculating and verifying post-installation savings. Each project is developed individually in an effort to apply the most accurate and cost effective M&V protocol. This is completed in a collaborative and consultative environment with the customer.

Project Financing / Financial Conduit

UMC will meet with our customers regularly during the development of the project to assure that we are working in conjunction with funding sources to meet the ultimate objective. There are many funding sources that are considered and taken into account for each potential project; some of these funding options include, Owner Capital, Bond Issuance, State Energy Loan Program, 3rd Party Financing, Tax Exempt Municipal Lease, Clean Renewable Energy Bonds, Production Tax Credits, Bonneville Environmental Foundation Grants, Operating Lease, Pass thru Tax Credits

(EPACT 2005, CREBS, Production Tax Credits, etc) and local Utility Incentives…just to name a few.

Universities, Local Municipalities, State Agencies, and not for profit institutions do not have a tax liability; therefore they do not qualify for a tax credit directly. However lending institutions as well as design/construction professionals involved in the project may have a tax liability that in some cases can be leveraged to act as a shared or "pass-thru" partner so that the project does realize the tax credit benefit. This is common for the tax exempt municipal lease as well as the clean renewable energy bond (CREBs) where the lending institution themselves are able to take the tax credit in exchange for providing the competitive low interest loans.

For Federal, state, or local government buildings, the Energy Policy Act of 2005 allows for the person or company primarily responsible for designing the upgrade to the facility to realize the tax credit therefore to act as a "pass-thru" partner for Utility Conservation Opportunities.

Utility Support and Funding

To reduce the initial cost of a project, UMC will secure conservation incentive money by working directly with the applicable utilities. We will also seek any audit and design assistance money that could be available to help fund that portion of the project. We have found that it is prudent to involve the utility with project meetings during each phase of the project. The partnering approach eliminates end-of-project conflicts regarding funding levels, and will help to expedite the final incentive payments. This funding can be applicable to electrical, natural gas and water/sewer utility providers.

EXPERIENCE WITH M&V PROCESSES

As previously discussed in Section 4, UMC recognizes that the realized success of any energy services project is ultimately based on the applicability and reliability of the savings Measurement and Verification (M&V) program. As such, UMC works diligently to educate customers as to the options available for confirmation of the savings. UMC follows the typical protocols designated by the International Performance Measurement and Verification Protocol (IPMVP) for defining specific utility baselines as well as calculating and verifying post-installation savings. Each project is developed individually in an effort to apply the most accurate and cost effective M&V protocol. This is completed in a collaborative and consultative environment with the customer.

The IPMVP protocol includes four guarantee options to measure and verify savings: Option A – Partially Measured Retrofit Isolation, Option B – Retrofit Isolation, Option C – Whole Facility, and Option D – Calibrated Simulation. The following table describes these options in more detail and provides examples of typical applications.

M&V Option	How Savings Are Calculated	Typical Applications
Option A. Partially Measured Retrofit Isolation This approach is intended for Facility Improvement Measures where a one-time measurement for specific equipment or systems instantaneous baseline energy use, and a one-time measurement for specific equipment or systems instantaneous post-implementation energy use can be measured. Baseline and Post energy consumption is calculated by multiplying the measured end use instantaneous capacity (i.e. – kW, Gal/hr, BTU/hr) by stipulated hours of operation for each mode of operation (i.e. – hours, week, month).	Savings are determined by partial field measurement of the energy use of the system(s) to which an ECM was applied; separate from the energy use of the rest of the facility. Measurements may be either short-term or continuous. Partial measurement means that some but not all parameter(s) may be stipulated, if the total impact of possible stipulation error(s) is not significant to the resultant savings. Careful review of ECM design and installation will ensure that stipulated values fairly represent the probable actual value. Stipulations should be shown in the M&V Plan along with analysis of the significance of the error they may introduce.	Lighting retrofit where power draw is measured periodically. Operating hours of the lights are assumed to be one half hour per day longer than store open hours.
Option B. Retrofit Isolation This approach is intended for Facility Improvement Measures where continuous periodic measurements for specific equipment or systems baseline energy use, and continuous periodic measurements for that equipment or systems post-implementation energy use can be measured.	Savings are determined by field measurement of the energy use of the systems to which the ECM was applied; separate from the energy use of the rest of the facility. Short-term or continuous measurements are taken throughout the post-retrofit period.	Application of controls to vary the load on a constant speed pump using a variable speed drive. Electricity use is measured by a kWh meter installed on the electrical supply to the pump motor. In the base year this meter is in place for a week to verify constant loading. The meter is in place throughout the post-retrofit period to track variations in energy use.
Option C. Whole Facility This approach is intended for measurements of the whole-facility where specific meter baseline energy use and measurements of whole-facility or specific meter post-implementation energy use can be measured.	Savings are determined by measuring energy use at the whole facility level. Short-term or continuous measurements are taken throughout the post-retrofit period.	Multifaceted energy management program affecting many systems in a building. Energy use is measured by the gas and electric utility meters for a twelve month base year period and throughout the post-retrofit period.
Option D. Calibrated Simulation This approach is intended for Facility Improvement Measures where the end use capacity or operational efficiency; demand, energy consumption or power level; or manufacturer's measurements, industry standard efficiencies or operating hours are known in advance, and used in a calculation or analysis method that will calculate the outcome.	Savings are determined through simulation of the energy use of components or the whole facility. Simulation routines must be demonstrated to adequately model actual energy performance measured in the facility. This option usually requires considerable skill in calibrated simulation.	Multifaceted energy management program affecting many systems in a building but where no base year data are available. Post-retrofit period energy use is measured by the calibrated simulation using. Base year energy use is determined by simulation using a model calibrated by the post-retrofit period utility data.

DESIGNING AND MANAGING CONSTRUCTION PROJECTS

UMC has extensive experience designing, cost estimating and managing every conceivable type of construction project; both large and small…simple and complex. A sampling of project types is shown in the following table.

UMC Design Services – Areas of Expertise Design Services Provided		
Mechanical / HVAC Systems	Mechanical System Simulation	Process Piping Systems
Energy Modeling	Plumbing / Piping Systems	Medical Gas Systems
Industrial Ventilation	Industrial Water Systems	Central Plants (HW / CHW / Steam)
Thermal Storage	Control Systems (Direct Digital Control)	Sub-metering / Monitoring Systems
LEED Projects	Sustainable Design	Energy Management Control Systems
Renewable Energy Technologies	Heat Recovery Systems	Domestic Water Systems
Water Conservation Technologies	Efficient Building Envelope Upgrades	Lighting Retrofits & Controls
Market Sectors		
Public / Private Office	Medical / Biotech	High Tech / Laboratory
High Rise	Industrial	Airport
Higher Education	Prison / Detention Facilities	Federal Military Bases
Campus Settings	Education (K-12)	Retail Spaces

EXPERIENCE OBTAINING INCENTIVE, REBATES AND GRANTS

There are many paths to funding and financing projects. Our team has substantial relevant experience with capturing rebates, grants and tax credits, along with 3rd party financing for developing energy based projects. All available options will be pursued for funding each project. The following table provides a list of some of the financial resources that may be applicable.

Potential Funding Sources (Grants, Rebates, Etc.)		
Department of Commerce Energy Efficiency Grants	Local Utility Conservation Incentives	Bonneville Environmental Grants and / or Federal appropriations
OSPI Energy Grants Program	Washington State Loan Program & State Energy Program	USDA Renewable Energy and Energy Efficiency Programs
WA Department of Forestry	US Department of Agriculture	American Recovery and Reinvestment Act (ARRA)
Bonds		
Clean Renewable Energy Bonds	Qualified Energy Conservation Bonds	Build America Bonds
	Revenue Bonds	
Tax Exemptions		
Retail Sales Tax Exemption for Forest Derived Biomass	Retail Sales Tax Exemption for Hog Fuel Used to Produce Steam, Electricity, Heat, or Biofuel	Retail Sales Tax Exemption for Renewable Energy Production Equip
	Tax Exempt Municipal Lease	
Tax Credits		
Renewable energy credits & New Market (pass thru)	B&O Tax Credit for the sale of forest Derived Biomass Used to Produce Electricity, Steam, Heat, or Biofuel	Federal Production Tax Credits

One of the most utilized sources for funding of conservation based projects is the incentive dollars often made available through local utilities. The Puget Sound marketplace is extremely active in promoting and providing incentives to assist state municipalities who are interested in implementing conservation programs. UMC will, on our client's behalf, proactively seek out and secure conservation incentive money, federal and/or state grants, rebates, low interest loans, funding for engineering analysis, pass-through tax credits or any other available funding that can help to support each specific opportunity.

Prior experience has shown that the earlier in the process that the incentive provider can be involved the smoother the process will go. Most utilities in the Northwest maintain an experienced and technically savvy staff of conservation professionals who can add insight and experience throughout the development of a project. We have found that it is prudent to involve each utility in project meetings during early phases of the project. This partnering approach improves the overall scope of the project and helps to expedite all potential incentive moneys. Our approach to securing funding from potential incentive providers includes the following steps.

Step 1. UMC contacts applicable utility and/or grant provider in order to outline the parameters of the performance contracting project.

Step 2. Incentive provider requests that a proposal be submitted, or specific forms/application be completed - describing the project, audit plan and calculation methodology.

Step 3. Once the methodology is approved by the incentive provider, the audit and savings calculations proceed as planned. The final study is presented to both the client and the applicable provider.

Step 4. The incentive provider reviews the information provided, and issues a letter of authorization or intent stating the amount and/or type of funding secured for the client's project. The letter may also contain a description of construction deliverables required, as well as a measurement and verification plan that will be required at, or near the end of construction.

Step 5. Following the completion of all construction deliverables and the fulfillment of any required measurement and verification plan, as required by the incentive provider, the client can then expect an incentive payment, typically within four to eight weeks. In the event of a low or no interest loan, the incentive provider will need to approve the measurement and verification plan, and projected savings prior to the start of construction.

UMC uses the above steps and its partnering philosophy to secure incentives for our customers. Some utilities with which we have experience include BPA, Snohomish County PUD, Seattle City Light, Seattle Public Utilities, Puget Sound Energy, Tacoma Public Utilities, Cascade Natural Gas, Washington Water Power, Grays Harbor County PUD No. 1, Chelan County PUD No. 1 and smaller utilities in Washington, Nevada, Alaska and Oregon.

PROJECT STAFF

UMC maintains a highly qualified staff of over 50 energy conservation, design and implementation professionals. Our team includes Project Developers, Energy Engineers, Professional Design Engineers, Project Engineers, Project & Construction Managers, Commissioning Specialists, M&V Specialists, Controls Specialists and Equipment Service/Maintenance Technicians. Personal resumes of some of our key team members are included in the Appendix.

Key members of the project team that will be working on ESPC projects include the following personnel.

- Scott Locke, PE, Leed AP – Manager, Energy Services
  Scott has over 20 years' experience working in the fields of energy conservation and HVAC design; most notably within the performance contracting arena. This includes an extensive history of performing facility energy audits, analyzing potential opportunities, developing Energy Conservation Measures, designing mechanical, electrical, plumbing, controls and lighting upgrades, and working closely with facility owners and operators to identify and develop projects that solve problems and meet specific needs.

- Steve Brooks, PE – Manager, Special Projects
  Steve has over 15 years' experience with UMC and is a current owner. He will provide leadership with project development and senior level engineering.

- Troy Turpin, MME, CEM – Project Developer
  Troy has over thirteen years' experience working in the energy industry serving as Account Executive, Energy Engineer and Project Developer. Troy has experience providing energy efficiency surveys and developing cost-effective facility improvement measures for K-12, higher education, healthcare, large commercial and industrial facilities. Projects have included efficiency improvements in HVAC, building envelope, lighting, motors, water systems, heat recovery, climate control, biomass to energy studies, irrigation systems and control system design.

- CV Nguyen, CEM – Project Manager
  Over twenty years of working in the commercial and industrial construction industry. Experience includes project management, plan/specs and design build budgeting and estimating, field engineering, design review, system commissioning, energy based re-commissioning, and testing & balancing. CV's experience leading & working within varied phases of construction makes him an ideal project manager for successfully developing and implementing technically difficult, performance based projects.

- Ryan Lynn, Project Manager
  Ryan provides over 19 years of experience in the HVAC industry estimating, designing and project management.

- Ian McFarland, Account Manager
  With over ten years of direct, business-to-business sales experience, Ian McFarland has built his career enabling clients in their operational-efficiency goals. His broad base of client experience ranges between the public and private sectors, in both commercial and industrial markets, and as specialized as biotech and retail. Via leveraging sound, logical infrastructure upgrades to reduce operating expenses, Ian is a resourceful tool for executive staff, facilities teams, human resources and environmental health and safety for any organization.

  Ian is a member of the Steering Committee of the AGC's Future Leaders Forum, active in the Seattle 2030 District and a student mentor in the University of Puget Sound's Business Leadership Program.

- Todd Bovey, PE – Engineering Manager
  Todd brings over 30 years of experience in mechanical engineering design and project management. He has expertise in the design of highly complex HVAC, plumbing, and piping systems.

- Daniel Vu – Design Engineer
  Daniel's goal in design is to layout out a system that anyone without the technical background can look at the design and understand the system with no questions. I have over ten years of experience in the design of Health Care, Office Building, Bio-Technology and Industrial Projects.

- Max Harshman, PE – Project Executive
  Max brings a unique blend of construction experience to this project. Max's experience include that he is a licensed Mechanical Engineer, with 15 years of experience as a lead engineer, combined with a proven commissioning experience and project management experience make him a valued asset to the project team. He understands the entire construction process.

- Steve Russo – Manager, Industrial Group
  Project management to include estimating, subcontractor and supplier coordination, equipment and material procurement, pricing and negotiation of contract changes, processing of payment requests/submittals/O&Ms, and project closeout.

- Pat Damitio – VP/COO
  Pat has complete responsibility for the success of all work. With over seventeen years of experience including project management, estimating, planning and scheduling, field engineering, and craft supervision.

EPA'S ENERGY STAR PORTFOLIO MANAGER

Energy Benchmarking of each facility is one of the first steps taken when beginning a feasibility study. UMCs Energy Team makes extensive use of all available benchmarking tools. This includes various programs, among which are our own, tried & true in-house benchmarking program or EPAs Energy Star Portfolio Manager. We have worked directly with numerous customers over the years in providing Energy Star reporting; whether it be for the customers own internal energy reporting needs or for state & local energy rating disclosure requirements. .

PROJECT PROBLEMS EXPERIENCED & REMEDIES

Anyone who has worked within the construction industry knows that issues will inevitably arise on any project. And when those issues do come up, that's when you know the character of the company you are dealing with. UMC takes great pride in meeting all issues head-on and with immediacy. Following are a few examples of our commitment to our customers.

Example 1: In early 2012, upon final commissioning of a newly installed 25,000 cfm air handling unit at a school district on Orcas Island, it was determined that both the inlet an discharge duct configuration was creating more static pressure than desired. This increased static pressure would result in additional fan energy usage. And while the excess usage was not in excess of the energy guarantee, it was obvious that there was still room for improvement. We immediately dispatched

our in-house sheet metal team and re-built the duct configuration with no additional cost to the customer.

Example 2: When an early morning call came in to our energy team concerning a lack of heating in a recently completed project, our project manager immediately took it upon himself to head to the jobsite. A newly installed high efficiency boiler had not come on that morning and the facility was still cold. On the way, he contacted the equipment vendor and the controls manufacturer and made sure that they met him at the site so he could resolve any issue. Once on site, the issue was quickly resolved and training was implemented to make sure it never happened again. The facility has been operating trouble free since.

MAKEUP OF TYPICAL PROJECT TEAM

All of UMCs resources used to develop ESPC projects are located within the state of Washington. Our typical project team is headed by a Project Developer who is the primary person responsible for working directly with the customer to develop and implement a successful project. Directly supporting the Project Developer will be a team consisting of Energy Engineers, Design Engineers, a Project Manager and a Controls Technician. In addition, there is a supporting cast that resides at our Mukilteo office that includes financial experts, project cost estimators, equipment purchasing agents, CAD drafters & designers, industrial & wastewater experts, service & maintenance technicians and a full mechanical fabrication department.

SECTION 3: MANAGEMENT APPROACH

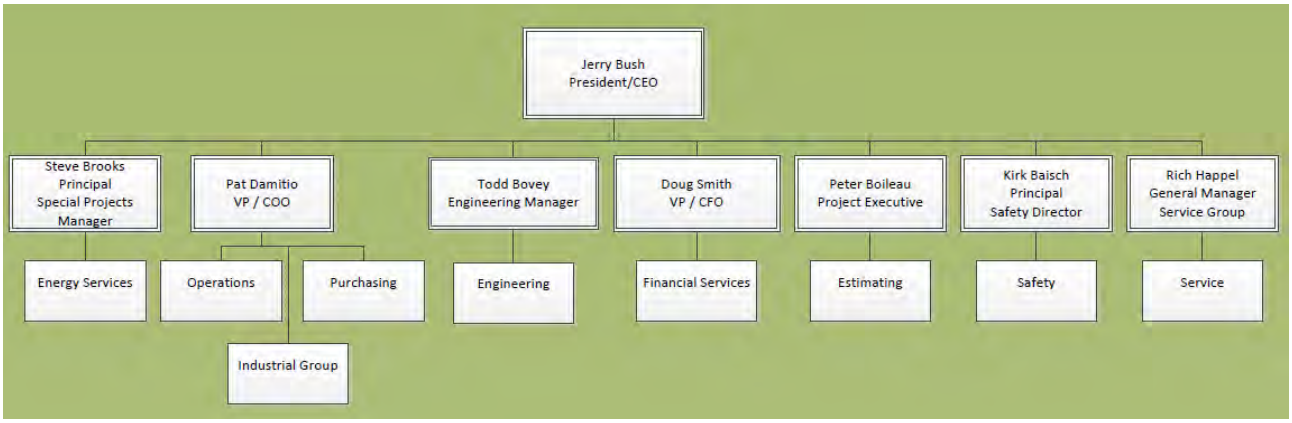
ORGANIZATIONAL STRUCTURE

University Mechanical Contractors, Inc. (UMC) has operated continuously in the Seattle area since 1920. The company is currently under the ownership of four partners, including one member of the fourth generation of UMC's founder. The long-established history of successful company performance and responsible service provides our customers the security that UMC will continue operating in the Pacific Northwest for the next 100 years and beyond.

One key to UMC's success is diversity of services. The company's experience as an energy services provider, a designer, engineering firm, developer, commissioner, maintenance / service provider, and a mechanical contractor assures our customers of a complete, centralized resource from project start to finish.

UMC has a qualified engineering staff with full design/build capabilities. We specialize in design build, design/assist, energy services and plan & specification delivery methods. Such diversity and expertise is rare to find in the Northwest within one single company. UMC is also one of the largest mechanical contractors in the Pacific Northwest and generally operates in the states of Washington, Oregon, Nevada, Hawaii and Alaska. While the company actively pursues work throughout the western United States, our primary home is the state of Washington.

Our current in-house organizational structure, as it pertains to Energy Services, is shown below.



UMC is the right-sized organization for providing a project that best fits the needs or our customers. ***We are locally owned and operated, meaning that all decisions are made in-house***. No need to rely on decision makers who are located in another state (or country) who are not aware of the issues and opportunities here in the Northwest. ***We are completely vendor neutral***; thus able to help customers make the most beneficial and cost effective decisions when selecting important equipment.

MANAGEMENT APPROACH

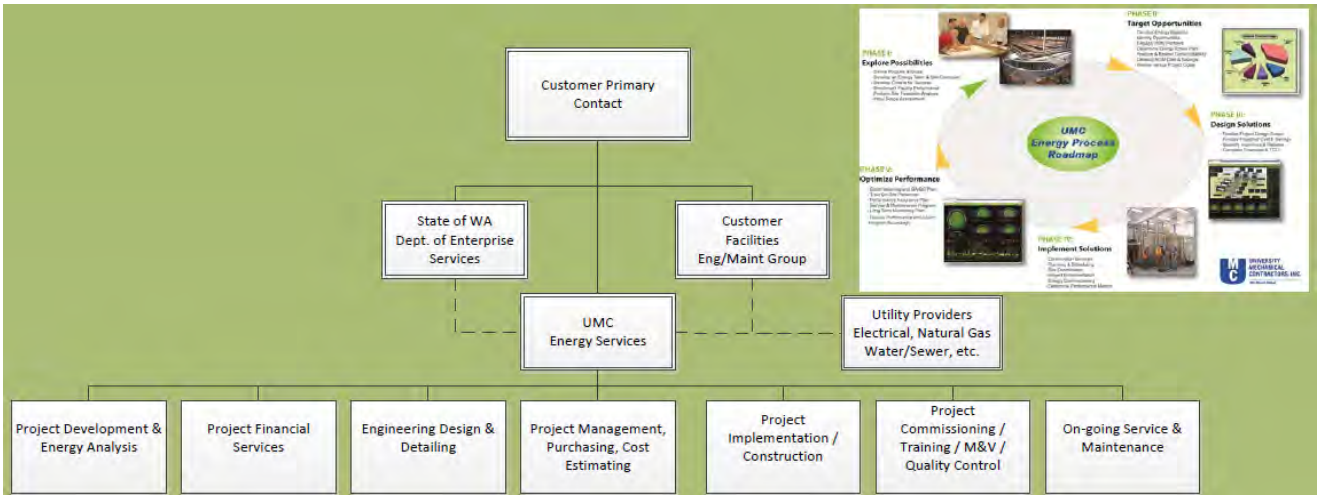
UMC believes that the primary key to success is our ability to consistently perform and deliver quality. As such, we focus on our company mission – "*We Build Value*". Our goal as an Energy Services Provider is to deliver this value to our customers in the form of more energy efficient facilities, improved infrastructure, reduced utility and operational expense, better working

environments, reduced maintenance headaches, improved sustainability, and overall improved building performance.

UMC, as the Energy Services Provider, will supply the leadership, experience, and technical knowledge necessary to guide our customers through the analysis, design, implementation, and verification of a successful project. However, we are only a portion of the team. A truly successful project is comprised of a team that includes members of our customer's facilities group and the Department of Enterprise Services as well. We understand that our customers usually know their current facilities operation and needs much better than anyone, and this knowledge is vital throughout the project development.

To utilize engineering and auditing funds wisely, we will focus on significant and advantageous conservation upgrade alternatives; while efficiently analyzing and dismissing measures that are not viable. ***Constant and ongoing communication will take place daily…not just at scheduled update meetings. This is vital to keeping the project on track and making sure that all parties are involved in the process and completely satisfied with the final product***.

The chart below displays our organizational team approach for Energy Services Projects. This approach has proven very successful for State ESPC projects.



Ongoing and continuous quality management and communication is a core requirement for any UMC project. As such, a single point of accountability will be designated for each project. This will eliminate any concerns or confusion over who to call when questions arise.

UMC Energy Services Team

A highly knowledgeable, well organized team is a necessary requirement for the success of any energy project. Following is a brief description of our team member roles and responsibilities that are involved on each of our projects.

Project Developer

Our Project Developers work directly with customers to understand and develop primary project goals and see that these goals are fulfilled. Primary responsibilities include managing project design/development process, energy engineering and overall project scheduling. Also, facilitates financial program development, provides contractual documentation, and oversees quality process from beginning to end.

Energy Engineer

Works directly with Project Developer to audit, analyze & evaluate projects. Responsible for preliminary schematic design intent (with help of Engineering Design/Detailing Department). Develops and delivers engineering scope intent to Engineering Design team for development of design documents. Works directly with the Project Manager to develop both the preliminary and final cost estimates for project proposal. Develops energy and utility savings estimates. Facilitates teaming with utilities (or others organizations as appropriate) to find and develop incentives/grants/rebates.

Design Engineer

Our design engineers work with the Project Developer and Energy Engineer during the proposal development to provide initial design input for cost estimating purposes. This is typically not developed to the 100% construction document level but to approximately 15%-30% (depending on the needs of the cost estimating team). Completes final design documents as part of design/build effort once proposal/contract has been accepted & signed by customer. Responsible for meeting all State and Local code requirements.

Project Manager

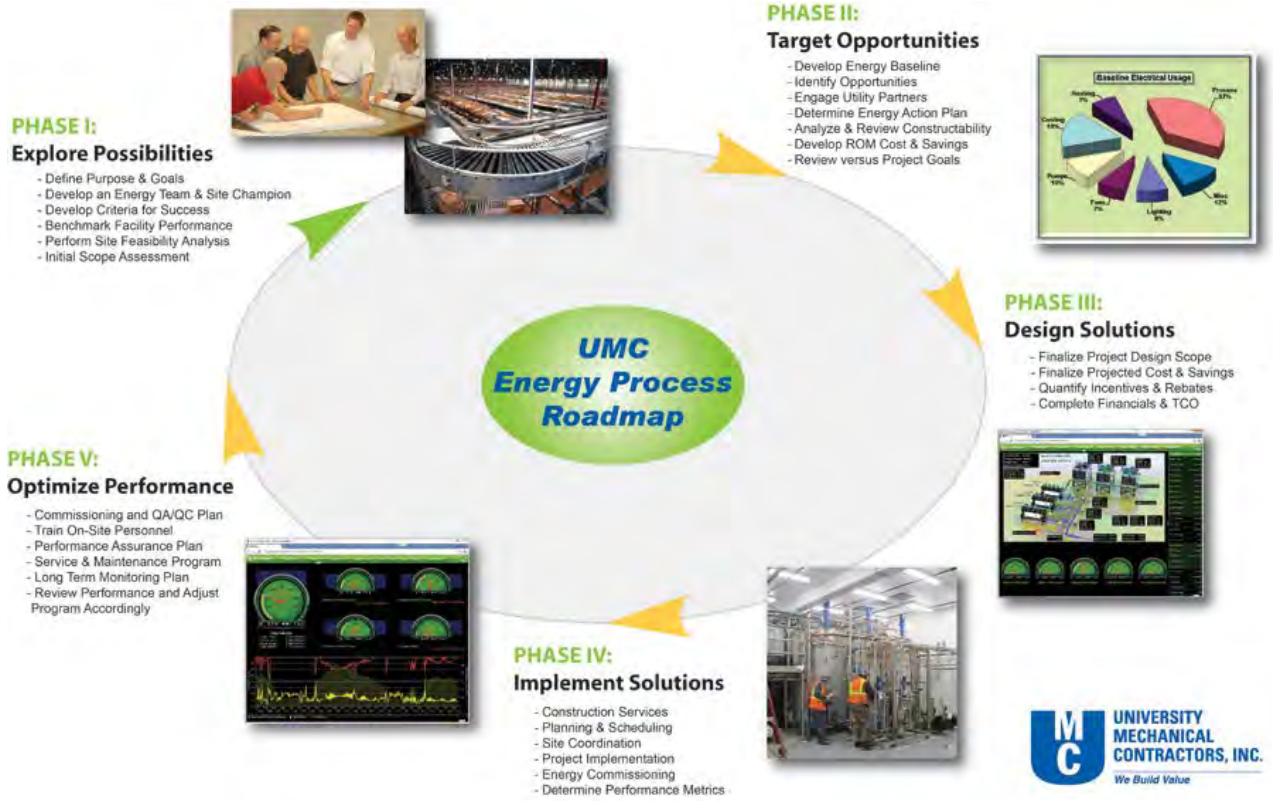
Works directly with Project Development and Engineering Design teams to develop guaranteed maximum cost during project development phase. Must understand scope of work and participate in risk assessment prior to delivery of project proposal to customer. Once project has been accepted by customer, the Project Manager is responsible for all aspects of project construction. Coordinates with Project Development team to make sure all project goals are met. Coordinates with Engineering Design team to complete design documents as required per design/build scope. Coordinates with commissioning and M&V teams to deliver final commissioning and all guarantee requirements. Responsible for all customer training.

Commissioning Lead

Responsible for coordinating, scheduling and delivering all commissioning & energy based re-commissioning requirements for projects. Works directly with the Measurement & Verification Specialist for development and delivery of on-going project guarantee performance M&V requirements.

Measurement & Verification Specialist

Our M&V Specialist work directly with Project Development team to determine and document M&V requirements for project guarantees. Responsible for the development of the project guarantee performance documents that must be included in all project proposals. Responsible for providing all measurement & verification functions as required for pre & post measurements and all development, delivery, and review of M&V documents for customer.



Project Development Process

To insure the success of a project, UMC's development team makes a point to always ***begin with the end in mind***. Project goals are identified and documented at the outset, so that the realization of these goals will be the primary focus from beginning to end…and into the future. The following chart provides an overview of the workflow process associated with each UMC Energy Services Project.

Each UMC energy conservation project starts with a focus on **Phase I – Explore Possibilities:** During this phase, our Development Team assesses the project potential as it relates to realizing specific objectives. Once a project has been identified, the Development Team will take care to enthusiastically guide you through the process and each successive phase of project development.

Phase II - Target Opportunities: Our Development Team will focus resources towards pinpointing the conservation measures that will have the greatest impact on your facility. Most projects are developed with the intent to optimize utility savings, increase energy efficiency, reduce operating budgets, improve occupant comfort, upgrade infrastructure and eliminate deferred maintenance. All while identifying and securing any available outside funding resources (grants, incentives, tax credits, financing).

Phase III - Design Solutions: UMC's team of Professional Engineers, Certified Energy Managers and construction professionals will finalize a plan that converts the "targeted opportunities" into an innovative and cost-effective engineering solution. As the overall project scope is honed to a final implementation plan, the driving financial impact will be measured through the use of a Total Cost of Ownership model.

Phase IV - Implement Solutions: Once the actual construction project begins, it's imperative that the team overseeing the construction has a complete understanding of the project development history. This is why our construction managers are also a part of our Development Team. This way they are involved early in the process and will make sure that the final result meets the documented project goals.

Phase V - Optimize Performance: Once construction is complete, the actual long-term success of a project will depend on the next steps taken. These crucial steps include proper energy commissioning, customer training, ongoing service & maintenance and continuous monitoring of key indicators. Our team will guide you through these steps, and help to implement actions for continued efficiency improvements.

The key steps that UMC's Energy Services Group follows during each of these project development phases are shown in the following table

UMC – Project Development Process	
Phase I – Explore Possibilities	
✓ Define Purpose & Goals ✓ Develop Criteria for Success ✓ Benchmark Facility Performance	✓ Perform Site Feasibility Analysis ✓ Initial Scope Assessment ✓ Develop an Energy Team & Site Champion
Phase II - Target Opportunities	
✓ Develop Energy Baseline ✓ Identify Opportunities ✓ Engage Utility Partners	✓ Analyze Opportunities & Review Constructability ✓ Develop ROM Cost & Savings ✓ Review versus Project Goals
Phase III – Design Solutions	
✓ Finalize Project Design Scope ✓ Guaranteed Cost & Savings	✓ Quantify Incentives & Rebates ✓ Complete Financials & TCO
Phase IV Implement Solutions	
✓ Construction Services ✓ Planning & Scheduling ✓ Site Coordination	✓ Project Implementation ✓ Energy Commissioning ✓ Determine Performance Metrics
Phase V – Optimize Performance	
✓ Commissioning and QA/QC Plan ✓ Train On-Site Personnel ✓ Performance Assurance Plan (M&V)	✓ Pro-Active Service & Maintenance ✓ Long Term Monitoring Plan ✓ Review Performance and Adjust Program Accordingly

MARKETING ESPC PROGRAM

While we are admittedly not a company focused heavily on marketing, relying more on letting our past project speak for themselves through customer "word of mouth", UMC does recognize the inherent value to the community in marketing the opportunities available through the state energy program. State and municipal entities that do not know about the breadth of conservation services and project funding advantages of this program need to be made aware. As such, we do utilize our in-house resources and marketing personnel to develop case studies of successful projects, and to contact current and new customers to continuously promote the state ESPC program.

MINIMUM VIABLE PROJECT SIZE

UMC does not put a minimum size limit on potential projects.

APPROACH TO COMMUNICATION WITH DES ENERGY PROGRAM

UMC seeks to be an excellent teammate with the DES. This precipitates continuous and ongoing communication with the DES Project Manager throughout the course of the project. For ultimate success, it is important that the ESCO and the DES are in full agreement on all aspects of the project. Ideally, this includes discussions prior to meetings with customers to confirm the approach on projects so that any potential issues are resolved in advance.

PROJECT APPROACH FROM MARKETING TO ESPC

UMCs project approach is described above under "Project Development Process".

INSTALLATION METHODS

Once the actual construction project begins, things begin to happen fast. Owners need an experienced and dedicated project manager to maintain control, coordinate installation schedules, oversee quality control, safety requirements, and communicate effectively and efficiently on a daily basis. This is an extremely important aspect of implementing a quality project that meets the requirements and expectations of an Energy Services Performance Contract. This project manager must maintain careful and constant communication with the project team – comprised of the customer, designers, engineers, and subcontractors. Scheduling, coordination and attention to detail is paramount to performing to our own high level of expectation on each project. UMC maintains a strong department of over 40 project managers, project engineers, and construction coordinators that are highly trained and motivated to make each job 100% successful.

Potential subcontractors and equipment vendors are carefully qualified during the project development process to prevent any issues from arising during the construction phase. Typically, multiple bids are required and compared versus exacting standards and specifications that we have developed to make sure that the best value is attained.

UMC will maintain an open-book pricing structure (see attached fee schedule for example) to assure our customers that the services provided are fair and cost competitive. Although actual fees are typically project specific (often based on project size and complexity), our development, design, and project construction fees often fall within a predictable, industry specific range, as shown.

While UMC does have the capability to self-perform mechanical construction, utilizing one of the premier assembly teams in the industry; we do not require that any portion of the work be self-performed. We are willing and capable to work with the customer and the State of Washington to

provide additional bids from other sources for each portion of the work to assure that all aspects of the project are cost competitive.

Delivering Work in a Timely Manner

ESPC projects must often be developed and implemented within a short period of time in order to meet funding source timeframes and seasonal implementation windows; as well as to allow the customer to realize the savings and improved comfort as quickly as possible. UMC is committed to providing the necessary resources and implementing an efficient process that delivers the final project results in a very timely manner. As such, UMC's Energy Service Professionals will always be available to meet these goals.

Procedures for Required Submittals to Dept. of Revenue, Employment Security & Labor & Industries

As a Business conducting business in Washington State, UMC follows all business and project specific requirements for filing documentation and responding to requests required by the Department of Revenue, Employment Security and Labor and Industries. These are typically discussed and determined at the beginning of the project development process.

Identifying and Mitigating Risks Associated with Guaranteed Cost, Savings and Performance

With any Energy Services Performance Contract there is an inherent amount of risk that must be identified and mitigated throughout the development of the project. UMC's extensive background of taking and successfully completing difficult projects has provided us with a wealth of experience at finding and limiting the risks associated with any design/build type of construction project. Whether these risks are construction related, political, legal, financial, design, or contractor/vendor relations, UMC will work to reduce, if not eliminate, these issues.

Construction Type Risks:

- ☑ Hazardous Materials (asbestos; PCB ballast): Any hazardous material situation must be identified during the project audit and scoping phase. UMC audit team will request copies of existing reports identifying hazardous materials on site. We will also check for hazardous materials during the audit and, if located, bring them to the attention of the customer. Once these items have been identified, they can be taken into account during design, project pricing, and implementation planning.
- ☑ Construction Issues (code compliance, equipment delays; non-responsive subcontractor): With any type of construction project there are unforeseen issues that may arise at any time during project construction. With over 90 years of experience in the construction industry, UMC has learned to prepare and react to these issues in a timely and effective manner to reduce impact to project cost and scheduling while adhering to safety, code and regulatory requirements. Often, a contingency plan is implemented as part of the project proposal. This plan can account for contingency funds that can be used to cover issues of this type so that the financials of the project are not adversely affected.
- ☑ Political Risks (lack of support; fear of political fallout if project fails): Given the complexity and unfamiliarity of the process associated with an ESPC, there are often political issues that may arise due to a lack of understanding of this process. UMC has found that continuous education of the appropriate personnel helps to ease this fear and provide for a smoother project.

Whatever the risk may be, UMC has experience finding and mitigating these risks. We assist our customers in all venues necessary to make each project successful.

EPACT TAX CREDIT

Federal tax deductions of up to $1.80 per square foot are available for improving the energy efficiency of existing commercial buildings, government and non-profit buildings through EPACT 179D. EPACT 179D originating as part of the Energy Policy Act of 2005. Third-party certification is required to claim this incentive. UMC will work with Third-party certifiers such as Capital Review Group to facilitate these opportunities as they arise. UMC will work with the customer to best determine the path for capturing this credit on a project by project basis.

APPRENTICESHIP TRAINING PROGRAMS

UMC fully endorses the public works requirements for apprenticeship training as set forth in the RCW (Chapter 39.04.320). The program provides a necessary means of developing new skills and experience for workers. ***With a current apprenticeship ratio of approximately 25%, well ahead of RCW goal requirements***, we continue to exhibit our full support of this program.

SMALL BUSINESS/WMBE PLAN

UMC believes that working with small business partners makes good business sense. Working with small businesses fosters competition, enhances vendor performance and cost efficiencies, brings new ideas and technologies to the table, and helps strengthen our pool of specialized resources. Therefore, it is UMC's policy to solicit, promote, encourage, and provide opportunities for small, disadvantaged, and minority and women-owned small businesses, as well as to veteran-owned small businesses (including service-disabled veteran-owned), businesses located in HUBZones, Historically Black Colleges and Universities, and Minority Institutions.

Our objectives are:

- To encourage the growth of competent small business concerns in the public and private sectors of the economy.
- To ensure that small business concerns are provided maximum subcontracting opportunities on federal, state, local, and commercial contracts awarded to UMC.

Some examples of small disadvantaged businesses that UMC is familiar with and promotes are listed below:

HAMASAKI Consulting Engineering Services LLC. is a Woman-Owned Business Minority Business that offers 3rd party commissioning authority services, mechanical consulting design and third party review.
Blue Mountain Electric, Inc. is a Veteran Owned Small Business Enterprise specializing in electrical construction.
Seven Sisters Electric, Inc. is a Woman-Owned Business Enterprise and could be one of our select electrical contractors.
Barney Electric LLC. is a Certified Small Disadvantaged Business and a Certified 8a Participant that provides electrical installation and contracting services.
J.P. Francis, Inc., is a Minority Business Enterprise, and could be one of our select mechanical contractors.
Lorache CAD/IT Services LLC. is a Certified Small Disadvantaged Business and a Certified 8a Participant that provides painting/patching, CAD and general construction services.

RECYCLING POLICIES AND PROCEDURES

UMC includes recycling as a part of our sustainability efforts. We strive to not only maximize our efforts on the job site and at our various offices but empower our customers to follow our lead on recycling efforts through education. We embrace the US Green Building Council's LEED (Leadership in Engineering and Environmental Design) Program. As such, our design team has experience maximizing the points associated with recycling.

The implementation of our projects include a waste management plan that includes policies and procedures for dealing with the storage, recycling, proper handling and disposal of construction related waste. In addition to this, we look to reduce waste when possible through the re-use of materials as appropriate.

HAZARDOUS MATERIALS AND REMEDIATION

Hazardous materials can often be found on any construction project and pose a safety or health risk if not properly handled. UMC takes the identification and proper handling of hazardous materials very seriously. UMC follows all local, state and federal guidelines for dealing with hazardous materials and updates our company hazardous management plan regularly. Our safety department insures that each project team has available to them the proper knowledge, training and tools to reduce the safety risk associated with the materials. Job site safety meetings are performed regularly and the company has a "no tolerance" policy for personnel violations.

As an example, our employees understand that in the event asbestos is identified in an area we are working, where our work could result in the disturbance of the material any further work is stopped until the material is dealt with properly.

We have extensive experience subcontracting out the abatement of hazardous materials such as asbestos, PCB's, mercury, oil, solvents and other toxic materials.

SECTION 4: COMPUTATION OF ENERGY BASELINE AND POST-INSTALLATION ENERGY USE

COMPUTING ENERGY AND UTILITY BASELINE

When developing an ESPC project, one of the initial requirements is to begin quantifying the historical energy usage and current operating practices of each specific facility in an effort to identify the most suitable energy and utility baseline. This baseline energy consumption is critical in establishing a reference point for future measurement of energy and utility savings.

The development of the utility baseline begins with the site verification of all existing utility service meters (electrical, natural gas, water/sewer, etc). Each of these meters is reviewed to check service areas to make sure that all usage been accounted for from a utility account perspective. Up to three years of historical, monthly energy usage is then compiled for each utility account. Analysis of this utility information is performed to identify trends and anomalies that need to be accounted for prior to establishing the utility usage baseline.

In addition to the utility baseline, a separate baseline of mechanical/electrical systems must be established to confirm the current operation of each system that could be affected by the implementation of the proposed project. Once these system baselines have been developed, they are compared to and balanced against the historical utility baselines to verify the accuracy.

UMC utilizes various methods for computing the system baselines. Primarily, we utilize hand held measurement & metering equipment, portable trending devices, existing building control systems (if available), in conjunction with in-house developed modeling spreadsheets and industry accepted modeling software programs to establish building or equipment annual baseline usage. We utilize sound engineering principles and industry accepted engineering methodology in an effort to provide the best value to our customers and reduce potential risk.

When developing the energy baseline for a campus type situation where individual metering is not available, we begin by gathering the utility bills for the campus and developing the utility baseline as described above. This can then be used to determine an initial expected energy usage per square foot for the entire campus. While the usage per square foot will provide a good preliminary estimate of energy usage for each facility, additional work must be accomplished to account for varying usage for each type of facility. This is accomplished through on site audits, equipment inventories, and monitoring/measurements of each facility to verify the current operating practices. The verification of the individual facility operating practices and development of the energy baseline may include some or all of the following steps.

Step 1. Compile monthly historical utility bills and check for accuracy, trends, and anomalies

Step 2. Perform site audits to quantify energy using equipment

Step 3. Perform interviews with operations/maintenance personnel to understand current equipment operating practices, facility occupancy schedules, system/equipment issues & malfunctions, current best practices, and any other information pertinent to current facility energy usage.

Step 4. Verify the existing equipment and system operation through usage of measuring/monitoring equipment. This could include, among other things, spot measurements of equipment electrical kW load, utilization of any existing sub-meters, short term trending of motor kW, amperage, space temperature, lighting hours of operation, or any other applicable operating variable that is important to developing an accurate baseline.

Step 5. Analyze all information collected and perform an energy balance model for use in comparing to actual historical consumption. This approach allows for very accurate calculations in most facilities. In some larger facilities, sub-metering may be installed if determined to be more cost effective than the above approach.

Step 6. Compare baseline operation to local, state and federal code requirements.

PROPOSING MODIFIED BASELINE SCENARIOS

There are certain situations where a modified baseline may be proposed to the customer. One situation where this scenario may be appropriate can arise when a facility has been operating for the past few years with inadequate ventilation. As a result, the facility will have utilized a deceptively low amount of energy to heat and cool the facility, at the cost of poor indoor air quality. In this circumstance, UMC would bring the issue to the attention of the DES project manager and the customer. One course of action that would then be considered is a modified baseline.

POST-INSTALLATION MEASUREMENT AND VERIFICATION

The realized success of any energy services project is ultimately based on the applicability and reliability of the M&V program that is implemented to confirm project performance. As such, UMC will work diligently to our customers as to the options available for confirmation of the savings. Since the range of M&V options vary between accuracy and cost to implement, it is extremely important that all parties understand which options are most applicable for each measure so that a qualified and informed decision can be made.

UMC follows the typical protocols designated by the International Performance Measurement and Verification Protocol (IPMVP) for defining specific utility baselines as well as calculating and verifying post-installation savings. Each M&V plan is developed individually in an effort to apply the most accurate and cost effective M&V protocol for that specific project. This will be completed in a collaborative and consultative environment.

After each project has been completed, and prior to the implementation of any M&V related measurements, project specific site verification and commissioning is completed. This process confirms that all proposed upgrade measures have been installed and are operating as proposed. Once this has been completed, and upon the date and frequency outlined, we perform all measurements as mutually agreed upon in the proposal. We then submit an M&V report that quantifies the operation of the equipment following the implementation of the project and thus quantifies the projected savings. This post-installation report is reviewed in person with the owner to identify any potential issues and answer questions that may arise.

SECTION 5: SAVINGS AND EQUIPMENT PERFORMANCE GUARANTEES

PROJECT COST GUARANTEE POLICIES

All proposed costs that UMC provides as part of an Energy Services Performance Contract are based on a not to exceed guaranteed maximum price. Requests for additional funds or change orders will not be allowed unless the modifications are requested or accepted by the customer. If the cost of work exceeds the guaranteed maximum price for implementation, the customer is not responsible for covering these additional costs.

These prices will be not be revised unless the owner decides to make changes to the scope of the project, or project exclusions or unforeseeable latent conditions are identified that effect the proposed project. In the event that the project scope must be revised due to one of these conditions, UMC will work with the customer to determine cost effective alternatives that will meet the project budget while maintaining the intent of the Energy Services project.

ENERGY SAVINGS GUARANTEE POLICIES

All Energy Services Performance Contracts performed by UMC Energy Services include a full energy savings guarantee. The energy savings is identified at the time of the proposal and the guarantee is placed at up to 95% of the calculated savings. All proposed guarantee percentages are discussed up front to help the customer understand any risks associated with this guarantee.

All energy savings guarantee are based on units of energy or utility usage (kWh, therms, gallons, etc), not specific dollar savings. The applicable dollar savings are calculated based on the utility rate structures in place and defined in the utility baseline. All savings in excess of the guaranteed savings are the sole property of the customer. The timetable for compiling and reporting the ongoing savings are defined in the proposed contract. This can vary from monthly, to quarterly, to annual reconciliation.

In the event that changes are incurred within the facility, UMC requests that the customer notify us within 30 days of any:

- Physical Change to operating schedules, strategies, equipment and conditions in the Facility from those described in the Contracted Baseline data.
- Any other Physical Changes in or at the Facility that may increase or decrease energy usage, including without limitation: changes in operations, business conducted, occupancy, hours of operation, and energy consuming equipment and malfunctions, failures and related changes in energy consuming equipment.
- Any damage to, or destruction of, the installed equipment.

If changes occur within the facility that affect the operation & energy utilization of the equipment installed as part of the ESPC, baseline modification may be required. UMC will work closely with the customer to make the baseline modifications based on sound engineering principles.

UMC will diligently monitor facility energy utilization as defined in the M&V contract in an effort to identify any potential issues that could affect the project savings performance at the earliest possible moment. Once a potential issue is identified, we will focus our efforts on correcting the

issue as quickly as possible to restore the system's operating efficiency. In the event that an issue cannot be resolved in an acceptable manner, we will compensate our customer for the measured energy savings shortfall.

EQUIPMENT PERFORMANCE GUARANTEE POLICIES

As part of any ESPC project, UMC will coordinate with equipment manufactures and owners to implement and adhere to the best available extended warranty offered. In some cases, simply coordinating the type of equipment purchased (such as is the case with lamps & associated ballasts) can lead to a better warranty. UMC also provides guarantees on mechanical systems fabricated in house. As new equipment is installed, we will coordinate and manage factory start up and training to assure that the customer understands ongoing operating requirements of the system.

UMC's Service Group (which is MSCA Greenstar certified) can also assist in maintaining service requirements and preventative maintenance that are required by manufacturer's warranties and that will assist it extending the longevity and efficient operation of vital facility infrastructure. UMC maintains a highly qualified staff of service personnel, including dedicated project managers.

In the event that there are equipment issues that occur beyond the warranty date, UMC will work with the customer to help identify the best means of resolving the problem. This can often be accomplished most easily when UMC has a remote monitoring window into the equipment control system. The first step is always to help identify the root cause of the issue and then find and implement the appropriate solution.

SECTION 6: FINANCING ABILITY

The first step to project financial development is to find and capture every available source of funding that will provide a benefit for our customer - essentially expanding the scope of the overall project. In our minds, leaving a source of funding on the table, no matter how small, isn't acceptable. To this extent our team will have the primary responsibility of identifying these available sources; working with the customer, the State of Washington and the funding supplier to properly facilitate all requirements.

Project Financing Financial Conduit

UMC maintains partnerships with local and national financing companies that specialize in providing recommendations and competitive lending rates as part of any Energy Services Performance Contract. These companies can be selected through a partnership or a competitive financing RFP based on interest rate and services. We will facilitate and oversee this process. However, in most cases the actual financing contract is directly between the customer and the selected financial institution.

UMC Ability to Finance Project Costs

UMC works with third party lenders as the primary source of funding for the majority of projects. We understand that in most cases the professional services portion of the project costs is not available during the development phase of projects. This cost is required to be funded by the ESCO until the project funds are released, which is normally during the construction phase of the project. We also realize that there is a real cost associated with carrying that debt for an extended period of time. We will work with the customer and the State of Washington to determine if it is appropriate to charge a nominal fee associated with the servicing of that debt, in the form of an interest rate applied to the principal over a defined period of time.

UMC maintains the financial ability to fund an entire project in select situations although it is not our primary interest of focus. In the event that the total project cost is financed by UMC, we will work with the customer and the State of Washington to determine the appropriate interest rate and structure of the loan that meets the current interest rates and loan structures typically available in the market place at the time of the project.

Funding Source

UMC will meet with our customers regularly during the development of the project to assure that we are working in conjunction with funding sources to meet the ultimate objective (begin with the end in mind). There are many funding sources that are considered and taken into account for each potential project; some of these funding options include, Owner Capital, Bond Issuance, State Energy Loan Program, 3rd Party Financing, Tax Exempt Municipal Lease, Clean Renewable Energy Bonds, Production Tax Credits, Bonneville Environmental Foundation Grants, Operating Lease, Pass thru Tax Credits (EPACT 2005, CREBS, Production Tax Credits, etc) and local Utility Incentives…just to name a few.

Lenders that we are familiar with and have used in the past include:

- Key Bank
- Bank of America
- Wells Fargo

- GE Capital

(Please see the attached letters of commitment from Key Bank in the Appendix).

Pass thru Tax Credits

Universities, Local Municipalities, State Agencies, and not for profit institutions do not have a tax liability; therefore they do not qualify for a tax credit directly. However lending institutions as well as design/construction professionals involved in the project may have a tax liability that in some cases can be leveraged to act as a shared or "pass-thru" partner so that the project does realize the tax credit benefit. This is common for the tax exempt municipal lease as well as the clean renewable energy bond (CREBs) where the lending institution themselves are able to take the tax credit in exchange for providing the competitive low interest loans.

For Federal, state, or local government buildings, the Energy Policy Act of 2005 allows for the person or company primarily responsible for designing the upgrade to the facility to realize the tax credit therefore to act as a "pass-thru" partner for Utility Conservation Opportunities.

Utility Support and Funding

To reduce the initial cost of a project, UMC will secure conservation incentive money by working directly with the applicable utilities. We will also seek any audit and design assistance money that could be available to help fund that portion of the project. We have found that it is prudent to involve the utility with project meetings during each phase of the project. The partnering approach eliminates end-of-project conflicts regarding funding levels, and will help to expedite the final incentive payments to the customer. This funding can be applicable to electrical, natural gas and water/sewer utility providers.

SECTION 7: APPENDIX

1. SAMPLE PERFORMANCE CONTRACTING PROJECT TO INCLUDE:
    A. PRELIMINARY AUDIT FINDINGS
    B. AUDIT PROPOSAL
    C. MEASUREMENT AND VERIFICATION PLAN INCLUDING KEY VARIABLES TO BE MEASURED
    D. INVESTMENT GRADE AUDIT FINDINGS
    E. ENERGY SERVICES PROPOSAL WITH DETAILED COST BREAKDOWN
    F. MEASUREMENT AND VERIFICATION REPORT
2. PROJECT STAFF / RESUMES
3. PROJECT STAFF / RESUMES
4. FUNDING SOURCE – LETTERS OF COMMITMENT
5. FEDERAL FORM 330
6. UMC COMPANY INFORMATION

ITEM 1: SAMPLE PERFORMANCE CONTRACTING PROJECT

UNIVERSITY MECHANICAL CONTRACTORS, INC.
We Build Value

Orcas Island School District
No 137

ENERGY SAVINGS PERFORMANCE CONTRACT INVESTMENT GRADE AUDIT FOR ORCAS ISLAND SCHOOL DISTRICT ELEMENTARY SCHOOL UPGRADES

PREPARED BY
UNIVERSITY MECHANICAL CONTRACTORS, INC.
October 22, 2010
(Updated December 6, 2010)

Final Draft

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7.0 IMPLEMENTATION PLAN

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1.0 EXECUTIVE SUMMARY

University Mechanical Contractors, (UMC), is pleased to have the opportunity to present this Investment Grade Audit for Orcas Island School District (OISD). The scope of this project is focused on reducing energy usage and improving the educational environment at the OISD Elementary School. After performing a complete audit and analysis of these this facility, we have worked directly with OISD and the state of WA General Administration to develop an energy conservation and facility upgrade program. When implemented, this program will provide the following benefits.

Energy and Water Conservation Benefits:

1. **203,266 kWh (694 million Btus) of annual energy savings. This equates to $13,300 / year at current utility rates**
2. **34,200 gallons of annual water savings. This equates to $581 / year at current utility rates**
3. **Estimated BPA conservation incentives of $40,600**

Atmospheric Benefits:

This Project will eliminate	**200,420**	**lbs CO_2 / Year from the atmosphere**
This is the Equivalent of Planting	**4,478**	**Trees**
...Or...Removing	**13**	**Cars from the Road**

Health and Life Safety Benefits:

1. **Improves indoor air quality at the Elementary**
2. **Improves water quality at the Elementary School**
3. **Reduces possibility of water leaks in the Elementary School crawl space that could lead to mildew & mold growth**
4. **Improves comfort for students and staff**
5. **Improves learning environment by reducing noise in the classrooms at the Elementary School**

Facility Infrastructure Benefits:

1. **Replaces an outdated HVAC system at the Elementary School with a new, efficient positively pressurized VAV system**
2. **Replaces a failing domestic water distribution system at the Elementary School**
3. **Replaces all inefficient water fixtures (water closets, urinals & faucets) with new high efficiency units**
4. **Provides new HVAC direct digital control (DDC) system at the Elementary School**

UMC is pleased to provide this project that meets the initial goals and provides substantial benefits to OISD. The estimated project investment, estimated utility incentive, and guaranteed utility consumption savings resulting from the project's implementation are shown in the following table.

Savings and Investment Summary

Utility Conservation & Facility Upgrade Measures	Annual Savings (1) $	Estimated Operational Savings $	Projected Utility Rebate (2) $	Guaranteed Project Cost $	Simple Payback Yrs
UCM-2: Water Conservation Upgrades	**$ 2,525**	**$ 450**	**$ -**	**$ 41,371**	**13.9**
	$ -			**$ -**	
UCM-3: Elementary School HVAC Upgrade	**$ 13,311**	**$ -**	**$ 40,653**	**$ 1,080,597**	**78.1**
	$ -			**$ -**	
UCM-5: Domestic Water Piping Upgrade (Elementary School)	**$ 581**	**$ 5,700**	**$ -**	**$ 345,007**	**54.9**
	$ -	$ -	$ -	**$ -**	
	$ 16,417	**$ 6,150**	**$ 40,653**	**$ 1,466,976**	**63.2**
Construction Contingency				$ 117,800	
Re-Commission Repair Contingency Budget				$ -	
Subtotal				**$ 1,584,775**	

Notes:
(1) Annual utility savings ($) are based on current utility rate schedule
(2) Rebates & Incentives are estimated, but not guaranteed

We are excited to be the Energy Service Company (ESCO) partnering with OISD and will continue to work collaboratively with the District in planning, developing and implementing a seamless project that achieves the financial, facility, engineering, and operational objectives.

2.0 EXISTING CONDITIONS

2.1 Facility Description & Overview – Orcas Island Elementary School

Overview:
The Orcas Island Elementary School is a 27,394 square foot, two level wood structure with a brick façade. The facility was constructed in two separate phases, with the original facility (including the entry, administration and the most southern classrooms) built in the early 1950's. A subsequent section (on the north end of the facility) was constructed in 1992, at the same time as the new high school construction.

Mechanical Systems:
Heating for the facility is provided through electrical resistance heating. The original structure has one air handling unit (AHU) per floor to provide a mixture of ventilation and return air to the classrooms and administration area. These AHUs are located directly above the girl's restroom and supply air through a distribution duct located in the center of the hallway. Supply air is distributed from this central duct, through an electric resistance coil heater and dispersed to each classroom from a side wall diffuser. Ventilated light fixtures are used to return air into the ceiling space that is used as a return air plenum back to each main AHU.

Heating for the elementary school's newest addition is provided through unit ventilators located above the ceiling in each classroom. Each unit has a supply fan that draws a mixture of outside & return air across an electric resistance heater before discharging the air into the space via ceiling diffusers. The return air is ducted, through a ceiling grill, back to the main unit ventilator.

There are also additional electric resistance radiators located in hallways, stairwells, restrooms, and select office spaces.

Domestic hot water (DHW) requirements are provided through a single electric heater located in the exterior mechanical room.

Energy Management Systems:
The original facility heating system is controlled primarily through stand alone electronic thermostats in the individual classrooms/offices. The AHUs and unit ventilators located in the newer addition are controlled via remote Honeywell programmable thermostats located in a first floor storage space near the elevator. Each of these thermostats must be reset by hand to accommodate schedule changes.

Lighting:
The lighting for this facility is principally fluorescent fixtures with 32 watt, T8 lamps and electronic instant start ballasts throughout. There are still a few locations (particularly storage spaces, mechanical rooms and custodial closets) where the fixtures utilize T12 lamps and magnetic ballasts. Information provided through lighting loggers located in selected areas indicates that employees are doing a good job of turning lights off in areas that are not occupied continuously.

Water Fixtures:
Water fixtures serving the facility are primarily high flow fixtures, consisting of 3.5 & 4.5 gpf water closets, 1.0 & 1.5 gpf urinals and 2.0 & 2.2 gpm faucets.

Identified Operational Issues:

1. The existing domestic water system within the old section of the Elementary School is comprised principally of galvanized piping which has become corroded over the years This is causing numerous issues within the school including (1) an overall lack of pressure throughout the distribution system, (2) undrinkable rust filled water delivered from sinks and (3) ongoing issues with leaks throughout the system – especially within the crawl space beneath the facility (where the main distribution is located).

2. Previous leaks have flooded the crawl space. These leaks, along with the lack of airflow in the crawl space, have resulted in a damp, musty environment that could potentially facilitate mildew or mold growth.

3. The HVAC air distribution system does not currently provide adequate ventilation air due to lack of operational control of outside air dampers. This includes both the unit ventilators and the AHUs. All dampers that were audited had failed in the full recirculation air mode. Carbon Dioxide (CO2) monitoring was used to confirm the lack of ventilation air in two select classrooms. CO2 generated from occupants disperses well within the space and is a good indicator of outside air ventilation. The levels of concentration in the classrooms reached 1,200 ppm within 30 minutes of occupancy. This is a higher than desired level for a classroom.
4. The two AHUs located in the ceiling space above the girl's restrooms are extremely noisy and distracting to every day classroom activity.
5. The ceiling space is utilized as a return air plenum. This space is very dirty and is not filtered before being returned to the AHU. The result is that this dirt if blown back into the classrooms. Some occupants have installed makeshift filters at the diffusers to their rooms in an attempt to mitigate this issue.

6. The operable windows are fairly loose and do not have adequate weather-stripping.
7. The doors do not have any weather-stripping and do not close tightly.
8. The second floor ceiling is insulated with blow-in insulating fill directly between the rafters. Over the years, this insulation has moved around resulting in some areas that have minimal coverage.

3.0 FACILITY AUDIT & ANALYSIS

3.1 Utility Data Analysis

Utility Suppliers

The individual utility suppliers are listed below.

Electricity

Orcas Power & Light provides electricity. The observed blended rate is $0.0668/kwh at the Elementary School. The detailed baseline utility rate is shown in Section 6.

Water

Water is provided through the Eastsound Water Users Association. The current combined rate is $17.00/1,000 gallons (for all monthly water use in excess of 8,750 gallons). The detailed baseline utility rate is shown in Section 6.

Electric Utility Data

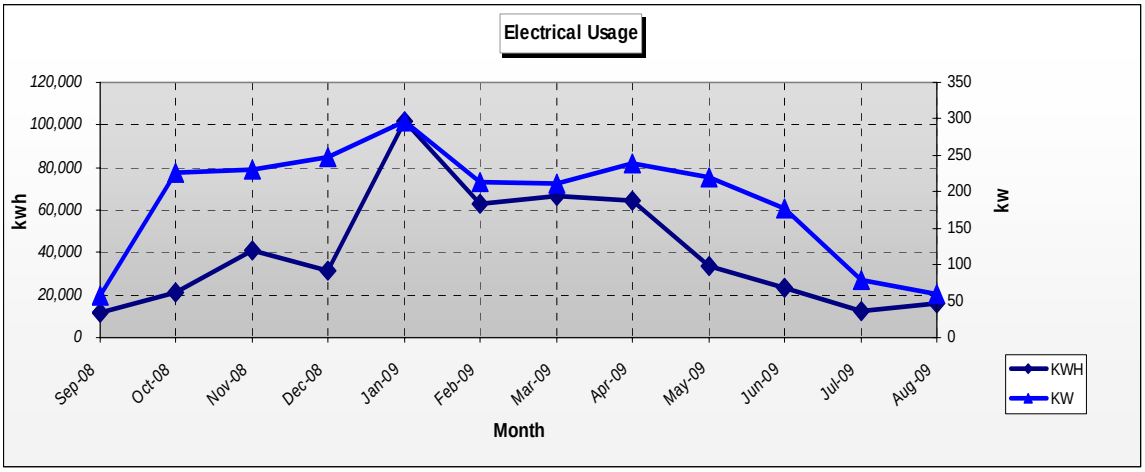
The electric service is provided to the district through four separate meters. These meters and their associated service areas are listed below.

Meter #04003360	Serves: Elementary School & Old Gym
Meter #93549566	Serves: High School
Meter #93549567	Serves: Middle School, Cafeteria & Library
Meter #83335444	Serves: Maintenance Shop

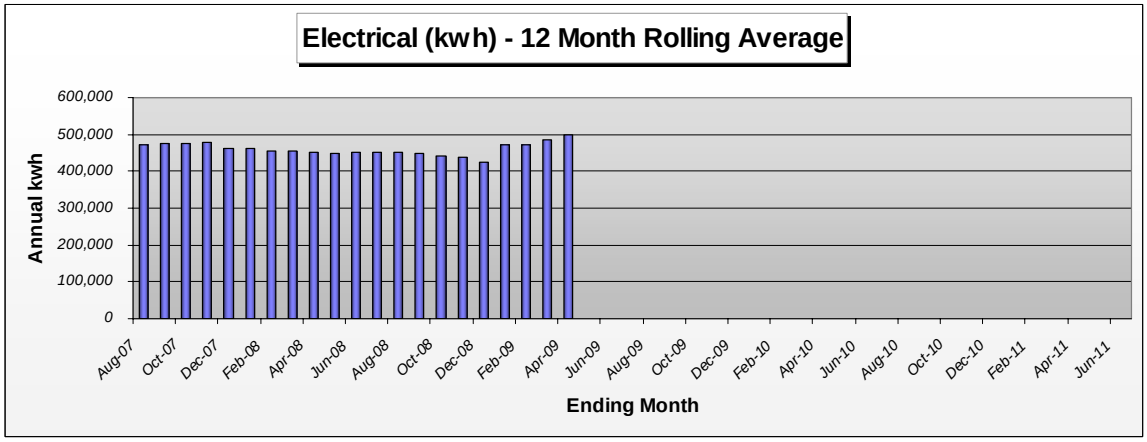
Elementary School Electrical Usage

Throughout the 3 year period starting September 2006 and ending August 2009, the Elementary School consumed an average of 470,453 kWh/year of electricity. The average annual electric demand for the same period was 2,277 kW, with a monthly peak of 296 kW in January of 2007 and a monthly low of 48 kW in August 2007.

The following charts shows historical electric consumption and demand from September 2008 through August 2009. This chart follows a typical seasonal electrical utilization curve for a K-12 facility that utilizes electricity as it's primary heating source.

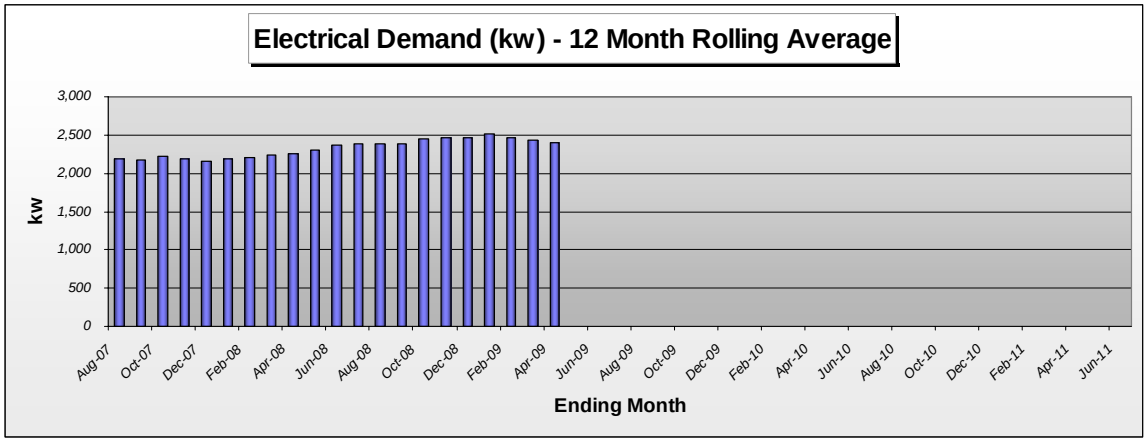


One method, to illustrate the upward or down ward trend of utility usage over a long period of time is through the use of a 12-month rolling average chart (shown below). Each bar on the following charts represents the total kW or kWh for the previous 12 months (including the month noted on the x-axis).



The primary point of interest in the chart above is the upward trend in annual kWh that has occurred since May of 2009. Since that time the annual energy usage has increased by about 75,000 kWh/yr. At this time, it is unknown whether this energy increase is continuing or has leveled out. Although the weather fluctuations have had some effect on this electrical increase, they do not appear to be the primary cause.

The following chart shows that the demand rolling average during the same timeframe. The electrical demand has continued on an upward trend over the last three years; although this trend has dropped off slighting over the last three months. This trend is most likely due to the continued increase in plug load equipment utilized within the facility.



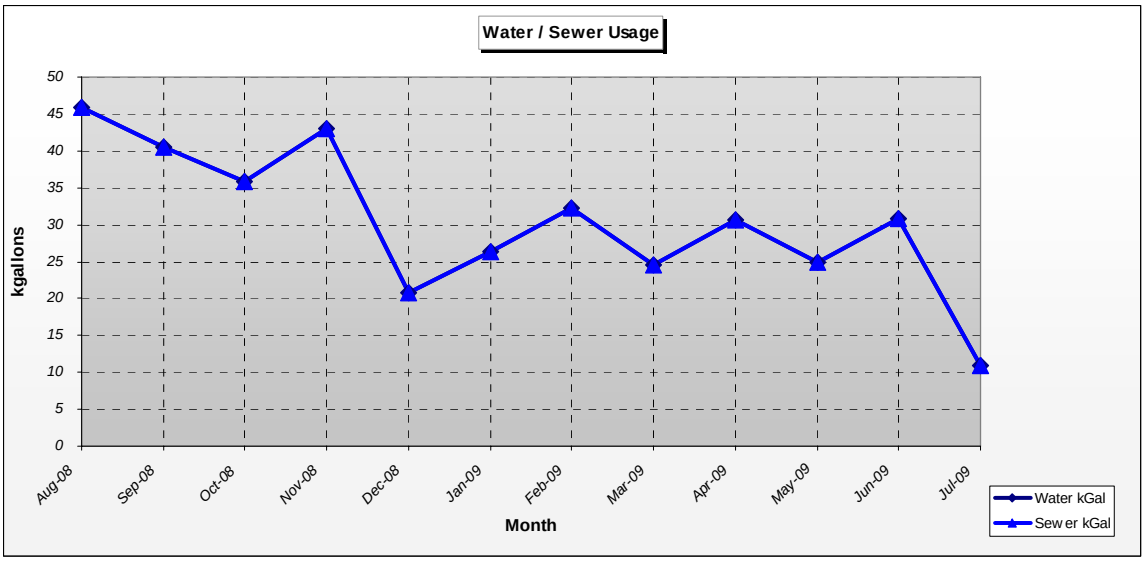
Water/Sewer Utility Data

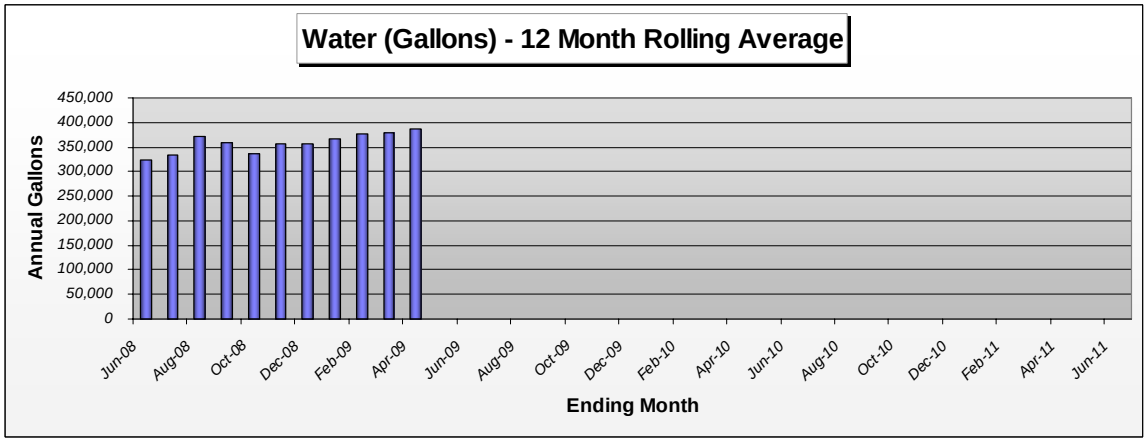
The water service is provided to the district through six separate accounts. These accounts and their associated service areas are listed below.

Account #04-0500	Serves: Elementary School, Old Gym, District Office & Library
Account #04-0561	Serves: High School
Account #04-0550	Serves: Middle School & Cafeteria
Account #04-0525	Serves: Middle School & Cafeteria (abandoned in 2007)
Account #04-0575	Serves: Playfield drinking water (used Aug-Nov)
Account #06-0135	Serves: Irrigation (no longer used; field now irrigated by on-site well)

Elementary School Water Usage

The following charts show historical water consumption from August 2008 through July 2009 and the 12 month rolling average usage from June 2008 to July 2009. The annual water usage for the last 12 months was 366,400 gallons. As can be seen from the rolling average, the usage has continued to increase slightly over the last 2 years





Energy Use Index

The Energy Use Index (EUI) is a method used to compare the energy usage between similar facilities in geographic regions throughout the United States. This EUI is a measure of the total energy usage (in British Thermal Units – Btu) divided by the total square footage of the facility. The EUI for the Elementary School is shown in the following section for both the current historical utility baseline and for the modeled (adjusted) baseline. For comparison purposes, a good target EUI for an all electrical school in western Washington is about 38,000 Btu/sqft/yr.

3.1 Building Baselines

For the purposes of this project, the proposed electrical usage Baseline utility consumption for Orcas Island school district is described in this section. As

described in Section 2 – Existing Conditions, there are numerous operational issues at the Elementary School that must be taken into consideration when determining the expected annual energy usage baseline for these facilities. These issues include a lack of code required ventilation air (provided by the HVAC system), and numerous operating inconsistencies with fan operating schedules (some that have been turned off at the electrical breaker serving the equipment). This prevents the historical utility bill usage from providing an accurate comparative baseline for future expected usage (following the implementation of the proposed Utility Conservation Measures).

Elementary School Baseline

The baseline development for the Elementary School is proposed as follows. Starting with the existing actual utility usage for the historical electrical usage provided. This historical usage is shown in the following table.

Historical Utility Usage					
MON - YR	**KWH**	**KWH $**	**KW**	**KW $**	**ELECTRIC $**
Sep-08	11,360	$742	58	$61	$803
Oct-08	21,440	$1,327	226	$331	$1,658
Nov-08	41,120	$2,468	230	$339	$2,807
Dec-08	31,680	$1,921	248	$367	$2,288
Jan-09	101,760	$5,985	296	$444	$6,429
Feb-09	62,720	$3,721	214	$313	$4,034
Mar-09	66,880	$3,962	211	$308	$4,270
Apr-09	64,480	$3,823	238	$352	$4,175
May-09	33,920	$2,051	219	$321	$2,372
Jun-09	23,680	$1,457	178	$254	$1,711
Jul-09	12,480	$807	78	$94	$901
Aug-09	16,160	$1,079	59	$74	$1,153
Subtotals	**487,680**	**$29,343**	**2,255**	**$3,258**	**$32,601**
Units/Sqft	**17.80**	**$ 1.07**	**0.08**	**$ 0.12**	**$ 1.19**
Energy Use Index (EUI) for this Facility:			**60,760**	**btu/sqft**	

The actual operating characteristics for the Elementary School were modeled (Using Trane Trace 700) and then modified to determine the expected annual operating usage when the appropriate OA ventilation rates were applied to the HVAC equipment. This modified baseline is shown in the proposed baseline table below.

Elementary School – Proposed Electrical Usage Baseline

Modeled Baseline Adjustment (allowing for design ventilation)						
MON - YR	**KWH**	**KWH $**	**KW**	**KW $**	**ELECTRIC $**	**HDD**
Sep-08	32,639	$2,024	68	$98	$2,122	123
Oct-08	42,390	$2,628	264	$383	$3,011	405
Nov-08	79,932	$4,956	269	$389	$5,345	468
Dec-08	83,691	$5,189	290	$420	$5,609	864
Jan-09	77,646	$4,814	346	$501	$5,315	797
Feb-09	62,888	$3,899	250	$362	$4,261	649
Mar-09	72,423	$4,490	246	$357	$4,847	714
Apr-09	55,661	$3,451	278	$403	$3,854	465
May-09	32,474	$2,013	256	$371	$2,384	273
Jun-09	26,140	$1,621	208	$301	$1,922	70
Jul-09	9,600	$595	91	$132	$727	29
Aug-09	10,368	$643	69	$100	$743	36
Subtotals	**585,852**	**$36,323**	**2,633**	**$3,818**	**$40,141**	**4,893**
Units/Sqft	**21.39**	**$1.07**	**0.08**	**$0.12**	**$1.19**	

Energy Use Index (EUI) for this Facility: 72,991 btu/sqft

Elementary School – Proposed Water Usage Baseline

Water Usage		
MON - YR	**Water kGal**	**Water $**
Aug-08	45.80	$698
Sep-08	40.50	$608
Oct-08	35.80	$528
Nov-08	43.00	$651
Dec-08	20.70	$271
Jan-09	26.40	$368
Feb-09	32.20	$467
Mar-09	24.60	$338
Apr-09	30.70	$441
May-09	24.90	$353
Jun-09	30.80	$443
Jul-09	11.00	$107
Subtotals	**366.40**	**$5,273**

The water and sewer Baseline utility consumption shall be as described below. This Baseline facility utility consumption will be used as the reference with which future years' utility usage will be compared while monitoring the Guaranteed Savings. HDD stands for Heating Degree Days and are based on a balance point of 65 degrees F. This is a measure of relevant weather that can be used to correlate monthly usage with previous or subsequent years.

Baseline Operating Practices

The operating practices during the Baseline period determine the utility consumption shown in the Tables shown above. The information in the following tables outlines the operating characteristics that were in effect during the Baseline period, as determined during the Investment Grade Audit.

Existing Operating Characteristics:

Elementary School - Existing Equipment Annual Operating Hours (all AHUs) Annual Operating Hours = 1,882				
Day of Week	Sept - June Run Hours	July – August Run Hours		
Monday	7:00 am to 3:00 pm	Off		
Tuesday	7:00 am to 3:00 pm	Off		
Wednesday	7:00 am to 3:00 pm	Off		
Thursday	7:00 am to 3:00 pm	Off		
Friday	7:00 am to 3:00 pm	Off		
Saturday	Avg 4 hrs/day override	Off		
Sunday	Off	Off		
Holiday	Off	Off		

Elementary School and High School - Existing Heating/Cooling Operating Set point Temperatures				
Day of Week	Occupied Degree F (Heating/Cooling)	Unoccupied Degree F (Heating/Cooling)		
Monday	70 / NA	55 / NA		
Tuesday	70 / NA	55 / NA		
Wednesday	70 / NA	55 / NA		
Thursday	70 / NA	55 / NA		
Friday	70 / NA	55 / NA		
Saturday	70 / NA	55 / NA		
Sunday	70 / NA	55 / NA		
Holiday	70 / NA	55 / NA		

Additional Baseline Information (Existing Operation)

- Annual Operating hours associated with lighting fixtures are as defined by the lighting savings spreadsheets (Appendix)

- The existing ventilation air for the Elementary School is well below the proposed minimum code requirements. An existing baseline adjustment has been made via the modeled utility bill operating characteristics.

Proposed Operating Characteristics:

Elementary School - Proposed Equipment Annual Operating Hours (all AHUs) Annual Operating Hours = 1,882				
Day of Week	Sept - June Run Hours	July – August Run Hours		
Monday	7:00 am to 3:00 pm	Off		
Tuesday	7:00 am to 3:00 pm	Off		
Wednesday	7:00 am to 3:00 pm	Off		
Thursday	7:00 am to 3:00 pm	Off		
Friday	7:00 am to 3:00 pm	Off		
Saturday	Avg 4 hrs/day override	Off		
Sunday	Off	Off		
Holiday	Off	Off		

Elementary School and High School - Existing Heating/Cooling Operating Set point Temperatures				
Day of Week	Occupied Degree F (Heating/Cooling)	Unoccupied Degree F (Heating/Cooling)		
Monday	70 / NA	55 / NA		
Tuesday	70 / NA	55 / NA		
Wednesday	70 / NA	55 / NA		
Thursday	70 / NA	55 / NA		
Friday	70 / NA	55 / NA		
Saturday	70 / NA	55 / NA		
Sunday	70 / NA	55 / NA		
Holiday	70 / NA	55 / NA		

Additional Baseline Information (Proposed Operation)

- Annual Operating hours associated with lighting fixtures are as defined by the lighting savings spreadsheets (Appendix)

4.0 PROPOSED SCOPE OF WORK

4.1 Scope of Work

The following is a detailed description of each energy conservation measure (ECM) that is being recommended as part of this proposal.

UCM-2 Water Conservation Upgrades
Overview of Current Situation
The domestic water fixtures currently in use throughout both the Elementary School are primarily high flow fixtures. The Elementary school has a combination of wall mounted flush valve water closets & floor mounted tank top water closets that utilize between 3.5 & 4.5 gallons per flush (gpf), urinals that utilize 1.5 gpf and sink faucets with 2.2 gpm aerators (or no aerators at all). By today's standards, these our very high flow, outdated technology for commercial domestic water fixtures.
Recommendations
All existing water closets and urinals will be replaced with new, state of the art, ultra low flow fixtures that will utilize 1.28 gpf and 0.125 gpf respectively. In addition, the existing sink faucets in all public & private restrooms will be replaced with new 0.5 gpm water faucets and new 1.0 gpm aerators will be installed in all sinks that are located in classrooms. This will provide a 65% reduction in water usage per flush for water closets and a 90% reduction in water usage for urinals. Due to existing pressurization and leak issues with the old, galvanized domestic water piping serving these fixtures, this measure can only be implemented if the DW distribution piping is also replaced as part of this project (see Measure 3). This will assure that there is adequate pressure to flush these low flow fixtures appropriately, as well as providing appropriate water quality for students & faculty
Benefits (Including Occupant Health & Safety)
• Greatly reduces the ongoing water usage associated with the domestic water fixtures • Provides new fixtures throughout both facilities • Reduces leaks associated with existing fixtures and sink faucets.

UCM-3 Elementary School HVAC Upgrade

Overview of Current Situation

The existing Elementary School Heating & Ventilating system consists a combination of two (2) constant volume AHUs serving the original school classrooms, eight (8)constant volume unit ventilators (installed in 1993) serving the new addition classrooms, and numerous electric radiant heaters providing additional heat in hallways, stairwells and select offices. All of these units utilize electric resistance heating coils for heating of the facility.

These units currently are noisy (disrupting classes), lack a good control system and do not provide adequate ventilation air for the students (all outside air dampers reviewed during this audit were closed at all times). In addition, dust is being introduced through the return air plenum; which is then distributed back into the classroom. As a result, the existing H&V system does not adequately provide for a good learning environment for the Elementary School students

Recommendations

Replace the existing constant volume AHUs and unit ventilators with one (1) new variable air volume (VAV) AHU. This unit will provide make-up air to twenty-one (21), low noise fan powered VAV boxes, each of which will designed to serve serving. Each VAV box will be controlled via a local thermostat and an occupancy controller that will shut off the ventilation air damper, the VAV box fan, and the lights when the space is not occupied. The fan powered VAV boxes will utilize ventilation air from the main system mixed with return air from the local space to maintain room temperature and code designed ventilation requirements.

The system will utilize a central AHU (located in the exterior 1st floor mechanical space) that will deliver the appropriate amount of fresh air to each space (based on occupancy). Energy efficient preheating of the ventilation air will be supplied via an air cooled heat pump and the appropriate mixing of return air. The discharge air from the main AHU will provide additional energy savings by utilizing a supply air reset control to increase the discharge air temperature base on outside air conditions. This system will be controlled via a new direct digital control (DDC) system, also tied into the DDC system currently serving the High School. This system will provide for on-site and off-site monitoring and control of all HVAC systems to allow for efficient operation. In addition, this DDC will provide the capability to trend and track system operation and energy usage over time; allowing for efficient modifications to maintain long term energy efficient operation.

Future Recommendation: Currently the windows throughout the facility are being considered for replacement as part of a future architectural & infrastructure upgrade. If that project is implemented at some point in the future, the newly installed windows (if operable) should be fitted with a contact closure tied to the new building DDC automation system. This contact closure would be designed to prevent operation of the fan powered VAV box whenever the window is opened.

Benefits (Including Occupant Health & Safety)

- Reduces overall electrical energy usage
- Reduces fan motor usage, heating requirements & lighting operation throughout the facility
- Provides the required amount of ventilation air for occupants; improving the Health & Safety within the facility
- Provides a more comfortable educational environment
- Improves learning environment for the students
- Replaces an old H&V system that is reaching the end of it's useful life with a new, efficient,

high quality H&V system

UCM-5 Domestic Water System Piping Upgrade (Elementary School)

Overview of Current Situation

The existing domestic water system within the old section of the Elementary School is comprised principally of galvanized piping which has become corroded over the years This is causing numerous issues within the school including (1) an overall lack of pressure throughout the distribution system, (2) undrinkable rust filled water delivered from sinks and (3) ongoing issues with leaks throughout the system – especially within the crawl space beneath the facility (where the main distribution is located).

Previous leaks have flooded the crawl space. These leaks, along with the lack of airflow in the crawl space, have resulted in a damp, musty environment that could potentially facilitate mildew & mold growth.

Recommendations

This measure will replace the existing galvanized section of the domestic water system located throughout the crawl space beneath the facility and the wall risers as required. The replacement of this old DW piping will allow for the implementation of Measure 1 (Water Conservation). This new system will also be designed such that the risers serving the restrooms will easily facilitate the addition of a grey-water (or rainwater) flushing system at some point in the future to conserve addition water.

In addition to replacing the DW distribution system, the waste piping that is located within the walls serving new fixture locations will also be replaced. This is recommended since the area behind the walls will have to be accessed for replacement of supply water piping. Replacing the waste piping in these areas at the same time is a proactive measure that will reduce potential cost for access and repair/replacement of this waste piping at a future date.

Additional Recommendation (not included in this project): An option can be provided for replacement of all waste piping located within the crawl space if requested by OISD. As currently developed, this project only includes the portion of the waste vent piping that is located within the risers leading to the restrooms.

Benefits (Including Occupant Health & Safety)

- Reduces ongoing water waste caused by leaking pipes
- Reduces the potential for mold & mildew growth within the crawl space due to leaks; improving the Health & Safety within the facility
- Provides safe, accessible drinking water for the students & staff; improving the Health & Safety within the facility
- Reduces the opportunity for leaks within walls & ceilings causing damage to the facility and the equipment within
- Sets the stage for additional water savings in the future through the addition of a grey-water flushing system for water closets & urinals.

4.2 Project Notations/Clarifications/Exclusions

1. **For targeted construction in summer of 2011, in order to complete design and order equipment, a notice to proceed will be provided to UMC by January 1, 2011**. This will allow adequate time for system design, equipment selection, lead time for equipment purchase & delivery, and appropriate manpower scheduling that will insure the timely completion of the project.
2. Guaranteed pricing is good for 180 days. Given the long lead time for construction start date, this project pricing will have to be reviewed and modified appropriately prior to final delivery.
3. Adequate space will be provided for the staging of materials.
4. Orcas Island School District shall provide access as required per the coordinated schedule.
5. This project does not include any hazardous material identification, material handling, removal and disposal, which may be found during construction of this project.
6. This project does not include any asbestos testing or abatement.
7. This project does not allow for cost associated with working in hazardous or confined spaces.
8. This project does not include any upgrades to the existing electrical system due to load or code requirements at either the Elementary School or High School.
9. UCM-3 Elementary School HVAC Upgrade proposes to utilize the existing side-wall diffuser locations for distribution of air to the classrooms in the “original” school facility. This is due to the offset in ceiling heights between the hall & classrooms. New diffusers will be selected and installed in each room as appropriate.
10. This project does not include any upgrades to the existing fire protection system at either the Elementary or High School.
11. This proposal does not include the repair or replacement of existing damaged lighting fixtures, hardware and lenses/fixture enclosures.
12. This project does not include any costs for temporary construction utilities and services, or structural upgrades.
13. All work as proposed is expected to be done during normal working hours.

5.0 PROJECT FINANCIALS

This section provides an overview of the financial impact on Orcas Island School District through implementation of this program. We have attempted to convey this information in a manner that identifies the costs, savings, fees, rates and structures along with a cash flow analysis.

5.1 Project Cost Structure

For development and performance of the Work described in this proposal, Orcas Island School District shall pay to University Mechanical Contactors, Inc. the Contract Sum of $1,466,975 - (excluding estimated WA State Sales Tax, contingency and, estimated WA State GA Project Management Fees). The following table outlines all of these costs, including UMC's fees and compensation.

CATEGORY	COST ($)	% OF CONSTRUCTION
CONSTRUCTION COST (MTRL & LBR)	**$ 1,083,711**	
PROJECT DEVELOPMENT		
INVESTMENT GRADE AUDIT		
Subtotal	**$ -**	
PROJECT IMPLEMENTATION		
MECH DESIGN (CONSTRUCTION DOCUMENTS)	$ 97,534	9.0%
LIGHTING DESIGN		
PROJECT/CONSTRUCTION MANAGEMENT	$ 65,023	6.0%
PM TRAVEL		
Subtotal	**$ 162,557**	
PERFORMANCE MEASUREMENT & VERIFICATION		
MEASURMENT & VERIFICATION (YRS 2 & 3)	$ 9,384	
Subtotal	**$ 9,384**	
OTHER PROJECT COSTS		
PERFORMANCE & PAYMENT BOND	$ 16,256	1.5%
OVERHEAD	$ 108,371	10.0%
PROFIT	$ 86,697	8.0%
Subtotal	**$ 211,324**	
TOTAL PROJECT COST - (EXCLUDING TAX)	**$ 1,466,975**	

CONSTRUCTION & RE-COMMISSION CONTINGENCY	**$**	**117,800**
SUBTOTAL (WITH CONTINGENCY)	**$**	**1,584,775**

WA STATE GA PROJECT MANAGEMENT FEE	**$**	**33,000**
WA STATE GA M&V FEE (YEARS 2 & 3)	**$**	**4,000**
ESTIMATED TAX (@ 7.8%)	**$**	**123,612**
SUBTOTAL (WITH CONTINGENCY)	**$**	**1,745,388**

Notes: Mechanical design fee is % of mechanical construction cost only
Lighting design fee is % of lighting construction cost only ($0)
Project Management, bond and O&) fees are % of total construction cost

5.2 ECM Investment Summary

Investment Grade Audit (IGA)
The Cost for the IGA is per Contract Agreement No. 2010-082 A (1) between the Orcas Island School District, WA State GA and University Mechanical Contractors

Labor and Materials
Details of the Scope of Work associated with the Labor and Material Costs are provided in the Section 4.0.

Construction Contingency
A construction contingency is included for this project for the purpose of covering latent conditions, owner or ESCO requested changed, design changes, increased mobilization costs or other unforeseen issues that may arise.

1) UMC is authorized to utilize this contingency for items necessary to complete the original intended scope of this project. This can be done following review by the owner and Washington State General Administration.

2) Latent Conditions Contingency is an allowance provided within the contract on the assumption that latent or unknown conditions do exist related to existing systems, facilities or the facility sites. The discovery of these latent conditions could not have been reasonably known prior to construction. Furthermore, the owner has disclosed all adverse conditions that are known or could be reasonably known prior to construction. These conditions may include, but are not limited to: defects, malfunctions or obsolescence in systems being modified or in supporting systems; systems and conditions required to be upgraded to meet current or new building or safety codes; defective structures; discovery of hazardous materials including asbestos; buried utilities or underground obstructions; etc. In addition, UMC reserves the right to use the contingency to fund unforeseen cost-to-capital costs. Such conditions when uncovered shall be dealt with in the course of the project and the project responses to the unknown conditions shall be treated as Change Orders.

3) Owner Contingency is an allowance to accommodate adjustments to scope directed by the Owner through change orders as outlined below:

    a) Change Orders for Latent Conditions and for Owner Directed Changes requiring price adjustments, if any, shall be funded first from the Construction Contingency Allowance less the Design Contingency part

to the extent of the available allowance budget and then from additional funds added to the Contract Price targeted to the Construction Contingency Allowance through the Change Order process.

b) In addition, such changes may delay the Contract Schedule or contiguous tasks or both. The contractor shall be entitled to equitable adjustments to the schedule. Such schedule adjustments and the resultant price of such adjustments shall be included in the Change Order.

4) Design Contingency Allowance is used to provide small project adjustments to contract costs due to minor errors, happenstance or minor circumstances. These contingency funds are separate from all other contingency funds and are accessible solely by change order.

5) Increased mobilization cost associated with implementing the project in two separate phases.

6) Potential increases in the cost of labor & materials for the measures that will be implemented in 2011.

Re-commissioning Contingency

Re-commissioning Contingency is provided to allow for repair/replacement of control & operational issues identified during the re-commissioning process. This contingency is wholly Owner Directed.

Mechanical, Electrical and Plumbing Design Costs:

The following items and tasks are included in the fee:

- ✓ Conduct Design Analysis
- ✓ Evaluate Design Alternatives
- ✓ General Project Engineering
- ✓ Preliminary and Final design submittal and review
- ✓ Design documentation
- ✓ Review and selection of materials and systems

Construction Management / Administration:

The following items and tasks are included in the construction management / administration fee:

- ✓ General Quality Oversight
- ✓ Project Progress Reports
- ✓ Permitting Process
- ✓ Coordination with civic, county and/or federal code officials
- ✓ Subcontractor Contract Development

- ✓ Construction Administration
- ✓ Coordination with Client
- ✓ Project Accounting and Invoicing
- ✓ Commissioning Co-ordination
- ✓ Project Logs and Records
- ✓ MEP Redlines and As-Built Development
- ✓ Project Close-Out
- ✓ Release of Purchase Orders
- ✓ Site General Conditions
- ✓ Start-up of Systems
- ✓ Performance Testing
- ✓ Training Administration/Coordination with factory representatives
- ✓ Onsite Subcontractor/Discipline Coordination
- ✓ Quality Assurance/Quality Control
- ✓ Inventory of materials and equipment received
- ✓ Site Safety Administration
- ✓ Punch list Development/Resolution

The following table summarizes the total investment summary per UCM.

UCM Summary

Utility Conservation & Facility Upgrade Measures	Annual Savings (1) $	Estimated Operational Savings $	Projected Utility Rebate (2) $	Guaranteed Project Cost $	Simple Payback Yrs
UCM-2: Water Conservation Upgrades	**$ 2,525**	**$ 450**	**$ -**	**$ 41,371**	**13.9**
	$ -			**$ -**	
UCM-3: Elementary School HVAC Upgrade	**$ 13,311**	**$ -**	**$ 40,653**	**$ 1,080,597**	**78.1**
	$ -			**$ -**	
UCM-5: Domestic Water Piping Upgrade (Elementary School)	**$ 581**	**$ 5,700**	**$ -**	**$ 345,007**	**54.9**
	$ -	$ -	$ -	**$ -**	
	$ 16,417	**$ 6,150**	**$ 40,653**	**$ 1,466,976**	**63.2**
Construction Contingency				$ 117,800	
Re-Commission Repair Contingency Budget				$ -	
Subtotal				**$ 1,584,775**	

Notes:
(1) Annual utility savings ($) are based on current utility rate schedule
(2) Rebates & Incentives are estimated, but not guaranteed

6.0 MEASUREMENT & VERIFICATION

6.1 Summary of Total Guaranteed Savings

The tables in this section illustrate the total savings in 2009 dollars and extended over a 20 year life span. The actual savings guarantee will be in units of energy (kwh, demand kw, and gallons water). The dollars shown in these tables are calculated by applying the current rates (as shown in Section 6) to the guaranteed units of energy saved. An annual escalation rate has been applied equal to 2% for utility rates and 3% for operational costs.

Year	Annual Utility Savings	Annual Operational Savings	Cummulative Project Savings
Construction			
1	$16,417	$6,150	$22,567
2	$16,746	$6,273	$45,586
3	$17,080	$6,398	$69,065
4	$17,422	$6,526	$93,013
5	$17,770	$6,657	$117,441
6	$18,126	$6,790	$142,357
7	$18,488	$6,926	$167,771
8	$18,858	$7,064	$193,693
9	$19,235	$7,206	$220,134
10	$19,620	$7,350	$247,104
11	$20,012	$7,497	$274,614
12	$20,413	$7,647	$302,673
13	$20,821	$7,800	$331,294
14	$21,237	$7,956	$360,487
15	$21,662	$8,115	$390,264
16	$22,095	$8,277	$420,636
17	$22,537	$8,443	$451,616
18	$22,988	$8,611	$483,216
19	$23,448	$8,784	$515,447
20	$23,917	$8,959	$548,323

The following Table summarizes the first year savings of the Total Guaranteed Savings (Total Guaranteed Savings Summary) in Guarantee Type categories. **All guarantees are based on units of energy (not dollars)**.

Proposed M&V Type				
Energy Conservation Measure	Measurement & Verification Option Proposed			
	Option A Partially Measured Retrofit Isolation	Option B Retrofit Isolation	Option C Whole Facility	Option D Calibrated Simulation
UCM 2 Water Conservation	X			
UCM 3 Elementary School HVAC Upgrade				X
UCM 5 Domestic Water Piping Upgrade (Elementary School)				X

The following Table illustrates the total guaranteed savings in units of energy.

Utility Conservation & Facility Upgrade Measures	Guaranteed Energy/Utility Savings				
	Electric		Propane	Water / Sewer	
	kW/yr	kWh/yr	Mbtu	gal/yr	gal/yr
UCM-2: Water Conservation Upgrades	-	-	-	148,500	148,500
UCM-3: Elementary School HVAC Upgrade	373	203,266	-	-	-
UCM-5: Domestic Water Piping Upgrade (Elementary School)	-	-	-	34,200	34,200
	-	-	-	-	-
	373	203,266	-	182,700	182,700

Guarantee Savings Types

The IPMVP protocol includes four guarantee options to measure and verify savings: Option A – Partially Measured Retrofit Isolation, Option B – Retrofit Isolation, Option C – Whole Facility, and Option D – Calibrated Simulation. The following table describes these options in more detail.

M&V Option	How Savings Are Calculated	Typical Applications
Option A. Partially Measured Retrofit Isolation This approach is intended for Facility Improvement Measures where a one-time measurement for specific equipment or systems instantaneous baseline energy use, and a one-time measurement for specific equipment or systems instantaneous post-implementation energy use can be measured. Baseline and Post energy consumption is calculated by multiplying the measured end use instantaneous capacity (i.e. – kW, Gal/hr,	Savings are determined by partial field measurement of the energy use of the system(s) to which an ECM was applied; separate from the energy use of the rest of the facility. Measurements may be either short-term or continuous. Partial measurement means that some but not all parameter(s) may be	Lighting retrofit where power draw is measured periodically. Operating hours of the lights are assumed to be one half hour per day longer than store open hours.

BTU/hr) by stipulated hours of operation for each mode of operation (i.e. – hours, week, month).	stipulated, if the total impact of possible stipulation error(s) is not significant to the resultant savings. Careful review of ECM design and installation will ensure that stipulated values fairly represent the probable actual value. Stipulations should be shown in the M&V Plan along with analysis of the significance of the error they may introduce.	
Option B. Retrofit Isolation This approach is intended for Facility Improvement Measures where continuous periodic measurements for specific equipment or systems baseline energy use, and continuous periodic measurements for that equipment or systems post-implementation energy use can be measured.	Savings are determined by field measurement of the energy use of the systems to which the ECM was applied, separate from the energy use of the rest of the facility. Short-term or continuous measurements are taken throughout the post-retrofit period.	Application of controls to vary the load on a constant speed pump using a variable speed drive. Electricity use is measured by a kWh meter installed on the electrical supply to the pump motor. In the base year this meter is in place for a week to verify constant loading. The meter is in place throughout the post-retrofit period to track variations in energy use.
Option C. Whole Facility This approach is intended for measurements of the whole-facility where specific meter baseline energy use and measurements of whole-facility or specific meter post-implementation energy use can be measured.	Savings are determined by measuring energy use at the whole facility level. Short-term or continuous measurements are taken throughout the post-retrofit period.	Multifaceted energy management program affecting many systems in a building. Energy use is measured by the gas and electric utility meters for a twelve month base year period and throughout the post-retrofit period.
Option D. Calibrated Simulation This approach is intended for Facility Improvement Measures where the end use capacity or operational efficiency; demand, energy consumption or power level; or manufacturer's measurements, industry	Savings are determined through simulation of the energy use of components or the whole facility. Simulation routines must be demonstrated to	Multifaceted energy management program affecting many systems in a building but where no base year data are

standard efficiencies or operating hours are known in advance, and used in a calculation or analysis method that will calculate the outcome.	adequately model actual energy performance measured in the facility. This option usually requires considerable skill in calibrated simulation.	available. Post-retrofit period energy use is measured by the calibrated simulation using. Base year energy use is determined by simulation using a model calibrated by the post-retrofit period utility data.

6.4 Measurement and Verification Plan

The following information outlines are applicable for this contract:

Measurement and Verification (M&V) methods provided under this Article**:**
Option A – Partially Measured Retrofit Isolation
Option B – Retrofit Isolation
Option C – Whole Facility
Option D – Calibrated Simulation

General Overview:
The purpose of the Measurement and Verification (M&V) Section is to identify the methods, measurements, procedures and tools that will be used to verify the savings for each ECM. Savings were determined by comparing prior usage, consumption or efficiencies defined as the Baseline to the selected ECMs being implemented against the post ECM implementation usage, consumption or efficiencies. The Baseline usage, consumption or efficiencies are described in this Section, Baseline Data. The usage, consumption or efficiencies associated with the ECM implementation, is defined as the Contracted Baseline, and is described in this Section, Contracted Baseline Data.

The actual guaranteed savings associated with this Program is outlined in this Section, Summary of Total Guaranteed Savings and Guaranteed Savings Types.

UCM 2.00 – Water Conservation

Proposed M&V Method – Option A Partially Measured Retrofit Isolation

M&V Procedure
All M&V activities associated with the Project will be conducted by UMC.

An audit has been performed to determine the total number of existing fixtures at the facility, as well as identifying the type of fixture and the corresponding water

usage or GPF (gallons per flush – for water closets and urinals) and/or GPM (gallons per minute – for sinks/faucets). This audit also lists the total number and type of replacement fixtures that are recommended, as well as the corresponding GPF. This information has been utilized in addition to an estimated number of flushes per day (based on industry standards and water usage balance based on historical water consumption for this facility) to determine the existing water usage as well as the proposed water usage. The M&V will be performed as follows:

Pre-Installation Measurements: A goal of 5% of the water closets, urinals, and sinks will be measured before the retrofit to confirm the GPF/GPM water flow. All measurements will be compared against the +/- 10% flow tolerance as set forth by manufacturers and will be considered to be within the appropriate flow range if they fall within this tolerance. The total quantities of existing fixtures have been determined via the audit. The estimated flushes/usage per day has been determined based on industry standards, historical water consumption, and typical occupancy of the facility for the State and will be stipulated in all calculations.

Post-Installation Inspection: After the Project has been installed and commissioned, an OISD representative and UMC Project Manager will conduct an inspection to verify that the fixtures installed are consistent with what was proposed. The quantity of proposed fixtures will be verified during the system commissioning.

Post-Installation Measurements: There will not be any post installation measurements completed on the new water fixtures that have been installed. Post installation usage will be based on Manufacturer's specifications of the equipment.

Operational Savings associated with this measure will be stipulated.

<u>Calculations:</u>

The baseline water usage is modeled using data collected during the site survey. This modeled usage is then compared to the baseline usage from the utility data analysis. A modeled baseline water usage that is equal to or less than the utility data baseline confirms that the model is accurate. The detailed results are presented in the Appendix.

Existing Baseline Water Usage: $WU_{EX} = (WU_{WC})_{EX} + (WU_{U})_{EX}$
Where:

$(WU_{WC})_{EX}$ = Annual water closet water usage in thousands of gallons

for existing fixtures

$(WU_U)_{EX}$ = Annual urinal water usage in thousands of gallons for existing fixtures

$(WU_{WC})_{EX} = (QTY_{WC} \times GPF_{WC} \times FPD_{WC} \times DPY) / 1000$
$(WU_U)_{EX} = (QTY_U \times GPF_U \times FPD_U \times DPY) / 1000$

Where:

QTY = Quantity of water closets, urinals, respectively as noted by the subscripts

GPF = Gallons per flush for water closets and urinals, respectively as noted by the subscripts

FPD = Flushes per day for water closets and urinals, respectively as noted by the subscripts

DPY = Days per year of normal usage

$FPD = Occ \times UPD / QTY_{WC}$
$MPD_F = Occ \times UPD / QTY_{WC}$

Where:

Occ = Number of occupants (both employees & daily visitors)

UPD = Uses per day

New Proposed Water Usage: $WU_{NEW} = (WU_{WC})_{NEW} + (WU_U)_{NEW} + (WU_F)_{NEW}$

Where:

$(WU_{WC})_{EX}$ = Annual water closet water usage in thousands of gallons for new fixtures

$(WU_U)_{EX}$ = Annual urinal water usage in thousands of gallons for new fixtures

Savings: $WU_{SAVED} = WU_{EX} – WU_{NEW}$

<u>Calculations Variables Index:</u>

Common Parameters	Value	Verification Method
Occupied Days / Year (DPY)	150	Stipulated
Uses per Day Water Closets (UPD_{WC})	Elem School (men) – 20 Elem School (women) – 30	Stipulated (performed water balance report versus annual usage to verify)
Uses per Day Urinals (UPD_U)	High School (men) – 15	Stipulated (performed

	Elem School (men) – 25	water balance report versus annual usage to verify)
Uses per Day Sinks (UPD_S)	Elem School (men) – 25 Elem School (women) – 25	Stipulated (performed water balance report versus annual usage to verify)
Faucet Time per Use (TPU_F)	Public Sinks – 0.2 minutes Classroom Sinks – 0.5 minutes	Stipulated (performed water balance report versus annual usage to verify)

Existing Parameters	Value	Verification Method
Existing Water Closet Gallons/Flush $(GPF_{WC})_{EX}$	3.5 gpf	One Time Pre Measurement
Existing Urinal Gallons/Flush $(GPF_U)_{EX}$	1.5 gpf	One Time Pre Measurement
Existing Faucet Gallons/Minute $(GPM_F)_{EX}$	All Faucets: 2.2	One Time Pre Measurement

Proposed Parameters	Value	Verification Method
Proposed Water Closet Gallons/Flush $(GPF_{WC})_{NEW}$	All Water Closets: 1.28	Stipulated
Proposed Urinal Gallons/Flush $(GPF_U)_{NEW}$	All Urinals: 0.125	Stipulated
Proposed Faucet Reducers Gallons/Minute $(GPM_F)_{NEW}$	Bathroom Faucets: 0.5 Classroom Aerators: 1.0	Stipulated

Assumptions:
This M&V plan was written with the following assumptions:

1. The operating schedules will not change because of this project.
2. All components are maintained in full working condition in both the baseline and post retrofit scenarios.
3. The Measurement & Verification procedure, outlined below, will be completed once before implementation and once at the end of the implementation process.

UCM 3.00 – Elementary School HVAC Upgrade

Proposed M&V Method – Option D Calibrated Simulation

M&V Procedure
All M&V activities associated with the Project will be conducted by UMC.

Pre-Installation Measurements: The existing baseline operating characteristics of the Elementary School HVAC system have been modeled (utilizing Trane Trace 700). Due to the current operating condition, in which the ventilation air is below the ASHRAE recommendations, the model baseline utility usage was adjusted to account for the appropriate amount of ventilation air (see Baseline in Section 3). Future savings will be compared versus this baseline operation.

Post-Installation Measurements: Short term monitoring/trending of select system operating characteristics shall be made and compared to the predicted (modeled) operation to confirm that the system is operating at the estimated efficiency. The operating characteristics to be measured will include the following.

- AHU supply fan motor kw usage via VAV system VFD operation
- Discharge air reset temperature to confirm SA reset operation
- Monitor space temperature & lighting operation of 4 select classrooms to confirm space setback via occupancy sensor
- Monitor carbon dioxide in 4 select classrooms to confirm appropriate ventilation rates

In addition to the short term trending of facility operating characteristics, additional M&V will consist of confirmation of system commissioning to proposed operating requirements; including documentation of equipment operating schedules and occupied/unoccupied set points.

Calculations
All measurements will be compared versus the existing Trane Trace model

Calculations Variables Index:

Existing & Proposed Parameters	Quantity	Verification Method
See Trane Trace Model		Calibrated Simulation

UCM 5.00 – Domestic Water Piping Upgrade (Elementary School

Proposed M&V Method – Option D Calibrated Simulation (Stipulated)

M&V Procedure
Savings associated with this measure were calculated based on the elimination of existing water leaks within the current DW system. These leaks were estimated from daily water readings recorded by the Eastsound Water Users Association during non-occupied periods (weekends). This information indicated a leak rate of 100 gallons/day.

After the Project has been installed and commissioned, an OISD representative and UMC Project Manager will conduct an inspection to verify that the implementation of the projects are consistent with what was proposed.

Operational Savings associated with this measure will be stipulated.

Calculations
Following final inspection and commissioning, a verification of the original savings estimate will be performed to confirm savings based on the actual installation. Savings presented in the contract documents will be stipulated throughout the duration of the contract.

6.3 Utility Rate Structure and Escalation Rates

Utility costs used for savings calculations will be based on the utility rate in effect for the predominant bill or the utility rate in effect for the corresponding period of the Baseline period, whichever is greater. The rate, in effect during the Baseline period, will be designated the floor price, and is shown below for each utility.

Electricity		
Tariff Number or Designation:	Commercial Service	
Utility Name:	Orcas Power & Light	
Rate Structure:	$ 32.50	Basic Charge
First 5,000 kWh	$ 0.0710	$ per kWh
Over 5,000 kWh	$ 0.0620	$ per kWh
First 20 kW	$ 0.00	$ per kW
Over 20 kW	$ 1.90	$ per kW
Blended Rate (Elementary School)	$ 0.0668/kWh	Average $ per kwh[1]
Blended Rate (High School)	$ 0.0704/kWh	Average $ per kwh[1]

1. Based on baseline load profile

Water/Sewer		
Tariff Number or Designation:	General Rate	
Utility Name:	Eastsound Water Users Association	
Rate Structure:		
Base Rate	$ 68.25	$ per month
Water Rate	$ 17.00	$ per kgallon (for all water in excess of 8,750/month)

6.4 Applicable Codes

Federal, State, and Local codes or regulations are applicable to the use and operation of the facility. All work installed under this project will meet the requirements of the following codes:

- The International Building Code and appendices thereto pertaining to building accessibility, not including the adoption of the incorporated electrical codes, plumbing codes, fire codes or property maintenance codes other than specifically referenced subjects or sections of the International Fire Code, but including the incorporated International Residential Code; International Mechanical Code; International Fuel Gas Code; International Energy Conservation Code.
- The Washington State Energy Code
- The Uniform Mechanical Code
- The Uniform Code for Building Conservation
- The Safety Code for Elevators and Escalators (ASME/ANSI A 17-.1)
- The NEC
- The NFPA Fire Alarm Systems
- The NFPA 13 Fire Sprinkler Systems
- The Uniform Plumbing Code
- The Washington State Ventilation and Indoor Air Quality Code
- All applicable local city codes

UMC is not responsible for the code compliance of systems not installed under this project.

6.5 M&V Costs

The first year of the M&V for this project is included in the price of the program. OISD has the option to continue M&V and associated energy guarantees for the subsequent years at the prices shown below (including a labor escalation rate of 4%). To elect this option OISD shall provide written notification to UMC one month after the end of the prior period. In the event this option is not elected for a particular year, it may not be elected in subsequent years. UMC's ongoing fee for M&V for years 2 through 4 is shown below.

Year	Annual M&V Cost
1	(1)
2	$4,600
3	$4,784
4	$4,975

(1) Included in project cost

6.6 M&V Reporting

UMC will provide a savings summary report to the customer within 90 days of completion for the first year of reporting. Thereafter on an annual basis, through the end of the performance guarantee period (if opted to be included by OISD).

6.7 Customer Responsibilities

This section details the responsibilities of UMC and the Customer, in connection with the management and administration of the Performance Guarantee.

The Customer will provide a representative at each facility to coordinate work and provide required data described below. Customer will provide access to all spaces required for pre measurement and post measurement. At the Customer's discretion, one representative will witness all pre and post measurements. UMC will provide calibration reports on all meters as required by the Customer.

The Customer will provide UMC with accurate facility operating information, as defined below, and in the Contracted Baseline article of this Section during each Annual Period, as soon as such information becomes available to the Customer.

Customer will provide UMC with copies of utility bills within 7 days of receipt by Customer or provide access to utility vendor information.

Customer will provide telephone/data remote access as UMC reasonably requests. All charges related to telephone/data line installation, activation and communication services are the responsibility of the Customer.

Customer will be responsible for notification of UMC regarding schedule changes of the air handling systems associated with this measure. Customer will be responsible for maintaining proposed schedules and setback temperatures. If, for any reason, schedules or setback temperatures must change, Customer will be responsible to make UMC aware of the change.

Customer will maintain all proposed operating schedules as defined in this proposal.

Customer will provide equipment service and preventative maintenance to keep all equipment installed as part of this project operating efficiently.

Customer agrees that the existing operating schedules and equipment conditions, as provided in the following sections, are complete and correct. If, for any reason, the customer requires that the equipment be operated differently than the proposed schedules, UMC reserves the right to adjust the guarantee amounts accordingly.

During the performance guarantee period, any post-retrofit changes made by the customer that may affect the baseline data (i.e., new construction, additional electrical loads, manual control of automatic devices, etc.) shall be reported to UMC so that adjustments can be made to reflect the changes and proper adjustments to the savings guarantees can be made.

UMC will provide an operations and maintenance manual. Upkeep of the equipment installed as part of this project is the responsibility of the Customer's maintenance personnel. Any loss of efficiency that occurs to the installed equipment caused by a lack of ongoing maintenance or upkeep shall be taken into account and appropriate impact to annual savings adjusted.

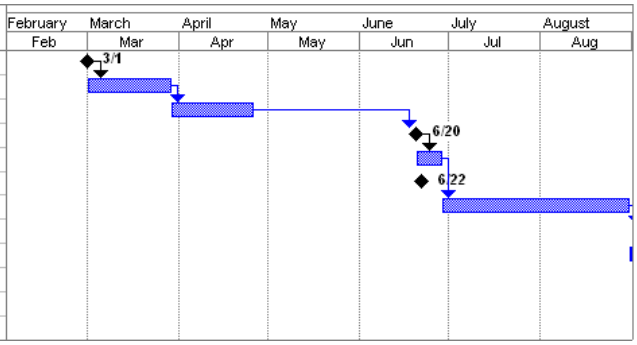
Currently, there are no planned changes that will affect the baseline data.

7.0 IMPLEMENTATION PLAN

7.1 Project Schedule

A preliminary project schedule for the Orcas Island School District ESPC project milestones is shown below.

ID		Task Name	Duration	Start	Finish
1		Contract Issued to UMC	0 days	Tue 3/1/11	Tue 3/1/11
2		Engineering Begins	20 days	Tue 3/1/11	Mon 3/28/11
3		Submittals & Equipment Released	20 days	Tue 3/29/11	Mon 4/25/11
4		Site Mobilization	0 days	Mon 6/20/11	Mon 6/20/11
5		Demolition and Prep	7 days	Mon 6/20/11	Tue 6/28/11
6		Material Delivered	0 days	Wed 6/22/11	Wed 6/22/11
7		Installation	45 days	Wed 6/29/11	Tue 8/30/11
8		Substantial Completion	0 days	Tue 8/30/11	Tue 8/30/11
9		Punch List	2 days	Wed 8/31/11	Thu 9/1/11
10		Post Measurements Complete	3 days	Fri 9/2/11	Tue 9/6/11
11		Project Installation Complete	0 days	Tue 9/6/11	Tue 9/6/11
12		O&M and M&V Reports	15 days	Mon 9/5/11	Fri 9/23/11



8.0 APPENDIX

UCM 1 - Lighting Audit & Proposed Retrofit

Project:	Orcas SD - Elementary School
Date:	21-Oct-08
Auditor:	

Proprietary Document: University Mechanical Contractors, Inc.

UNIVERSITY MECHANICAL CONTRACTORS, INC.
We Build Value

		Retrofit Description													Savings					Utility	Installed Cost			
Location	**Type**		**Qty**		**Annual Operating Hours**	**Fixture Description**	**Fixture Type (sconc, trof, surfmnt, recess, etc)**	**Lamp Type (FL, PL, Inc, MH, etc)**	**Lamp Watts**	**Lamps per Fixture**	**Ballast Type**	**Ballasts per Fixture**	**Watts per Fixture**	**Total kW**	**kWh/Yr**	**%kW to Demand**	**Months Demand is Applied**	**Annual Demand kW**	**Annual Usage kWh**	**$/Yr**	**Estimated Incentive $**	**Cost per Fixture ($)**	**Total Fixture Cost ($)**	**Total Installed Cost ($)**	**Payback**
		Existing		**Auto Select**																					
				Manual Override										-	-										
		Proposed		**Auto Select**																					
				Manual Override										-	-	90%	10	-	-	$ -	$ -	$ -			
		Existing		**Auto Select**	2800	156 - 2 lamp 4ft T8		F	32	2	Electronic	1	54											
			83	**Manual Override**										4.5	12,550										
		Proposed		**Auto Select**	2800	78 - 2 lamp 4ft F32T8 (25w)		FL	25	2	Elect	1	45											
Facility Wide	Classroom		83	**Manual Override**										3.7	10,458	90%	10	6.7	2,092	$ 137	$ 418	$ -		(3)
		Existing		**Auto Select**	2800	157 - 3 lamp 4ft T8		F	32	3	Electronic	1	81											
			195	**Manual Override**										15.8	44,226										
		Proposed		**Auto Select**	2800	80 - 3 lamp 4ft F32T8 (25w)		FL	25	3	Elect	1	67											
Facility Wide	Classroom		195	**Manual Override**										13.1	36,582	90%	10	24.6	7,644	$ 502	$ 1,529	$ -		(3)
		Existing		**Auto Select**	2800	30 - 4 lamp 4ft F30T12 ES Elect		FI	34	4	Elec	1	121											
			1	**Manual Override**										0.1	339										
		Proposed		**Auto Select**	2800	82 - 4 lamp 4ft F32T8 (25w)		FL	25	4	Elect	1	91											
Facility Wide	Classroom		1	**Manual Override**										0.1	255	90%	10	0.3	84	$ 6	$ 17	$ -		(3)
		Existing		**Auto Select**	1560	27 - 2 lamp 4ft F30T12 ES Elect		FI	34	2	Elec	1	62											
			18	**Manual Override**										1.1	1,741										
		Proposed		**Auto Select**	1560	78 - 2 lamp 4ft F32T8 (25w)		FL	25	2	Elect	1	45											
Facility Wide	Mechanical/Storage		18	**Manual Override**										0.8	1,264	90%	10	2.8	477	$ 33	$ 95	$ -		(3)
		Existing		**Auto Select**	8760	148 - 2 lamp 7W PL exit		F	7	2	MAG	2	20											
			7	**Manual Override**										0.1	1,226										
		Proposed		**Auto Select**	8760	153 - EXIT LED		LED	3	1	none	0	3											
Exit Signs	Exit/Emergency		7	**Manual Override**										0.0	184	90%	10	1.1	1,042	$ 65	$ 208	$ -		(3)
		Existing		**Auto Select**	2800	43 - 3 lamp 4ft F40T12 Elect		FI	40	3	Elec	1	107											
			3	**Manual Override**										0.3	899										
		Proposed		**Auto Select**	2800	80 - 3 lamp 4ft F32T8 (25w)		FL	25	3	Elect	1	67											
Facility Wide	Classroom		3	**Manual Override**										0.2	563	90%	10	1.1	336	$ 22	$ 67	$ -		(3)
		Existing		**Auto Select**	4380	131 - 1lamp 250 W HPS		HID	250	1	CWA	1	300											
			8	**Manual Override**										2.4	10,512										
		Proposed		**Auto Select**	4380	187 - Area Not Included		0	250	1	0	1	300											
Exterior Security Lights	Security (Ext)		8	**Manual Override**										2.4	10,512	90%	10	-	-	$ -	$ -	$ -		
		Existing		**Auto Select**																				
				Manual Override										-	-									
		Proposed		**Auto Select**																				
				Manual Override										-	-	90%	10	-	-	$ -	$ -	$ -		
		Existing		**Auto Select**																				
				Manual Override										-	-									
		Proposed		**Auto Select**																				
				Manual Override										-	-	90%	10	-	-	$ -		$ -		
Subtotals		**Existing**	**315**											**24.38**	**71,493**			**36**	**11,675**	**$ 765**	**$ 2,335**		**$ -**	**$ -**	**(3.1)**
		Proposed	**315**											**20.32**	**59,817**										

Proprietary Document: University Mechanical Contractors, Inc.

UCM 1 - Lighting Controls

Project:	Orcas SD - Elementary School
Date:	21-Oct-08
Auditor:	0

Proprietary Document: University Mechanical Contractors, Inc.

UNIVERSITY MECHANICAL CONTRACTORS, INC.
We Build Value

					Savings		Utility		
Location	**Type**	**Lighting Control Type**	**Current Annual Operating Hours**	**Estimated % Reduction in Operating Hours**	**Annual Usage kWh**	**$/Yr**	**Estimated Incentive $**	**Total Installed Cost ($)**	**Payback**
-	-	Motion Control	-		-	$ -	$ -		
-	-	Motion Control	-		-	$ -	$ -		
Rm 401	Classroom		2,800	15%	113	$ 7	$ 11		(2)
Rm 402	Classroom		2,800	15%	113	$ 7	$ 11		(2)
Rm 403	Classroom		2,800	15%	56	$ 3	$ 6		(2)
Rm 411	Classroom		2,800	15%	253	$ 15	$ 25		(2)
Rm 411	Classroom		2,800	15%	57	$ 3	$ 6		(2)
Rm 412	Classroom		2,800	15%	253	$ 15	$ 25		(2)
Rm 412	Classroom		2,800	15%	57	$ 3	$ 6		(2)
Rm 413	Classroom		2,800	15%	253	$ 15	$ 25		(2)
Rm 413	Classroom		2,800	15%	57	$ 3	$ 6		(2)
Rm 414	Classroom		2,800	15%	253	$ 15	$ 25		(2)
Rm 414	Classroom		2,800	15%	57	$ 3	$ 6		(2)
Rm 415	Classroom		2,800	15%	310	$ 19	$ 31		(2)
Rm 416	Classroom		2,800	15%	169	$ 10	$ 17		(2)
Rm 416	Classroom		2,800	15%	19	$ 1	$ 2		(2)
Rm 417	Classroom		2,800	15%	422	$ 26	$ 42		(2)
Rm 418	Classroom		2,800	15%	338	$ 21	$ 34		(2)
1st Floor Boys RR	Restrooms		5,486	15%	222	$ 14	$ 22		(2)
1st Floor Girls RR	Restrooms		5,486	15%	222	$ 14	$ 22		(2)

Rm 420	Classroom		2,800	15%	169	$ 10	$ 17		(2)
Rm 420	Classroom		2,800	15%	38	$ 2	$ 4		(2)
Rm 421	Classroom		2,800	15%	169	$ 10	$ 17		(2)
Rm 421	Classroom		2,800	15%	38	$ 2	$ 4		(2)
Rm 423	Classroom		2,800	15%	225	$ 14	$ 23		(2)
Rm 423	Classroom		2,800	15%	76	$ 5	$ 8		(2)
Rm 425	Classroom		2,800	15%	253	$ 15	$ 25		(2)
Rm 425	Classroom		2,800	15%	57	$ 3	$ 6		(2)
Rm 426	Classroom		2,800	15%	141	$ 9	$ 14		(2)
Rm 427	Classroom		2,800	15%	253	$ 15	$ 25		(2)
Rm 427	Classroom		2,800	15%	57	$ 3	$ 6		(2)
Rm 428	Classroom		2,800	15%	253	$ 15	$ 25		(2)
Rm 428	Classroom		2,800	15%	57	$ 3	$ 6		(2)
Rm 429	Classroom		2,800	15%	338	$ 21	$ 34		(2)
Rm 431	Classroom		2,800	15%	338	$ 21	$ 34		(2)
Rm 433	Classroom		2,800	15%	338	$ 21	$ 34		(2)
Rm 432	Classroom		2,800	15%	310	$ 19	$ 31		(2)
Rm 432	Classroom		2,800	15%	19	$ 1	$ 2		(2)
2nd Floor Boys RR	Restrooms		5,486	15%	222	$ 14	$ 22		(2)
2nd Floor Girls RR	Restrooms		5,486	15%	222	$ 14	$ 22		(2)
Exterior Security Lights	Security (Ext)		4,380	50%	5,256	$ 321	$ 526		(2)
-	-		-	0%	-	$ -			
Subtotal					**12,049**	**$ 735**	**$ 1,205**	**$ -**	**(2)**

UCM 2 - Water Audit & Proposed Retrofit

Project:	Orcas Island SD (Elementary School)
Measure:	Water Conservation Project
Date:	14-Feb-11
Auditor:	SL

Proprietary Document: University Mechanical Contractors, Inc.

UNIVERSITY MECHANICAL CONTRACTORS, INC.
We Build Value

Location	Type	Retrofit Description	Qty		Enter (Toilet=1, Urinal=2, Sink=3, Shower=4)	Fixture Description	Additional Information	Urinals/Toilets gpf	Urinals/Toilets Uses per Day	Sinks/Faucets/Showers gpm	Sinks/Faucets/Showers Uses per Day	Sinks/Faucets/Showers Minutes per Use	Days per Year	Total Gal/Yr	Estimated % of Fixtures to be Retrofit	Utility Savings Annual Gallons (Water)	Utility Savings Annual Gallons (Sewer)	Utility Savings $/Yr	Utility Estimated Incentive $	Installed Cost Cost per Fixture ($)	Installed Cost Total Fixture Cost ($)	Installed Cost Total Installed Cost ($)	Payback
		Existing	2	Auto Select Manual Override		6 - Toilet (tank top) - 3.5 gpf	Floor Mtd	3.5	20	0	0	0	150	21,000									
Boys RR - 1st Floor	General Usage (Mens)	Proposed	2	Auto Select Manual Override	1	5 - Toilet (tank top) - 1.28 gpf	Floor Mtd	1.28	20	0	0	0	150	7,680	100%	13,320	13,320	$ 226		$ 800	$ 1,600	$ 1,600	7.1
		Existing	3	Auto Select Manual Override		2 - Urinal - 1.5 gpf		1.5	25	0	0	0	150	16,875									
Boys RR - 1st Floor	General Usage (Mens)	Proposed	3	Auto Select Manual Override	2	1 - Urinal - .125 gpf		0.125	25	0	0	0	150	1,406	100%	15,469	15,469	$ 263		$ 600	$ 1,800	$ 1,800	6.8
		Existing	2	Auto Select Manual Override		16 - Sink/Faucet - 2.2 gpm		0	0	2.2	25	0.2	150	3,300									
Boys RR - 1st Floor	General Usage (Mens)	Proposed	2	Auto Select Manual Override	3	16 - Sink (Faucet Replacement) - 0.5 gpm		0	0	0.5	25	0.2	150	750	100%	2,550	2,550	$ 43		$ 200	$ 400	$ 400	9.2
		Existing	3	Auto Select Manual Override		6 - Toilet (tank top) - 3.5 gpf	Floor Mtd	3.5	30	0	0	0	150	47,250									
Girls RR - 1st Floor	General Usage (Womens)	Proposed	3	Auto Select Manual Override	1	5 - Toilet (tank top) - 1.28 gpf	Floor Mtd	1.28	30	0	0	0	150	17,280	100%	29,970	29,970	$ 509		$ 800	$ 2,400	$ 2,400	4.7
		Existing	3	Auto Select Manual Override		16 - Sink/Faucet - 2.2 gpm		0	0	2.2	25	0.2	150	4,950									
Girls RR - 1st Floor	General Usage (Womens)	Proposed	3	Auto Select Manual Override	3	16 - Sink (Faucet Replacement) - 0.5 gpm		0	0	0.5	25	0.2	150	1,125	100%	3,825	3,825	$ 65		$ 200	$ 600	$ 600	9.2
		Existing	1	Auto Select Manual Override		9 - Toilet (flush valve) - 3.5 gpf	Wall Mtd	3.5	20	0	0	0	150	10,500									
Rm 405 (Nurse)	Public Area	Proposed	1	Auto Select Manual Override	1	11 - Toilet (flush valve) - 1.28 gpf	Wall Mtd	1.28	20	0	0	0	150	3,840	100%	6,660	6,660	$ 113		$ 800	$ 800	$ 800	7.1
		Existing	1	Auto Select Manual Override		16 - Sink/Faucet - 2.2 gpm		0	0	2.2	15	0.2	150	990									
Rm 405 (Nurse)	Public Area	Proposed	1	Auto Select Manual Override	3	16 - Sink (Faucet Replacement) - 0.5 gpm		0	0	0.5	15	0.2	150	225	100%	765	765	$ 13		$ 200	$ 200	$ 200	15.4
		Existing	1	Auto Select Manual Override		6 - Toilet (tank top) - 3.5 gpf	Floor Mtd	3.5	20	0	0	0	150	10,500									
Rm 416	Public Area	Proposed	1	Auto Select Manual Override	1	5 - Toilet (tank top) - 1.28 gpf	Floor Mtd	1.28	20	0	0	0	150	3,840	100%	6,660	6,660	$ 113		$ 800	$ 800	$ 800	7.1
		Existing	1	Auto Select Manual Override		16 - Sink/Faucet - 2.2 gpm		0	0	2.2	15	0.2	150	990									
Rm 416	Public Area	Proposed	1	Auto Select Manual Override	3	16 - Sink (Faucet Replacement) - 0.5 gpm		0	0	0.5	15	0.2	150	225	100%	765	765	$ 13		$ 200	$ 200	$ 200	15.4
		Existing	1	Auto Select Manual Override		6 - Toilet (tank top) - 3.5 gpf	Floor Mtd	3.5	20	0	0	0	150	10,500									
Rm 417	Public Area	Proposed	1	Auto Select Manual Override	1	5 - Toilet (tank top) - 1.28 gpf	Floor Mtd	1.28	20	0	0	0	150	3,840	100%	6,660	6,660	$ 113		$ 800	$ 800	$ 800	7.1
		Existing	1	Auto Select Manual Override		16 - Sink/Faucet - 2.2 gpm		0	0	2.2	15	0.2	150	990									
Rm 418	Public Area	Proposed	1	Auto Select Manual Override	3	16 - Sink (Faucet Replacement) - 0.5 gpm		0	0	0.5	15	0.2	150	225	100%	765	765	$ 13		$ 200	$ 200	$ 200	15.4
		Existing	2	Auto Select Manual Override		6 - Toilet (tank top) - 3.5 gpf	Floor Mtd	3.5	20	0	0	0	150	21,000									
Boys RR - 2nd Floor	General Usage (Mens)	Proposed	2	Auto Select Manual Override	1	5 - Toilet (tank top) - 1.28 gpf	Floor Mtd	1.28	20	0	0	0	150	7,680	100%	13,320	13,320	$ 226		$ 800	$ 1,600	$ 1,600	7.1
		Existing	3	Auto Select Manual Override		2 - Urinal - 1.5 gpf		1.5	25	0	0	0	150	16,875									
Boys RR - 2nd Floor	General Usage (Mens)	Proposed	3	Auto Select Manual Override	2	1 - Urinal - .125 gpf		0.125	25	0	0	0	150	1,406	100%	15,469	15,469	$ 263		$ 600	$ 1,800	$ 1,800	6.8
		Existing	2	Auto Select Manual Override		16 - Sink/Faucet - 2.2 gpm		0	0	2.2	25	0.2	150	3,300									
Boys RR - 2nd Floor	General Usage (Mens)	Proposed	2	Auto Select Manual Override	3	16 - Sink (Faucet Replacement) - 0.5 gpm		0	0	0.5	25	0.2	150	750	100%	2,550	2,550	$ 43		$ 200	$ 400	$ 400	9.2
		Existing	3	Auto Select Manual Override		6 - Toilet (tank top) - 3.5 gpf	Floor Mtd	3.5	30	0	0	0	150	47,250									
Girls RR - 2nd Floor	General Usage (Womens)	Proposed	3	Auto Select Manual Override	1	5 - Toilet (tank top) - 1.28 gpf	Floor Mtd	1.28	30	0	0	0	150	17,280	100%	29,970	29,970	$ 509		$ 800	$ 2,400	$ 2,400	4.7
		Existing	3	Auto Select Manual Override		16 - Sink/Faucet - 2.2 gpm		0	0	2.2	25	0.2	150	4,950									
Girls RR - 2nd Floor	General Usage (Womens)	Proposed	3	Auto Select Manual Override	3	16 - Sink (Faucet Replacement) - 0.5 gpm		0	0	0.5	25	0.2	150	1,125	100%	3,825	3,825	$ 65		$ 200	$ 600	$ 600	9.2
		Existing	1	Auto Select Manual Override		6 - Toilet (tank top) - 3.5 gpf	Floor Mtd	3.5	20	0	0	0	150	10,500									
Rm 426 - Staff	Public Area	Proposed	1	Auto Select Manual Override	1	5 - Toilet (tank top) - 1.28 gpf	Floor Mtd	1.28	20	0	0	0	150	3,840	100%	6,660	6,660	$ 113		$ 800	$ 800	$ 800	7.1
		Existing	1	Auto Select Manual Override		16 - Sink/Faucet - 2.2 gpm		0	0	2.2	15	0.2	150	990									
Rm 426 - Staff	Public Area	Proposed	1	Auto Select Manual Override	3	16 - Sink (Faucet Replacement) - 0.5 gpm		0	0	0.5	15	0.2	150	225	100%	765	765	$ 13		$ 200	$ 200	$ 200	15.4
		Existing	21	Auto Select Manual Override		16 - Sink/Faucet - 2.2 gpm		0	0	2.2	5	0.5	150	17,325									
ClassRms Sinks	ClassRoom	Proposed	21	Auto Select Manual Override	3	21 - Sink (Aerator) - 1.5 gpm		0	0	1.5	5	0.5	150	11,813	100%	5,513	5,513	$ 94		$ 50	$ 1,050	$ 1,050	11.2
		Existing		Auto Select Manual Override										-									
		Proposed		Auto Select Manual Override										-	100%	-	-	$ -			$ -	$ -	
		Existing		Auto Select Manual Override										-									
		Proposed		Auto Select Manual Override										-	100%	-	-	$ -			$ -	$ -	
Subtotals		Existing	55											250,035		165,480	165,480	$ 2,813	$ -	$ 9,250	$ 18,650	$ 18,650	6.6
		Proposed	55											84,555									

Proprietary Document: University Mechanical Contractors, Inc.

MONTHLY ENERGY CONSUMPTION

By UMC

Baselne (Exist): OISD - Elem School (Existing Facility as currently operating)

------- Monthly Energy Consumption -------

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Electric													
On-Pk Cons. (kWh)	59,190	49,449	54,645	44,323	28,677	24,442	9,454	9,911	28,652	35,759	61,062	62,860	468,423
On-Pk Demand (kW)	322	321	320	311	281	201	190	152	265	317	321	322	322

Building Energy Consumption =	65,618	Btu/(ft2-year)
Source Energy Consumption =	196,875	Btu/(ft2-year)
Floor Area =	24,364	ft2

EQUIPMENT ENERGY CONSUMPTION

By UMC

Baseline (Exist): OISD - Elem School (Existing Facility as currently operating)

Equipment - Utility		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
		------- Monthly Consumption -------												
Lights														
	Electric (kWh)	7,036.7	6,362.2	7,435.7	6,745.4	7,236.2	4,460.5	3,297.2	3,364.7	6,745.4	7,236.2	6,944.9	6,837.3	73,702.4
	Peak (kW)	26.8	26.8	26.8	26.8	26.8	26.2	26.2	26.2	26.8	26.8	26.8	26.8	26.8
MISC LD														
	Electric (kWh)	9,174.4	8,295.1	9,700.9	8,793.6	9,437.7	9,320.1	4,990.5	5,192.1	8,793.6	9,437.7	9,056.8	8,911.2	101,103.6
	Peak (kW)	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3
Cpl 1: Cooling plant - 001 [Sum of dsn coil capacities=38.13 tons]														
Hpl 1: Heating plant - 002 [Sum of dsn coil capacities=3,221 mbh]														
Electric Resistance - 001 [Nominal Capacity=3,221 mbh] (Heating Equipment)														
	Electric (kWh)	36,082.5	28,557.1	30,440.0	22,138.6	6,898.2	5,539.1	146.1	340.7	8,439.3	14,173.8	38,278.9	40,289.0	231,323.1
	Peak (kW)	275.2	274.6	273.5	264.1	234.6	154.2	143.1	105.2	218.7	270.3	274.4	275.7	275.7
System - 001														
Unit vent supply fan (Main Clg Fan)														
	Electric (kWh)	105.3	95.1	108.2	101.4	75.1	74.7	9.0	9.8	69.1	75.1	102.9	103.8	929.4
	Peak (kW)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
System - 002														
Unit vent supply fan (Main Clg Fan)														
	Electric (kWh)	103.9	93.9	106.9	100.1	74.2	73.8	8.9	9.7	68.2	74.2	101.6	102.5	917.8
	Peak (kW)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
System - 003														
Unit vent supply fan (Main Clg Fan)														
	Electric (kWh)	58.4	52.8	60.0	56.2	41.7	41.4	5.0	5.5	38.3	41.7	57.1	57.6	515.5
	Peak (kW)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
System - 004														
Unit vent supply fan (Main Clg Fan)														
	Electric (kWh)	45.1	40.7	46.3	43.4	32.2	32.0	3.9	4.2	29.6	32.2	44.0	44.4	397.9
	Peak (kW)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
System - 005														
Unit vent supply fan (Main Clg Fan)														
	Electric (kWh)	75.5	68.2	77.6	72.7	53.9	53.6	6.4	7.1	49.5	53.9	73.7	74.4	666.3
	Peak (kW)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
System - 006														
Unit vent supply fan (Main Clg Fan)														

Electric (kWh)	83.7	75.6	86.0	80.6	59.7	59.4	7.1	7.8	54.9	59.7	81.8	82.5	739.0
Peak (kW)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

System - 007

Unit vent supply fan (Main Clg Fan)

Electric (kWh)	45.6	41.2	46.9	43.9	32.5	32.4	3.9	4.3	29.9	32.5	44.6	45.0	402.6
Peak (kW)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

System - 008

Unit vent supply fan (Main Clg Fan)

Electric (kWh)	59.8	54.0	61.5	57.6	42.7	42.4	5.1	5.6	39.2	42.7	58.4	58.9	527.9
Peak (kW)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

System - 009

Fan coil supply fan (Main Clg Fan)

Electric (kWh)	2,964.0	2,678.5	3,047.0	2,855.0	2,115.5	2,103.5	253.0	277.0	1,945.0	2,115.5	2,896.5	2,922.5	26,173.0
Peak (kW)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Eq4381 - Propeller fan (System Exhaust Fan)

Electric (kWh)	149.5	135.9	145.8	144.7	189.2	209.1	184.7	158.9	164.4	97.4	162.1	155.6	1,897.3
Peak (kW)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

System - 010

Fan coil supply fan (Main Clg Fan)

Electric (kWh)	2,964.0	2,678.5	3,047.0	2,855.0	2,115.5	2,103.5	253.0	277.0	1,945.0	2,115.5	2,896.5	2,922.5	26,173.0
Peak (kW)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Propeller fan (System Exhaust Fan)

Electric (kWh)	149.5	135.9	145.8	144.7	189.2	209.1	184.7	158.9	164.4	97.4	162.1	155.6	1,897.3
Peak (kW)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

System - 011

Propeller fan (System Exhaust Fan)

Electric (kWh)	92.6	84.2	88.9	89.9	83.4	87.7	95.6	88.1	76.1	73.0	100.4	97.2	1,057.0
Peak (kW)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3

MONTHLY ENERGY CONSUMPTION

By UMC

Baseline (Adjusted): OISD - Elem School (Baseline adjusted to account for proper ventilation air)

------- Monthly Energy Consumption -------

Utility		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Electric														
	On-Pk Cons. (kWh)	77,646	62,888	72,423	55,661	32,474	26,140	9,600	10,368	32,639	42,390	79,932	83,691	585,852
	On-Pk Demand (kW)	376	369	376	356	319	239	216	185	328	359	378	379	379

Building Energy Consumption =	82,068	Btu/(ft2-year)
Source Energy Consumption =	246,230	Btu/(ft2-year)
Floor Area =	24,364	ft2

EQUIPMENT ENERGY CONSUMPTION

By UMC

Baseline (Adjusted): OISD - Elem School (Baseline adjusted to account for proper ventilation air)

Equipment - Utility		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
		------- Monthly Consumption -------												
Lights														
	Electric (kWh)	7,036.7	6,362.2	7,435.7	6,745.4	7,236.2	4,460.5	3,297.2	3,364.7	6,745.4	7,236.2	6,944.9	6,837.3	73,702.4
	Peak (kW)	26.8	26.8	26.8	26.8	26.8	26.2	26.2	26.2	26.8	26.8	26.8	26.8	26.8
MISC LD														
	Electric (kWh)	9,174.4	8,295.1	9,700.9	8,793.6	9,437.7	9,320.1	4,990.5	5,192.1	8,793.6	9,437.7	9,056.8	8,911.2	101,103.6
	Peak (kW)	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3
Cpl 1: Cooling plant - 001 [Sum of dsn coil capacities=31.94 tons]														
Hpl 1: Heating plant - 002 [Sum of dsn coil capacities=5,069 mbh]														
Electric Resistance - 001 [Nominal Capacity=5,069 mbh] (Heating Equipment)														
	Electric (kWh)	54,401.6	41,873.9	48,072.7	33,345.2	10,640.0	7,198.9	362.7	846.9	12,366.2	20,685.2	57,029.7	60,992.1	347,815.2
	Peak (kW)	329.1	322.6	329.7	309.4	272.7	193.0	168.9	137.9	281.8	311.9	331.0	332.7	332.7
System - 001														
Unit vent supply fan	(Main Clg Fan)													
	Electric (kWh)	105.3	95.1	108.2	101.4	75.1	74.7	9.0	9.8	69.1	75.1	102.9	103.8	929.4
	Peak (kW)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
System - 002														
Unit vent supply fan	(Main Clg Fan)													
	Electric (kWh)	103.9	93.9	106.9	100.1	74.2	73.8	8.9	9.7	68.2	74.2	101.6	102.5	917.8
	Peak (kW)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
System - 003														
Unit vent supply fan	(Main Clg Fan)													
	Electric (kWh)	58.4	52.8	60.0	56.2	41.7	41.4	5.0	5.5	38.3	41.7	57.1	57.6	515.5
	Peak (kW)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
System - 004														
Unit vent supply fan	(Main Clg Fan)													
	Electric (kWh)	45.1	40.7	46.3	43.4	32.2	32.0	3.9	4.2	29.6	32.2	44.0	44.4	397.9
	Peak (kW)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
System - 005														
Unit vent supply fan	(Main Clg Fan)													
	Electric (kWh)	75.5	68.2	77.6	72.7	53.9	53.6	6.4	7.1	49.5	53.9	73.7	74.4	666.3
	Peak (kW)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
System - 006														
Unit vent supply fan	(Main Clg Fan)													
	Electric (kWh)	83.7	75.6	86.0	80.6	59.7	59.4	7.1	7.8	54.9	59.7	81.8	82.5	739.0
	Peak (kW)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

System - 007

Unit vent supply fan (Main Clg Fan)

Electric (kWh)	45.6	41.2	46.9	43.9	32.5	32.4	3.9	4.3	29.9	32.5	44.6	45.0	402.6
Peak (kW)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

System - 008

Unit vent supply fan (Main Clg Fan)

Electric (kWh)	59.8	54.0	61.5	57.6	42.7	42.4	5.1	5.6	39.2	42.7	58.4	58.9	527.9
Peak (kW)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

System - 009

Fan coil supply fan (Main Clg Fan)

Electric (kWh)	2,964.0	2,678.5	3,047.0	2,855.0	2,115.5	2,103.5	253.0	277.0	1,945.0	2,115.5	2,896.5	2,922.5	26,173.0
Peak (kW)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Eq4381 - Propeller fan (System Exhaust Fan)

Electric (kWh)	199.0	180.4	199.4	192.2	196.7	209.5	131.0	114.7	174.5	135.9	205.1	201.7	2,140.0
Peak (kW)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

System - 010

Fan coil supply fan (Main Clg Fan)

Electric (kWh)	2,964.0	2,678.5	3,047.0	2,855.0	2,115.5	2,103.5	253.0	277.0	1,945.0	2,115.5	2,896.5	2,922.5	26,173.0
Peak (kW)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0

Propeller fan (System Exhaust Fan)

Electric (kWh)	199.0	180.4	199.4	192.2	196.7	209.5	131.0	114.7	174.5	135.9	205.1	201.7	2,140.0
Peak (kW)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

System - 011

Propeller fan (System Exhaust Fan)

Electric (kWh)	130.1	117.9	127.5	126.1	123.6	124.5	132.2	126.9	116.3	116.2	133.6	133.4	1,508.3
Peak (kW)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3

MONTHLY ENERGY CONSUMPTION

By UMC

Proposed: **OISD - Elem School (Replace existing HVAC with new VAV system & Heat Recovery)**

------- Monthly Energy Consumption -------

Utility	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
Electric													
On-Pk Cons. (kWh)	46,334	38,339	42,556	34,278	22,890	19,676	8,424	8,720	22,586	28,988	46,959	48,838	368,589
On-Pk Demand (kW)	221	212	206	199	179	139	133	88	168	199	222	225	225

Building Energy Consumption =	51,633	Btu/(ft2-year)
Source Energy Consumption =	154,915	Btu/(ft2-year)
Floor Area =	24,364	ft2

EQUIPMENT ENERGY CONSUMPTION

By UMC

Proposed: **OISD - Elem School (Replace existing HVAC with new VAV system & heat recovery)**

Equipment - Utility		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
		------- Monthly Consumption -------												
Lights														
	Electric (kWh)	7,036.7	6,362.2	7,435.7	6,745.4	7,236.2	4,460.5	3,297.2	3,364.7	6,745.4	7,236.2	6,944.9	6,837.3	73,702.4
	Peak (kW)	26.8	26.8	26.8	26.8	26.8	26.2	26.2	26.2	26.8	26.8	26.8	26.8	26.8
MISC LD														
	Electric (kWh)	9,174.4	8,295.1	9,700.9	8,793.6	9,437.7	9,320.1	4,990.5	5,192.1	8,793.6	9,437.7	9,056.8	8,911.2	101,103.6
	Peak (kW)	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3
Cpl 1: Cooling plant - 001 [Sum of dsn coil capacities=35.69 tons]														
Hpl 1: Heating plant - 002 [Sum of dsn coil capacities=980.9 mbh]														
Electric Resistance - 001 [Nominal Capacity=980.9 mbh] (Heating Equipment)														
	Electric (kWh)	25,365.4	19,538.6	20,732.3	14,617.6	3,489.5	3,194.7	0.0	25.4	4,478.1	9,308.8	26,210.4	28,255.5	155,216.3
	Peak (kW)	142.0	139.5	139.2	134.4	117.2	77.9	81.5	43.2	108.0	133.2	142.7	145.5	145.5
System - 009														
BI Centrifugal var spd mtr (Main Clg Fan)														
	Electric (kWh)	3,261.1	2,948.3	3,432.7	3,128.2	2,379.0	2,357.2	96.9	100.8	2,185.9	2,396.9	3,231.1	3,191.6	28,709.6
	Peak (kW)	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
Parallel Fan Powered VAV w/ECM (Main Htg Fan)														
	Electric (kWh)	1,442.2	1,145.5	1,200.2	941.2	297.9	307.8	0.0	1.5	338.1	564.0	1,455.4	1,585.6	9,279.3
	Peak (kW)	8.1	8.1	8.1	8.0	7.5	6.8	7.0	3.1	7.6	8.1	8.1	8.1	8.1
System - 011														
Propeller fan (System Exhaust Fan)														
	Electric (kWh)	54.2	49.3	53.9	52.2	49.5	36.2	39.7	35.9	44.7	44.1	60.7	56.9	577.3
	Peak (kW)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3

Project: **Orcas Island School District**
Facility: **Elementary School**
Measure: **UCM 6 - Weatherization**
Reduce Infiltration Around Windows & Doors
Date: **14-Feb-11**

		Existing						Proposed						Savings		
		Annual Operating Hours			Annual Heating Energy Usage	Annual Cooling Energy Usage	Annual Energy Usage	Annual Operating Hours			Annual Energy Usage	Annual Cooling Energy Usage	Annual Energy Usage	Heating	Cooling	
May - Sept OAT	Hrs/yr	(1:00-8:00)	(9:00-16:00)	(17:00-24:00)	kwh	kwh	$	(1:00-8:00)	(9:00-16:00)	(17:00-24:00)	kwh	kwh	$	kwh	kwh	$
97.5	1	-	1	-		-	$ -	-	1	-		-	$ -		-	$ -
92.5	5	-	3	0		-	$ -	-	3	0		-	$ -		-	$ -
87.5	27	-	13	2		-	$ -	-	13	2		-	$ -		-	$ -
82.5	85	-	41	6		-	$ -	-	41	6		-	$ -		-	$ -
77.5	170	-	79	12		-	$ -	-	79	12		-	$ -		-	$ -
72.5	337	1	152	24		-	$ -	1	152	24		-	$ -		-	$ -
67.5	583	6	235	43			$ -	6	235	43			$ -		-	$ -
62.5	1051	45	307	74	2,009		$ -	45	307	74	1,190		$ -	819	-	$ -
57.5	1424	103	312	83	3,594		$ -	103	312	83	2,128		$ -	1,466	-	$ -
52.5	1477	111	319	84	4,977		$ -	111	319	84	2,948		$ -	2,030	-	$ -
47.5	1467	103	318	90	6,224		$ -	103	318	90	3,686		$ -	2,538	-	$ -
42.5	1157	87	230	70	5,685		$ -	87	230	70	3,367		$ -	2,318	-	$ -
37.5	657	56	108	39	3,489		$ -	56	108	39	2,066		$ -	1,423	-	$ -
32.5	213	21	31	10	1,237		$ -	21	31	10	732		$ -	504	-	$ -
27.5	57	5	11	3	419		$ -	5	11	3	248		$ -	171	-	$ -
22.5	25	2	4	1	197		$ -	2	4	1	116		$ -	80	-	$ -
17.5	15	2	2	1	121		$ -	2	2	1	72		$ -	49	-	$ -
12.5	3	0	1	0	33		$ -	0	1	0	20		$ -	13	-	$ -
Subtotal	8,754	542	2,167	542	27,984	-	$ -	542	2,167	542	16,573	-	$ -	11,412	-	$ -

Existing Infiltration Rate	Annual Hours 1-8	Annual Hours 9-16	Annual Hours 17-24
Airflow (CFM) =	1571.4	1571.4	1571.4
% OA/RA =	100%	100%	100%
Avg RAT (Cooling) =	72	72	72
Avg RAT (Heating) =	72	72	72

Typical Schedule	Annual Hours 1-8	Annual Hours 9-16	Annual Hours 17-24
Hours/day in Range	2	8	2
Days/week	5	5	5

Proposed Infiltration Rate	Annual Hours 1-8	Annual Hours 9-16	Annual Hours 17-24
Airflow (CFM) =	930.6	930.6	930.6
% OA/RA =	100%	100%	100%
Avg RAT (Cooling) =	72	72	72
Avg RAT (Heating) =	72	72	72

Does Facility Have Cooling (Y/N) = N
Average Cooling Efficiency (kw/Ton) = 0.90

Utility Rate:
Electrical Cost ($/kwh) = $ 0.062

Heating Cost ($/therm) =

Project: **Orcas Island School District**
Facility: **Elementary School**
Measure: **UCM 6 - Weatherization**
Reduce Infiltration Around Doors & Windows
Date: **14-Feb-11**

Facility	Exterior Doors	Windows (Total Qty)	Windows Operable Perimeter Linear ft	Windows (% Qty to use in Calculation)	Existing Average Infiltration (cfm)	Proposed Average Infiltration (cfm)
					-	-
ES	9				1,080	720
	0				-	-
					-	-
ES Windows		78	10	90%	491	211
					-	-
					-	-
					-	-
					-	-
					-	-
					-	-
					-	-
					-	-
					-	-
					-	-
					-	-
					-	-
					-	-
					-	-
					-	-
					-	-
					-	-
					-	-
					-	-
					-	-
					-	-
Subtotal					**1,571**	**931**

Assumptions

Existing Doors:

Estimated Average Crack Width =	0.125	inches
Average Pressure Differential =	.063"	water col
Est Average Leakage Rate (cfm) =	10	cfm/linear ft (per ASHRAE)
Safety Factor (%) =	40%	
Average Leak Rate (cfm)	6	cfm/linear ft (used in calculation)

Proposed Doors:

Estimated Average Crack Width =	0.0625	inches
Average Pressure Differential =	.063"	water col
Average Leakage Rate (cfm) =	4	cfm/linear ft (per ASHRAE)

Average Linear Ft of Crack/Door = 20 =(7'x2)+(3'x2)

Existing Windows:
Estimated Leakage Value = 0.7 cfm/linear ft

Proposed Windows:
Estimated Leakage Value = 0.3 cfm/linear ft

ASHRAE/ANSI indicates leakage values of 1.0, 0.8, 0.5, 0.2 cfm/ft for excessive, leaky, normal and tight windows.

UNIVERSITY MECHANICAL CONTRACTORS, INC.
We Build Value

Orcas Island School District
No 137

ENERGY SAVINGS PERFORMANCE CONTRACT MEASUREMENT & VERIFICATION REPORT FOR ORCAS ISLAND SCHOOL DISTRICT PHASE II

PREPARED BY
UNIVERSITY MECHANICAL CONTRACTORS, INC.
March, 2012

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1.0 EXECUTIVE SUMMARY

University Mechanical Contractors, (UMC), is pleased to have the opportunity to present the initial Measurement and Verification (M&V) report for Orcas Island School District (OISD) Phase II ESPC Project. This project included the implementation of three Utility Conservation Measures (UCMs) that were implemented at the Orcas Island Elementary School. Following completion of this project, the formal commencement of energy savings began as of February 1st, 2012. This report provides an initial update on the status of the project based on the measurements and trending that have been completed up to this point. Since the project has just recently been fully completed and commissioned, these savings are only now beginning to accrue. UMC will monitor the savings over the next year and present a separate M&V report in February of 2013.

It should also be noted that all savings are being compared to a modified utility baseline as identified and detailed in the Investment Grade Audit (IGA). A summary of this baseline adjustment is also provided in Section 5.0 of this report. Below is an update of the current status of each measure and the associated M&V procedure.

- UCM-2 Water Conservation Upgrades: This project is complete. Pre & post measurements of select lighting locations have been completed to confirm energy savings.
- UCM-3 Elementary School HVAC Upgrades: This project is complete. Ongoing optimization is still underway to improve savings performance. Preliminary trends confirm operation of scheduling, demand control ventilation and occupancy controls.
- UCM-5 Domestic Water System Piping Upgrades: This project is complete. All plumbing piping & fixtures replaced at Elementary School.

The following Table provides a summary of the measured savings.

Utility Conservation & Facility Upgrade Measures		Measured Energy/Utility Savings					Annual Savings (1)	Estimated Operational Savings	
		Electric		Propane	Water / Sewer				
	School	kW/yr	kWh/yr	Mbtu	Usage gal/yr	Sewer gal/yr	$	$	M&V Completed
		-	-	-	-	-	$ -	$ -	$ -
UCM-2: Water Conservation Upgrades	ES	-	-	-	183,068	183,068	$ 3,112	$ 450	Pre & Post Measurements
		-	-	-	-	-	$ -	$ -	$ -
UCM-3: Elementary School HVAC Upgrade	ES	415	225,851	-	-	-	$ 16,857	$ 5,700	Calibrated Simulation (Stipulated)
		-	-	-	-	-	$ -	$ -	$ -
UCM-5: Domestic Water Piping Upgrade	ES	-	-	-	34,200	34,200	$ 581	$ -	Calibrated Simulation (Stipulated)
		-	-	-	-	-	$ -	$ -	$ -
									$ -
Subtotal		**415**	**225,851**	**-**	**217,268**	**217,268**	**$ 20,551**	**$ 6,150**	

Notes: (1) Annual Savings shown in this table are based on the current utility rates.

The M&V methods utilized for this project were developed following the recommended options set forth in the International Performance Measurement & Verification Protocol (IPMVP). The original M&V plan, as set forth in the IGA has been included in the appendix for reference. The specific M&V methods used for each UCM are shown in the following table.

Proposed M&V Type				
Energy Conservation Measure	**Measurement & Verification Option Proposed**			
	Option A Partially Measured Retrofit Isolation	**Option B** Retrofit Isolation	**Option C** Whole Facility	**Option D** Calibrated Simulation
UCM 2 Water Conservation	X			
UCM 3 Elementary School HVAC Upgrade				X
UCM 5 Domestic Water Piping Upgrade (Elementary School)				X

2.0 UTILITY CONSERVATION MEASURES

2.1 UCM-2: Water Conservation Upgrades

Baseline System:
When UMC came on site and did our initial assessment of the buildings it was noted that the domestic water fixtures that were in use throughout both the Elementary School and the High School were primarily made up of high flow fixtures. The Elementary school had a combination of wall mounted flush valve water closets & floor mounted tank top water closets that utilized between 3.5 & 4.5 gallons per flush (gpf), urinals that utilized 1.5 gpf and sink faucets with 2.2 gpm aerators (or no aerators at all). The High school also had wall mounted flush valve water closets that utilized 3.5 gpf and, similar to the Elementary School, urinals with 1.5 gpf flush valves and sink faucets with 2.2 gpm aerators.

Upgrades Completed:
Existing water closets and urinals were replaced with new, state of the art, ultra-low flow fixtures that will utilize 1.28 gpf and 0.125 gpf respectively.

UMC also replaced the existing sink faucets in all public & private restrooms with new 0.5 gpm water faucets and new 1.0 gpm faucets were installed in all sinks that are located in classrooms.

Measurement & Verification
The M&V method for this UCM, as defined in the Investment Grade Audit consisted of pre measurements of the actual water usage of a representative sample of fixtures (water closets, urinals and faucets). These measurements have been completed and are provided in the appendix. Post installation usage was based upon manufacturer's specifications (See Appendix for supporting documentation).

UCM 2 Annual Savings Summary

Elem School Guaranteed Annual Savings	148,500 Gal/yr
Elem School Measured Savings	183,068 Gal/yr
Elem School Differential in Savings	**+34,568 Gal/yr**

Operational Savings
Operational savings were estimated as a result of this measure. These estimated savings were based on a reduced number of plumbing annual repair/upgrade requirements due to the replacement of all water closets and urinals within the Elementary with new fixtures. The estimated ongoing cost

savings was set at an agreed upon number of $425/year and was intended to cover an annualized reduction in leaks and broken fixtures. This operational savings is a stipulated cost savings (as agreed upon in the original IGA and in the proposed M&V section of this document).

UCM-3: Elementary School HVAC Upgrade

Baseline System:
The baseline Elementary School Heating & Ventilating system consisted of a combination of two (2) constant volume AHUs serving the original school classrooms, eight (8)constant volume unit ventilators (installed in 1993) serving the new addition classrooms, and numerous electric radiant heaters providing additional heat in hallways, stairwells and select offices. All of these units utilized electric resistance heating coils for heating of the facility.

These units were noisy (disrupting classes), lacked a good control system and did not provide adequate ventilation air for the students (all outside air dampers reviewed during the audit were closed at all times). In addition, dust was being introduced through the return air plenum; which was then distributed back into the classroom. As a result, the H&V system did not adequately provide for a good learning environment for the Elementary School students

Upgrades Completed:
Replaced the constant volume AHUs and unit ventilators with one (1) new variable air volume (VAV) rooftop unit. This unit now provides make-up air to low noise, fan powered VAV boxes. Each VAV box is controlled via a local thermostat and an occupancy controller that shuts off the ventilation air damper, the VAV box fan, and the lights when the space is not occupied for a preset period of time. The fan powered VAV boxes utilize ventilation air from the main system mixed with return air from the local space to maintain room temperature and code designed ventilation requirements.

The system utilizes a central AHU (located in the exterior 1st floor mechanical space) that delivers the appropriate amount of fresh air to each space (based on occupancy). Energy efficient preheating of the ventilation air is being supplied via an air-to-air heat exchanger. This heat exchanger recovers 70% of the heat from the exhaust air and transfers it to the incoming ventilation air.

The discharge air from the main AHU provides additional energy savings by utilizing a supply air reset control to increase the discharge air temperature based on outside air conditions. This system is controlled via a new direct digital control (DDC) system which is tied into the DDC system currently serving the High School. This system provides for on-site and off-site monitoring and control of all HVAC systems to allow for efficient operation. In addition, this DDC provides the capability to trend and track system operation and energy usage over time; allowing for efficient modifications to maintain long term energy efficient operation.

In addition to the measures listed above, the following conservation measures were also completed as part of this measure.

- Install dedicated demand control ventilation, including a CO2 sensor in the return air ductwork to control ventilation air to optimum levels.

- An occupancy sensor was installed for each classroom space served by VAV boxes. These sensors were control both lights and unit ventilators.

- Upgraded the exhaust fan systems for the restrooms and connect to the new building automation system.

- Installed electrical meters to monitor electrical usage to both the administration and gym facilities.

Measurement & Verification

Short term monitoring/trending of select system operating characteristics has been completed to confirm that the system is operating as specified. This includes scheduling functions, space temperatures, occupancy control and demand control ventilation (See the following graphs).

The initial review of the current operating characteristics indicates that the system is operating in a manner consistent with the original modeling characteristics. The only cause for concern in meeting the annual guarantee is the consistent overrides of individual spaces. This is occurring consistently at nights and weekends. While some night & weekend occupancy was anticipated in the model, extensive overrides will begin to offset the energy savings attributable the overall system and cut into the annual energy savings. It must be noted that this is an issues outside the scope of this project; and thus not under UMC's control to regulate. (please see Section 7: Recommendations to Optimize Ongoing Savings)

The following table compares the annual energy usage of the current system operations (based on specific measured characteristics) as compared to the modeled annual usage. This table is based on the system operating on the baseline operating schedule and does not take into account potential increased usage that could occur based on the additional override operation (as previously mentioned).

Equipment	Modeled Energy Usage (kWh)	Anticipated Annual Usage Based on Current Operating Characteristics (kWh)	Calculation Variables Used (Measured)
Main RTU (fans)	28,710	14,212	RTU operating at 60% (monitored at vfd); Operating hours: 9 hrs/day, 4 hrs on weekends; Fan operates for 40 weeks/yr
VAV Boxes (fans) - Scheduled Operation	9,279	4,917	ECM motors operating at an avg of 80% (estimated); Operating hours: 9 hrs/day, 4 hrs on weekends; Fans operate for 40 weeks/yr
VAV Boxes (heaters) - Scheduled Operation	155,216	155,216	Electrical heating usage to provide current building load; % OA measured within model parameters; air/air heat exchanger operating at 65% minimum efficiency
Subtotals	**193,205**	**174,345**	

As can be seen in this table, the system is currently operating on track with the anticipated baseline model (adjusted for code required ventilation air).

The following two tables provide information concerning the energy operating characteristics of the VAV boxes. These boxes provide all electrical heating requirements for the system.

Installed VAV Box Specifications

Unit	Max Air	Min Air	Heater kW	Heater Volts	Htng Stages	Fan HP	Fan Volts	FAN KW	Fan CFM	Unit Size	Inlet Size	Outlet Size	Location	Rm Served	CKT
FTU-101	1270	700	9	277/1	2	1/3	277/1	0.2	1270	512	12	14x12	102	101,102	HE-18
FTU-102	590	295	4.2	277/1	1	1/8	277/1	0.1	590	308	8	10x10	102	103	HE-20
FTU-103	1200	600	9	277/1	2	1/3	277/1	0.2	1200	512	12	14x12	111	111	HE-16
FTU-104	1220	610	9	277/1	2	1/4	277/1	0.2	1220	512	12	14x12	108	108	HA-6
FTU-105	1440	720	10	277/1	2	1/2	277/1	0.4	1440	514	14	14x12	122	122	HA-1
FTU-106	1190	600	9	277/1	2	1/3	277/1	0.2	1190	514	14	14x12	127	127	HA-2
FTU-107	1190	600	9	277/1	2	1/3	277/1	0.2	1190	514	14	14x12	128	128	HA-4
FTU-108	1275	700	10	277/1	2	1/3	277/1	0.2	1275	514	14	14x12	121	121	HA-3
FTU-109	1385	700	10	277/1	2	1/3	277/1	0.2	1385	512	12	14x12	143	120,143,141,140,139	HA-5
FTU-110	1695	850	11	277/1	3	1/2	277/1	0.4	1695	614	14	14x12	138	131,134	HA-7
FTU-201	1120	600	8	277/1	2	1/4	277/1	0.2	1120	512	12	14x12	210	202	HE-13
FTU-202	570	300	4.2	277/1	1	1/8	277/1	0.1	570	308	8	10x10	202	203	HE-19
FTU-203	1250	700	9	277/1	2	1/4	277/1	0.2	1250	614	14	14x12	208	208	HE-15
FTU-204	1020	600	8	277/1	2	1/4	277/1	0.2	1020	510	10	14x12	206	206	HE-14
FTU-205	1360	700	10	277/1	2	1/3	277/1	0.2	1360	514	14	14x12	224	224	HB-7
FTU-206	1290	650	9	277/1	2	1/3	277/1	0.2	1290	512	12	14x12	225	225	HB-2
FTU-207	1225	650	9	277/1	2	1/3	277/1	0.2	1225	514	14	14x12	226	226,227	HB-4
FTU-208	1225	650	9	277/1	2	1/3	277/1	0.2	1225	514	14	14x12	223	223	HB-1
FTU-209	1120	600	8	277/1	2	1/4	277/1	0.2	1120	512	12	14x12	222	222	HB-3
FTU-210	1170	600	9	277/1	2	1/3	277/1	0.2	1170	514	14	14x12	220	220,232	HB-6
FTU-211	1160	600	9	277/1	2	1/3	277/1	0.2	1160	512	12	14x12	221	221	HB-5
FTU-212	310	150	2.2	277/1	1	1/15	277/1	0.050	310	108	8	10x10	209	209,Stairwell	HE-17
Total	**25275**	**13175**	**184.6**					**4.9**							

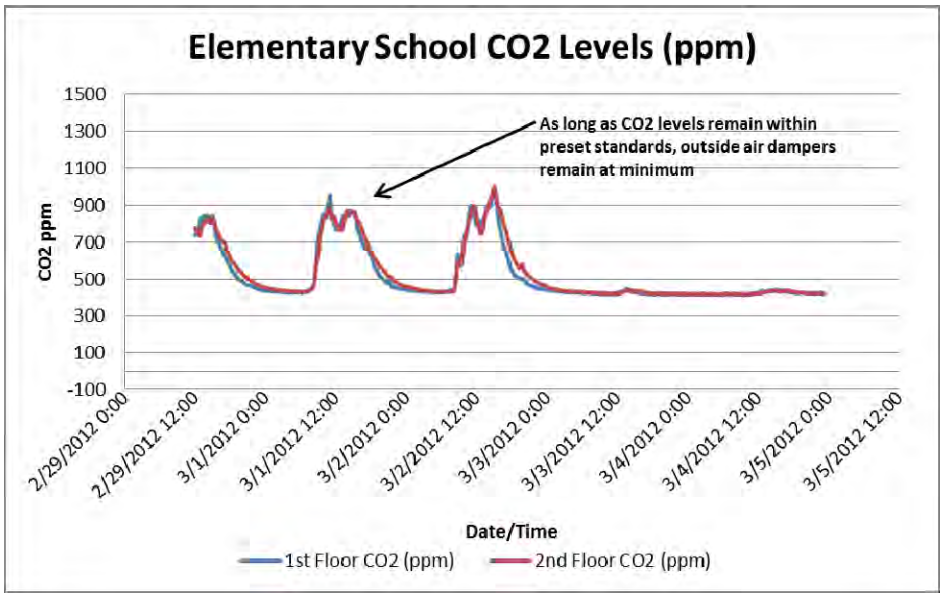
VAV Box Operating Characteristics

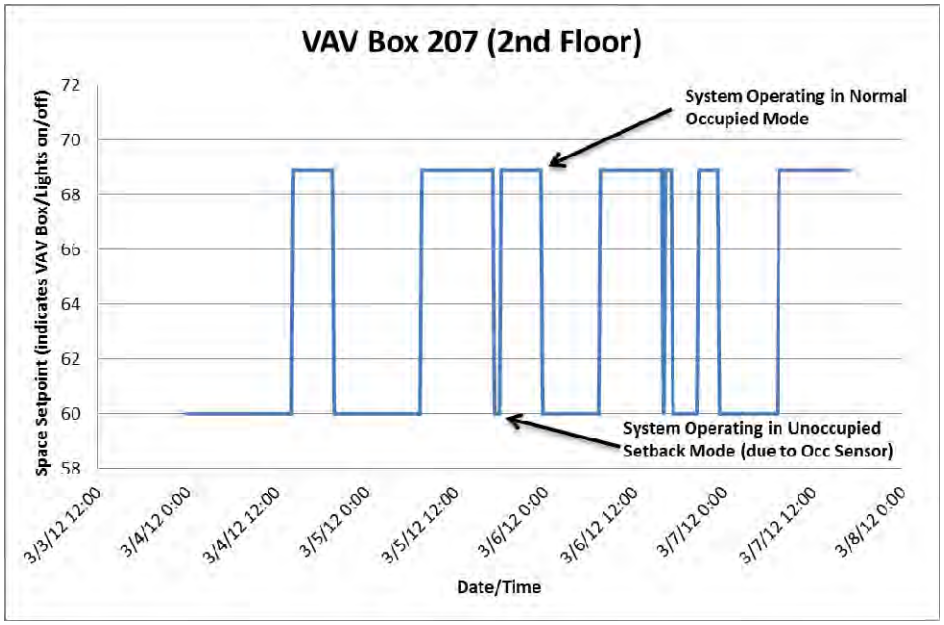
Unit	Min Air	Mixed Air Temp 58	Mixed Air Temp 59	Mixed Air Temp 60	Mixed Air Temp 61	Mixed Air Temp 62	Mixed Air Temp 63	Mixed Air Temp 64	Mixed Air Temp 65	Mixed Air Temp 66	Mixed Air Temp 67	Total Rated KW
FTU-101	700	6.0	5.8	5.5	5.3	5.1	4.9	4.7	4.4	4.2	4.0	9
FTU-102	295	2.5	2.4	2.3	2.2	2.1	2.1	2.0	1.9	1.8	1.7	4.2
FTU-103	600	5.1	4.9	4.7	4.6	4.4	4.2	4.0	3.8	3.6	3.4	9
FTU-104	610	5.2	5.0	4.8	4.6	4.4	4.2	4.1	3.9	3.7	3.5	9
FTU-105	720	6.2	5.9	5.7	5.5	5.2	5.0	4.8	4.6	4.3	4.1	10
FTU-106	600	5.1	4.9	4.7	4.6	4.4	4.2	4.0	3.8	3.6	3.4	9
FTU-107	600	5.1	4.9	4.7	4.6	4.4	4.2	4.0	3.8	3.6	3.4	9
FTU-108	700	6.0	5.8	5.5	5.3	5.1	4.9	4.7	4.4	4.2	4.0	10
FTU-109	700	[illegible]	[illegible]	[illegible]	5.3	5.1	4.9	4.7	4.4	4.2	4.0	10
FTU-110	850	[illegible]	[illegible]	[illegible]	6.5	6.2	5.9	5.6	5.4	5.1	4.8	11
FTU-201	600	[illegible]	[illegible]	[illegible]	4.6	4.4	4.2	4.0	3.8	3.6	3.4	8
FTU-202	300	2.6	2.5	2.4	2.3	2.2	2.1	2.0	1.9	1.8	1.7	4.2
FTU-203	700	6.0	5.8	5.5	5.3	5.1	4.9	4.7	4.4	4.2	4.0	9
FTU-204	600	5.1	4.9	4.7	4.6	4.4	4.2	4.0	3.8	3.6	3.4	8
FTU-205	700	6.0	5.8	5.5	5.3	5.1	4.9	4.7	4.4	4.2	4.0	10
FTU-206	650	5.6	5.3	5.1	4.9	4.7	4.5	4.3	4.1	3.9	3.7	9
FTU-207	650	5.6	5.3	5.1	4.9	4.7	4.5	4.3	4.1	3.9	3.7	9
FTU-208	650	5.6	5.3	5.1	4.9	4.7	4.5	4.3	4.1	3.9	3.7	9
FTU-209	600	5.1	4.9	4.7	4.6	4.4	4.2	4.0	3.8	3.6	3.4	8
FTU-210	600	5.1	4.9	4.7	4.6	4.4	4.2	4.0	3.8	3.6	3.4	9
FTU-211	600	5.1	4.9	4.7	4.6	4.4	4.2	4.0	3.8	3.6	3.4	9
FTU-212	150	1.3	1.2	1.2	1.1	1.1	1.0	1.0	0.9	0.9	0.9	2.2
TOTAL KW		**112.6**	**108.4**	**104.2**	**100.1**	**95.9**	**91.7**	**87.6**	**83.4**	**79.2**	**75.0**	**184.6**

Operating Range

The current operating sequence for the existing HVAC system is able to maintain a mixed air temperature within the range as noted in the preceding table. By maintaining operation within this range, we are able to limit the demand energy usage of the boxes to less than half of their design range. This is achieve through the efficient control of the RTU, and the integral air-to-air heat exchanger.

CO2 sensors were installed on the return air to the units which have been linked through the controls system to the outside air (OSA) damper actuator. As the CO2 level raises past the acceptable level the OSA damper opens to allow more fresh air in and lower the CO2 level. These sensors can be seen to work from the graphs seen below. From these graphs we can see that as the CO2 increases, the OSA damper opens as required to maintain ventilation rates.





UCM 3 Annual Savings Summary

Elem School Guaranteed Annual Savings	203,266 kWh
Elem School Measured Savings	225,851 kWh
Elem School Differential in Savings	**+22,585 kWh**

(Note: The savings estimate for the Elementary School is based on measured, observed and trended information that indicates the system operating efficiencies

and characteristics are, at a minimum, equal to those utilized in the calibrated simulation. As a result, the estimated savings are anticipated to be exceeded. As mentioned in the documentation, the continued excessive overriding of individual spaces (via the VAV boxes) is a potential identified issue that could reduce this anticipated savings.)

UCM-5: Domestic Water Piping Upgrade

Baseline System:
The baseline domestic water system within the old section of the Elementary School was comprised principally of galvanized piping which has become corroded over the years This was causing numerous issues within the school including (1) an overall lack of pressure throughout the distribution system, (2) undrinkable rust filled water delivered from sinks and (3) ongoing issues with leaks throughout the system – especially within the crawl space beneath the facility (where the main distribution is located).

Previous leaks had flooded the crawl space. These leaks, along with the lack of airflow in the crawl space, had also resulted in a damp, musty environment that could potentially have facilitated mildew & mold growth.

Upgrades Completed:
The following conservation measures were also completed as part of this measure.

- Replaced all galvanized sections of the domestic water system located throughout the crawl space beneath the facility and the wall risers.
- Replaced all waste piping, both within walls and crawl space.
- Replaced water fountains.
- Installed new water meters for the Administration building and Old Gym.
- Install new central water filtration system.

Measurement & Verification
The new plumbing system was verified to be properly installed and operating correctly and operating to be successfully. This is a stipulated savings measure that is verified based on energy savings estimates developed through a "calibrated simulation" (or computer model).

UCM 5 Annual Savings Summary

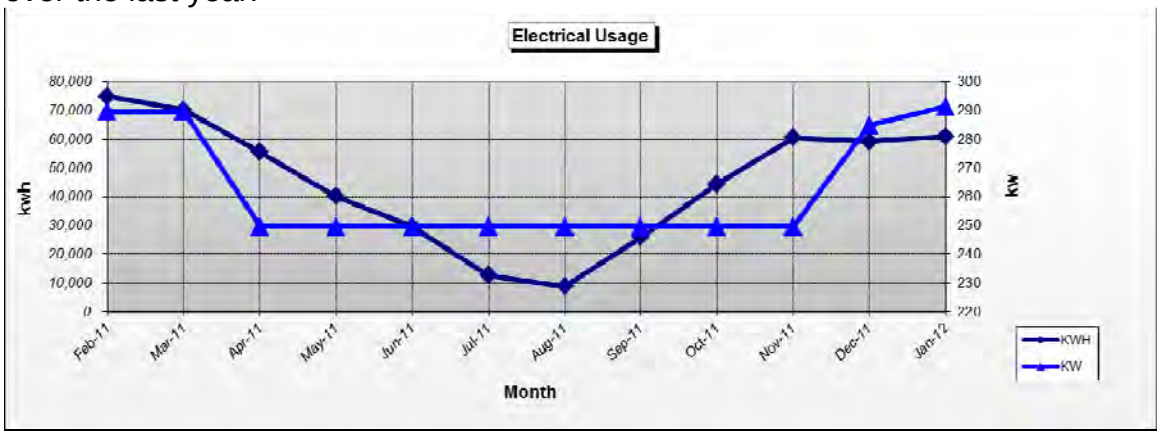
Elem School Guaranteed Annual Savings	34,200 Gal/yr
Elem School Measured Savings	36,000 Gal/yr
Elem School Differential in Savings	**+1,800 Gal/yr**

Operational Savings
Operational savings were estimated as a result of this measure. These estimated savings were based on a reducing the number of ongoing annual repairs due to leaks and plumbing issues (primarily in the crawl space). The savings were based on historical repair information, associated with this

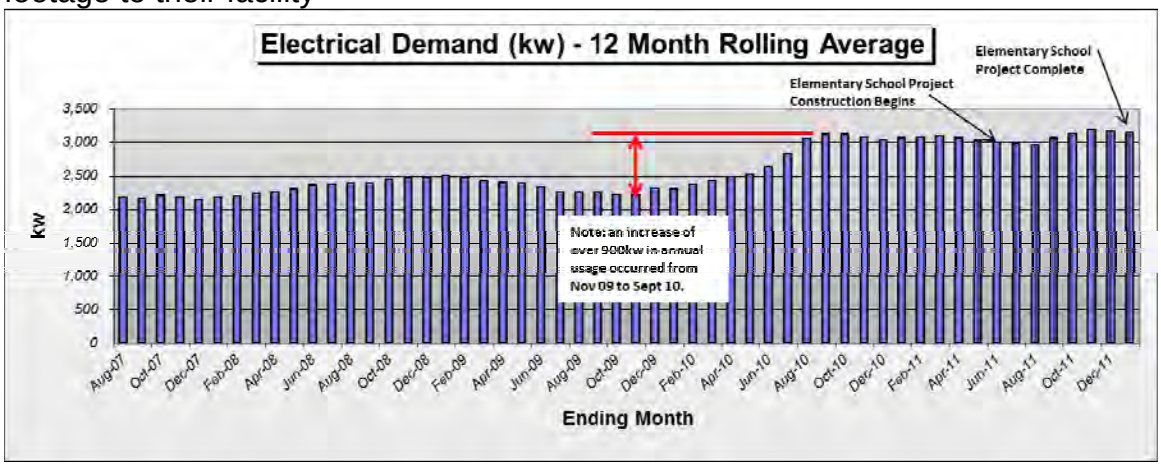
plumbing system, over the previous years as provided by OISD. The estimated ongoing cost savings was set at an agreed upon number of $5,700/year and was intended to cover an annualized reduction in leaks and required plumbing upgrades in the basement and walls. This operational savings is a stipulated cost savings (as agreed upon in the original IGA and in the proposed M&V section of this document).

3.0 UTILITY METER ANALYSIS

The following is a chart that shows the electrical usage and the electrical demand over the last year.

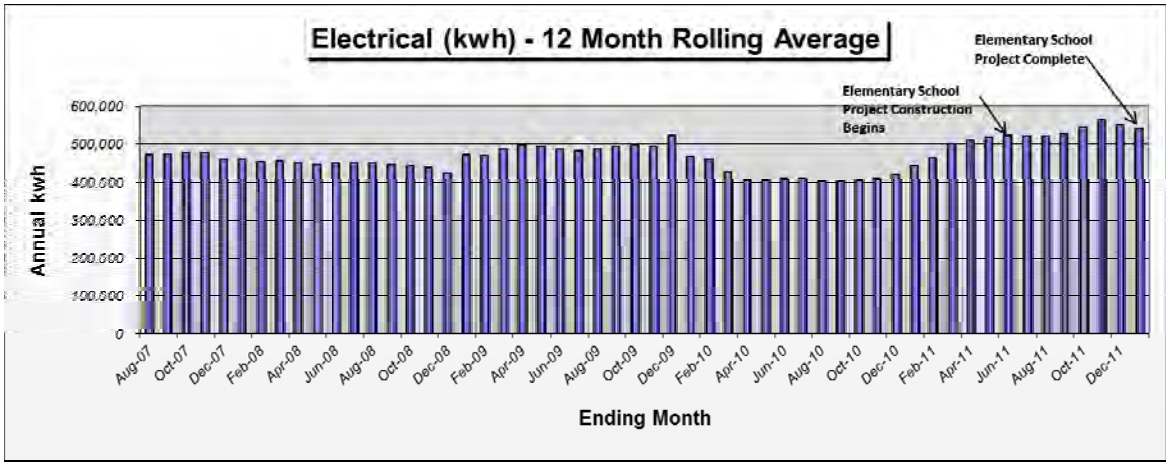


The following chart illustrates the electrical demand (kW) rolling average over the last 5 years for the Elementary School. This type of rolling average chart is extremely useful in identifying trends in energy usage over a period of time. As can be seen in the chart, there was a significant increase in electrical demand from Nov'09 through Sept'10. This is seen often in school districts or office spaces that are continually adding equipment (ie: computer or other high tech devices), increasing occupancy (students or teachers) or have added square footage to their facility

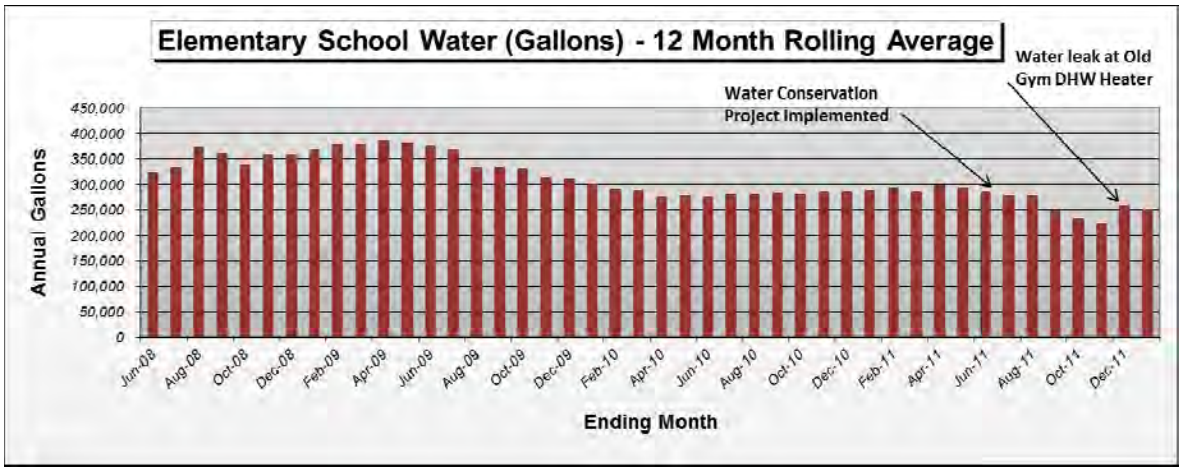


The following chart shows the 12-month rolling average for the Elementary School electrical usage (kWh) during this same period of time. An increase in electrical demand (as seen in the previous chart) will often correspond directly to an increase in the electrical usage (kWh) over the same timeframe. This is not

necessarily the case in this instance. While the electrical usage does show an increase, it did not start until October of 2010. This could be due partly to changes in weather, or possibly due to some actions were taken during this timeframe to prevent the increase in demand from translating directly to an increase in electrical usage.



The following graph illustrates a dramatic effect on the water consumption at the Elementary School. From the graph below you can see that following the implementation of the project there has been a significant reduction in annual water usage. However, a water leak at the Old Gym (which is on the same water meter as the Elementary School) interrupted the savings trend in Dec'11.



4.0 RATE SCHEDULE UPDATE

The electrical utility rates have significantly increased from the initial Baseline Rates. The water Rates have remained the same.

Rate Increases (from Baseline):

- Electricity ($/kWh) 12% increase
- Demand ($/kW) 47% increase
- Water ($/1,000Gal) no increase

Following is the baseline rates at time of proposal followed by the current rates.

Electricity - Baseline		
Tariff Number or Designation:	Commercial Service	
Utility Name:	Orcas Power & Light	
Rate Structure:	$ 32.50	Basic Charge
First 5,000 kWh	$ 0.0710	$ per kWh
Over 5,000 kWh	$ 0.0620	$ per kWh
First 20 kW	$ 0.00	$ per kW
Over 20 kW	$ 1.90	$ per kW
1. Based on baseline load profile		
Water/Sewer - Baseline		
Tariff Number or Designation:	General Rate	
Utility Name:	Eastsound Water Users Association	
Rate Structure:		
Base Rate	$ 68.25	$ per month
Water Rate	$ 17.00	$ per kgallon (for all water in excess of 8,750/month)

Electricity - Current Rate (as of February 2012)		
Tariff Number or Designation:	Commercial Service	
Utility Name:	Orcas Power & Light	
Rate Structure:	$ 36.00	Basic Charge
First 5,000 kWh	$ 0.0770	$ per kWh
Over 5,000 kWh	$ 0.0695	$ per kWh
First 20 kW	$ 0.00	$ per kW
Over 20 kW	$ 2.80	$ per kW
1. Based on baseline load profile		
Water/Sewer – Current Rate (as of February 2012)		
Tariff Number or Designation:	General Rate	
Utility Name:	Eastsound Water Users Association	
Rate Structure:		
Base Rate	$ 39.00	$ per month
Water Rate	$ 17.00	$ per kgallon (for all water in excess of 5,000/month)

5.0 BASELINE ADJUSTMENT

As described in the initial IGA, a utility baseline adjustment was implemented at the Elementary School to adjust the utility usage upwards. This was done to account for the increase in ventilation air at the facility that was implemented as a result of this project. When UMC performed the initial assessment of the operation of the air handling units as well as the unit ventilators it was seen that the outside air dampers were not working correctly. Units were not operating at code required minimum air standards. In addition, there were several operating inconsistencies with fan operating schedules (some that had been turned off at the electrical breaker serving the equipment and thus were not running). Upon correcting these issues and providing the code required amount of ventilation air, there is a subsequent increase in the amount of power required to heat this cold outside air, as well as to operate the fans for the appropriate schedules.. Due to this the historical baseline power consumption had to be adjusted in order to accurately depict the usage with the H&V system operating with the proper amount of ventilation air. The baseline development for the Elementary School was developed as described below.

The baseline development for the Elementary School is proposed as follows. Starting with the existing actual utility usage for the historical electrical usage provided. This historical usage is shown in the following table.

Historical Utility Usage					
MON - YR	**KWH**	**KWH $**	**KW**	**KW $**	**ELECTRIC $**
Sep-08	11,360	$742	58	$61	$803
Oct-08	21,440	$1,327	226	$331	$1,658
Nov-08	41,120	$2,468	230	$339	$2,807
Dec-08	31,680	$1,921	248	$367	$2,288
Jan-09	101,760	$5,985	296	$444	$6,429
Feb-09	62,720	$3,721	214	$313	$4,034
Mar-09	66,880	$3,962	211	$308	$4,270
Apr-09	64,480	$3,823	238	$352	$4,175
May-09	33,920	$2,051	219	$321	$2,372
Jun-09	23,680	$1,457	178	$254	$1,711
Jul-09	12,480	$807	78	$94	$901
Aug-09	16,160	$1,079	59	$74	$1,153
Subtotals	**487,680**	**$29,343**	**2,255**	**$3,258**	**$32,601**
Units/Sqft	**17.80**	**$ 1.07**	**0.08**	**$ 0.12**	**$ 1.19**
Energy Use Index (EUI) for this Facility:			**60,760**	**btu/sqft**	

The actual operating characteristics for the Elementary School were modeled (Using Trane Trace 700) and then modified to determine the expected annual operating usage when the appropriate OA ventilation rates were applied to the HVAC equipment. This modified baseline is shown in the baseline table below.

Elementary School –Electrical Usage Baseline

Modeled Baseline Adjustment (allowing for design ventilation)						
MON - YR	**KWH**	**KWH $**	**KW**	**KW $**	**ELECTRIC $**	**HDD**
Sep-08	32,639	$2,024	68	$98	$2,122	123
Oct-08	42,390	$2,628	264	$383	$3,011	405
Nov-08	79,932	$4,956	269	$389	$5,345	468
Dec-08	83,691	$5,189	290	$420	$5,609	864
Jan-09	77,646	$4,814	346	$501	$5,315	797
Feb-09	62,888	$3,899	250	$362	$4,261	649
Mar-09	72,423	$4,490	246	$357	$4,847	714
Apr-09	55,661	$3,451	278	$403	$3,854	465
May-09	32,474	$2,013	256	$371	$2,384	273
Jun-09	26,140	$1,621	208	$301	$1,922	70
Jul-09	9,600	$595	91	$132	$727	29
Aug-09	10,368	$643	69	$100	$743	36
Subtotals	**585,852**	**$36,323**	**2,633**	**$3,818**	**$40,141**	**4,893**
Units/Sqft	**21.39**	**$1.07**	**0.08**	**$0.12**	**$1.19**	
Energy Use Index (EUI) for this Facility:			**72,991**	**btu/sqft**		

The water and sewer Baseline utility consumption is described below.

Elementary School –Water Usage Baseline

Water Usage		
MON - YR	**Water kGal**	**Water $**
Aug-08	45.80	$698
Sep-08	40.50	$608
Oct-08	35.80	$528
Nov-08	43.00	$651
Dec-08	20.70	$271
Jan-09	26.40	$368
Feb-09	32.20	$467
Mar-09	24.60	$338
Apr-09	30.70	$441
May-09	24.90	$353
Jun-09	30.80	$443
Jul-09	11.00	$107
Subtotals	**366.40**	**$5,273**

This Baseline facility utility consumption will be used as the reference with which future years' utility usage will be compared while monitoring the Guaranteed Savings. HDD stands for Heating Degree Days and are based on a balance point of 65 degrees F. This is a measure of relevant weather that can be used to correlate monthly usage with previous or subsequent years.

6.0 SAVINGS SUMMARY

The savings calculations were developed using the adjusted baseline and translated into dollars utilizing the current rate structure for water and electricity. The current rate structure can be seen above in Section 4.0.

The guaranteed savings for each UCM implemented as a part of this project is shown in the following table.

Utility Conservation & Facility Upgrade Measures		Guaranteed Energy/Utility Savings					Annual Savings (1)	Estimated Operational Savings	Savings were Based on the Following Guarantee
		Electric		Propane	Water / Sewer				
	School	kW/yr	kWh/yr	Mbtu	Usage gal/yr	Sewer gal/yr	$	$	%
		-	-	-	-	-	$ -	$ -	0%
UCM-2: Water Conservation Upgrades	ES	-	-	-	148,500	148,500	$ 2,525	$ 450	90%
		-	-	-	-	-	$ -	$ -	0%
UCM-3: Elementary School HVAC Upgrade	ES	373	203,266	-	-	-	$ 15,172	$ -	90%
		-	-	-	-	-	$ -	$ -	0%
UCM-5: Domestic Water Piping Upgrade	ES	-	-	-	34,200	34,200	$ 581	$ 5,700	95%
							$ -	$ -	0%
Subtotal		**373**	**203,266**	**-**	**182,700**	**182,700**	**$ 18,277**	**$ 6,150**	

The annual savings that are now beginning to accrue, based on the adjusted utility baseline (Section 5), and the measured savings (as identified in this report) are summarized in the following table.

Utility Conservation & Facility Upgrade Measures		Measured Energy/Utility Savings					Annual Savings (1)	Estimated Operational Savings	
		Electric		Propane	Water / Sewer				
	School	kW/yr	kWh/yr	Mbtu	Usage gal/yr	Sewer gal/yr	$	$	M&V Completed
		-	-	-	-	-	$ -	$ -	$ -
UCM-2: Water Conservation Upgrades	ES	-	-	-	183,068	183,068	$ 3,112	$ 450	Pre & Post Measurements
		-	-	-	-	-	$ -	$ -	$ -
UCM-3: Elementary School HVAC Upgrade	ES	415	225,851	-	-	-	$ 16,857	$ 5,700	Calibrated Simulation (Stipulated)
		-	-	-	-	-	$ -	$ -	$ -
UCM-5: Domestic Water Piping Upgrade	ES	-	-	-	34,200	34,200	$ 581	$ -	Calibrated Simulation (Stipulated)
		-	-	-	-	-	$ -	$ -	$ -
									$ -
Subtotal		**415**	**225,851**	**-**	**217,268**	**217,268**	**$ 20,551**	**$ 6,150**	
Savings Differential (Guaranteed versus Measured)		**41**	**22,585**	**-**	**34,568**	**34,568**	**$ 2,273**	**$ -**	

Notes: (1) Annual Savings shown in this table are based on the current utility rates.

7.0 Recommendations To Optimize Ongoing Savings

In order to optimize the savings as we move forward UMC recommends that one person takes on the role of campus “energy champion”. This person should take responsibility for the following tasks:

- Implement the initial holiday/vacation schedule at the beginning of each school year. This is the most important task going forward. The savings achieved through all efficiency gains with the new system can be quickly lost if schedules are not actively maintained year to year.
- Continue to update and monitor the schedule to make sure that the system is turned off during all potential unoccupied periods (like unscheduled weather days).
- Update the schedule to accommodate one-time events that occur after hours or on weekends. Review to make sure these overrides do not affect the schedule long term.
- Actively review the schedule monthly to see if any overrides have been implemented that are causing the system to operate excessive hours. This can often happen if the operating schedule is modified to accommodate an unscheduled event (such as a parent/teacher conference in the evening).
- Review & maintain occupied & unoccupied heating setpoints. These should be checked periodically to make sure they have not been modified or overridden to maintain specific areas at temperatures that are outside of the acceptable operating ranges. Occupied heating setpoints should be between 68F & 70F, while unoccupied setpoints should be between 55F & 60F.
- In broader terms, a campus "energy champion" should promote conservation at all times....providing information on savings strategies, watching for potential issues (electric heaters in spaces, windows open when heating system is on, lights left on at night or weekends, etc.

8.0 APPENDIX

UCM-2: Water Conservation Upgrades – Supporting Documentation

Measurement & Verification

Project: **Orcas Island School District**
Facility: **HS & ES**

Pre-Measurements

Location	Fixture	Amount Measured	Units	Date Measured
Girls locker room (ADA stall)	Water Closet	3.10	gpf	28-Jun-10
2nd floor men's RR (ADA stall)	Water Closet	5.50	gpf	28-Jun-10
2nd floor men's RR (2nd stall)	Water Closet	8.50	gpf	28-Jun-10
Staff toilet	Water Closet	3.50	gpf	28-Jun-10
Outside men's RR	Water Closet	2.80	gpf	28-Jun-10
Coaches RR (womens)	Water Closet	3.00	gpf	28-Jun-10
Average		4.40	gpf	

Pre-Measurements

Location	Fixture	Amount Measured	Units	Date Measured
Men's locker room (unit on left)	Urinals	0.75	gpf	28-Jun-10
2nd floor men's RR (unit of right)	Urinals	0.75	gpf	28-Jun-10
Outside men's RR	Urinals	1.00	gpf	28-Jun-10
Average		0.83	gpf	

Pre-Measurements

Location	Fixture	Amount Measured	Units	Date Measured
Girls Locker Room	Sink	0.50	gpm	28-Jun-10
Staff toilet	Sink	1.50	gpm	28-Jun-10
Outside men's RR	Sink	1.60	gpm	28-Jun-10
Average		1.20	gpf	

UCM 2 - Water Audit & Proposed Retrofit

Project:	Orcas Island SD (Elementary School)
Measure:	Water Conservation Project
Date:	5-Mar-12
Auditor:	SL

Proprietary Document: University Mechanical Contractors, Inc.

UNIVERSITY MECHANICAL CONTRACTORS, INC. We Build Value

Location	Type		Qty		Enter (Toilet=1, Urinal=2, Sink=3, Shower=4)	Fixture Description	Additional Information	Urinals/Toilets gpf	Urinals/Toilets Uses per Day	Sinks/Faucets/Showers gpm	Sinks/Faucets/Showers Uses per Day	Sinks/Faucets/Showers Minutes per Use	Days per Year	Total Gal/Yr	Estimated % of Fixtures to be Retrofit	Utility Savings Annual Gallons (Water)	Utility Savings Annual Gallons (Sewer)
Boys RR - 1st Floor	General Usage (Mens)	Existing	2	Auto Select	1	6 - Toilet (tank top) - 3.5 gpf	Floor Mtd		20	0	0	0	150	26,400	100%	18,720	18,720
				Manual Override				4.4									
		Proposed	2	Auto Select		5 - Toilet (tank top) - 1.28 gpf	Floor Mtd		20	0	0	0	150	7,680			
				Manual Override				1.28									
Boys RR - 1st Floor	General Usage (Mens)	Existing	3	Auto Select	2	2 - Urinal - 1.5 gpf			25	0	0	0	150	9,338	100%	7,931	7,931
				Manual Override				0.83									
		Proposed	3	Auto Select		1 - Urinal - .125 gpf			25	0	0	0	150	1,406			
				Manual Override				0.125									
Boys RR - 1st Floor	General Usage (Mens)	Existing	2	Auto Select	3	16 - Sink/Faucet - 2.2 gpm		0	0		25	0.2	150	1,800	100%	1,050	1,050
				Manual Override						1.2							
		Proposed	2	Auto Select		16 - Sink (Faucet Replacement) - 0.5 gpm		0	0	0.5	25	0.2	150	750			
				Manual Override													
Girls RR - 1st Floor	General Usage (Womens)	Existing	3	Auto Select	1	6 - Toilet (tank top) - 3.5 gpf	Floor Mtd		30	0	0	0	150	59,400	100%	42,120	42,120
				Manual Override				4.4									
		Proposed	3	Auto Select		5 - Toilet (tank top) - 1.28 gpf	Floor Mtd		30	0	0	0	150	17,280			
				Manual Override				1.28									
Girls RR - 1st Floor	General Usage (Womens)	Existing	3	Auto Select	3	16 - Sink/Faucet - 2.2 gpm		0	0		25	0.2	150	2,700	100%	1,575	1,575
				Manual Override						1.2							
		Proposed	3	Auto Select		16 - Sink (Faucet Replacement) - 0.5 gpm		0	0	0.5	25	0.2	150	1,125			
				Manual Override													
Rm 405 (Nurse)	Public Area	Existing	1	Auto Select	1	9 - Toilet (flush valve) - 3.5 gpf	Wall Mtd		20	0	0	0	150	13,200	100%	9,360	9,360
				Manual Override				4.4									
		Proposed	1	Auto Select		11 - Toilet (flush valve) - 1.28 gpf	Wall Mtd		20	0	0	0	150	3,840			
				Manual Override				1.28									
Rm 405 (Nurse)	Public Area	Existing	1	Auto Select	3	16 - Sink/Faucet - 2.2 gpm		0	0		15	0.2	150	540	100%	315	315
				Manual Override						1.2							
		Proposed	1	Auto Select		16 - Sink (Faucet Replacement) - 0.5 gpm		0	0	0.5	15	0.2	150	225			
				Manual Override													
Rm 416	Public Area	Existing	1	Auto Select	1	6 - Toilet (tank top) - 3.5 gpf	Floor Mtd		20	0	0	0	150	13,200	100%	9,360	9,360
				Manual Override				4.4									
		Proposed	1	Auto Select		5 - Toilet (tank top) - 1.28 gpf	Floor Mtd		20	0	0	0	150	3,840			
				Manual Override				1.28									
Rm 416	Public Area	Existing	1	Auto Select	3	16 - Sink/Faucet - 2.2 gpm		0	0		15	0.2	150	540	100%	315	315
				Manual Override						1.2							
		Proposed	1	Auto Select		16 - Sink (Faucet Replacement) - 0.5 gpm		0	0	0.5	15	0.2	150	225			
				Manual Override													
Rm 417	Public Area	Existing	1	Auto Select	1	6 - Toilet (tank top) - 3.5 gpf	Floor Mtd		20	0	0	0	150	13,200	100%	9,360	9,360
				Manual Override				4.4									
		Proposed	1	Auto Select		5 - Toilet (tank top) - 1.28 gpf	Floor Mtd		20	0	0	0	150	3,840			
				Manual Override				1.28									
Rm 418	Public Area	Existing	1	Auto Select	3	16 - Sink/Faucet - 2.2 gpm		0	0		15	0.2	150	540	100%	315	315
				Manual Override						1.2							
		Proposed	1	Auto Select		16 - Sink (Faucet Replacement) - 0.5 gpm		0	0	0.5	15	0.2	150	225			
				Manual Override													
Boys RR - 2nd Floor	General Usage (Mens)	Existing	2	Auto Select	1	6 - Toilet (tank top) - 3.5 gpf	Floor Mtd		20	0	0	0	150	26,400	100%	18,720	18,720
				Manual Override				4.4									
		Proposed	2	Auto Select		5 - Toilet (tank top) - 1.28 gpf	Floor Mtd		20	0	0	0	150	7,680			
				Manual Override				1.28									
Boys RR - 2nd Floor	General Usage (Mens)	Existing	3	Auto Select	2	2 - Urinal - 1.5 gpf			25	0	0	0	150	9,338	100%	7,931	7,931
				Manual Override				0.83									
		Proposed	3	Auto Select		1 - Urinal - .125 gpf			25	0	0	0	150	1,406			
				Manual Override				0.125									
Boys RR - 2nd Floor	General Usage (Mens)	Existing	2	Auto Select	3	16 - Sink/Faucet - 2.2 gpm		0	0		25	0.2	150	1,800	100%	1,050	1,050
				Manual Override						1.2							
		Proposed	2	Auto Select		16 - Sink (Faucet Replacement) - 0.5 gpm		0	0	0.5	25	0.2	150	750			
				Manual Override													
Girls RR - 2nd Floor	General Usage (Womens)	Existing	3	Auto Select	1	6 - Toilet (tank top) - 3.5 gpf	Floor Mtd		30	0	0	0	150	59,400	100%	42,120	42,120
				Manual Override				4.4									
		Proposed	3	Auto Select		5 - Toilet (tank top) - 1.28 gpf	Floor Mtd		30	0	0	0	150	17,280			
				Manual Override				1.28									
Girls RR - 2nd Floor	General Usage (Womens)	Existing	3	Auto Select	3	16 - Sink/Faucet - 2.2 gpm		0	0		25	0.2	150	2,700	100%	1,575	1,575
				Manual Override						1.2							
		Proposed	3	Auto Select		16 - Sink (Faucet Replacement) - 0.5 gpm		0	0	0.5	25	0.2	150	1,125			
				Manual Override													
Rm 426 - Staff	Public Area	Existing	1	Auto Select	1	6 - Toilet (tank top) - 3.5 gpf	Floor Mtd		20	0	0	0	150	13,200	100%	9,360	9,360
				Manual Override				4.4									
		Proposed	1	Auto Select		5 - Toilet (tank top) - 1.28 gpf	Floor Mtd		20	0	0	0	150	3,840			
				Manual Override				1.28									
Rm 426 - Staff	Public Area	Existing	1	Auto Select	3	16 - Sink/Faucet - 2.2 gpm		0	0		15	0.2	150	540	100%	315	315
				Manual Override						1.2							
		Proposed	1	Auto Select		16 - Sink (Faucet Replacement) - 0.5 gpm		0	0	0.5	15	0.2	150	225			
				Manual Override													
ClassRms Sinks	ClassRoom	Existing	21	Auto Select	3	16 - Sink/Faucet - 2.2 gpm		0	0		5	0.5	150	9,450	100%	1,575	1,575
				Manual Override						1.2							
		Proposed	21	Auto Select		21 - Sink (Aerator) - 1.5 gpm		0	0		5	0.5	150	7,875			
				Manual Override						1							
		Existing		Auto Select										-	100%	-	-
				Manual Override													
		Proposed		Auto Select										-			
				Manual Override													
		Existing		Auto Select										-	100%	-	-
				Manual Override													
		Proposed		Auto Select										-			
				Manual Override													
Subtotals		Existing	55											263,685		183,068	183,068
		Proposed	55											80,618			

UNIVERSITY MECHANICAL CONTRACTORS, INC. We Build Value

Orcas Island School District
No 137

UCM-3: High School Controls Upgrades – Supporting Documentation
Table – Adjusted Baseline

EQUIPMENT ENERGY CONSUMPTION

By UMC

Baseline (Adjusted): OISD - Elem School (Baseline adjusted to account for proper ventilation air)

Equipment - Utility		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
		------- Monthly Consumption -------												
Lights														
	Electric (kWh)	7,036.7	6,362.2	7,435.7	6,745.4	7,236.2	4,460.5	3,297.2	3,364.7	6,745.4	7,236.2	6,944.9	6,837.3	73,702.4
	Peak (kW)	26.8	26.8	26.8	26.8	26.8	26.2	26.2	26.2	26.8	26.8	26.8	26.8	26.8
MISC LD														
	Electric (kWh)	9,174.4	8,295.1	9,700.9	8,793.6	9,437.7	9,320.1	4,990.5	5,192.1	8,793.6	9,437.7	9,056.8	8,911.2	101,103.6
	Peak (kW)	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3
Cpl 1: Cooling plant - 001 [Sum of dsn coil capacities=31.94 tons]														
Hpl 1: Heating plant - 002 [Sum of dsn coil capacities=5,069 mbh]														
Electric Resistance - 001 [Nominal Capacity=5,069 mbh] (Heating Equipment)														
	Electric (kWh)	54,401.6	41,873.9	48,072.7	33,345.2	10,640.0	7,198.9	362.7	846.9	12,366.2	20,685.2	57,029.7	60,992.1	347,815.2
	Peak (kW)	329.1	322.6	329.7	309.4	272.7	193.0	168.9	137.9	281.8	311.9	331.0	332.7	332.7
System - 001														
Unit vent supply fan (Main Clg Fan)														
	Electric (kWh)	105.3	95.1	108.2	101.4	75.1	74.7	9.0	9.8	69.1	75.1	102.9	103.8	929.4
	Peak (kW)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
System - 002														
Unit vent supply fan (Main Clg Fan)														
	Electric (kWh)	103.9	93.9	106.9	100.1	74.2	73.8	8.9	9.7	68.2	74.2	101.6	102.5	917.8
	Peak (kW)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
System - 003														
Unit vent supply fan (Main Clg Fan)														
	Electric (kWh)	58.4	52.8	60.0	56.2	41.7	41.4	5.0	5.5	38.3	41.7	57.1	57.6	515.5
	Peak (kW)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
System - 004														
Unit vent supply fan (Main Clg Fan)														
	Electric (kWh)	45.1	40.7	46.3	43.4	32.2	32.0	3.9	4.2	29.6	32.2	44.0	44.4	397.9
	Peak (kW)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
System - 005														
Unit vent supply fan (Main Clg Fan)														
	Electric (kWh)	75.5	68.2	77.6	72.7	53.9	53.6	6.4	7.1	49.5	53.9	73.7	74.4	666.3
	Peak (kW)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
System - 006														
Unit vent supply fan (Main Clg Fan)														
	Electric (kWh)	83.7	75.6	86.0	80.6	59.7	59.4	7.1	7.8	54.9	59.7	81.8	82.5	739.0
	Peak (kW)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
System - 007														
Unit vent supply fan (Main Clg Fan)														
	Electric (kWh)	45.6	41.2	46.9	43.9	32.5	32.4	3.9	4.3	29.9	32.5	44.6	45.0	402.6
	Peak (kW)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
System - 008														
Unit vent supply fan (Main Clg Fan)														
	Electric (kWh)	59.8	54.0	61.5	57.6	42.7	42.4	5.1	5.6	39.2	42.7	58.4	58.9	527.9
	Peak (kW)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
System - 009														
Fan coil supply fan (Main Clg Fan)														
	Electric (kWh)	2,964.0	2,678.5	3,047.0	2,855.0	2,115.5	2,103.5	253.0	277.0	1,945.0	2,115.5	2,896.5	2,922.5	26,173.0
	Peak (kW)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Eq4381 - Propeller fan (System Exhaust Fan)														
	Electric (kWh)	199.0	180.4	199.4	192.2	196.7	209.5	131.0	114.7	174.5	135.9	205.1	201.7	2,140.0
	Peak (kW)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
System - 010														
Fan coil supply fan (Main Clg Fan)														
	Electric (kWh)	2,964.0	2,678.5	3,047.0	2,855.0	2,115.5	2,103.5	253.0	277.0	1,945.0	2,115.5	2,896.5	2,922.5	26,173.0
	Peak (kW)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Propeller fan (System Exhaust Fan)														
	Electric (kWh)	199.0	180.4	199.4	192.2	196.7	209.5	131.0	114.7	174.5	135.9	205.1	201.7	2,140.0
	Peak (kW)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
System - 011														
Propeller fan (System Exhaust Fan)														
	Electric (kWh)	130.1	117.9	127.5	126.1	123.6	124.5	132.2	126.9	116.3	116.2	133.6	133.4	1,508.3
	Peak (kW)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
											Total Annual kwh			585,852

Project Name: Orcas Island SD - Elementary School
Dataset Name: C:\CDS\TRACE700\Projects\Orcas SD Elem baselnadj rev2.trc

TRACE® 700 v6.0 calculated at 04:59 PM on 11/04/2009
Alternative - 1 Equipment Energy Consumption report page 2 of 2

UNIVERSITY MECHANICAL CONTRACTORS, INC.
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Orcas Island School District
No 137

Table – Projected Savings

EQUIPMENT ENERGY CONSUMPTION

By UMC

Proposed: **OISD - Elem School (Replace existing HVAC with new VAV system & heat recovery)**

Equipment - Utility		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total
		------- Monthly Consumption -------												
Lights														
	Electric (kWh)	7,036.7	6,362.2	7,435.7	6,745.4	7,236.2	4,460.5	3,297.2	3,364.7	6,745.4	7,236.2	6,944.9	6,837.3	73,702.4
	Peak (kW)	26.8	26.8	26.8	26.8	26.8	26.2	26.2	26.2	26.8	26.8	26.8	26.8	26.8
MISC LD														
	Electric (kWh)	9,174.4	8,295.1	9,700.9	8,793.6	9,437.7	9,320.1	4,990.5	5,192.1	8,793.6	9,437.7	9,056.8	8,911.2	101,103.6
	Peak (kW)	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3
Cpl 1: Cooling plant - 001 [Sum of dsn coil capacities=35.69 tons]														
Hpl 1: Heating plant - 002 [Sum of dsn coil capacities=980.9 mbh]														
Electric Resistance - 001 [Nominal Capacity=980.9 mbh] (Heating Equipment)														
	Electric (kWh)	25,365.4	19,538.6	20,732.3	14,617.6	3,489.5	3,194.7	0.0	25.4	4,478.1	9,308.8	26,210.4	28,255.5	155,216.3
	Peak (kW)	142.0	139.5	139.2	134.4	117.2	77.9	81.5	43.2	108.0	133.2	142.7	145.5	145.5
System - 009														
BI Centrifugal var spd mtr (Main Clg Fan)														
	Electric (kWh)	3,261.1	2,948.3	3,432.7	3,128.2	2,379.0	2,357.2	96.9	100.8	2,185.9	2,396.9	3,231.1	3,191.6	28,709.6
	Peak (kW)	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
Parallel Fan Powered VAV w/ECM (Main Htg Fan)														
	Electric (kWh)	1,442.2	1,145.5	1,200.2	941.2	297.9	307.8	0.0	1.5	338.1	564.0	1,455.4	1,585.6	9,279.3
	Peak (kW)	8.1	8.1	8.1	8.0	7.5	6.8	7.0	3.1	7.6	8.1	8.1	8.1	8.1
System - 011														
Propeller fan (System Exhaust Fan)														
	Electric (kWh)	54.2	49.3	53.9	52.2	49.5	36.2	39.7	35.9	44.7	44.1	60.7	56.9	577.3
	Peak (kW)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
											Total Annual kwh			368,588

Project Name: Orcas Island SD - Elementary School
Dataset Name: C:\CDS\TRACE700\Projects\Orcas SD Elem VAV rev2.trc

TRACE® 700 v6.0 calculated at 02:10 PM on 02/01/2011
Alternative - 1 Equipment Energy Consumption report page 1 of 1

Table – M&V Update (March 2012)

EQUIPMENT ENERGY CONSUMPTION

By UMC

Proposed: **OISD - Elem School (Replace existing HVAC with new VAV system & heat recovery)**

Equipment - Utility		Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total	M&V Updated (Mar 2012)	
		------- Monthly Consumption -------														
Lights																
	Electric (kWh)	7,036.7	6,362.2	7,435.7	6,745.4	7,236.2	4,460.5	3,297.2	3,364.7	6,745.4	7,236.2	6,944.9	6,837.3	73,702.4	annual kwh	73,702
	Peak (kW)	26.8	26.8	26.8	26.8	26.8	26.2	26.2	26.2	26.8	26.8	26.8	26.8	26.8	peak kw	27
MISC LD																
	Electric (kWh)	9,174.4	8,295.1	9,700.9	8,793.6	9,437.7	9,320.1	4,990.5	5,192.1	8,793.6	9,437.7	9,056.8	8,911.2	101,103.6	annual kwh	101,104
	Peak (kW)	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	37.3	peak kw	37
Cpl 1: Cooling plant - 001 [Sum of dsn coil capacities=35.69 tons]																
Hpl 1: Heating plant - 002 [Sum of dsn coil capacities=980.9 mbh]																
Electric Resistance - 001 [Nominal Capacity=980.9 mbh] (Heating Equipment)																
	Electric (kWh)	25,365.4	19,538.6	20,732.3	14,617.6	3,489.5	3,194.7	0.0	25.4	4,478.1	9,308.8	26,210.4	28,255.5	155,216.3	annual kwh	125,280
	Peak (kW)	142.0	139.5	139.2	134.4	117.2	77.9	81.5	43.2	108.0	133.2	142.7	145.5	145.5	kw (at 75% avg)	139
System - 009																
BI Centrifugal var spd mtr (Main Clg Fan)																
	Electric (kWh)	3,261.1	2,948.3	3,432.7	3,128.2	2,379.0	2,357.2	96.9	100.8	2,185.9	2,396.9	3,231.1	3,191.6	28,709.6	annual kwh	14,212
	Peak (kW)	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	kw (at 60%)	7
Parallel Fan Powered VAV w/ECM (Main Htg Fan)																
	Electric (kWh)	1,442.2	1,145.5	1,200.2	941.2	297.9	307.8	0.0	1.5	338.1	564.0	1,455.4	1,585.6	9,279.3	annual kwh	4,917
	Peak (kW)	8.1	8.1	8.1	8.0	7.5	6.8	7.0	3.1	7.6	8.1	8.1	8.1	8.1	kw (at 80%)	3
System - 011																
Propeller fan (System Exhaust Fan)																
	Electric (kWh)	54.2	49.3	53.9	52.2	49.5	36.2	39.7	35.9	44.7	44.1	60.7	56.9	577.3		577
	Peak (kW)	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3		0
											Total Annual kwh			368,588	Total Annual kwh	319,793

Annual Operating Hours	1960
(9hrs/day) + 4 hrs wkend for 40 wks /yr	
Operating Hrs < 60F	1800

Project Name: Orcas Island SD - Elementary School
Dataset Name: C:\CDS\TRACE700\Projects\Orcas SD Elem VAV rev2.trc

TRACE® 700 v6.0 calculated at 02:10 PM on 02/01/2011
Alternative - 1 Equipment Energy Consumption report page 1 of 1

Measurement and Verification Plan

Guarantee Savings Types

The IPMVP protocol includes four guarantee options to measure and verify savings: Option A – Partially Measured Retrofit Isolation, Option B – Retrofit Isolation, Option C – Whole Facility, and Option D – Calibrated Simulation. The following table describes these options in more detail.

M&V Option	How Savings Are Calculated	Typical Applications
Option A. Partially Measured Retrofit Isolation This approach is intended for Facility Improvement Measures where a one-time measurement for specific equipment or systems instantaneous baseline energy use, and a one-time measurement for specific equipment or systems instantaneous post-implementation energy use can be measured. Baseline and Post energy consumption is calculated by multiplying the measured end use instantaneous capacity (i.e. – kW, Gal/hr, BTU/hr) by stipulated hours of operation for each mode of operation (i.e. – hours, week, month).	Savings are determined by partial field measurement of the energy use of the system(s) to which an ECM was applied; separate from the energy use of the rest of the facility. Measurements may be either short-term or continuous. Partial measurement means that some but not all parameter(s) may be stipulated, if the total impact of possible stipulation error(s) is not significant to the resultant savings. Careful review of ECM design and installation will ensure that stipulated values fairly represent the probable actual value. Stipulations should be shown in the M&V Plan along with analysis of the significance of the error they may introduce.	Lighting retrofit where power draw is measured periodically. Operating hours of the lights are assumed to be one half hour per day longer than store open hours.
Option B. Retrofit Isolation This approach is intended for Facility Improvement Measures where continuous periodic measurements for specific equipment or systems baseline energy use, and continuous periodic measurements for that equipment or systems post-implementation energy use can be measured.	Savings are determined by field measurement of the energy use of the systems to which the ECM was applied, separate from the energy use of the rest of the facility. Short-term or continuous measurements are taken throughout the post-retrofit period.	Application of controls to vary the load on a constant speed pump using a variable speed drive. Electricity use is measured by a kWh meter installed on the electrical supply to the pump motor. In the base year this meter is in place for a

		week to verify constant loading. The meter is in place throughout the post-retrofit period to track variations in energy use.
Option C. Whole Facility This approach is intended for measurements of the whole-facility where specific meter baseline energy use and measurements of whole-facility or specific meter post-implementation energy use can be measured.	Savings are determined by measuring energy use at the whole facility level. Short-term or continuous measurements are taken throughout the post-retrofit period.	Multifaceted energy management program affecting many systems in a building. Energy use is measured by the gas and electric utility meters for a twelve month base year period and throughout the post-retrofit period.
Option D. Calibrated Simulation This approach is intended for Facility Improvement Measures where the end use capacity or operational efficiency; demand, energy consumption or power level; or manufacturer's measurements, industry standard efficiencies or operating hours are known in advance, and used in a calculation or analysis method that will calculate the outcome.	Savings are determined through simulation of the energy use of components or the whole facility. Simulation routines must be demonstrated to adequately model actual energy performance measured in the facility. This option usually requires considerable skill in calibrated simulation.	Multifaceted energy management program affecting many systems in a building but where no base year data are available. Post-retrofit period energy use is measured by the calibrated simulation using. Base year energy use is determined by simulation using a model calibrated by the post-retrofit period utility data.

6.4 Measurement and Verification Plan

The following information outlines are applicable for this contract:

<u>Measurement and Verification (M&V) methods provided under this Article</u>**:**

Option A – Partially Measured Retrofit Isolation
Option B – Retrofit Isolation
Option C – Whole Facility
Option D – Calibrated Simulation

General Overview:

The purpose of the Measurement and Verification (M&V) Section is to identify the methods, measurements, procedures and tools that will be used to verify the savings for each ECM. Savings were determined by comparing prior usage, consumption or efficiencies defined as the Baseline to the selected ECMs being implemented against the post ECM implementation usage, consumption or efficiencies. The Baseline usage, consumption or efficiencies are described in this Section, Baseline Data. The usage, consumption or efficiencies associated with the ECM implementation, is defined as the Contracted Baseline, and is described in this Section, Contracted Baseline Data.

The actual guaranteed savings associated with this Program is outlined in this Section, Summary of Total Guaranteed Savings and Guaranteed Savings Types.

UCM 2.00 – Water Conservation

Proposed M&V Method – Option A Partially Measured Retrofit Isolation

M&V Procedure
All M&V activities associated with the Project will be conducted by UMC.

An audit has been performed to determine the total number of existing fixtures at the facility, as well as identifying the type of fixture and the corresponding water usage or GPF (gallons per flush – for water closets and urinals) and/or GPM (gallons per minute – for sinks/faucets). This audit also lists the total number and type of replacement fixtures that are recommended, as well as the corresponding GPF. This information has been utilized in addition to an estimated number of flushes per day (based on industry standards and water usage balance based on historical water consumption for this facility) to determine the existing water usage as well as the proposed water usage. The M&V will be performed as follows:

Pre-Installation Measurements: A goal of 5% of the water closets, urinals, and sinks will be measured before the retrofit to confirm the GPF/GPM water flow. All measurements will be compared against the +/- 10% flow tolerance as set forth by manufacturers and will be considered to be within the appropriate flow range if they fall within this tolerance. The total quantities of existing fixtures have been determined via the audit. The estimated flushes/usage per day has been determined based on industry standards, historical water consumption, and typical occupancy of the facility for the State and will be stipulated in all calculations.

Post-Installation Inspection: After the Project has been installed and commissioned, an OISD representative and UMC Project Manager will conduct an inspection to verify that the fixtures installed are consistent with what was

proposed. The quantity of proposed fixtures will be verified during the system commissioning.

Post-Installation Measurements: There will not be any post installation measurements completed on the new water fixtures that have been installed. Post installation usage will be based on Manufacturer's specifications of the equipment.

Operational Savings associated with this measure will be stipulated.

Calculations:

The baseline water usage is modeled using data collected during the site survey. This modeled usage is then compared to the baseline usage from the utility data analysis. A modeled baseline water usage that is equal to or less than the utility data baseline confirms that the model is accurate. The detailed results are presented in the Appendix.

Existing Baseline Water Usage: $WU_{EX} = (WU_{WC})_{EX} + (WU_U)_{EX}$

Where:

$(WU_{WC})_{EX}$ = Annual water closet water usage in thousands of gallons for existing fixtures

$(WU_U)_{EX}$ = Annual urinal water usage in thousands of gallons for existing fixtures

$(WU_{WC})_{EX} = (QTY_{WC} \times GPF_{WC} \times FPD_{WC} \times DPY) / 1000$

$(WU_U)_{EX} = (QTY_U \times GPF_U \times FPD_U \times DPY) / 1000$

Where:

QTY = Quantity of water closets, urinals, respectively as noted by the subscripts

GPF = Gallons per flush for water closets and urinals, respectively as noted by the subscripts

FPD = Flushes per day for water closets and urinals, respectively as noted by the subscripts

DPY = Days per year of normal usage

$FPD = Occ \times UPD / QTY_{WC}$

$MPD_F = Occ \times UPD / QTY_{WC}$

Where:

Occ = Number of occupants (both employees & daily visitors)
UPD = Uses per day

New Proposed Water Usage: $WU_{NEW} = (WU_{WC})_{NEW} + (WU_U)_{NEW} + (WU_F)_{NEW}$
Where:
$(WU_{WC})_{EX}$ = Annual water closet water usage in thousands of gallons for new fixtures
$(WU_U)_{EX}$ = Annual urinal water usage in thousands of gallons for new fixtures

Savings: $WU_{SAVED} = WU_{EX} – WU_{NEW}$

<u>Calculations Variables Index:</u>

Common Parameters	Value	Verification Method
Occupied Days / Year (DPY)	150	Stipulated
Uses per Day Water Closets (UPD_{WC})	Elem School (men) – 20 Elem School (women) – 30	Stipulated (performed water balance report versus annual usage to verify)
Uses per Day Urinals (UPD_U)	High School (men) – 15 Elem School (men) – 25	Stipulated (performed water balance report versus annual usage to verify)
Uses per Day Sinks (UPD_S)	Elem School (men) – 25 Elem School (women) – 25	Stipulated (performed water balance report versus annual usage to verify)
Faucet Time per Use (TPU_F)	Public Sinks – 0.2 minutes Classroom Sinks – 0.5 minutes	Stipulated (performed water balance report versus annual usage to verify)

Existing Parameters	Value	Verification Method
Existing Water Closet Gallons/Flush $(GPF_{WC})_{EX}$	3.5 gpf	One Time Pre Measurement
Existing Urinal Gallons/Flush $(GPF_U)_{EX}$	1.5 gpf	One Time Pre Measurement
Existing Faucet Gallons/Minute $(GPM_F)_{EX}$	All Faucets: 2.2	One Time Pre Measurement

Proposed Parameters	Value	Verification Method
Proposed Water Closet Gallons/Flush $(GPF_{WC})_{NEW}$	All Water Closets: 1.28	Stipulated
Proposed Urinal Gallons/Flush $(GPF_U)_{NEW}$	All Urinals: 0.125	Stipulated

Proposed Faucet Reducers Gallons/Minute $(GPM_F)_{NEW}$	Bathroom Faucets: 0.5 Classroom Aerators: 1.0	Stipulated

Assumptions:
This M&V plan was written with the following assumptions:

1. The operating schedules will not change because of this project.
2. All components are maintained in full working condition in both the baseline and post retrofit scenarios.
3. The Measurement & Verification procedure, outlined below, will be completed once before implementation and once at the end of the implementation process.

UCM 3.00 – Elementary School HVAC Upgrade

Proposed M&V Method – Option D Calibrated Simulation

M&V Procedure
All M&V activities associated with the Project will be conducted by UMC.

Pre-Installation Measurements: The existing baseline operating characteristics of the Elementary School HVAC system have been modeled (utilizing Trane Trace 700). Due to the current operating condition, in which the ventilation air is below the ASHRAE recommendations, the model baseline utility usage was adjusted to account for the appropriate amount of ventilation air (see Baseline in Section 3). Future savings will be compared versus this baseline operation.

Post-Installation Measurements: Short term monitoring/trending of select system operating characteristics shall be made and compared to the predicted (modeled) operation to confirm that the system is operating at the estimated efficiency. The operating characteristics to be measured will include the following.

- AHU supply fan motor kw usage via VAV system VFD operation
- Discharge air reset temperature to confirm SA reset operation
- Monitor space temperature & lighting operation of 4 select classrooms to confirm space setback via occupancy sensor
- Monitor carbon dioxide in 4 select classrooms to confirm appropriate ventilation rates

In addition to the short term trending of facility operating characteristics, additional M&V will consist of confirmation of system commissioning to proposed operating requirements; including documentation of equipment operating schedules and occupied/unoccupied set points.

Calculations
All measurements will be compared versus the existing Trane Trace model

Calculations Variables Index:

Existing & Proposed Parameters	Quantity	Verification Method
See Trane Trace Model		Calibrated Simulation

UCM 5.00 – Domestic Water Piping Upgrade (Elementary School

Proposed M&V Method – Option D Calibrated Simulation (Stipulated)

M&V Procedure
Savings associated with this measure were calculated based on the elimination of existing water leaks within the current DW system. These leaks were estimated from daily water readings recorded by the Eastsound Water Users Association during non-occupied periods (weekends). This information indicated a leak rate of 100 gallons/day.

After the Project has been installed and commissioned, an OISD representative and UMC Project Manager will conduct an inspection to verify that the implementation of the projects are consistent with what was proposed.

Operational Savings associated with this measure will be stipulated.

Calculations
Following final inspection and commissioning, a verification of the original savings estimate will be performed to confirm savings based on the actual installation. Savings presented in the contract documents will be stipulated throughout the duration of the contract.

6.3 Utility Rate Structure and Escalation Rates

Utility costs used for savings calculations will be based on the utility rate in effect for the predominant bill or the utility rate in effect for the corresponding period of the Baseline period, whichever is greater. The rate, in effect during the Baseline period, will be designated the floor price, and is shown below for each utility.

Electricity		
Tariff Number or Designation:	Commercial Service	
Utility Name:	Orcas Power & Light	
Rate Structure:	$ 32.50	Basic Charge

First 5,000 kWh	$ 0.0710	$ per kWh
Over 5,000 kWh	$ 0.0620	$ per kWh
First 20 kW	$ 0.00	$ per kW
Over 20 kW	$ 1.90	$ per kW
Blended Rate (Elementary School)	$ 0.0668/kWh	Average $ per kwh[1]
Blended Rate (High School)	$ 0.0704/kWh	Average $ per kwh[1]

1. Based on baseline load profile

Water/Sewer		
Tariff Number or Designation:	General Rate	
Utility Name:	Eastsound Water Users Association	
Rate Structure:		
Base Rate	$ 68.25	$ per month
Water Rate	$ 17.00	$ per kgallon (for all water in excess of 8,750/month)

6.4 Applicable Codes

Federal, State, and Local codes or regulations are applicable to the use and operation of the facility. All work installed under this project will meet the requirements of the following codes:

- The International Building Code and appendices thereto pertaining to building accessibility, not including the adoption of the incorporated electrical codes, plumbing codes, fire codes or property maintenance codes other than specifically referenced subjects or sections of the International Fire Code, but including the incorporated International Residential Code; International Mechanical Code; International Fuel Gas Code; International Energy Conservation Code.
- The Washington State Energy Code
- The Uniform Mechanical Code
- The Uniform Code for Building Conservation
- The Safety Code for Elevators and Escalators (ASME/ANSI A 17-.1)
- The NEC
- The NFPA Fire Alarm Systems
- The NFPA 13 Fire Sprinkler Systems
- The Uniform Plumbing Code
- The Washington State Ventilation and Indoor Air Quality Code

- All applicable local city codes

UMC is not responsible for the code compliance of systems not installed under this project.

6.5 M&V Costs

The first year of the M&V for this project is included in the price of the program. OISD has the option to continue M&V and associated energy guarantees for the subsequent years at the prices shown below (including a labor escalation rate of 4%). To elect this option OISD shall provide written notification to UMC one month after the end of the prior period. In the event this option is not elected for a particular year, it may not be elected in subsequent years. UMC's ongoing fee for M&V for years 2 through 4 is shown below.

Year	Annual M&V Cost
1	(1)
2	$4,600
3	$4,784
4	$4,975

(1) Included in project cost

6.6 M&V Reporting

UMC will provide a savings summary report to the customer within 90 days of completion for the first year of reporting. Thereafter on an annual basis, through the end of the performance guarantee period (if opted to be included by OISD).

6.7 Customer Responsibilities

This section details the responsibilities of UMC and the Customer, in connection with the management and administration of the Performance Guarantee.

The Customer will provide a representative at each facility to coordinate work and provide required data described below. Customer will provide access to all spaces required for pre measurement and post measurement. At the Customer's discretion, one representative will witness all pre and post measurements. UMC will provide calibration reports on all meters as required by the Customer.

The Customer will provide UMC with accurate facility operating information, as defined below, and in the Contracted Baseline article of this Section during each Annual Period, as soon as such information becomes available to the Customer.

Customer will provide UMC with copies of utility bills within 7 days of receipt by Customer or provide access to utility vendor information.

Customer will provide telephone/data remote access as UMC reasonably requests. All charges related to telephone/data line installation, activation and communication services are the responsibility of the Customer.

Customer will be responsible for notification of UMC regarding schedule changes of the air handling systems associated with this measure. Customer will be responsible for maintaining proposed schedules and setback temperatures. If, for any reason, schedules or setback temperatures must change, Customer will be responsible to make UMC aware of the change.

Customer will maintain all proposed operating schedules as defined in this proposal.

Customer will provide equipment service and preventative maintenance to keep all equipment installed as part of this project operating efficiently.

Customer agrees that the existing operating schedules and equipment conditions, as provided in the following sections, are complete and correct. If, for any reason, the customer requires that the equipment be operated differently than the proposed schedules, UMC reserves the right to adjust the guarantee amounts accordingly.

During the performance guarantee period, any post-retrofit changes made by the customer that may affect the baseline data (i.e., new construction, additional electrical loads, manual control of automatic devices, etc.) shall be reported to UMC so that adjustments can be made to reflect the changes and proper adjustments to the savings guarantees can be made.

UMC will provide an operations and maintenance manual. Upkeep of the equipment installed as part of this project is the responsibility of the Customer's maintenance personnel. Any loss of efficiency that occurs to the installed equipment caused by a lack of ongoing maintenance or upkeep shall be taken into account and appropriate impact to annual savings adjusted.

Currently, there are no planned changes that will affect the baseline data.

ITEM 2: PROJECT STAFF / RESUMES

PROJECT STAFF

Our People and Industry Experience

At UMC we believe that in order to develop a successful project it is imperative that the project team be comprised of experienced professionals. To support the Energy Services business we have selected experience professionals from our project management, design engineering and quality control divisions to assist in helping our customers attain their sustainability goals. Following is a sampling of our key people that support our energy services and performance-based contracting business:

UNIVERSITY MECHANICAL CONTRACTORS, INC.

We Build Value

JERRY BUSH
Principal/ President / CEO

QUICK FACTS:

EDUCATION:

B.S., Construction Management
Colorado State University

REGISTRATIONS:

BOARD:

REFERENCES:

RESPONSIBILITIES:

Resource Allocation, Planning, Project Management

Jerry has a wide range of experience in the management of mechanical construction services for both the design-build and plan/spec markets. His specialties include overall project planning, resource allocation, management, labor negotiations and contract negotiations.

NOTABLE PROJECT EXPERIENCE:

Stafford Creek Corrections Center, Aberdeen, Washington
Project Manager for a 21-building, maximum-security prison facility (HVAC, ductwork fire protection, controls, and insulation).

Benaroya Music Hall Center, Seattle, Washington
Construction of world class, 2,500-seat concert hall and 550-seat recital hall. Negotiated contract including plumbing, piping, sheetmetal, controls, and fire protection.

Network Commerce, Inc.
120,000 sq. ft., five floor tenant improvement including data center. Confidentiality agreement prevents further description.

High-Tech Eastside Client - Building 50
Design/build project consisting of 230,000 sf office space, a 4-story parking garage and associated site improvements.

Overlake Hospital – Medical Office Building, Bellevue, Washington
Sr. Project Manager for design/build projects on campus.

University of Washington, H-Wing Addition, Seattle, Washington
Construction of 200,000 sf. laboratory/classroom facility. HVAC, fume exhaust/control system, steam chilled water, lab gases and plumbing.

Pacific Place, Seattle, Washington
Mechanical design-build construction of 500,000 sf. retail and parking downtown Seattle.

Overlake Hospital, Emergency Department Remodel, Bellevue, Washington
Remodel of existing emergency room. Complete mechanical scope, in occupied space. Project was phased in order to keep the ER in operation.

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NOTABLE PROJECT EXPERIENCE (Continued):

Redhook Ale Brewery, Portsmouth, New Hampshire
Process piping serving brewery systems, steam and condensate, design/build HVAC and humidification systems.

Redhook Ale Brewery, Woodinville, Washington
Process piping serving brewery systems, steam and condensate, design/build HVAC and humidification systems.

High End Residential Estate, Mercer Island, Washington
Project Manager, negotiated contract for residence and adjoining facilities.

Northwest Hospital Outpatient Clinic, Seattle, Washington
Project Manager for build-out of shell and tenant improvement systems. HVAC, fire protection, piping plumbing, controls and balancing.

Boeing 9-04 Chemical Management Building, Seattle, Washington
Construction of chemical storage facility. Secondary containment systems. HVAC and fire protection.

Kodiak Hospital Addition, Outpatient Clinic, Kodiak, Alaska
Project Manager for 60,000 sf. addition and 33,000 sf. renovation. Participated in project starting with
Pre-construction.

Group Health, Seattle, Washington
Retrofit mechanical chilled water and energy management control systems.

WSDOT I-90 Tunnel, Seattle, Washington
Heavy highway construction of tunnel maintenance facility.

WSDOT Kingston Ferry Terminal, Kingston, Washington
Construction of new ferry dock, office facility and waste disposal system.

Boeing 40-30 Cooling Water Revisions, Everett, Washington
Retrofit of existing mechanical systems, addition of mechanical equipment. Coordination with owner on critical operations during construction in occupied building.

Seattle University Bookstore, Seattle, Washington
Remodel of existing building, upgrade of HVAC and plumbing systems.

AT&T Pop Building, Olympia, Washington
Construction of telecommunications transfer building. HVAC, piping, plumbing, controls, fire protection and balance.

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NOTABLE PROJECT EXPERIENCE (Continued):

Washington State Patrol Crime Lab, Seattle, Washington

Construction of laboratory in existing tenant space. HVAC, lab piping, and plumbing.

Boeing 2-25 Computer Room, Seattle, Washington

Retrofit existing mechanical system, upgrade AC capacity, work performed in occupied building.

UNIVERSITY MECHANICAL CONTRACTORS, INC.

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PAT DAMITIO
VP/COO

QUICK FACTS:

EDUCATION:

University of Washington: BSME

REGISTRATIONS:

REFERENCES:

RESPONSIBILITIES:

Complete responsibility for the success of all Industrial work. Over fifteen years of experience including project management, estimating, planning and scheduling, field engineering, and craft supervision.

NOTABLE PROJECT EXPERIENCE:

Hanford 200 West Pump & Treat, Richland, WA

Project supervisor for process mechanical portion of new facility that treats groundwater and then returns treated water to the aquifer. Contract value approximately $20M.

Spokane County Regional Water Reclamation Facility, Spokane, Washington

Project supervisor for new wastewater treatment facility. As mechanical subcontractor to CH2M Hill, scope includes all mechanical, as well as installation of all process equipment.

Seattle Steam Wood-Waste, Seattle, WA

- UMC is general contractor for replacing existing field-erected gas fired steam boiler with wood fired steam generation. Includes combustor, bag houses, breeching modifications, fuel and ash conveying and a complete wood fuel handling facility.

Brightwater Treatment Plant, Woodinville, WA

- Liquids Stream: Mechanical for new wastewater treatment facility. Scope includes process and utility equipment installation, piping, foul air ducting, and HVAC.
- Yard Piping: Mechanical for yard piping.
- Site Prep Yard Piping: Supply and install yard piping for first phase of new wastewater treatment plant. Pipe diameters range from 30” to 84”, all with weld joints.

Nippon Paper / Daishowa America Paper Company, Port Angeles, WA

- PM#2 Rebuild. Complete replacement of 2nd dryer section and rebuild of wirepit. Included demolition, concrete, machinery erection & piping.
- PM#3 Rebuild. Paper machine rebuild project, including machinery installation, piping and instrumentation.
- Numerous small to medium capital projects and shutdowns from the recycle paper plant to the reel. Work includes paper machine modifications, concrete foundations, steel erection, instrumentation, piping, equipment installation and boiler modifications.

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NOTABLE PROJECT EXPERIENCE (Continued):

Kimberly-Clark / Scott Paper, Everett, WA

- TM5 Safe Zone Project. Tissue machine modifications to improve dry end performance and worker safety.
- Cluster Rule Control Room Project. A design/build installation for an elevated control room located above the Washer Room. Work scope included structural steel erection, HVAC, general building work, electrical.
- #14 Boiler Flyash Clarifier Project. Cast in place concrete clarifier project. Work scope included demolition of existing foundations, site work and structural concrete.
- Aeration Tank Repair. Upgraded aeration basin and replaced diffusers.
- New Trim and Broke System. Pneumatic conveying system for towel and tissue trim and broke.
- Numerous small to medium capital projects and shutdowns throughout the mill. Work includes boiler modifications/repairs, piping, equipment installation/modification, concrete foundations, and steel erection.

Nucor Steel / Birmingham Steel, Seattle, WA

- Baghouse Installation. Complete installation including structural steel, concrete, equipment and piping.
- Melt Shop furnace replacement. Demolition of existing 90 ton/hr. furnace, complete foundation, installation of new 120 ton/hr. furnace, associated equipment, structural steel, piping, ductwork.
- Melt Shop Caster Rebuild. Piping, equipment and structural supports for Caster Rebuild.
- Craneway Upgrade. Upgrade 4,000 feet of work-in-progress and finished product craneways.
- Scrap Yard Roof. Install two new roofs complete including structural supports and foundations.
- Numerous small to medium capital projects and shutdowns throughout the Melt Shop and Bar Mill. Work includes civil, structural, piping, instrumentation, heavy rigging, ducting, and equipment installation/modification.

Oregon Steel Mills, Portland OR

- Shipping Craneway Upgrade. Major structural upgrade to operating overhead crane system.
- Spindle Supports. Install center supports for the 4-High spindles.
- Descale System Upgrade. Modify/replace descale piping system.
- Numerous small to medium capital projects and shutdowns throughout the Mill. Work includes civil, structural, heavy rigging, and equipment rebuilds/repairs.

Port Townsend Paper Corporation, Port Townsend WA

Numerous small capital projects and shutdowns throughout the mill. Work includes piping and equipment installation/modification.

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NOTABLE PROJECT EXPERIENCE (Continued):

Duke Energy-Grays Harbor LLC, Satsop WA

- Combustion Gas Turbines. Installation of two Turbines for new 300 mw combined cycle energy facility. Work includes piping, ducting, structural steel, equipment installation, instrumentation and controls.
- Maintenance Contract. Three-year maintenance contract for mothballed facility.

TransAlta Big Hanaford Power Plant, Centralia WA

Installation of Turbine/Generator, Surface Condenser, and balance of plant mechanical for new 300 mw combined cycle energy facility. Work includes equipment installation, piping, and utility rack installation.

University of Washington Boiler #4 Replacement, Seattle WA

Boiler Replacement and building modifications including piping, equipment installation, instrumentation and electrical.

Jackson Hydroelectric Project - Unit 4 Francis Turbine Rebuild, Sultan, WA

Remove, balance and replace runner. Replace thrust/guide bearing. Replace runner and spiral case wear rings. Inspect generator bearings. Replace “o” rings, gaskets and seals in turbine. Inspect wicket gates and spiral case for cavitation.

Flammable Storage Building, Ball Corporation, Kent WA

Turnkey Design/Build project for aluminum can manufacturer .

Saveall Installation Project, Boise Cascade Corporation, Steilacoom, WA

Complete installation including structural steel, equipment and piping.

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SCOTT LOCKE, P.E., LEED AP
Energy Services Manager

QUICK FACTS:

EDUCATION:

BS Mechanical Engineering, Baylor University

ACCREDIDATIONS:

Registered Professional Engineer and LEED Accredited Professional

RESPONSIBILITIES:

Performing facility energy audits, analyzing potential opportunities, developing Energy Conservation Measures, designing mechanical, electrical, plumbing, controls and lighting upgrades, and working closely with facility owners and operators to identify and develop projects that solve problems and meet specific needs.

REFERENCES:

Scott has over 20 years' experience working in the fields of energy conservation and HVAC design; most notably within the performance contracting arena. This includes an extensive history of performing facility energy audits, analyzing potential opportunities, developing Energy Conservation Measures, designing mechanical, electrical, plumbing, controls and lighting upgrades, and working closely with facility owners and operators to identify and develop projects that solve problems and meet specific needs.

NOTABLE PROJECT EXPERIENCE:

State of Washington DES – Old Capital Building, Olympia, Washington (2011-2012)

Project Developer for two phases of Energy Savings Performance Contracting projects implemented in 120,000 sqft historical facility located in downtown Olympia. ECMs implemented included redesign of heating HW system, new high eff condensing HW boilers, energy based re-commissioning, zone air-side revisions to resolve space comfort conditions, demand control ventilation and implementation of variable speed pumping. Contact – Jim Hayes, Department of Enterprise Services (360-407-9381)

Orcas Island School District, Orcas Island, Washington (2010-2011)

Project Developer for two distinct phases of Energy Savings Performance Contracting projects implemented at the OISD Elementary School and High School. ECMs implemented included redesign and replacement of entire HVAC & plumbing systems at the elementary school, lighting & lighting control upgrades, water conservation upgrades, installation of new DDC and energy based re-commissioning at high school. Contact – Barbara Kline, Superintendent, OISD (360-376-2284)

Kemper Development Company, Bellevue, Washington (2012)

Energy Engineer for development of chiller plant retrofits for both the Bank of America Building and the Corner Building in downtown Bellevue. Each project involved the full redesign of the existing CHW plant to a new, state of the art fully variable CHW plant; including new centrifugal chillers (with Turbocor comp technology), new variable CHW & CW pumps, variable speed cooling tower and new controls. Contact – Tony Cook, KDC (425-460-5814)

Naval Air Station Whidbey Island, Whidbey Island, Washington (2010-2011)

Project Developer for development and implementation of Turn-Key energy conservation project focused on 25 facilities. Projects included heat recovery, VAV conversion, controls upgrades, energy based re-commissioning, and demand control ventilation. Contact – Jeff Peterson, PSE (425-456-2732)

UNIVERSITY MECHANICAL CONTRACTORS, INC.
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NOTABLE PROJECT EXPERIENCE (Continued):

Bangar Naval Station Building 7000, Silverdale, Washington (2010)

Industrial Facility Chiller Plant Energy Upgrade. Project included Turbocor retrofit of two, 140 ton McQuay chillers, new Kiltech chiller controls, new VFD controlled cooling towers, new CHW & CW pumps and addition of chemical free CW treatment. Contact – Michael Huber, BPA (206-220-6778)

Western Washington University, Bellingham, Washington (2010-2011)

Biomass Gasification Plant Feasibility Study. Analyses of campus district heating upgrade opportunities. Alternatives analyzed include: biomass gasification, cogeneration, stack heat recovery, thermal storage, campus steam to hot water conversion and district heating options. Contact – John Furman, Director of Facilities Management (360-650-3496)

Bangar Naval Station Building 6400, Silverdale, Washington (2010)

District Chiller Plant Energy Upgrade. Project included Turbocor retrofit of two, 180 ton Trane chillers, new Kiltech chiller controls, new VFD controlled cooling towers, new CHW & CW pumps and addition of chemical free CW treatment. Contact – Michael Huber, BPA (206-220-6778)

Bangar Naval Station Building 1100, Silverdale, Washington (2010)

Data Center Chiller Plant Energy Upgrade. Project included the replacement of two, 60 ton Bohn water-cooled chillers with one, new 120 ton Smardt air-cooled chiller, removal of CW system and fluid coolers, and new CHW pumps. Contact – Michael Huber, BPA (206-220-6778)

Bangar Naval Station Building 7074, Silverdale, Washington (2010)

Chiller Plant Energy Upgrade. Project included the installation of one new 140 ton Multistack/Turbocor chiller, the Turbocor retrofit of one, 160 ton McQuay chiller, new Kiltech chiller controls, new VFD controlled fluid towers, new CHW & CW pumps and addition of chemical free CW treatment. Contact – Michael Huber, BPA (206-220-6778)

Port of Seattle – Seatac Airport, Sea-Tac, WA

State of Idaho Capital Mall Campus, Boise, ID

Mukilteo School District, Mukilteo, WA

Alaska Department of Corrections, Various Sites, AK

University of Alaska Anchorage, Anchorage, AK

Pierce County Buildings, Tacoma, WA

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NOTABLE PROJECT EXPERIENCE (Continued):

Snoqualmie School District, Snoqualmie, WA

South Kitsap School District, Bremerton, WA

Seattle Central Community College, Seattle, WA

St. Joseph's Regional Medical Center, Lewiston, ID

Providence Hospitals, Seattle, Everett, Yakima, WA

Children's Hospital, Seattle, WA

Boeing – Various Sites, WA, OR

UNIVERSITY MECHANICAL CONTRACTORS, INC.
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TROY TURPIN, MME, CEM
Energy Services
Account Executive

QUICK FACTS:

EDUCATION:

BSME Oregon State University; MME University of Washington

ACCREDIDATIONS:

WA State EIT – Certified Energy Manager (CEM)

RESPONSIBILITIES:

Performing facility energy audits, analyzing potential opportunities, developing Energy Conservation Measures, designing mechanical, electrical, plumbing, controls and lighting upgrades, and working closely with facility owners and operators to identify and develop projects that solve problems and meet specific needs.

REFERENCES:

Troy has over thirteen years' experience working in the energy industry serving as Account Executive, Energy Engineer and Project Developer. Troy has experience providing energy efficiency surveys and developing cost-effective facility improvement measures for K-12, higher education, healthcare, large commercial and industrial facilities. Projects have included efficiency improvements in HVAC, building envelope, lighting, motors, water systems, heat recovery, climate control, biomass to energy studies, irrigation systems and control system design.

NOTABLE PROJECT EXPERIENCE:

State of Washington DES – Old Capital Building, Olympia, Washington (2011-2012)

Energy Engineer for two phases of Energy Savings Performance Contracting projects implemented in 120,000 sqft historical facility located in downtown Olympia. ECMs implemented included redesign of heating HW system, new high eff condensing HW boilers, energy based re-commissioning, zone air-side revisions to resolve space comfort conditions, demand control ventilation and implementation of variable speed pumping. Contact – Jim Hayes, Department of Enterprise Services (360-407-9381)

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Naval Air Station Whidbey Island, Whidbey Island, Washington (2010-2011)

Energy Engineer for development and implementation of Turn-Key energy conservation project focused on 25 facilities. Projects included heat recovery, VAV conversion, controls upgrades, energy based re-commissioning, and demand control ventilation. Contact – Jeff Peterson, PSE (425-456-2732)

UNIVERSITY MECHANICAL CONTRACTORS, INC.

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NOTABLE PROJECT EXPERIENCE (Continued):

Bangor Naval Station Building 7000, Silverdale, Washington (2010)

Project Developer for Industrial Facility Chiller Plant Energy Upgrade. Project included Turbocor retrofit of two, 140 ton McQuay chillers, new Kiltech chiller controls, new VFD controlled cooling towers, new CHW & CW pumps and addition of chemical free CW treatment. Contact – Michael Huber, BPA (206-220-6778)

Western Washington University, Bellingham, Washington (2010-2011)

Biomass Gasification Plant Feasibility Study. Analyses of campus district heating upgrade opportunities. Alternatives analyzed include: biomass gasification, cogeneration, stack heat recovery, thermal storage, campus steam to hot water conversion and district heating options. Contact – John Furman, Director of Facilities Management (360-650-3496)

Bangor Naval Station Building 6400, Silverdale, Washington (2010)

Project Developer for District Chiller Plant Energy Upgrade. Project included Turbocor retrofit of two, 180 ton Trane chillers, new Kiltech chiller controls, new VFD controlled cooling towers, new CHW & CW pumps and addition of chemical free CW treatment. Contact – Michael Huber, BPA (206-220-6778)

Bangor Naval Station Building 1100, Silverdale, Washington (2010)

Project Developer for Data Center Chiller Plant Energy Upgrade. Project included the replacement of two, 60 ton Bohn water-cooled chillers with one, new 120 ton Smardt air-cooled chiller, removal of CW system and fluid coolers, and new CHW pumps. Contact – Michael Huber, BPA (206-220-6778)

Bangor Naval Station Building 7074, Silverdale, Washington (2010)

Project Developer for Chiller Plant Energy Upgrade. Project included the installation of one new 140 ton Multistack/Turbocor chiller, the Turbocor retrofit of one, 160 ton McQuay chiller, new Kiltech chiller controls, new VFD controlled fluid towers, new CHW & CW pumps and addition of chemical free CW treatment. Contact – Michael Huber, BPA (206-220-6778)

Bangor Naval Station Building 2800, Silverdale, Washington (2011)

Project Developer for Design and installation of five new 2-stage boiler stack economizers on large steam boilers. Installation of new DDC, VFDs on Feedwater and Condensate pumps. Contact – Michael Huber, BPA (206-220-6778)

UNIVERSITY MECHANICAL CONTRACTORS, INC.
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NOTABLE PROJECT EXPERIENCE (Continued):

Bangor Naval Station Building 6400, Silverdale, Washington (2011)

Project Developer for Design and installation of two new 2-stage boiler stack economizers on large steam boilers. Installation of new high turn-down burners, new DDC, VFDs on Feedwater and Transfer pumps. Contact – Michael Huber, BPA (206-220-6778)

Seattle-Tacoma International Airport Stage 2 Mechanical Upgrade ESPC, SeaTac, Washington (2010-2012)

Project Developer for Investment Grade Audit that lead to the following UCMs. CV to VAV of qty. 105 terminal boxes, Siemens DDC upgrades, Cooling Tower isolation for free cooling, chiller plant optimization and AHU-5 – 8 heat recovery. – Mike Smith (206-787-4815)

State of Washington DES – Old Capital Building, Olympia, Washington (2011-2012)

Energy Engineer for two phases of Energy Savings Performance Contracting projects implemented in 120,000 sqft historical facility located in downtown Olympia. ECMs implemented included redesign of heating HW system, new high eff condensing HW boilers, energy based re-commissioning, zone air-side revisions to resolve space comfort conditions, demand control ventilation and implementation of variable speed pumping. Contact – Jim Hayes, Department of Enterprise Services (360-407-9381)

Children's Hospital, Seattle, WA

Quilayutte Valley School District, Forks, WA

Reynolds School District, Portland, OR

Clallum County Economic Development Council Biomass to Energy Project, Forks, WA

Boise State University, Boise, ID

Port of Seattle – SeaTac Airport, SeaTac, WA

Emmett School District, Emmett, ID

King County, Seattle, WA

Wells Fargo Tower, Portland, OR

Willamette University, Salem, OR

North Santiam School District, Oregon

Kellogg School District, Kellogg, ID

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NOTABLE PROJECT EXPERIENCE (Continued):

City of Kent, Kent, WA

Unocal Anchorage Cogen Study, Anchorage, AK

Tacoma Community College, Tacoma, WA

Seattle Central Community College, Seattle, WA

State of Washington Department of Information Services, Olympia, WA

Naval Base Kitsap, Silverdale, WA

Naval Air Station Whidbey, Oak Harbor, WA

ZymoGenetics, Seattle, WA

Orcas Island School District, East Sound, WA

Kemper Development Company, Bellevue, WA

Western Washington University, Bellingham, WA

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STEVE BROOKS, P.E.
Special Projects Manager, Principal

QUICK FACTS:

EDUCATION:

Bachelor of Science in Mechanical Engineering, Seattle University, Seattle, WA

REGISTRATIONS:

Professional Engineer, State of Washington

REFERENCES:

RESPONSIBILITIES:

Design Engineer of HVAC, plumbing and piping systems
Construction Project Manager for tenant improvements at Fred Hutchinson Cancer Research Center and Seattle Cancer Care Alliance.

NOTABLE PROJECT EXPERIENCE:

Sea-Tac Airport South Bagwell As-Built Project Sea-Tac, Washington

UMC has utilized the latest technology and devices to produce accurate, detailed locations, to scale, depicting the South Bagwell utilities, systems and structure. The end result is a user-friendly tool essential to coordination of future expansion projects.

Electric Lightwave, Seattle, WA

Full mechanical design for critical environment telephone switch center. Project included installation of all mechanical components without interrupting the existing facilities operation. Project was located in a historic downtown building and met stringent visual and acoustical requirements.

Cedar River Water Treatment Plant, Seattle, WA

Lead Engineer for full mechanical HVAC design. Project included ventilation and wastewater systems for disinfection control buildings as well as the main Administration Bldg. Administration building received a LEED Gold Rating from the US Green Building Council.

Edgewater Kitchen Remodel, Seattle, WA

Extensive full-service kitchen remodel

AT&T Switchgear Facility, Tacoma, WA

Data center - mission critical. Non-disclosure agreement in place

Garden Fresh Foods, Bothell, WA

Designer for 5000 square foot food processing and cold storage facility.

St. Monica School Addition, Mercer Island, WA

16,000 sf addition consisting of classrooms, administration, library, and restrooms

Immunex, Seattle, WA

Various lab remodels

Sea-Tac Airport, Sea-Tac, WA

Various T.I. projects

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NOTABLE PROJECT EXPERIENCE (Continued):

Youth Theater Northwest, Mercer Island, WA
Lead Engineer for complete remodel of children's theater and education center

Sound Mind & Body, Seattle, WA
Full mechanical design for 45,000 sq, ft, health club

Chiron Analytical and Bioanalytical Labs, Seattle, WA
Design/build plumbing/HVAC/medical gas system and 8+ lab TI projects

Overlake Hospital Medical Center, Bellevue, WA
Lead Engineer for relocation of Hospital Pharmacy, Physical Therapy and Occupational Therapy.

Microsoft Building 123/126, Redmond, WA
Tenant improvement for Microsoft/mail group

AT&T Training Center, Bothell, WA
Full mechanical design-build services. Confidentiality agreement prevents further description

Fred Hutchinson Cancer Research Center, Seattle, WA
Lead Engineer of more than 100,000 square feet of tenant improvements to existing laboratory facilities involving VAV fume hood systems, heat recovery systems, specialty gas systems ,custom ventilation systems, and critical data center installations.

Fred Hutchinson Cancer Research Center, Seattle, WA
Construction Project Manager of design/ build projects for all tenant improvements on the FHCRC campus.

Seattle Cancer Care Alliance, Seattle, WA
Construction Project Manager for critical care cancer treatment facility tenant improvements. Installations include 3.0 Tesla MRI, research laboratory, outpatient treatment centers, CT scan, PET scan and linear accelerator facility.

Boeing 18-03 Security Center Upgrade, Kent, WA
Lead Engineer and construction Project Manager for renovation of 5,000 square feet of raised floor space for consolidation of emergency dispatch and emergency central command.

Overlake Hospital Medical Center, Bellevue, WA
Design Engineer for inpatient surgery and recovery area expansion

Park-90, Seattle, WA
Lead mechanical coordinator for full trade coordination and shop drawing production for 50,000 square foot renovation for City of Seattle Police department.

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NOTABLE PROJECT EXPERIENCE (Continued):

Center For New Creation, Seattle, WA
Commercial TI for chemical dependence outreach facility

Swedish 4SW/5SW Seattle, WA
Lead designer for two floor remodel of SW tower

Emerald Queen Casino, Tacoma, WA
Full mechanical design for 62,000 sf casino and event center

Swedish – Madison Medical Tower, Seattle, WA
Lead engineer for several outpatient service tenant improvements in Class A+ medical office building.

Regence Blue Shield, Seattle, WA
Full mechanical design for material production facility and central data center.

Blue Origin, Seattle, WA
Full mechanical design/build for physics research laboratory

Vulcan Marketing Center, Seattle, WA
Lead designer and construction project manager of a full mechanical design/build of Vulcan's South Lake Union marketing center. Features modular design for building portability.

Allen Institute For Brain Science, Seattle, WA
Full mechanical design for 8,500 square foot research lab containing fume hoods, heat recovery and vivarium within fully occupied office building.

720 Olive, Seattle, WA
Design/Build project to install a single package elevator machine room cooling unit. Modular air handler had to be used to allow all materials to be brought to roof through a single roof access door.

1001 4th Ave., Seattle, WA
Design/build project to retrofit an existing 50-story downtown high-rise with new elevator shaft ventilation systems. The project involved ventilating 5 separate shafts utilizing existing building penetrations and mechanical spaces.

Building 36 at Microsoft, Redmond, WA
Design engineer for new office building consisting of four custom rooftop air handlers and 200+ fan powered terminal units.

Providence Hospital, Seattle, WA
Full mechanical design/build for relocation of hospital lab services.

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TODD BOVEY, P.E., HFDP
Engineering Manager

QUICK FACTS:

EDUCATION:

B.S. Architectural Engineering, University of Texas at Austin
Computer Programming for Engineers, University of Washington

REGISTRATIONS:

Professional Mechanical Engineer, WA & OR

PROFESSIONAL AFFILIATIONS:

American Society for Healthcare Engineering (ASHE); American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE)

REFERENCES:

PUBLISHED WORK/ARTICLES:

"How BIM helped a hospital go green," Seattle Daily Journal of Commerce, Health Care Design & Construction issue, April 24, 2008

Todd brings over 30 years of experience in mechanical engineering design and project management. He has expertise in the design of highly complex HVAC, plumbing, and piping systems.

NOTABLE PROJECT EXPERIENCE:

Swedish Medical Center Issaquah, Issaquah, WA
Fast-track Integrated Project Delivery for 540,000 sq. ft. hospital, medical office, and central plant. Scope includes 160 patient rooms, 12 operating rooms, and central sterile services.

Multicare Good Samaritan Hospital Patient Care Tower, Puyallup, WA
Fast-track design/assist 340,000 sq. ft. hospital expansion. Scope includes 80 patient rooms, eight operating rooms, 450 ton chilled water central plant, boiler plant renovation, and parking structure.

Multicare Good Samaritan Hospital Central Utility Plant, Puyallup, WA

Multicare Good Samaritan Hospital Parking Structure PS2, Puyallup, WA

Multicare Good Samaritan Hospital Central Utility Plant Third Generator, Puyallup, WA

Seattle Children's Central Sterile Renovation, Seattle, WA

Seattle Children's Ambulatory Care Building Project, Seattle, Washington

Seattle Children's Satellite Pharmacy, Seattle, WA

Valley Medical Center Emergency Services Tower Levels 6 & 7, Renton, WA

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RICHARD C. HAPPEL, LEED AP
General Manager – Service Group

QUICK FACTS:

EDUCATION:

Turbocor Compressor & Kiltech Chiller Control Systems – Advanced Factory Certification

San Diego Community College – HVAC Controls - 1982

Long Beach Community College – HVAC - 1980

U.S. Navy – Machinists Mate "A"-School – 1977

REGISTRATIONS:

Washington State Society of Health Care Engineering (WSSHE)
Building Owners & Managers Association (BOMA)

RESPONSIBILITIES:

General Management HVAC/R and Plumbing Services; customer contact, estimating, project management, contract negotiations, budget control, and quality assurance.

Rich leads UMC's Service Group, which offers complete mechanical service to data centers, clinical environments, commercial buildings, and schools, as well as energy retrofitting. With Rich's extensive service experience and leadership, the UMC Service Group is able to provide the most demanding clients with cost-effective solutions for service and maintenance.

PROFESSIONAL EXPERIENCE:

2002-Present, UMC, Project Manager; General Manager, Service Group

1997-2002, Carrier Corporation, Area/Territory Manager

1987-1997, Trane Company, General Manager – Service Group

1986-1987, Trane Company, Field Service Engineer

1982-1986, Temperature Control, Field Service Technician

1978-1982, U.S. Navy, Machinists Mate

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STEVEN J. RUSSO, P.E.
Industrial Group Manager

QUICK FACTS:

EDUCATION:

Bachelor of Science, Civil Engineering, Construction Option
Michigan Technological University, Houghton, Michigan

REGISTRATIONS:

Registered Professional Engineer, State of Washington
Registered Professional Engineer, State of Michigan

REFERENCES:

Pat Nahan - Central Washington University, (509) 963-3335; Bruce Beane - Daishowa America, Port Angeles, Wa., (360) 452-0665; Tom Thramer Kimberly-Clark Corporation, Everett, Wa, (425) 259-7546; Lyle Eiseman - M.A. Mortenson Company, Renton, Wa., (425) 271-9891; Tony Koch - Bpa Northwest District Office–Mes, Seattle, Wa. (206) 220-6777; Dave Williams - Ch2m Hill Constructors, Inc (Cci), Renton, Wa (425) 271-9891 Jim Meniketti - Wood-Harbinger Bellevue, Wa (425) 822-9499; Duane Maki - City Of Seattle, Seattle Public Utilities , Seattle, Wa (206) 233-5169

RESPONSIBILITIES:

Project management to include estimating, subcontractor and supplier coordination, equipment and material procurement, pricing and negotiation of contract changes, processing of payment requests/submittals/O&Ms, and project closeout.

NOTABLE PROJECT EXPERIENCE:

Hanford 200 West Pump & Treat Project, Hanford Nuclear Reservation, WA

Process mechanical subcontractor on large federal project to clean the aquifer underneath the nuclear reservation. Water is extracted and processed to remove contaminants and then the water is injected back into the aquifer. Contract Value in excess of $20M.

Brightwater Treatment Plant, Woodinville, WA

Project Manager for Process Mechanical portions for new wastewater treatment facility. Scope includes Liquids Stream process and utility equipment installation, piping, foul air ducting, HVAC and the mechanical for Yard Piping. Contract value approximately $40MM.

Everett Water Pollution Control Facility Expansion Project, Everett, WA

Project Manager for the process mechanical and miscellaneous metals portions of the $41,000,000 overall plant expansion. The $10,000,000 UMC scope of work includes such items as the installation of process equipment for treatment and odor control, underground piping work up to 72” diameter, above grading piping including fiberglass piping for foul air conveyance, assembly and setting of geodesic domes.

Main Terminal HVAC Piping Upgrade West Loop, SeaTac, WA

Project Manager for the upgrading of steam, condensate, hydronic and chilled water piping in the Main Terminal building at the SeaTac Airport to support the overall expansion of this airport. This project will provide the operations personnel with more system redundancy and better control. This work was all performed during night shift hours.

Maple Lane School Steam Plant/Utility Tunnel Upgrade, Centralia, WA

Project Manager for the seismic upgrade of the existing boiler plant and replacement of the existing steam and condensate piping in approximately 700 feet of underground utility tunnels. UMC acted as the General Contractor and self-performed the concrete and mechanical work and subcontracted the remaining work. This work was performed at a Washington State run penitentiary for male youths.

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NOTABLE PROJECT EXPERIENCE (Continued):

IWTP Improvements/IWS Pump Station, Sea-Tac, WA

Project Manager for expansion of an existing industrial waste facility for the Prot of Seattle at the Sea-Tac airport. This project is one component of the overall airport expansion project.

Cedar River Water Treatment Plant

Project Manager for pre-construction and construction for a new 180 mgd water treatment plant under a design/build/operate contract with Seattle Public Utilities. This project included the installation of process piping up to 78" diameter, valves up to 72" diameter, sluice grates, submersible intake pumps, chemical piping as well as domestic plumbing.

Big Hanford Power Plant – Trans Alta/Centralia Project, Centralia, WA

Fast-track project involving the construction of a new 250 mw, natural gas fired power plant to supplement the existing coal-fired power plant.

Walnut Mall Project, Central Washington University, Ellensburg, WA

Installation of approximately 1500 lf steam and condensate piping in precast vault sections to replace the existing direct buried system, as well as to facilitate future expansion. Additionally, a chilled water system was generally installed parallel with the vaults. This work was performed as part of an energy management contract between Abacus Engineered Systems and the State of Washington.

Bangor Naval Submarine Base – Bldg 2800 Boiler Plant Upgrade, Silverdale, WA

The project consisted of the installation of three new dual-fuel fire tube boilers to replace two existing coal fired units. The work also included the repair and retrofitting to existing mechanical, electrical and building components as necessary. This project was of a design-build nature.

VA Puget Sound Health Care System – BL3 Lab Upgrade, Seattle, WA

Renovate existing space to accommodate a level 3 bio-hazard lab. Particular attention was directed towards ensuring that the new lab area was isolated from the outer hospital environment for health safety reasons.

Park Place Building – Generator Set, Seattle, WA

This project consisted of the installation of a new generator, piping and controls to be utilized for backup power needs.

Renton Wastewater Treatment Plant – Solids Phase, Renton, WA

The project provided for the 34 million dollar solids stream upgrade to the existing wastewater treatment plant.

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NOTABLE PROJECT EXPERIENCE (Continued):

West Point Wastewater Treatment Plant – Solids Stream, Seattle, WA

The project consisted of the 21 million dollar solids stream upgrade to the existing wastewater treatment plant. The total construction value for all phases/all contractors exceeded $500 million dollars.

Post Point Wastewater Treatment Plant - Upgrade, Bellingham, WA

The project entailed upgrading the existing facility. Total costs for the expansion exceeded 44 million dollars.

Central Wastewater Treatment Plant - Expansion, Nashville, TN

The project consisted of the 79 million dollar upgrade to Nashville's primary, existing wastewater treatment plant.

Seneca Wastewater Treatment Plant - Upgrade, Eagan, MN

This project concerned upgrading one of the primary wastewater treatment plants serving the greater Minneapolis area. The project had a total construction value of approximately 49 million dollars.

Roberto Bustamente Treatment Plant, El Paso, TX

Construction of a new, 42 million dollar wastewater treatment facility located along the Rio Grande River.

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MAX HARSHMAN
Project Executive / Budget Lead

QUICK FACTS:

EXPERIENCE:

EDUCATION:

B.S. in Mechanical Engineering, Kansas University

REGISTRATIONS:

Washington State Licensed Professional Engineer; LEED Accredited Professional, MCA CPM2 Project Manager Training

REFERENCES:

Todd Karr, GLY (Group Health) (425) 451-8877
Larry Humphreys, Humphreys LLC (SMCI and Swedish Medical Center Main Campus) (206) 931-9260
Randy Boettcher, Sellen (SMCI) (206) 682-7770

RESPONSIBILITIES:

Provide oversight and guidance on project to ensure the success of the project for the customer and UMC. Tasks include: Design review, Scheduling work, Allocating Resources, Material and Equipment Procurement, and Financial Billing and Projections.

Max brings a unique blend of construction experience to this project. Max's experience include that he is a licensed Mechanical Engineer, with 15 years of experience as a lead engineer, combined with a proven commissioning experience and project management experience make him a valued asset to the project team. He understands the entire construction process.

NOTABLE PROJECT EXPERIENCE:

Group Health (ICFD), Puyallup, WA

Sr. Project Manager for this 50,000 sq. ft. Integrated Care Facility Design (ICFD) facility. Design/Build full-service mechanical. Targeted LEED Gold.

Hi-Tech Eastside Client - OneLab, Redmond WA

Involved in the Design and Project Management role. The mechanical system is innovative by solely utilizing direct evaporatively cooled air handlers to condition the data center.

Wenatchee Data Center

Assisted in the design of the chilled-water system and controls. Role also included being the commissioning agent. Mechanical commissioning included the electrical monitoring system being incorporated into the building automation system.

Swedish Issaquah Campus, Issaquah, WA

Project Manager for this new campus project that will provide a broad range of inpatient and outpatient medical services including oncology, cardiac care, obstetrics, pediatrics, primary care, emergency services, intensive care and a host of other medical and surgical services and specialists. Integrated Project Delivery (IPD).

Horizon House, Seattle, WA

Design/build project consisting of the renovation of a 19-story senior care living facility. The expansion will add 295,000 sq. ft. to the campus and renovate 28,000 sq. ft. The HVAC system consists of a condenser water system with hybrid hydronic heat pumps.

Hi-Tech Eastside Client - Highlands Campus, Issaquah, WA

3 office buildings (608,000 sf.) and 3 parking garages. Mechanical system consisted of a chilled water central plant and a rooftop air-handling units with looped ductwork for system redundancy.

Hi-Tech Eastside Client - Augusta Campus

Campus comprised of three office buildings and cafeteria. Mechanical systems include a central chilled water plant and rooftop air handlers. Participated as lead engineer for the tenant improvement phase and lab buildout.

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CV NGUYEN, CEM
Project Manager

QUICK FACTS:

EDUCATION:
Bachelor of Science – University of Washington

REGISTRATIONS:
Certified Energy Manager - CEM
Enhanced Project Manager Program – MCA
NEBB Certified Supervisor

PROFESSIONAL AFFILIATIONS:
AutoCAD Users Group International, American Design Drafting Association

REFERENCES:

RESPONSIBILITIES:
Work with owner to determine project focus & goals; Assist project executive in developing & analyzing potential opportunities
Proposal development, bid process and the procurement of new work; Perform facility energy audits; Coordinate with utilities to obtain incentives and rebates; Develop project scope and design intent; Review job estimate and prepare project budget; Estimate and negotiate change orders; Buyout major equipment and subcontractors; Track, forecast, report labor hours and material costs; Expedite and track deliveries of major equipment/materials; Maintain working knowledge of general conditions, work scope and specifications of project contract/subcontract
Maintain and control documents in compliance with Company Standards and contractual compliance; Collaborate with field labor supervision to plan, organize and schedule project work including integration of subcontract/contract project schedule; Review contract drawings, detail drawings and specifications; Oversee development of M&V plan

Over twenty years of working in the commercial and industrial construction industry. Experience includes project management, plan/specs and design build budgeting and estimating, field engineering, design review, system commissioning, energy based re-commissioning, and testing & balancing. CV's experience leading & working within varied phases of construction makes him an ideal project manager for successfully developing and implementing technically difficult, performance based projects.

NOTABLE PROJECT EXPERIENCE:

State of Washington DES – Old Capital Building, Olympia, Washington (2011-2012)
Project Manager for two phases of Energy Savings Performance Contracting projects implemented in 120,000 sqft historical facility located in downtown Olympia. ECMs implemented included redesign of heating HW system, new high eff condensing HW boilers, energy based re-commissioning, zone air-side revisions to resolve space comfort conditions, demand control ventilation and implementation of variable speed pumping. Contact – Jim Hayes, Department of Enterprise Services (360-407-9381)

Orcas Island School District, Orcas Island, Washington (2010-2011)
Project Manager for two distinct phases of Energy Savings Performance Contracting projects implemented at the OISD Elementary School and High School. ECMs implemented included redesign and replacement of entire HVAC & plumbing systems at the elementary school, lighting & lighting control upgrades, water conservation upgrades, installation of new DDC and energy based re-commissioning at high school. Contact – Barbara Kline, Superintendent, OISD (360-376-2284)

Kemper Development Company, Bellevue, Washington (2012)
Project Manager for implementation of chiller plant retrofits for both the Bank of America Building and the Corner Building in downtown Bellevue. Each project involved the full redesign of the existing CHW plant to a new, state of the art fully variable CHW plant; including new centrifugal chillers (with Turbocor compressor technology), new variable CHW & CW pumps, variable speed cooling tower and new controls. Contact – Tony Cook, KDC (425-460-5814)

Naval Air Station Whidbey Island, Whidbey Island, Washington (2010-2011)
Project Manager for development and implementation of Turn-Key energy conservation project focused on 25 facilities. Projects included heat recovery, VAV conversion, controls upgrades, energy based re-commissioning, and demand control ventilation. Contact – Jeff Peterson, PSE (425-456-2732)

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NOTABLE PROJECT EXPERIENCE (Continued):

Environmental Molecular Science Laboratory (EMSL), Richland, Washington

Field engineering for a 65 million dollar high tech laboratory for the Department of Energy. EMSL is a plan and specifications project with very complex and unique process piping systems such as helium recovery, liquid nitrogen and various special gases which require interface and field coordination between vendors and installation. Provide and implement acceptance test procedures (ATP).

Hazardous Analysis Material Management Training Center (HAMMER), Richland, Washington

Field engineering and Q.C. Manager a fire training and hazardous material management facility. Provide system interface to install Symtron's designed fire training systems.

Two Rivers Correctional Facility, Umatilla, Oregon

Supervised and performed mechanical systems testing and balancing for both low and high security correctional facility.

Cold Vacuum Drying Facility (Cold Vac), Hanford, Washington

Provide mechanical system testing and balancing, commissioning, and acceptance test procedure for high-level waste facility cold vacuum drying systems.

Over-pressurization Project (CSEPP), Umatilla, Oregon

Provide mechanical system testing and balancing and commissioning to maintain critical pressurization for twenty (20) chemical emergency facilities.

Edison Elementary School, Seattle, Washington

Provide system commissioning for mechanical HVAC, plumbing, electrical, fire alarm, security, and controls systems.

Central Washington University Fuel Switching Project, Ellensburg, Washington

Conceptual design and estimate to convert fuel oil system to natural gas for energy management.

Silverdale Doctors Clinic, Silverdale, Washington

Conceptual design and estimate medical clinic with mechanical HVAC, plumbing, and medical gas systems.

University of Washington-Johnson Hall Remodel, Seattle, Washington

Mechanical plan and specifications estimate.

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NOTABLE PROJECT EXPERIENCE (Continued):

Pacific Lutheran University – New Technical Center, Tacoma, Washington

Mechanical budgeting through design phases from development to construction.

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RYAN LYNN
Special Projects Group, Project Manager

19 years of experience in the HVAC industry estimating, designing, and project management.

QUICK FACTS:

PRIOR EXPERIENCE:

Sales Engineer, Operations Manager, Designer, Field supervisor

REGISTRATIONS:

REFERENCES:

Jon Friedrichsen, GLY (425) 451-8877
Bret Downing, Sellen (206) 805-7190

RESPONSIBILITIES:

Project Manager

NOTABLE PROJECT EXPERIENCE:

Uline, Kent, Washington

Design build project for the renovation of existing 28,000 two story sq. ft. office and 250,000 sq. ft. warehouse. Project included design and construction of complete replacement of existing office HVAC systems, plumbing upgrades and addition of weight room and cafeteria.

Orcas Island Elementary School, Orcas Island, Washington

Design build energy saving project to replace all existing HVAC and plumbing systems in existing two story 24,000 sq. ft. elementary school with new high efficient systems. UMC acted as GC for this project responsible for all subcontractors, structural upgrades, framing and finishes. Project included removal and disposal of all the existing HVAC, waste piping, all plumbing fixtures and existing galvanized water piping. New installation new variable air volume air handling unit located on the roof above the existing exterior mechanical equipment room, Installation of twenty (20) fan powered VAV boxes with electric heaters and ECM motors and all new ductwork for a complete HVAC system. UMC replaced all 60 existing plumbing fixtures with new low plumbing fixtures. Challenging short duration project due to required completion of project during summer break with limited options for equipment and material delivery and storage in San Juan Islands.

Swedish Medical Center Clinic, Seattle, Washington

Design build HVAC and plumbing project for a new TI build out of medical offices and exam suites for Swedish Medical Center located on the first floor of multi-story office building at 500 Born Ave in Seattle. Project consisted of installation of new HVAC systems including six new water source heat pumps two exhaust fans in an existing core space. New plumbing consisted of waste and vent systems for 15 – Exam rooms with sinks, hand wash sinks 3 – Treatment/ Exam rooms, 4 Restroom, 3 – Clean Utility rooms, 3 – Soiled Utility rooms and 1 – Staff Lounge room. Challenging short duration project with multiple trades working in small footprint.

Allen Institute for Brain Science Atlas Lab Fume Hoods, Seattle, Washington

Design Build Project to upgrade core systems and install new fume hoods in occupied lab area. Project manager responsible for all phases of construction major equipment purchasing, scheduling and establishing and maintaining the mechanical budget.

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NOTABLE PROJECT EXPERIENCE (Continued):

Overlake Hospital Medical Center Backfill Renovation, Bellevue, Washington

Design Assist project to renovate the existing hospital Intensive Care Unit, patient care unit and complete the new South Tower Operating rooms. Project manager responsible for major equipment purchasing, scheduling and establishing and maintaining the mechanical budget.

Evergreen TI Medical, Bothell, Washington

Construction of an 8,100 sf medical office space at TIAA Tenant improvement for office space and exam rooms. Responsible for establishing the mechanical budget, document management, and project closeout.

Silver Lake Medical, Everett, Washington

Two buildings with a total of 14 medical suites. Sales engineer responsible for design and drawings for installation and permit process. Also responsible for establishing and maintaining mechanical budgets.

Children's Hospital Home Care Services, Bothell, Washington

Design Build, Tenant improvement for office space and exam rooms. Project manager responsible for major equipment purchasing, scheduling and establishing and maintaining the mechanical budget

Overlake Hospital Medical Center Data Room HVAC Upgrades, Bellevue, Washington

Plan and spec. project to install additional air conditioning as well as revise and repair the existing computer room HVAC systems to provide the Data center with the required air conditioning.

Washington Mutual Bank HVAC Upgrades, Shoreline, Washington

HVAC system refurbishment project for the Washington Mutual Bank, Richmond Highland branch. Project manager responsible for establishing and maintaining the mechanical budget, scheduling and major equipment purchasing.

Providence Point Retirement Village, Issaquah, Washington

Multiple building, new construction project for retirement condominiums and common areas including buildings up to 5 stories with bellow ground parking. Worked for 3-years as field supervisor in charge of manpower. Worked for an additional 5-years on project as design and sales engineer providing mechanical drawings, purchasing, permit applications as well as maintaining budgets.

MS Redmond Ridge 1 WAN Room Upgrades, Redmond, Washington

Design assist project to upgrade existing HVAC and emergency ventilation in an occupied and functioning data center. Project Manager responsible for design completion, major equipment purchasing, scheduling and establishing and maintaining Guarantied Maximum Price.

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NOTABLE PROJECT EXPERIENCE (Continued):

MS Bldg. 10 Multi Roof Renewal, Redmond, Washington

Design build project for removal and replacement of rooftop mounted exhaust fans during roof replacement and repair. Project Manager responsible for major equipment purchasing, scheduling and establishing and maintaining budget.

Boeing 4-20/21 RWL Replacement, Renton, Washington

Design build project to replace existing rain water leader in existing occupied and functioning manufacturing facility. New rain water piping was installed parallel to existing piping and active drains were transferred to new systems as weather allowed. High bay work in active manufacturing space was highly safety oriented, preplanned and executed without damage to the building or injury to personnel. Project Manager responsible for design completion, purchasing, construction and safety planning, scheduling and T and M billing.

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DANIEL VU
Senior Engineer

My goal in design is layout out a system that anyone without the technical background can look at the design and understand the system with no questions. I have over ten years of experience in the design of Health Care, Office Building, Bio-Technology and Industrial Projects.

QUICK FACTS:

EDUCATION:

B.S. Mechanical Engineering WSU 1998 (EIT State of Washington)

REGISTRATIONS:

PROFESSIONAL AFFILIATIONS:

REFERENCES:

Greg Andrews, Virginia Mason (206) 341-0566; Bill States, Wood Harbinger (425) 822-9499; Nancy Hatfield, Boeing (425) 218-4729

RESPONSIBILITIES:

Calculations and drafting of HVAC systems. Equipment submittal reviews.

NOTABLE PROJECT EXPERIENCE:

Orcas Island School District, Orcas Island, WA

Project consists of approximately 23000 square feet. Project consist of removing existing unit ventilators, existing duct board and cabinet heaters and replace with new rooftop unit and fan power terminal units to serve these classrooms. Contact – Barbara Kline, Superintendent, OISD (360-376-2284)

Old Capitol Building, Olympia, WA

Project consists of approximately 85000 square feet. Project consists of renovations and modifications of building hot water heating system by replacing the old boilers with new condensing boiler and pumping system. Contact – Jim Hayes, Department of Enterprise Services (360-407-9381)

Swedish Medical Center MOB Issaquah, Issaquah, WA

Project consists of approximately 200000 square feet five-story with underground parking garage. Project includes 2 linear accelerator vaults, with one for future expansion. Mechanical engineer with responsibilities included HVAC and medical gas systems layouts and review equipment submittal and coordinate with other disciplines. Contact – Jeff Grinzell, Building Systems Engineer, Swedish (206- 215-1724)

Bangor Naval Station Building 6400, Silverdale, Washington (2010)

Project Developer for District Chiller Plant Energy Upgrade. Project included Turbocor retrofit of two, 180 ton Trane chillers, new Kiltech chiller controls, new VFD controlled cooling towers, new CHW & CW pumps and addition of chemical free CW treatment. Contact – Michael Huber, BPA (206-220-6778)

Bangor Naval Station Building 1100, Silverdale, Washington (2010)

Project Developer for Data Center Chiller Plant Energy Upgrade. Project included the replacement of two, 60 ton Bohn water-cooled chillers with one, new 120 ton Smardt air-cooled chiller, removal of CW system and fluid coolers, and new CHW pumps. Contact – Michael Huber, BPA (206-220-6778)

UNIVERSITY MECHANICAL CONTRACTORS, INC.

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NOTABLE PROJECT EXPERIENCE (Continued):

Bangor Naval Station Building 7074, Silverdale, Washington (2010)

Project Developer for Chiller Plant Energy Upgrade. Project included the installation of one new 140 ton Multistack/Turbocor chiller, the Turbocor retrofit of one, 160 ton McQuay chiller, new Kiltech chiller controls, new VFD controlled fluid towers, new CHW & CW pumps and addition of chemical free CW treatment. Contact – Michael Huber, BPA (206-220-6778)

Boeing 787 Utilities Support, Everett, WA

Project consist of renovations and modifications of to existing steam and HVAC systems of building 40-36 and 40-26 with new High Pressure Steam (HPS) to Low Pressure Steam (LPS) pressure reducing stations and brand new air handler unit to support 787 project. Lead mechanical engineer with responsibilities include fieldwork, retreat existing document, calculations and drafting of HVAC and plumbing systems and review equipment submittals and coordinate with other disciplines.

Boeing Building 40-32, 40-33, 40-53, Everett, WA

Project consists of renovations and modifications to the existing building 40-32, 40-33, and 40-53 into Lab and office spaces.

Limited Area Processing Storage Complex (LAPSC), Bangor, WA

Project consists of approximately 182000 square foot of multi-level below-grade, earth covered. Mechanical engineer with responsibilities included calculations and drafting of HVAC systems and coordinate with other disciplines.

Seattle Children Bellevue Clinics, Bellevue, WA

Project consists of approximately 75000 square feet two-story with underground parking garage. Project includes 3 operating rooms, nuclear medicines, radio-fluoroscopy, general radiology and examination rooms. Lead mechanical with responsibilities included calculations and drafting of HVAC systems with AutoCAD in 3 dimensions. Review submittals and coordinate with other disciplines.

Grays Harbors Community Hospital, Aberdeen, WA

Project consists of renovations and modifications of existing HVAC systems to serve nuclear medicines and radio-fluoroscopy on the first floor. Also put in a brand new air handling unit to support existing exam room and CT scan areas. Lead mechanical with responsibilities included field work, calculations, drafting of HVAC and plumbing systems. Review submittals and coordinate with other disciplines.

UNIVERSITY MECHANICAL CONTRACTORS, INC.

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NOTABLE PROJECT EXPERIENCE (Continued):

University of Washington Medical Center Cardiovascular Procedures Area, Seattle, WA

Project consists of renovations and modification to the existing NN Wing located on Level 2 of UWMC. Project includes two catherization labs, electrophysiology lab, electrophysiology bi-plane lab, control and equipment rooms, and patient recovery areas. Lead mechanical engineer with responsibilities included fieldwork, retreat existing document, calculations and drafting of HVAC and plumbing, review equipment submittals, and coordinate with other disciplines.

Washington State Liquor Control Board, Seattle, WA

Project consists of an expansion of approximately of 62000 square foot of the Distribution Center. Lead mechanical engineer with responsibilities included fieldwork, retreat existing document, calculation and drafting of HVAC systems and coordinate with other disciplines.

Seattle Genetics, Bothell, WA

Project consists of an expansion of second floor office and first floor research labs. Lead mechanical engineer with responsibilities included fieldwork, retreat existing document, calculation and drafting of HVAC systems and coordinate with other disciplines.

UNIVERSITY MECHANICAL CONTRACTORS, INC.
We Build Value

IAN MCFARLAND
Service Group
Account Executive

QUICK FACTS:

PRIOR EXPERIENCE:

BA—University of Puget Sound (Double Major in Finance and Politics)

REGISTRATIONS:

REFERENCES:

Travis Duncan, Director of Facilities, Mirabella Seattle 206-254-1414, tduncan@retirement.org
Tim Murphy, Facilities Manager, IKEA 253.847.9532 #2139, tim.murphy@ikea.com

RESPONSIBILITIES:

Direct Client Interface

With over ten years of direct, business-to-business sales experience, Ian McFarland has built his career enabling clients in their operational-efficiency goals. His broad base of client experience ranges between the public and private sectors, in both commercial and industrial markets, and as specialized as biotech and retail. Via leveraging sound, logical infrastructure upgrades to reduce operating expenses, Ian is a resourceful tool for executive staff, facilities teams, human resources and environmental health and safety for any organization.
Ian is a member of the Steering Committee of the AGC's Future Leaders Forum, active in the Seattle 2030 District and a student mentor in the University of Puget Sound's Business Leadership Program.

NOTABLE PROJECT EXPERIENCE:

Major Software Campus Energy Upgrades—Seattle-area, WA
Oversaw all project activities and served as liaison to owner and onsite property management.

Complete Municipal Energy Services Project, Confidential, OR
Led client-engagement, project development and extensive grant application process for the entire building portfolio of an Oregon city.

Major Retail Energy Upgrades, Tacoma, WA
Led client-engagement for three-stage, portfolio-wide energy upgrades for a major Pacific Northwest Retailer. Led grant and financing efforts, creating a positive project cash flow for client.

ITEM 3: LETTERS OF COMMITMENT

February 12, 2013

Key Government Finance, Inc.
1000 South McCaslin Blvd.
Superior, CO 80027

Mr. Doug Smith
Chief Financial Officer
University Mechanical Contractors, Inc.
11611 49th Place west
Mukilteo, WA98275-4255

Re: Letter of Qualifications/List of References for KeyBank National Association/Key Government Finance, Inc.

Dear Mr. Smith:

Key Government Finance, Inc. is providing this letter and list of references in connection with the selection by the Governor's Energy Office for as-needed energy performance contracting services. We are an active funding source for energy conservation projects, and have provided tax-exempt funding to many state and local government borrowers across the country.

We are an affiliate of KeyBank National Association and a, subsidiary of KeyCorp which is one of the nation's largest financial services companies, with assets of approximately $89 billion. Through three principal lines of business -- corporate banking, consumer finance, and community banking -- KeyCorp provides retail and wholesale banking, investment, financing, and money management services to individuals, companies, government institutions across the United States. Key Government Finance, Inc., specializes in the structuring and underwriting of tax-exempt financings to be placed in KGF's tax-exempt portfolio with current holdings in excess of $1 billion. KGF professionals have a national presence in the tax-exempt marketplace and are supported by a dedicated operations group and legal counsel who are experienced in navigating the regulatory issues and documentation requirements associated with tax-exempt financings.

Attached to this letter is a list of references. Specific contact information is available upon request.

Sincerely,

Kendall Hansen

Kendall Hansen
Government Account Exec.
Key Government Finance, Inc.
503-701-8476
216-357-6106 Fax
Kendall.Hansen@key.com

- Washington State Housing Finance Commission
  - $10 Million Master Lease Facility
  - ESPC Projects
  - Terms of 7 or 10 Years

- State of Alaska
  - General Master Lease Facility
  - All equipment types including Energy Projects with State Agencies
  - Terms up to 12 Years

- State of California
  - General Master Lease Facility
  - All equipment types including Energy Projects with State Agencies
  - Terms up to 7 Years

- California State University System
  - General Master Lease Facility
  - All equipment types including Energy Projects with State Agencies
  - Terms up to 12 Years

ITEM 4: FORM SF330

ARCHITECT-ENGINEER QUALIFICATIONS

OMB No.: **9000-0157**

Public reporting burden for this collection of information is estimated to average a total of 29 hours per response (25 hours for Part 1 and 4 hours for Part 2), including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to the FAR Secretariat (MVA), Regulatory and Federal Assistance Publications Division, GSA, Washington, DC 20405.

Federal agencies use this form to obtain information from architect-engineer (A-E) firms about their professional qualifications. Federal agencies select firms for A-E contracts on the basis of professional qualifications as required by the Brooks A-E Act (40 U.S.C. 1101 - 1104) and Part 36 of the Federal Acquisition Regulation (FAR).

The Brooks A-E Act requires the public announcement of requirements for A-E services (with some exceptions provided by other statutes), and the selection of at least three of the most highly qualified firms based on demonstrated competence and professional qualifications according to specific criteria published in the announcement. The Act then requires the negotiation of a contract at a fair and reasonable price starting first with the most highly qualified firm.

The information used to evaluate firms is from this form and other sources, including performance evaluations, any additional data requested by the agency, and interviews with the most highly qualified firms and their references.

GENERAL INSTRUCTIONS

Part I presents the qualifications for a specific contract.

Part II presents the general qualifications of a firm or a specific branch office of a firm. Part II has two uses:

1. An A-E firm may submit Part II to the appropriate central, regional or local office of each Federal agency to be kept on file. A public announcement is not required for certain contracts, and agencies may use Part II as a basis for selecting at least three of the most highly qualified firms for discussions prior to requesting submission of Part I. Firms are encouraged to update Part II on file with agency offices, as appropriate, according to FAR Part 36. If a firm has branch offices, submit a separate Part II for each branch office seeking work.

2. Prepare a separate Part II for each firm that will be part of the team proposed for a specific contract and submitted with Part I. If a firm has branch offices, submit a separate Part II for each branch office that has a key role on the team.

INDIVIDUAL AGENCY INSTRUCTIONS

Individual agencies may supplement these instructions. For example, they may limit the number of projects or number of pages submitted in Part I in response to a public announcement for a particular project. Carefully comply with any agency instructions when preparing and submitting this form. Be as concise as possible and provide only the information requested by the agency.

DEFINITIONS

Architect-Engineer Services: Defined in FAR 2.101.

Branch Office: A geographically distinct place of business or subsidiary office of a firm that has a key role on the team.

Discipline: Primary technical capabilities of key personnel, as evidenced by academic degree, professional registration, certification, and/or extensive experience.

Firm: Defined in FAR 36.102.

Key Personnel: Individuals who will have major contract responsibilities and/or provide unusual or unique expertise.

SPECIFIC INSTRUCTIONS

Part I - Contract-Specific Qualifications

Section A. Contract Information.

1. Title and Location. Enter the title and location of the contract for which this form is being submitted, exactly as shown in the public announcement or agency request.

2. Public Notice Date. Enter the posted date of the agency's notice on the Federal Business Opportunity website (FedBizOpps), other form of public announcement or agency request for this contract.

3. Solicitation or Project Number. Enter the agency's solicitation number and/or project number, if applicable, exactly as shown in the public announcement or agency request for this contract.

Section B. Architect-Engineer Point of Contact

4-8. Name, Title, Name of Firm, Telephone Number, Fax (Facsimile) Number and E-mail (Electronic Mail) Address. Provide information for a representative of the prime contractor or joint venture that the agency can contact for additional information.

Section C. Proposed Team.

9-11. Firm Name, Address, and Role in This Contract. Provide the contractual relationship, name, full mailing address, and a brief description of the role of each firm that will be involved in performance of this contract. List the prime contractor or joint venture partners first. If a firm has branch offices, indicate each individual branch office that will have a key role on the team. The named subcontractors and outside associates or consultants must be used, and any change must be approved by the contracting officer. (See FAR Part 52 Clause "Subcontractors and Outside Associates and Consultants (Architect-Engineer Services)".) Attach an additional sheet in the same format as Section C if needed.

Section D. Organizational Chart of Proposed Team.

As an attachment after Section C, present an organizational chart of the proposed team showing the names and roles of all key personnel listed in Section E and the firm they are associated with as listed in Section C.

Section E. Resumes of Key Personnel Proposed for This Contract.

Complete this section for each key person who will participate in this contract. Group by firm, with personnel of the prime contractor or joint venture partner firms first. The following blocks must be completed for each resume:

12. Name. Self-explanatory.

13. Role in This Contract. Self-explanatory.

14. Years Experience. Total years of relevant experience (block 14a), and years of relevant experience with current firm, but not necessarily the same branch office (block 14b).

15. Firm Name and Location. Name, city and state of the firm where the person currently works, which must correspond with one of the firms (or branch office of a firm, if appropriate) listed in Section C.

16. Education. Provide information on the highest relevant academic degree(s) received. Indicate the area(s) of specialization for each degree.

17. Current Professional Registration. Provide information on current relevant professional registration(s) in a State or possession of the United States, Puerto Rico, or the District of Columbia according to FAR Part 36.

18. Other Professional Qualifications. Provide information on any other professional qualifications relating to this contract, such as education, professional registration, publications, organizational memberships, certifications, training, awards, and foreign language capabilities.

19. Relevant Projects. Provide information on up to five projects in which the person had a significant role that demonstrates the person's capability relevant to her/his proposed role in this contract. These projects do not necessarily have to be any of the projects presented in Section F for the project team if the person was not involved in any of those projects or the person worked on other projects that were more relevant than the team projects in Section F. Use the check box provided to indicate if the project was performed with any office of the current firm. If any of the professional services or construction projects are not complete, leave Year Completed blank and indicate the status in Brief Description and Specific Role (block (3)).

Section F. Example Projects Which Best Illustrate Proposed Team's Qualifications for This Contract.

Select projects where multiple team members worked together, if possible, that demonstrate the team's capability to perform work similar to that required for this contract. Complete one Section F for each project. Present ten projects, unless otherwise specified by the agency. Complete the following blocks for each project:

20. Example Project Key Number. Start with "1" for the first project and number consecutively.

21. Title and Location. Title and location of project or contract. For an indefinite delivery contract, the location is the geographic scope of the contract.

22. Year Completed. Enter the year completed of the professional services (such as planning, engineering study, design, or surveying), and/or the year completed of construction, if applicable. If any of the professional services or the construction projects are not complete, leave Year Completed blank and indicate the status in Brief Description of Project and Relevance to This Contract (block 24).

23a. Project Owner. Project owner or user, such as a government agency or installation, an institution, a corporation or private individual.

23b. Point of Contact Name. Provide name of a person associated with the project owner or the organization which contracted for the professional services, who is very familiar with the project and the firm's (or firms') performance.

23c. Point of Contract Telephone Number. Self-explanatory.

24. Brief Description of Project and Relevance to This Contract. Indicate scope, size, cost, principal elements and special features of the project. Discuss the relevance of the example project to this contract. Enter any other information requested by the agency for each example project.

25. Firms from Section C Involved with This Project. Indicate which firms (or branch offices, if appropriate) on the project team were involved in the example project, and their roles. List in the same order as Section C.

Section G. Key Personnel Participation in Example Projects.

This matrix is intended to graphically depict which key personnel identified in Section E worked on the example projects listed in Section F. Complete the following blocks (see example below).

26. and 27. Names of Key Personnel and Role in This Contract. List the names of the key personnel and their proposed roles in this contract in the same order as they appear in Section E.

28. Example Projects Listed in Section F. In the column under each project key number (see block 29) and for each key person, place an "X" under the project key number for participation in the same or similar role.

29. Example Projects Key. List the key numbers and titles of the example projects in the same order as they appear in Section F.

Section H. Additional Information.

30. Use this section to provide additional information specifically requested by the agency or to address selection criteria that are not covered by the information provided in Sections A-G.

Section I. Authorized Representative

31. and 32. Signature of Authorized Representative and Date. An authorized representative of a joint venture or the prime contractor must sign and date the completed form. Signing attests that the information provided is current and factual, and that all firms on the proposed team agree to work on the project. Joint ventures selected for negotiations must make available a statement of participation by a principal of each member of the joint venture.

33. Name and Title. Self-explanatory.

SAMPLE ENTRIES FOR SECTION G (MATRIX)

26. NAMES OF KEY PERSONNEL (From Section E, Block 12)	27. ROLE IN THIS CONTRACT (From Section E, Block 13)	28. EXAMPLE PROJECTS LISTED IN SECTION F Fill in "Example Projects Key" section below before completing table. Place "X" under project key number for participation in same or similar role.									
		1	2	3	4	5	6	7	8	9	10
Jane A. Smith	Chief Architect	X		X							
Joseph B. Williams	Chief Mech. Engineer	X	X	X	X						
Tara C. Donovan	Chief Elec. Engineer	X	X		X						

29. EXAMPLE PROJECTS KEY

NO.	TITLE OF EXAMPLE PROJECT (FROM SECTION F)	NO.	TITLE OF EXAMPLE PROJECT (FROM SECTION F)
1	Federal Courthouse, Denver, CO	6	XYZ Corporation Headquarters, Boston, MA
2	Justin J. Wilson Federal Building, Baton Rouge, LA	7	Founder's Museum, Newport, RI

Part II - General Qualifications

See the "**General Instructions**" on page 1 for firms with branch offices. Prepare Part II for the specific branch office seeking work if the firm has branch offices.

1. Solicitation Number. If Part II is submitted for a specific contract, insert the agency's solicitation number and/or project number, if applicable, exactly as shown in the public announcement or agency request.

2a-2e. Firm (or Branch Office) Name and Address. Self-explanatory.

3. Year Established. Enter the year the firm (or branch office, if appropriate) was established under the current name.

4. DUNS Number. Insert the Data Universal Numbering System number issued by Dun and Bradstreet Information Services. Firms must have a DUNS number. See FAR Part 4.6.

5. Ownership.

a. Type. Enter the type of ownership or legal structure of the firm (sole proprietor, partnership, corporation, joint venture, etc.).

b. Small Business Status. Refer to the North American Industry Classification System (NAICS) code in the public announcement, and indicate if the firm is a small business according to the current size standard for that NAICS code (for example, Engineering Services (part of NAICS 541330), Architectural Services (NAICS 541310), Surveying and Mapping Services (NAICS 541370)). The small business categories and the internet website for the NAICS codes appear in FAR Part 19. Contact the requesting agency for any questions. Contact your local U.S. Small Business Administration office for any questions regarding Business Status.

6a-6c. Point of Contact. Provide this information for a representative of the firm that the agency can contact for additional information. The representative must be empowered to speak on contractual and policy matters.

7. Name of Firm. Enter the name of the firm if Part II is prepared for a branch office.

8a-8c. Former Firm Names. Indicate any other previous names for the firm (or branch office) during the last six years. Insert the year that this corporate name change was effective and the associated DUNS Number. This information is used to review past performance on Federal contracts.

9. Employees by Discipline. Use the relevant disciplines and associated function codes shown at the end of these instructions and list in the same numerical order. After the listed disciplines, write in any additional disciplines and leave the function code blank. List no more than 20 disciplines. Group remaining employees under "Other Employees" in column b. Each person can be counted only once according to his/her primary function. If Part II is prepared for a firm (including all branch offices), enter the number of employees by disciplines in column c(1). If Part II is prepared for a branch office, enter the number of employees by discipline in column c(2) and for the firm in column c(1).

10. Profile of Firm's Experience and Annual Average Revenue for Last 5 Years. Complete this block for the firm or branch office for which this Part II is prepared. Enter the experience categories which most accurately reflect the firm's technical capabilities and project experience. Use the relevant experience categories and associated profile codes shown at the end of these instructions, and list in the same numerical order. After the listed experience categories, write in any unlisted relevant project experience categories and leave the profile codes blank. For each type of experience, enter the appropriate revenue index number to reflect the professional services revenues received annually (averaged over the last 5 years) by the firm or branch office for performing that type of work. A particular project may be identified with one experience category or it may be broken into components, as best reflects the capabilities and types of work performed by the firm. However, do not double count the revenues received on a particular project.

11. Annual Average Professional Services Revenues of Firm for Last 3 Years. Complete this block for the firm or branch office for which this Part II is prepared. Enter the appropriate revenue index numbers to reflect the professional services revenues received annually (averaged over the last 3 years) by the firm or branch office. Indicate Federal work (performed directly for the Federal Government, either as the prime contractor or subcontractor), non-Federal work (all other domestic and foreign work, including Federally-assisted projects), and the total. If the firm has been in existence for less than 3 years, see the definition for "Annual Receipts" under FAR 19.101.

12. Authorized Representative. An authorized representative of the firm or branch office must sign and date the completed form. Signing attests that the information provided is current and factual. Provide the name and title of the authorized representative who signed the form.

List of Disciplines (Function Codes)

Code	Description	Code	Description
01	Acoustical Engineer	32	Hydraulic Engineer
02	Administrative	33	Hydrographic Surveyor
03	Aerial Photographer	34	Hydrologist
04	Aeronautical Engineer	35	Industrial Engineer
05	Archeologist	36	Industrial Hygienist
06	Architect	37	Interior Designer
07	Biologist	38	Land Surveyor
08	CADD Technician	39	Landscape Architect
09	Cartographer	40	Materials Engineer
10	Chemical Engineer	41	Materials Handling Engineer
11	Chemist	42	Mechanical Engineer
12	Civil Engineer	43	Mining Engineer
13	Communications Engineer	44	Oceanographer
14	Computer Programmer	45	Photo Interpreter
15	Construction Inspector	46	Photogrammetrist
16	Construction Manager	47	Planner: Urban/Regional
17	Corrosion Engineer	48	Project Manager
18	Cost Engineer/Estimator	49	Remote Sensing Specialist
19	Ecologist	50	Risk Assessor
20	Economist	51	Safety/Occupational Health Engineer
21	Electrical Engineer	52	Sanitary Engineer
22	Electronics Engineer	53	Scheduler
23	Environmental Engineer	54	Security Specialist
24	Environmental Scientist	55	Soils Engineer
25	Fire Protection Engineer	56	Specifications Writer
26	Forensic Engineer	57	Structural Engineer
27	Foundation/Geotechnical Engineer	58	Technician/Analyst
28	Geodetic Surveyor	59	Toxicologist
29	Geographic Information System Specialist	60	Transportation Engineer
30	Geologist	61	Value Engineer
31	Health Facility Planner	62	Water Resources Engineer

List of Experience Categories (Profile Codes)

Code	Description
A01	Acoustics, Noise Abatement
A02	Aerial Photography; Airborne Data and Imagery Collection and Analysis
A03	Agricultural Development; Grain Storage; Farm Mechanization
A04	Air Pollution Control
A05	Airports; Navaids; Airport Lighting; Aircraft Fueling
A06	Airports; Terminals and Hangars; Freight Handling
A07	Arctic Facilities
A08	Animal Facilities
A09	Anti-Terrorism/Force Protection
A10	Asbestos Abatement
A11	Auditoriums and Theaters
A12	Automation; Controls; Instrumentation
B01	Barracks; Dormitories
B02	Bridges
C01	Cartography
C02	Cemeteries *(Planning and Relocation)*
C03	Charting; Nautical and Aeronautical
C04	Chemical Processing and Storage
C05	Child Care/Development Facilities
C06	Churches; Chapels
C07	Coastal Engineering
C08	Codes; Standards; Ordinances
C09	Cold Storage; Refrigeration and Fast Freeze
C10	Commercial Building *(Low Rise)*; Shopping Centers
C11	Community Facilities
C12	Communications Systems; TV; Microwave
C13	Computer Facilities; Computer Service
C14	Conservation and Resource Management
C15	Construction Management
C16	Construction Surveying
C17	Corrosion Control; Cathodic Protection Electrolysis
C18	Cost Estimating; Cost Engineering and Analysis; Parametric Costing; Forecasting
C19	Cryogenic Facilities
D01	Dams *(Concrete; Arch)*
D02	Dams *(Earth; Rock)*; Dikes; Levees
D03	Desalinization *(Process and Facilities)*
D04	Design-Build - Preparation of Requests for Proposals
D05	Digital Elevation and Terrain Model Development
D06	Digital Orthophotography
D07	Dining Halls; Clubs; Restaurants
D08	Dredging Studies and Design
E01	Ecological and Archeological Investigations
E02	Educational Facilities; Classrooms
E03	Electrical Studies and Design
E04	Electronics
E05	Elevators; Escalators; People-Movers
E06	Embassies and Chanceries
E07	Energy Conservation; New Energy Sources
E08	Engineering Economics
E09	Environmental Impact Studies, Assessments or Statements
E10	Environmental and natural Resource Mapping
E11	Environmental Planning
E12	Environmental Remediation
E13	Environmental Testing and Analysis
F01	Fallout Shelters; Blast-Resistant Design
F02	Field Houses; Gyms; Stadiums
F03	Fire Protection
F04	Fisheries; Fish Ladders
F05	Forensic Engineering
F06	Forestry and Forest Products
G01	Garages; Vehicles Maintenance Facilities; Parking Decks
G02	Gas Systems *(Propane; Natural, Etc.)*
G03	Geodetic Surveying: Ground and Airborne
G04	Geographic Information System Services: Development, Analysis, and Data Collection

Code	Description
G05	Geospatial Data Conversion: Scanning, Digitizing, Compilation, Attributing, Scribing, Drafting
G06	Graphic Design
H01	Harbors; Jetties; Piers, Ship Terminal Facilities
H02	Hazardous Materials Handling and Storage
H03	Hazardous, Toxic, Radioactive Waste Remediation
H04	Heating; Ventilating; Air Conditioning
H05	Health Systems Planning
H06	High-rise; Air-Rights-Type Buildings
H07	Highways; Streets; Airfield Paving; Parking Lots
H08	Historical Preservation
H09	Hospital and Medical Facilities
H10	Hotels; Motels
H11	Housing *(Residential, Multi-Family; Apartments; Condominiums)*
H12	Hydraulics and Pneumatics
H13	Hydrographic Surveying
I01	Industrial Buildings; Manufacturing Plants
I02	Industrial Processes; Quality Control
I03	Industrial Waste Treatment
I04	Intelligent Transportation Systems
I05	Interior Design; Space Planning
I06	Irrigation; Drainage
J01	Judicial and Courtroom Facilities
L01	Laboratories; Medical Research Facilities
L02	Land Surveying
L03	Landscape Architecture
L04	Libraries; Museums; Galleries
L05	Lighting *(Interior; Display; Theater, Etc.)*
L06	Lighting *(Exteriors; Streets; Memorials; Athletic Fields, Etc.)*
M01	Mapping Location/Addressing Systems
M02	Materials Handling Systems; Conveyors; Sorters
M03	Metallurgy
M04	Microclimatology; Tropical Engineering
M05	Military Design Standards
M06	Mining and Mineralogy
M07	Missile Facilities *(Silos; Fuels; Transport)*
M08	Modular systems Design; Pre-Fabricated Structures or Components
N01	Naval Architecture; Off-Shore Platforms
N02	Navigation Structures; Locks
N03	Nuclear Facilities; Nuclear Shielding
O01	Office Buildings; Industrial Parks
O02	Oceanographic Engineering
O03	Ordnance; Munitions; Special Weapons
P01	Petroleum Exploration; Refining
P02	Petroleum and Fuel *(Storage and Distribution)*
P03	Photogrammetry
P04	Pipelines *(Cross-Country - Liquid and Gas)*
P05	Planning *(Community, Regional, Areawide and State)*
P06	Planning *(Site, Installation and Project)*
P07	Plumbing and Piping Design
P08	Prisons and Correctional Facilities
P09	Product, Machine Equipment Design
P10	Pneumatic Structures, Air-Support Buildings
P11	Postal Facilities
P12	Power Generation, Transmission, Distribution
P13	Public Safety Facilities
R01	Radar; Sonar; Radio and Radar Telescopes
R02	Radio Frequency Systems and Shieldings
R03	Railroad; Rapid Transit
R04	Recreation Facilities *(Parks, Marinas, Etc.)*
R05	Refrigeration Plants/Systems
R06	Rehabilitation *(Buildings; Structures; Facilities*
R07	Remote Sensing
R08	Research Facilities
R09	Resources Recovery; Recycling
R10	Risk Analysis
R11	Rivers; Canals; Waterways; Flood Control
R12	Roofing
S01	Safety Engineering; Accident Studies; OSHA Studies
S02	Security Systems; Intruder and Smoke Detection
S03	Seismic Designs and Studies

Code	Description
S04	Sewage Collection, Treatment and Disposal
S05	Soils and Geologic Studies; Foundations
S06	Solar Energy Utilization
S07	Solid Wastes; Incineration; Landfill
S08	Special Environments; Clean Rooms, Etc.
S09	Structural Design; Special Structures
S10	Surveying; Platting; Mapping; Flood Plain Studies
S11	Sustainable Design
S12	Swimming Pools
S13	Storm Water Handling and Facilities
T01	Telephone Systems *(Rural; Mobile; Intercom, Etc.)*
T02	Testing and Inspection Services
T03	Traffic and Transportation Engineering
T04	Topographic Surveying and Mapping
T05	Towers *(Self-Supporting and Guyed Systems)*
T06	Tunnels and Subways
U01	Unexploded Ordnance Remediation
U02	Urban renewals; Community Development
U03	Utilities *(Gas and Steam)*
V01	Value Analysis; Life-Cycle Costing
W01	Warehouse and Depots
W02	Water Resources; Hydrology; Ground Water
W03	Water Supply; Treatment and Distribution
W04	Wind Tunnels; Research/Testing Facilities Design
Z01	Zoning; Land Use Studies

ARCHITECT - ENGINEER QUALIFICATIONS

PART I - CONTRACT-SPECIFIC QUALIFICATIONS

A. CONTRACT INFORMATION

1.	TITLE AND LOCATION *(City and State):*	*Olympia, WA*
2.	PUBLIC NOTICE DATE:	January 23, 2013
3.	SOLICITATION OR PROJECT NUMBER:	2013-133

B. ARCHITECT-ENGINEER POINT OF CONTACT

4.	NAME AND TITLE:	Scott Locke / Manager, Energy Services
5.	NAME OF FIRM:	University Mechanical Contractors, Inc.
6.	TLEPHONE NUMBER:	206-364-9910
7.	FAX NUMBER:	206-365-3895
8.	E-MAIL ADDRESS:	slocke@umci.com

C. PROPOSED TEAM

(Complete this section for the prime contractor and all key subcontractors.)

9a.	PRIME (CHECK HERE):	√
9a.	JOINT-VENTURE PARTNER (CHECK HERE):	
9a.	SUBCONTRACTOR (CHECK HERE):	
9a.	FIRM NAME:	University Mechanical Contractors, Inc.
9a.	IF BRANCH OFFICE CHECK HERE:	
10a.	ADDRESS	11611 49th Place West, Mukilteo, WA 98275
11a.	ROLE IN THIS CONTRACT	Prime

9b.	PRIME (CHECK HERE):	
9b.	JOINT-VENTURE PARTNER (CHECK HERE):	
9b.	SUBCONTRACTOR (CHECK HERE):	
9b.	FIRM NAME:	
9b.	IF BRANCH OFFICE CHECK HERE:	
10b.	ADDRESS	
11b.	ROLE IN THIS CONTRACT	

9c. PRIME (CHECK HERE):

9c. JOINT-VENTURE PARTNER (CHECK HERE):

9c. SUBCONTRACTOR (CHECK HERE):

9c. FIRM NAME:

9c. IF BRANCH OFFICE CHECK HERE:

10c. ADDRESS

11c. ROLE IN THIS CONTRACT

9d. PRIME (CHECK HERE):

9d. JOINT-VENTURE PARTNER (CHECK HERE):

9d. SUBCONTRACTOR (CHECK HERE):

9d. FIRM NAME:

9d. IF BRANCH OFFICE CHECK HERE:

10d. ADDRESS

11d. ROLE IN THIS CONTRACT

9e. PRIME (CHECK HERE):

9e. JOINT-VENTURE PARTNER (CHECK HERE):

9e. SUBCONTRACTOR (CHECK HERE):

9e. FIRM NAME:

9e. IF BRANCH OFFICE CHECK HERE:

10e. ADDRESS

11e. ROLE IN THIS CONTRACT

9f. PRIME (CHECK HERE):

9f. JOINT-VENTURE PARTNER (CHECK HERE):

9f. SUBCONTRACTOR (CHECK HERE):

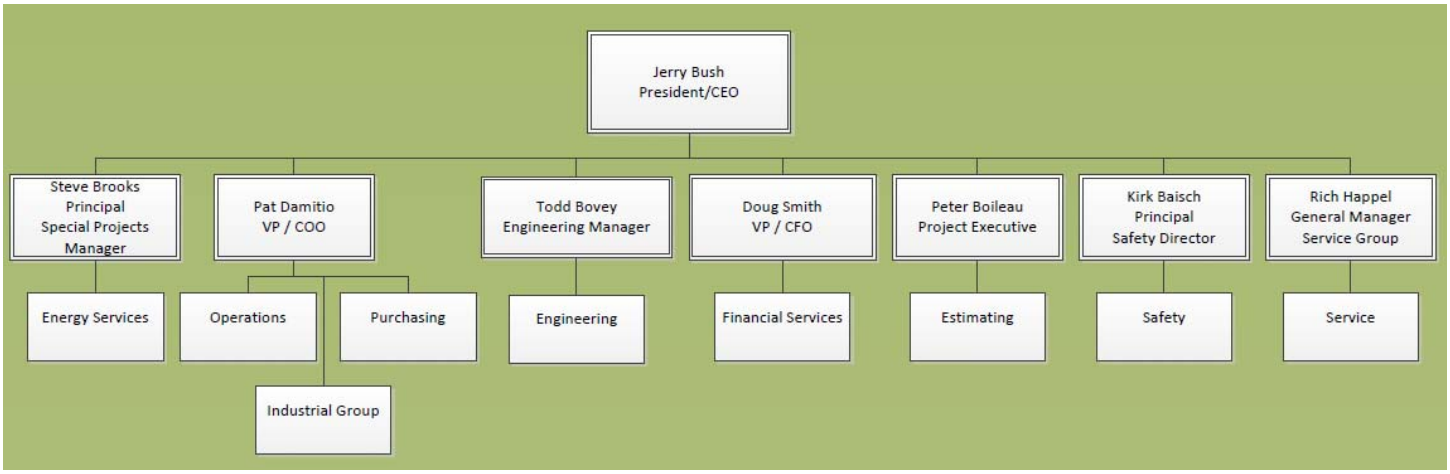
9f. FIRM NAME:

9f. IF BRANCH OFFICE CHECK HERE:

10f. ADDRESS

11f. ROLE IN THIS CONTRACT

D. ORGANIZATIONAL CHART OF PROPOSED TEAM *(Attached; check here)*



E. RESUMES OF KEY PERSONNEL PROPOSED FOR THIS CONTRACT

(Complete one Section E for each key person.)

12. NAME: Jerry Bush

13. ROLE IN THIS CONTRACT: President / CEO

14a. YEARS EXPERIENCE - TOTAL: 24 years 10 months

14b. YEARS EXPERIENCE - WITH CURRENT FIRM: 24 years 10 months

15. FIRM NAME AND LOCATION *(City and State)*: University Mechanical Contractors, Inc., Mukilteo, WA

16. EDUCATION *(DEGREE AND SPECIALIZATION)*: Bachelor of Science – Construction Management

17. CURRENT PROFESSIONAL REGISTRATION *(STATE AND DISCIPLINE):*

18. OTHER PROFESSIONAL QUALIFICATIONS *(Publications, Organizations, Training, Awards, etc.)*:

19a(1) Orcas Island School District Phase I ESPC

19a(2) Professional Services completed: 2011

19a(2) Construction completed: 2011

19a(3) Description and role: President/CEO with overall responsibility. $455,000 project. Projects include energy efficient lighting upgrades, energy based re-commissioning, water conservation, and occupancy based. Project in closeout phase.

19a(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19b(1) Orcas Island School District Phase II ESPC

19b(2) Professional Services completed: 2012

19b(2) Construction completed: 2012

19b(3) Description and role: President/CEO with overall responsibility. $1,470,000 project. Projects include new VAV system in Elem School, ventilation upgrades, controls upgrades, , energy efficient lighting upgrades, DW system upgrades, water conservation, and occupancy based HVAC/lighting controls. Project in pre-construction.

19b(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19c(1) Old Capital Building, Olympia

19c(2) Professional Services completed: 2011

19c(2) Construction completed: 2011

19c(3) Description and role: President/CEO with overall responsibility. $515,000 project. Project included high efficiency boiler upgrade in historic landmark facility. Project in construction.

19c(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19d(1) Naval Air Station Whidbey Island Energy Upgrades (25 buildings)

19d(2) Professional Services completed: February 2010

19d(2) Construction completed: 2011

19d(3) Description and role: President/CEO with overall responsibility. $1.45 million project. Projects include heat recovery, VAV conversion, controls upgrades, energy based re-commissioning, and demand control ventilation. Project in construction.

19d(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19e(1) Seatac Airport Stage 2 Mechanical Energy Upgrade

19e(2) Professional Services completed: 2013

19e(2) Construction ongoing:

19e(3) Description and role President/CEO with overall responsibility. $2.4 million project. Project included optimization of chiller plant, isolation of cooling towers for water side economizing, CV to VAV conversion of 105 terminal units, cooling tower alternative treatment, heat recovery. Project in pre-construction.

E. RESUMES OF KEY PERSONNEL PROPOSED FOR THIS CONTRACT

(Complete one Section E for each key person.)

12. NAME: Rich Happel

13. ROLE IN THIS CONTRACT: General Manager Service

14a. YEARS EXPERIENCE - TOTAL: 34 years

14b. YEARS EXPERIENCE - WITH CURRENT FIRM: 11 years

15. FIRM NAME AND LOCATION *(City and State)*: University Mechanical Contractors, Inc., Mukilteo, WA

16. EDUCATION *(DEGREE AND SPECIALIZATION)*:

17. CURRENT PROFESSIONAL REGISTRATION *(STATE AND DISCIPLINE):*

18. OTHER PROFESSIONAL QUALIFICATIONS *(Publications, Organizations, Training, Awards, etc.)*: Toshiba VFD's, Trane Chillers, Carrier Chillers, McQuay Chillers, Smardt Chillers/Kiltech Controls, Mammoth HVAC Systems, Turbocor Retrofit & Service

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19a(1) Orcas Island School District Phase I ESPC

19a(2) Professional Services completed: 2011

19a(2) Construction completed: 2011

19a(3) Description and role: Project oversight. $455,000 project. Projects include energy efficient lighting upgrades, energy based re-commissioning, water conservation, and occupancy based. Project in closeout phase.

19a(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19b(1) Orcas Island School District Phase II ESPC

19b(2) Professional Services completed: 2012

19b(2) Construction completed: 2012

19b(3) Description and role: Project oversight. $1,470,000 project. Projects include new VAV system in Elem School, ventilation upgrades, controls upgrades, , energy efficient lighting upgrades, DW system upgrades, water conservation, and occupancy based HVAC/lighting controls. Project in pre-construction.

19b(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19c(1) Old Capital Building, Olympia

19c(2) Professional Services completed: 2011

19c(2) Construction completed: 2011

19c(3) Description and role: Project oversight. $515,000 project. Project included high efficiency boiler upgrade in historic landmark facility. Project in construction.

19c(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19d(1) Naval Air Station Whidbey Island Energy Upgrades (25 buildings)

19d(2) Professional Services completed: February 2010

19d(2) Construction completed: 2011

19d(3) Description and role: Project Development & oversight. $1.45 million project. Projects include heat recovery, VAV conversion, controls upgrades, energy based re-commissioning, and demand control ventilation. Project in construction.

19d(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19e(1) Seatac Airport Stage 2 Mechanical Energy Upgrade

19e(2) Professional Services completed: 2013

19e(2) Construction ongoing:

19e(3) Description and role: Project oversight. $2.4 million project. Project included optimization of chiller plant, isolation of cooling towers for water side economizing, CV to VAV conversion of 105 terminal units, cooling tower alternative treatment, heat recovery. Project in pre-construction.

E. RESUMES OF KEY PERSONNEL PROPOSED FOR THIS CONTRACT

(Complete one Section E for each key person.)

12. NAME: Scott Locke

13. ROLE IN THIS CONTRACT: Project Developer

14a. YEARS EXPERIENCE - TOTAL: 25 years

14b. YEARS EXPERIENCE - WITH CURRENT FIRM: 5 year 3 months

15. FIRM NAME AND LOCATION *(City and State)*: University Mechanical Contractors, Inc., Mukilteo, WA

16. EDUCATION *(DEGREE AND SPECIALIZATION)*: Bachelor of Science – Mechanical Engineering

17. CURRENT PROFESSIONAL REGISTRATION *(STATE AND DISCIPLINE): Washington and Texas - Mechanical*

18. OTHER PROFESSIONAL QUALIFICATIONS *(Publications, Organizations, Training, Awards, etc.)*: LEED-AP, CEM, Member of ASHRAE, AEE

19a(1) Orcas Island School District Phase I ESPC

19a(2) Professional Services completed: 2011

19a(2) Construction completed: 2011

19a(3) Description and role: Project Developer/Energy Engineer. $455,000 project. Projects include energy efficient lighting upgrades, energy based re-commissioning, water conservation, and occupancy based. Project in closeout.

19a(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19b(1) Orcas Island School District Phase II ESPC

19b(2) Professional Services completed: 2012

19b(2) Construction completed: 2012

19b(3) Description and role: Project Developer/Energy Engineer. $1,470,000 project. Projects include new VAV system in Elem School, ventilation upgrades, controls upgrades, , energy efficient lighting upgrades, DW system upgrades, water conservation, and occupancy based HVAC/lighting controls. Project in pre-construction.

19b(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19c(1) Old Capital Building, Olympia

19c(2) Professional Services completed: 2011

19c(2) Construction completed: 2011

19c(3) Description and role: Project Developer/Energy Engineer. $515,000 project. Project included high efficiency boiler upgrade in historic landmark facility. Project in construction.

19c(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19d(1) Naval Air Station Whidbey Island Energy Upgrades (25 buildings)

19d(2) Professional Services completed: February 2010

19d(2) Construction completed: 2011

19d(3) Description and role: Project Developer/Energy Engineer, $1.45 million project. Projects include heat recovery, VAV conversion, controls upgrades, energy based re-commissioning, and demand control ventilation. Project in construction.

19d(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19e(1) Seatac Airport Stage 2 Mechanical Energy Upgrade

19e(2) Professional Services completed: 2013

19e(2) Construction ongoing:

19e(3) Description and role: Energy Engineer, $2.4 million project. Project included optimization of chiller plant, isolation of cooling towers for water side economizing, CV to VAV conversion of 105 terminal units, cooling tower alternative treatment, heat recovery. Project in pre-construction.

19e(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

E. RESUMES OF KEY PERSONNEL PROPOSED FOR THIS CONTRACT

(Complete one Section E for each key person.)

12. NAME: Troy Turpin

13. ROLE IN THIS CONTRACT: Project Developer/Energy Engineer

14a. YEARS EXPERIENCE - TOTAL: 13 years

14b. YEARS EXPERIENCE - WITH CURRENT FIRM: 5 year 3 months

15. FIRM NAME AND LOCATION *(City and State)*: University Mechanical Contractors, Inc., Mukilteo, WA

16. EDUCATION *(DEGREE AND SPECIALIZATION)*: Bachelor of Science – Mechanical Engineering, Master of Science - Engineering

17. CURRENT PROFESSIONAL REGISTRATION *(STATE AND DISCIPLINE):* WA State EIT - Mechanical

18. OTHER PROFESSIONAL QUALIFICATIONS *(Publications, Organizations, Training, Awards, etc.)*: CEM, Member of ASHRAE & AEE

19a(1) Orcas Island School District Phase I ESPC

19a(2) Professional Services completed: 2011

19a(2) Construction completed: 2011

19a(3) Description and role: Energy Engineer. $455,000 project. Projects include energy efficient lighting upgrades, energy based re-commissioning, water conservation, and occupancy based. Project in closeout.

19a(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19b(1) Bangor Building 2800 & 6400 Steam System Upgrade

19b(2) Professional Services completed: January 2010

19b(2) Construction completed: February 2011

19b(3) Description and role: Project Developer/Energy Engineer. $1,800,000 project. Projects included design of new 2 stage economizers on six (6) Boilers for stack heat recovery. New boiler controls, new pumps, new VFDs.

19b(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19c(1) Bangor Naval Base Kitsap Building B7000, B6400, B1100, B7074 & B7001 Energy Upgrade

19c(2) Professional Services completed: May 2009

19c(2) Construction completed: February 2011

19c(3) Description and role: Project Developer/Energy Engineer, $2.8 Million project. Project included redesign of chiller water system andTurbocor retrofit of four, 120/140 ton water cooled chillers, installation of two (2) new Multistack water cooled chillers, installation of two (2) new

SMARDT air cooled chillers, Kiltech chiller controls, new five (5) VFD controlled cooling towers, new CHW & CW pumps and addition of chemical free CW treatment.

19c(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19d(1) Naval Air Station Whidbey Island Energy Upgrades (25 buildings)

19d(2) Professional Services completed: February 2010

19d(2) Construction completed: 2011

19d(3) Description and role: Project Developer/Energy Engineer, $1.45 million project. Projects include heat recovery, VAV conversion, controls upgrades, energy based re-commissioning, and demand control ventilation. Project in construction.

19d(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19e(1) Seatac Airport Stage 2 Mechanical Energy Upgrade

19e(2) Professional Services completed: 2013

19e(2) Construction ongoing:

19e(3) Description and role: Energy Engineer, $2.4 million project. Project included optimization of chiller plant, isolation of cooling towers for water side economizing, CV to VAV conversion of 105 terminal units, cooling tower alternative treatment, heat recovery. Project in pre-construction.

19e(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

E. RESUMES OF KEY PERSONNEL PROPOSED FOR THIS CONTRACT

(Complete one Section E for each key person.)

12. NAME: CV Nguyen

13. ROLE IN THIS CONTRACT: Energy Project Manager/Commission Engineer

14a. YEARS EXPERIENCE - TOTAL: 22 years

14b. YEARS EXPERIENCE - WITH CURRENT FIRM: 8 years

15. FIRM NAME AND LOCATION *(City and State)*: University Mechanical Contractors, Inc., Mukilteo, WA

16. EDUCATION *(DEGREE AND SPECIALIZATION)*: Bachelor of Science – Mechanical Engineering

17. CURRENT PROFESSIONAL REGISTRATION *(STATE AND DISCIPLINE):*

18. OTHER PROFESSIONAL QUALIFICATIONS *(Publications, Organizations, Training, Awards, etc* CEM, NEBB Certified Supervisor

19a(1) Orcas Island School District Phase I ESPC

19a(2) Professional Services completed: 2011

19a(2) Construction completed: 2011

19a(3) Description and role: Project Manager/Commissioning Engineer. $455,000 project. Projects include energy efficient lighting upgrades, energy based re-commissioning, water conservation, and occupancy based. Project in closeout.

19a(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19b(1) Orcas Island School District Phase II ESPC

19b(2) Professional Services completed: 2012

19b(2) Construction completed: 2012

19b(3) Description and role: Project Manager/Commissioning Engineer. $1,470,000 project. Projects include new VAV system in Elem School, ventilation upgrades, controls upgrades, , energy efficient lighting upgrades, DW system upgrades, water conservation, and occupancy based HVAC/lighting controls. Project in pre-construction.

19b(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19c(1) Old Capital Building, Olympia

19c(2) Professional Services completed: 2011

19c(2) Construction completed: 2011

19c(3) Description and role: Project Manager. $515,000 project. Project included high efficiency boiler upgrade in historic landmark facility. Project in construction.

19c(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19d(1) Naval Air Station Whidbey Island Energy Upgrades (25 buildings)

19d(2) Professional Services completed: February 2010

19d(2) Construction completed: 2011

19d(3) Description and role: Project Manager/Commissioning Engineer, $1.45 million project. Projects include heat recovery, VAV conversion, controls upgrades, energy based re-commissioning, and demand control ventilation. Project in construction.

19d(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19e(1) Seatac Airport Stage 2 Mechanical Energy Upgrade

19e(2) Professional Services completed: 2013

19e(2) Construction ongoing:

19e(3) Description and role: Project Manager/Energy Engineer, $2.4 million project. Project included optimization of chiller plant, isolation of cooling towers for water side economizing, CV to VAV conversion of 105 terminal units, cooling tower alternative treatment, heat recovery. Project in pre-construction.

19e(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

E. RESUMES OF KEY PERSONNEL PROPOSED FOR THIS CONTRACT

(Complete one Section E for each key person.)

12. NAME: Terry Parmley

13. ROLE IN THIS CONTRACT: Sr. Controls Engineer/Retro-commissioning Engineer

14a. YEARS EXPERIENCE - TOTAL: 27 years

14b. YEARS EXPERIENCE - WITH CURRENT FIRM: 3 year 4 months

15. FIRM NAME AND LOCATION *(City and State)*: University Mechanical Contractors, Inc., Mukilteo, WA

16. EDUCATION *(DEGREE AND SPECIALIZATION)*: Associates of Science – Biology, HVAC Technology Courses

17. CURRENT PROFESSIONAL REGISTRATION *(STATE AND DISCIPLINE):*

18. OTHER PROFESSIONAL QUALIFICATIONS *(Publications, Organizations, Training, Awards, etc.)*:

19a(1) Orcas Island School District Phase I ESPC

19a(2) Professional Services completed: 2011

19a(2) Construction completed: 2011

19a(3) Description and role: Sr. Controls Engineer/Retro-commissioning Engineer. $455,000 project. Projects include energy efficient lighting upgrades, energy based re-commissioning, water conservation, and occupancy based. Project in closeout

19a(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19b(1) Bangor Naval Base Kitsap Building B7000, B6400, B1100, B7074 & B7001 Energy Upgrade

19b(2) Professional Services completed: May 2009

19b(2) Construction completed: February 2011

19b(3) Description and role: Sr. Controls Engineer/Retro-commissioning Engineer. $2.8 Million project. Project included redesign of chiller water system andTurbocor retrofit of four, 120/140 ton water cooled chillers, installation of two (2) new Multistack water cooled chillers, installation of two (2) new
SMARDT air cooled chillers, Kiltech chiller controls, new five (5) VFD controlled cooling towers, new CHW & CW pumps and addition of chemical free CW treatment.

19b(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19c(1) Bangor Building 2800 & 6400 Steam System Upgrade

19c(2) Professional Services completed: January 2010

19c(2) Construction completed: February 2011

19c(3) Description and role: Sr. Controls Engineer/Retro-commissioning Engineer. $1,800,000 project. Projects included design of new 2 stage economizers on six (6) Boilers for stack heat recovery. New boiler controls, new pumps, new VFDs.

19c(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19d(1) Naval Air Station Whidbey Island Energy Upgrades (25 buildings)

19d(2) Professional Services completed: February 2010

19d(2) Construction completed: 2011

19d(3) Description and role: Sr. Controls Engineer/Retro-commissioning Engineer. $1.45 million project. Projects include heat recovery, VAV conversion, controls upgrades, energy based re-commissioning, and demand control ventilation. Project in construction.

19d(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19e(1) Seatac Airport Stage 2 Mechanical Energy Upgrade

19e(2) Professional Services completed: 2013

19e(2) Construction ongoing:

19e(3) Description and role: Sr. Controls Engineer/Retro-commissioning Engineer. Project included optimization of chiller plant, isolation of cooling towers for water side economizing, CV to VAV conversion of 105 terminal units, cooling tower alternative treatment, heat recovery. Project in pre-construction.

19e(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

E. RESUMES OF KEY PERSONNEL PROPOSED FOR THIS CONTRACT

(Complete one Section E for each key person.)

12. NAME: Todd Bovey, PE, HFDP

13. ROLE IN THIS CONTRACT: Engineering Manager

14a. YEARS EXPERIENCE - TOTAL: 30 years

14b. YEARS EXPERIENCE - WITH CURRENT FIRM: 0 years, 9 months

15. FIRM NAME AND LOCATION *(City and State)*: University Mechanical Contractors, Inc., Mukilteo, WA

16. EDUCATION *(DEGREE AND SPECIALIZATION)*: Bachelor of Science – Architectural Engineering

17. CURRENT PROFESSIONAL REGISTRATION *(STATE AND DISCIPLINE): Washington - Mechanical*

18. OTHER PROFESSIONAL QUALIFICATIONS *(Publications, Organizations, Training, Awards, etc.)*:

19a(1) Swedish Medical Center Issaquah, Issaquah, WA

19a(2) Professional Services completed: 2011

19a(2) Construction completed:2012

19a(3) Description and role: Engineer of Record for project included fast-track Integrated Project Delivery of 540,000 sq. ft. hospital, medical office, and central plant. Scope included 160 patient rooms, 12 operating rooms, and central sterile services.

19a(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm:

19b(1) Multicare Good Samaritan Hospital Patient Care Tower, Puyallup, WA

19b(2) Professional Services completed: 2011

19b(2) Construction completed: 2011

19b(3) Description and role: Engineer of Record for fast-track design of 340,000 sq.ft hospital expansion. Scope includes 80 patient rooms, eight operating Rooms, 450 ton chilled water central plant, boiler plant renovation, and parking structure.

19b(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm:

19c(1) Seatac Airport Stage 2 Mechanical Energy Upgrade

19c(2) Professional Services completed: 2013

19c(2) Construction ongoing:

19c(3) Description and role: Sr. Controls Engineer/Retro-commissioning Engineer. Project included optimization of chiller plant, isolation of cooling towers for water side economizing, CV to VAV conversion of 105 terminal units, cooling tower alternative treatment, heat recovery. Project in pre-construction.

19c(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

E. RESUMES OF KEY PERSONNEL PROPOSED FOR THIS CONTRACT

(Complete one Section E for each key person.)

12. NAME: Max Harshman, PE, LEED AP

13. ROLE IN THIS CONTRACT: Mechanical Design Engineer

14a. YEARS EXPERIENCE - TOTAL: 20 years

14b. YEARS EXPERIENCE - WITH CURRENT FIRM: 9 years

15. FIRM NAME AND LOCATION *(City and State)*: University Mechanical Contractors, Inc., Mukilteo, WA

16. EDUCATION *(DEGREE AND SPECIALIZATION)*: Bachelor of Science – Mechanical Engineering

17. CURRENT PROFESSIONAL REGISTRATION *(STATE AND DISCIPLINE): Washington - Mechanical*

18. OTHER PROFESSIONAL QUALIFICATIONS *(Publications, Organizations, Training, Awards, etc.)*: LEED-AP, Member of ASHRAE

19a(1) Office Building Downtown Seattle – Confidential Client - LEED Gold Design/Build – Seattle, WA

19a(2) Professional Services completed: October 2006

19a(2) Construction completed: February 2008

19a(3) Description and Role: Mechanical design engineer, energy model, DDC, HVAC, LEED, mechanical and plumbing design. $4.1 million project.

19a(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19b(1) Office Building TI Downtown Seattle – Confidential Client - LEED Silver – Seattle, WA

19b(2) Professional Services completed: October 2006

19b(2) Construction Services completed: February 2008

19b(3) Description and role: Mechanical design engineer, energy model, DDC, HVAC, LEED, mechanical and plumbing design. $4.1 million project.
19b(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19c(1) Colman Center LEED Design – Seattle, WA

19c(2) Professional Services completed: December 2007

19c(2) Construction completed: Construction on hold.

19c(3) Description and role: Lead mechanical design engineer responsible for energy model, DDC, HVAC, LEED, mechanical and plumbing design. Construction on hold.

19c(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19d(1) Horizon House – Seattle, WA

19d(2) Professional Services completed: October 2007

19d(2) Construction completed: March 2008

19d(3) Description and role: Lead mechanical design engineer responsible for energy model, DDC, HVAC, LEED, mechanical and plumbing design. $8.7 million project.

19d(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19e(1) Cosmopolitan

19e(2) Professional Services completed: March 2006

19e(2) Construction completed: April 2007

19e(3) Description and role: Lead mechanical design engineer responsible for energy model, DDC, HVAC, LEED, mechanical and plumbing design. $8.3 million project.

19e(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

E. RESUMES OF KEY PERSONNEL PROPOSED FOR THIS CONTRACT

(Complete one Section E for each key person.)

12. NAME: Bryan Eppler

13. ROLE IN THIS CONTRACT: Project Manager

14a. YEARS EXPERIENCE - TOTAL: 20 years

14b. YEARS EXPERIENCE - WITH CURRENT FIRM: 16 years

15. FIRM NAME AND LOCATION *(City and State)*: University Mechanical Contractors, Inc., Mukilteo, WA

16. EDUCATION *(DEGREE AND SPECIALIZATION)*: Bachelor of Science – BS Engineering

17. CURRENT PROFESSIONAL REGISTRATION *(STATE AND DISCIPLINE):*

18. OTHER PROFESSIONAL QUALIFICATIONS *(Publications, Organizations, Training, Awards, etc.)*:

19a(1) Orcas Island School District Phase I ESPC

19a(2) Professional Services completed: 2011

19a(2) Construction completed: 2011

19a(3) Description and role: Project Management oversight. $455,000 project. Projects include energy efficient lighting upgrades, energy based re-commissioning, water conservation, and occupancy based. Project in closeout.

19a(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19b(1) Orcas Island School District Phase II ESPC

19b(2) Professional Services completed: 2012

19b(2) Construction completed: 2012

19b(3) Description and role: Project Management oversight. $1,470,000 project. Projects include new VAV system in Elem School, ventilation upgrades, controls upgrades, , energy efficient lighting upgrades, DW system upgrades, water conservation, and occupancy based HVAC/lighting controls. Project in pre-construction.

19b(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19c(1) Old Capital Building, Olympia

19c(2) Professional Services completed: 2011

19c(2) Construction completed: 2011

19c(3) Description and role: Project Management oversight. $515,000 project. Project included high efficiency boiler upgrade in historic landmark facility. Project in pre-construction.

19c(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19d(1) Naval Air Station Whidbey Island Energy Upgrades (25 buildings)

19d(2) Professional Services completed: February 2010

19d(2) Construction completed: 2011

19d(3) Description and role: Project Management oversight. $1.45 million project. Projects include heat recovery, VAV conversion, controls upgrades, energy based re-commissioning, and demand control ventilation. Project in construction.

19d(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19e(1) Seatac Airport Stage 2 Mechanical Energy Upgrade

19e(2) Professional Services completed: 2013

19e(2) Construction ongoing:

19e(3) Description and role Project Management oversight. $2.4 million project. Project included optimization of chiller plant, isolation of cooling towers for water side economizing, CV to VAV conversion of 105 terminal units, cooling tower alternative treatment, heat recovery. Project in pre-construction.

E. RESUMES OF KEY PERSONNEL PROPOSED FOR THIS CONTRACT

(Complete one Section E for each key person.)

12. NAME: Steve Brooks, PE

13. ROLE IN THIS CONTRACT: Senior Engineer

14a. YEARS EXPERIENCE - TOTAL: 14 years 6 months

14b. YEARS EXPERIENCE - WITH CURRENT FIRM: 14 years 6 months

15. FIRM NAME AND LOCATION *(City and State)*: University Mechanical Contractors, Inc., Mukilteo, WA

16. EDUCATION *(DEGREE AND SPECIALIZATION)*: Bachelor of Science – Mechanical Engineering

17. CURRENT PROFESSIONAL REGISTRATION *(STATE AND DISCIPLINE): Washington - Mechanical*

18. OTHER PROFESSIONAL QUALIFICATIONS *(Publications, Organizations, Training, Awards, etc.)*: Member of ASHRAE

19a(1) Cedar River Water Treatment Plant **-** Seattle, WA – LEED Gold, Design/Build

19a(2) Professional Services completed – Plan/Spec

19a(2) Construction completed: July 2007

19a(3) Description and Role: Project Lead Engineer for full mechanical HVAC design. Project included ventilation and wastewater systems for disinfection control buildings as well as the main Administration Bldg. Administration building received a LEED Gold Rating from the US Green Building Council.

19a(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19b(1) Electric Lightwave - Seattle, WA

19b(2) Professional Services completed: May 2003

19b(2) Construction Services completed: June 2004

19b(3) Description and Role: Full mechanical design for $600k critical environment telephone switch center. Project included installation of all mechanical components without interrupting the existing facilities operation.

19b(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19c(1) Fred Hutchinson Cancer Research Center – Seattle, WA

19c(2) Professional Services completed: Ongoing

19c(2) Construction completed: Ongoing.

19c(3) Description and role: Lead Engineer of more than 100,000 square feet of tenant improvements to existing laboratory facilities involving VAV systems, heat recovery systems, specialty gas systems ,custom ventilation systems, and critical data center installations.

19c(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19d(1) Allen Institute For Brain Science – Seattle, WA

19d(2) Professional Services completed: March 2007

19d(2) Construction completed: June 2007

19d(3) Description and role: Full mechanical design for 8,500 square foot research lab containing fume hoods, heat recovery and vivarium within fully occupied office building.

19d(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19e(1) Park-90 - Seattle, WA

19e(2) Professional Services completed: Plan/Spec 2004

19e(2) Construction completed: November 2004

19e(3) Description and role: Lead mechanical coordinator for full trade coordination and shop drawing production for 50,000 square foot renovation for City of Seattle Police department.

19e(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

E. RESUMES OF KEY PERSONNEL PROPOSED FOR THIS CONTRACT

(Complete one Section E for each key person.)

12.	NAME:	Richard Farmer, PMP, CEM
13.	ROLE IN THIS CONTRACT:	Retro Commissioning Lead/Project Manager
14a.	YEARS EXPERIENCE - TOTAL:	19 years
14b.	YEARS EXPERIENCE - WITH CURRENT FIRM:	5 year 6 months
15.	FIRM NAME AND LOCATION *(City and State)*:	University Mechanical Contractors, Inc., Mukilteo, WA

16. EDUCATION *(DEGREE AND SPECIALIZATION)*: HVAC Engineering – Johnson Controls Institute; MCA Western WA HVAC Engineering; A+ Certified - COMPTIA

17. CURRENT PROFESSIONAL REGISTRATION *(STATE AND DISCIPLINE):*

18. OTHER PROFESSIONAL QUALIFICATIONS *(Publications, Organizations, Training, Awards, etc.)*: Certified Energy Manager

19a(1) Harborview Ninth & Jefferson Building - Seattle, WA

19a(2) Professional Services completed: July 2006

19a(2) Construction completed: 2008

19a(3) Description and Role: Managed the MEP detailing process, coordination, field support & startup coordination.

19a(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19b(1) Renown Regional Medical Center – Acute Care Tower - Reno, NV

19b(2) Professional Services completed: March 2005

19b(2) Construction Services completed: March 2008

19b(3) Description and Role: Managed the complete temperature controls subcontract including design, coordination, installation and startup.

19b(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm:

19c(1) Renown Regional Medical Center – Central Utility Plant - Reno, NV

19c(2) Professional Services completed: March 2005

19c(2) Construction completed: March 2008

19c(3) Description and role: Managed the complete temperature controls subcontract including design, coordination, installation and startup.

19c(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm:

19d(1) Naval Air Station Whidbey Island Energy Upgrades (25 buildings)

19d(2) Professional Services completed: February 2010

19d(2) Construction completed: 2011

19d(3) Description and role: Sr. Controls Engineer/Retro-commissioning Engineer. $1.45 million project. Projects include heat recovery, VAV conversion, controls upgrades, energy based re-commissioning, and demand control ventilation.

19d(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19e(1) St. Edwards University Performance Contract, Austin, TX

19e(2) Professional Services completed: June 2001

19e(2) Construction completed: March 2002

19e(3) Description and role: Managed the complete temperature controls subcontract including design, coordination, installation and startup.

19e(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm:

E. RESUMES OF KEY PERSONNEL PROPOSED FOR THIS CONTRACT

(Complete one Section E for each key person.)

12. NAME: Daniel Vu, EIT

13. ROLE IN THIS CONTRACT: Project Engineer/Mechanical Design Engineer

14a. YEARS EXPERIENCE - TOTAL: 14 years

14b. YEARS EXPERIENCE - WITH CURRENT FIRM: 5 1/2 years

15. FIRM NAME AND LOCATION *(City and State)*: University Mechanical Contractors, Inc., Mukilteo, WA

16. EDUCATION *(DEGREE AND SPECIALIZATION)*: Bachelor of Science Mechanical Engineering

17. CURRENT PROFESSIONAL REGISTRATION *(STATE AND DISCIPLINE):* WA Engineer in Training

18. OTHER PROFESSIONAL QUALIFICATIONS *(Publications, Organizations, Training, Awards, etc.)*:

19a(1) Orcas Island School District Phase I ESPC

19a(2) Professional Services completed: 2011

19a(2) Construction completed: 2011

19a(3) Description and role: Mechanical Design Engineer. $455,000 project. Projects include energy efficient lighting upgrades, energy based re-commissioning water conservation, and occupancy based. Project in close-out.

19a(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19b(1) Bangor Building 2800 & 6400 Steam System Upgrade

19b(2) Professional Services completed: January 2010

19b(2) Construction completed: February 2011

19b(3) Description and role: Mechanical Design Engineer. $1,800,000 project. Projects included design of new 2 stage economizers on six (6) Boilers for stack heat recovery. New boiler controls, new pumps, new VFDs.

19b(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19c(1) Bangor Naval Base Kitsap Building B7000, B6400, B1100, B7074 & B7001 Energy Upgrade

19c(2) Professional Services completed: May 2009

19c(2) Construction completed: February 2011

19c(3) Description and role: Mechanical Design Engineer, $2.8 Million project. Project included redesign of chiller water system and Turbocor retrofit of four, 120/140 ton water cooled chillers, installation of two (2) new Multistack water cooled chillers, installation of two (2) new SMARDT air cooled chillers, Kiltech chiller controls, new five (5) VFD controlled cooling towers, new CHW & CW pumps and addition of chemical free CW treatment.

19c(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

19d(1) Naval Air Station Whidbey Island Energy Upgrades (25 buildings)

19d(2) Professional Services completed: February 2010

19d(2) Construction completed: 2011

19d(3) Description and role: Mechanical Design Engineer, $1.45 million project. Projects include heat recovery, VAV conversion, controls upgrades, energy based re-commissioning, and demand control ventilation. Project in construction.

19d(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √:

19e(1) Orcas Island School District Phase II ESPC

19e(2) Professional Services completed: 2012

19e(2) Construction completed: 2012

19e(3) Description and role: Mechanical Design Engineer. $1,470,000 project. Projects include new VAV system in Elem School, ventilation upgrades, controls upgrades, , energy efficient lighting upgrades, DW system upgrades, water conservation, and occupancy based HVAC/lighting controls. Project in pre-construction.

19e(3) RELEVANT PROJECT - BRIEF DESCRIPTION - Check here if project performed with current firm: √

F. EXAMPLE PROJECTS WHICH BEST ILLUSTRATE PROPOSED TEAM'S QUALIFICATIONS FOR THIS CONTRACT

(Present as many projects as requested by the agency, or 10 projects, if not specified. Complete one Section F for each project.)

D. EXAMPLE PROJECT KEY NUMBER: 001 Orcas Island SD Phase I ESPC

E. TITLE AND LOCATION (*City and State):* Eastsound, Washington

F. YEAR COMPLETED - PROFESSIONAL SERVICES: 2011

G. YEAR COMPLETED - CONSTRUCTION *(If applicable):* 2011

23a. PROJECT OWNER'S INFORMATION - PROJECT OWNER: Orcas Island School District

23b. PROJECT OWNER'S INFORMATION - POINT OF CONTACT NAME: Cathy Ferran (OISD)

23c. PROJECT OWNER'S INFORMATION - POINT OF CONTACT TELEPHONE NUMBER: (360) 376-2284

24. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT *(Include scope, size, and cost):* • Energy Conservation Upgrades. Projects include energy efficient lighting upgrades, energy based re-commissioning, water conservation, and occupancy based control. $455,000 Project cost and currently in close-out phase.

25. FIRMS FROM SECTION INVOLVED WITH THIS PROJECT

(1) FIRM NAME	(2) FIRM LOCATION *(City and State)*	(3) ROLE
Control Contractors Inc. (CCI)	Seattle, WA	Controls Provider
Orcas Plumbing & Heating	Eastsound, WA	Plumbing & Heating
Orcas Electric	Eastsound, WA	Electrical

D. EXAMPLE PROJECT KEY NUMBER: 002 Orcas Island SD Phase II ESPC

E. TITLE AND LOCATION (*City and State):* Eastsound, Washington

F. YEAR COMPLETED - PROFESSIONAL SERVICES: 2012

G. YEAR COMPLETED - CONSTRUCTION *(If applicable):*2012

23a. PROJECT OWNER'S INFORMATION - PROJECT OWNER: Orcas Island School District

23b. PROJECT OWNER'S INFORMATION - POINT OF CONTACT NAME: Cathy Ferran (OISD)

23c. PROJECT OWNER'S INFORMATION - POINT OF CONTACT TELEPHONE NUMBER: (360) 376-2284

24. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT *(Include scope, size, and cost):* • Energy Conservation Upgrades. Projects include new VAV system in Elem School, ventilation upgrades, controls upgrades, , energy efficient lighting upgrades, DW system upgrades, water conservation, and occupancy based HVAC/lighting controls. Project in pre-construction. Construction scheduled For Summer 2011. Project cost is $1,470,000. Project in pre-construction.

25. FIRMS FROM SECTION INVOLVED WITH THIS PROJECT

(1) FIRM NAME	(2) FIRM LOCATION *(City and State)*	(3) ROLE
Hudson Bay	Seattle, WA	Insulator
Sound Energy	Tacoma, WA	Controls Provider
Neudorfer Engineers Inc.	Seattle, WA	Testing & Balancing
Terra Firma	East Sound, WA	GC Work
Pride Electric	Redmond, WA	Electrical

D. EXAMPLE PROJECT KEY NUMBER: 003 Old Capital, Olympia Phase I ESPC

E. TITLE AND LOCATION (*City and State):* Olympia, Washington

F. YEAR COMPLETED - PROFESSIONAL SERVICES: 2011

G. YEAR COMPLETED - CONSTRUCTION *(If applicable):* 2011

23a. PROJECT OWNER'S INFORMATION - PROJECT OWNER: State of Washington

23b. PROJECT OWNER'S INFORMATION - POINT OF CONTACT NAME: Larry Kessel (Building Manager)

23c. PROJECT OWNER'S INFORMATION - POINT OF CONTACT TELEPHONE NUMBER (360) 586-0566

24. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT *(Include scope, size, and cost):* Construction of a $515,000 project. Project included high efficiency boiler upgrade in historic landmark facility. Project in construction.

25. FIRMS FROM SECTION INVOLVED WITH THIS PROJECT

(1) FIRM NAME	(2) FIRM LOCATION *(City and State)*	(3) ROLE
Stirrett Johnsen Mechanical	Silverdale, WA	Plumbing/Mechanical
D&G Insulator	Sumner, WA	Insulator
JCI	Bothell, WA	Controls Provider
Madsen Electric	Tacoma, WA	Electrical
Scott From Sheet metal	Tacoma, WA	Sheet metal

D. EXAMPLE PROJECT KEY NUMBER: 004 Naval Air Station Whidbey Island Energy Upgrade

E. TITLE AND LOCATION (*City and State):* Oak Harbor, Washington

F. YEAR COMPLETED - PROFESSIONAL SERVICES: February 2009

G. YEAR COMPLETED - CONSTRUCTION *(If applicable):* 2011

23a. PROJECT OWNER'S INFORMATION - PROJECT OWNER: Puget Sound Energy For US Navy

23b. PROJECT OWNER'S INFORMATION - POINT OF CONTACT NAME: Jeff Peterson (Puget Sound Energy)

23c. PROJECT OWNER'S INFORMATION - POINT OF CONTACT TELEPHONE NUMBER: (425) 456-2732

24. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT *(Include scope, size, and cost):* • Turn-Key energy conservation project focused on 25 facilities. Projects include heat recovery, VAV conversion, controls upgrades, energy based re-commissioning, and demand control ventilation. Project in construction.

25. FIRMS FROM SECTION INVOLVED WITH THIS PROJECT

(1) FIRM NAME	(2) FIRM LOCATION *(City and State)*	(3) ROLE
Hudson Bay	Seattle, WA	Insulator
JCI	Bothell, WA	Controls Provider
Neudorfer Engineers Inc.	Seattle, WA	Testing & Balancing
Blue Mountain Electric	Oak Harbour, WA	Electrical

D. EXAMPLE PROJECT KEY NUMBER: 005 Bangor Naval Base Building 2800 & 6400 Steam System Upgrade

E. TITLE AND LOCATION (*City and State):* Silverdale, Washington

F. YEAR COMPLETED - PROFESSIONAL SERVICES: June 2010

G. YEAR COMPLETED - CONSTRUCTION *(If applicable):* February 2011

23a. PROJECT OWNER'S INFORMATION - PROJECT OWNER: Bonneville Power Admin. For US Navy

23b. PROJECT OWNER'S INFORMATION - POINT OF CONTACT NAME: Michael Huber (Bonneville Power Administration)

23c. PROJECT OWNER'S INFORMATION - POINT OF CONTACT TELEPHONE NUMBER: : (206) 220-6778

24. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT *(Include scope, size, and cost):* Construction of a $1,800,000 project. Projects included design of new 2 stage economizers on six (6) Boilers for stack heat recovery. New boiler controls, new pumps, new VFDs.

25. FIRMS FROM SECTION INVOLVED WITH THIS PROJECT

(1) FIRM NAME	(2) FIRM LOCATION *(City and State)*	(3) ROLE
Control Contractors, Inc.	Seattle, WA	Controls Provider

Neudorfer Engineers Inc.	Seattle, WA	Testing & Balancing
Benz Air Engineering Co.	Las Vegas, Nevada	Boiler Combustion Controls
D&G Insulator	Sumner, WA	Insulator

D. EXAMPLE PROJECT KEY NUMBER: 006 Bangor Naval Base B7000, B6400, B1100, B7074 & B7001 Chilled Water System Upgrade

E. TITLE AND LOCATION (*City and State):* Silverdale, Washington

F. YEAR COMPLETED - PROFESSIONAL SERVICES: April 2009

G. YEAR COMPLETED - CONSTRUCTION *(If applicable):* February 2011

23a. PROJECT OWNER'S INFORMATION - PROJECT OWNER: Bonneville Power Admin. For US Navy

23b. PROJECT OWNER'S INFORMATION - POINT OF CONTACT NAME: Michael Huber (Bonneville Power Administration)

23c. PROJECT OWNER'S INFORMATION - POINT OF CONTACT TELEPHONE NUMBER: : (206) 220-6778

BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT *(Include scope, size, and cost):* $2.8 Million project. Project included redesign of chiller water system andTurbocor retrofit of four, 120/140 ton water cooled chillers, installation of two (2) new Multistack water cooled chillers, installation of two (2) new SMARDT air cooled chillers, Kiltech chiller controls, new five (5) VFD controlled cooling towers, new CHW & CW pumps and addition of chemical free CW treatment.

26. FIRMS FROM SECTION INVOLVED WITH THIS PROJECT

(1) FIRM NAME	(2) FIRM LOCATION *(City and State)*	(3) ROLE
PSW Electrical	Poulsbo, WA	Electrical
FluidTek	Seattle, WA	Water Treatment
CCI	Seattle, WA	Controls Provider
ATS Automation	Renton, WA	Controls Provider
D&G Insulator	Sumner, WA	Insulator

D. EXAMPLE PROJECT KEY NUMBER: 007 Seatac Airport Stage 2 Mechanical Upgrade ESPC

E. TITLE AND LOCATION (*City and State):* Seattle, Washington

F. YEAR COMPLETED - PROFESSIONAL SERVICES: 2013

G. YEAR COMPLETED - CONSTRUCTION *(If applicable): on going*

23a. PROJECT OWNER'S INFORMATION - PROJECT OWNER: Port of Seattle

23b. PROJECT OWNER'S INFORMATION - POINT OF CONTACT NAME: Mike Smith

23c. PROJECT OWNER'S INFORMATION - POINT OF CONTACT TELEPHONE NUMBER: (206) 248-4815

24. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT *(Include scope, size, and cost):* $2.4 million project. Project includes optimization of chiller plant, isolation of cooling towers for water side economizing, CV to VAV conversion of 105 terminal units, cooling tower alternative treatment, heat recovery, energy modeling using Trane Trace. Project in design/pre-construction. Work scheduled for Spring/Summer 2013.

25. FIRMS FROM SECTION INVOLVED WITH THIS PROJECT

(1) FIRM NAME	(2) FIRM LOCATION *(City and State)*	(3) ROLE
Siemens Building Technology	Issaquah, WA	Controls Provider

D. EXAMPLE PROJECT KEY NUMBER: 008 Western Washington University Biomass Gasification Plant Feasibility Study

E. TITLE AND LOCATION (*City and State):* Bellingham, Washington

F. YEAR COMPLETED - PROFESSIONAL SERVICES: November 2010

G. YEAR COMPLETED - CONSTRUCTION *(If applicable): on hold*

23a. PROJECT OWNER'S INFORMATION - PROJECT OWNER: Western Washington University

23b. PROJECT OWNER'S INFORMATION - POINT OF CONTACT NAME: Tim Wynn (WWU Director of Facilities)

23c. PROJECT OWNER'S INFORMATION - POINT OF CONTACT TELEPHONE NUMBER: (360) 650-3496

24. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT *(Include scope, size, and cost):* Biomass Gasification Plant Feasibility Study. Analyses of campus district heating upgrade opportunities. Alternatives analyzed include: biomass gasification, cogeneration, stack heat recovery, thermal storage, campus steam to hot water conversion and district heating options. Study was $65k. Estimated project construction cost of $15 million to $25 million.

25. FIRMS FROM SECTION INVOLVED WITH THIS PROJECT

(1) FIRM NAME	(2) FIRM LOCATION *(City and State)*	(3) ROLE
FVB Energy, Inc.	Bainbridge Island, WA	District Energy Consulting
Solgen Energy, LLC	Seattle, WA	District Energy Developer
Sonnichsen Engineering, LLC		Emissions Consultant
T.R. Miles Technical Consultants, Inc.		Conveyor/Fuel Source Consultant
Organic Fuel Processors, LLC		Fuel Source Distrbuter

D. EXAMPLE PROJECT KEY NUMBER: 009 Old Capital Phase II ESPC

E. TITLE AND LOCATION (*City and State):* Olympia, Washington

F. YEAR COMPLETED - PROFESSIONAL SERVICES: 2012

G. YEAR COMPLETED - CONSTRUCTION *(If applicable):* 2012

23a. PROJECT OWNER'S INFORMATION - PROJECT OWNER: State of Washington

23b. PROJECT OWNER'S INFORMATION - POINT OF CONTACT NAME: Jim Hayes

23c. PROJECT OWNER'S INFORMATION - POINT OF CONTACT TELEPHONE NUMBER: (360) 902-7281

24. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT *(Include scope, size, and cost):* Energy analysis and design of high efficiency boiler plant, energy based re-commissioning, water conservation and controls upgrades.

25. FIRMS FROM SECTION INVOLVED WITH THIS PROJECT

(1) FIRM NAME	(2) FIRM LOCATION *(City and State)*	(3) ROLE
Stirrett Johnsen Mechanical	Silverdale, WA	Plumbing/Mechanical
JCI	Bothell, WA	Controls Provider
WPCS Electric	Woodinville, WA	Electrical
Scott From Sheet metal	Tacoma, WA	Sheet metal
Neudorfer Engineers	Seattle, WA	TAB/Cx

D. EXAMPLE PROJECT KEY NUMBER: 010 Wheeler Data Center, Olympia

E. TITLE AND LOCATION (*City and State):* Olympia, Washington

F. YEAR COMPLETED - PROFESSIONAL SERVICES: 2010

G. YEAR COMPLETED – CONSTRUCTION: 2011

23a. PROJECT OWNER'S INFORMATION - PROJECT OWNER: State of Washington DIS

23b. PROJECT OWNER'S INFORMATION - POINT OF CONTACT NAME: Mr. Leonard Lewis

23c. PROJECT OWNER'S INFORMATION - POINT OF CONTACT TELEPHONE NUMBER: (360) 902-9886

24. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT *(Include scope, size, and cost):* An Energy Efficient Data center. Project included energy model with Trane Trace, and analysis if existing data center cooling and power load. $23.8 million project cost. Project in construction.

25. FIRMS FROM SECTION INVOLVED WITH THIS PROJECT

(1) FIRM NAME	(2) FIRM LOCATION *(City and State)*	(3) ROLE
Air Test Company, Inc.	Issaquah, WA	TAB Support

Hudson Bay	Seattle, WA	Insulators
ATS Automation, Inc.	Renton, WA	Controls Provider

G. KEY PERSONNEL PARTICIPATION IN EXAMPLE PROJECTS

26. NAMES OF KEY PERSONNEL (From Section E, Block 12)	27. ROLE IN THIS CONTRACT (From Section E, Block 13)	28. EXAMPLE PROJECTS LISTED IN SECTION F (Fill in "Example Projects Key" section below before completing table. Place "X" under project key number for participation in same or similar role.)									
		1	2	3	4	5	6	7	8	9	10
Jerry Bush	UMC President & CEO	X	X	X	X	X	X	X	X	X	X
Rich Happel	General Manager Service Group	X	X	X	X	X	X	X	X	X	
Scott Locke	Project Developer / Manager, Energy Services	X	X	X	X	X	X	X	X	X	X
Troy Turpin	Project Developer	X	X	X	X	X	X	X	X	X	
Todd Bovey	Engineering Manager							X			
Daniel Vu	Design Engineer/Project Engineer	X	X	X	X	X	X	X	X	X	
CV Nguyen	Energy Project Manager/Commissioning Specialist	X	X	X	X	X	X	X	X	X	
Terry Parmley	Sr. Control Engineer/Energy Engineer	X	X	X	X	X	X	X	X	X	
Bryan Eppler	Project Manager	X	X	X	X	X	X	X	X	X	X
Steve Brooks	Sr. Engineer		X					X			
Richard Farmer	Controls Retro-commissioning/Project Manager	X			X						X
Max Harshman	Sr. Engineer										X

29. EXAMPLE PROJECTS KEY

NO.	TITLE OF EXAMPLE PROJECT (FROM SECTION F)	NO.	TITLE OF EXAMPLE PROJECT (FROM SECTION F)
1	Orcas Island SD Phase I ESPC	6	Bangor Naval Base B7000, B6400, B1100, B7074 & B7001 Chilled Water System Upgrade
2	Orcas Island SD Phase II ESPC	7	Seatac Airport Stage 2 Mechanical Upgrade ESPC
3	Old Capital Building, Olympia Phase I ESPC	8	Western Washington University Biomass Gasification Plant Feasibility Study
4	Naval Air Station Whidbey Island Energy Upgrade (25 Bldgs)	9	Old Capital Building, Olympia Phase II ESPC
5	Bangor Naval Base B2800 & B6400 Steam System Upgrade	10	Wheeler Data Center, Olympia

H. ADDITIONAL INFORMATION

29. PROVIDE ANY ADDITIONAL INFORMATION REQUESTED BY THE AGENCY. ATTACH ADDITIONAL SHEETS AS NEEDED:

9. AUTHORIZED REPRESENTATIVE
The foregoing is a statement of facts.

30. SIGNATURE OF AUTHORIZED REPRESENTATIVE:

31. DATE SIGNED: 2.21.13

32. NAME AND TITLE OF SIGNER: Jerry Bush, President / CEO

9. EMPLOYEES BY DISCIPLINE

a. Function Code	b. Discipline	c(1). No. of Employees - Firm	c(2). No. of Employees - Branch
02	Administrative (including financing, contracts & IT)	34	
18	Cost Engineer / Estimator	3	
42	Mechanical Engineer	12	
48	Project Manager	20	
51	Safety / Occupational Health Engineer	2	
	Purchasing	4	
	Project Engineer	8	
08	Designer / Detailer / CADD Technician	8	
16	Construction Manager	3	
	Other Employee		

10. PROFILE OF FIRM'S EXPERIENCE AND ANNUAL AVERAGE REVENUE FOR LAST 5 YEARS

a. Profile Code	b. Experience	c. Revenue Index
A06	**Airports; Terminals & Hangars**	**8**
C10	**Commercial Building**	**8**
C13	**Computer Facilities**	**8**
D04	**Design-Build – Prep of RFP**	**2**
E07	**Energy Conservation; New Energy Sources**	**6**
H04	**HVAC**	**8**
I01	**Industrial Bldgs**	**8**
L01	**Laboratories; Medical Research Facilities**	**8**
P07	**Plumbing and Piping Design**	**8**
S04	**Sewage Collection, Treatment & Disposal**	**7**
S11	**Sustainable Design**	**7**

PROFESSIONAL SERVICES REVENUE INDEX NUMBER

1. Less than $100,000
2. $100,000 to less than $250,000
3. $250,000 to less than $500,000
4. $500,000 to less than $1 million
5. $1 million to less than $2 million
6. $2 million to less than $5 million
7. $5 million to less than $10 million
8. $10 million to less than $25 million
9. $25 million to less than $50 million
10. $50 million or greater

11. ANNUAL AVERAGE PROFESSIONAL SERVICES REVENUES OF FIRM FOR LAST 3 YEARS
(Insert revenue index number shown above)

11a. Federal Work: 4

11b. Non-Federal Work: 5

11c. Total Work: 6

12. AUTHORIZED REPRESENTATIVE. The foregoing is a statement of facts.

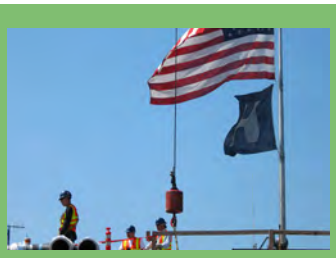
12a. SIGNATURE: [illegible] Pres/CEO

12b. DATE SIGNED: 2.21.13

Innovative

ENERGY

Solutions



Energy Focused Facility Upgrades

We can assist in the development and implementation of projects targeted to replace inefficient or outdated equipment with state of the art technologies. In doing so, we can help put together the technical scope of work as well as a financial package that substantiates the project payback through energy savings, utility incentives, rebates, tax credits, and improved maintenance efficiencies.

Benchmarking & Energy Assessments

Let our seasoned conservation specialists help you identify and make the most of potential conservation opportunities. We can quickly assess cost/savings benefits and develop Total Cost of Ownership models to help you make informed decisions for your organization.

Full-Service Performance Contracting

This strategic design-build facility improvement & energy efficiency program leverages utility savings, incentives, rebates and tax credits to pay for necessary infrastructure upgrades. Our dedicated and focused professionals will supply the knowledge and experience to help simplify the process and guide you through the necessary steps to implement a successful project.

Your Energy Management Partner

- **Qualified BPA Technical Service Provider.**
- **Washington state qualified energy services company.**
- **Long and successful record of providing design/build energy services to a diverse client base.**
- **PSE Comprehensive Building Tune-Up program provider.**
- **UMC will provide a team of professionals to lead your sustainability efforts from inception or play a support role in your current endeavors.**
- **Each of our projects is tailored towards meeting our client's specific needs through a "true partnership."**

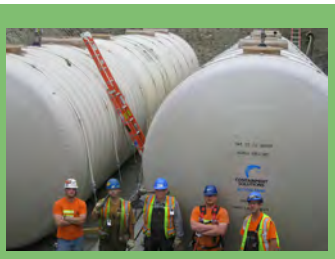
UMC's seasoned Design/Build Team has been providing energy services throughout the Puget Sound Region for years. A sampling of our notable sustainable accomplishments include numerous LEED Silver, Gold, and Platinum Certified office buildings, laboratory and wastewater treatment plants, installation of the new Biomass boiler for Seattle Steam's District Heat Plant, complementation of the most energy efficient medical facility in the Pacific Northwest, and the first retrofit installations in the Northwest of the newest high tech oil-less refrigerant compressors from Danfoss Turbocor. And, we have taken the next step; Incorporating Turbocor compressors into a full variable flow chiller plant

UMC has a focused Energy Services Group, which makes UMC even better positioned to provide Sustainable Energy Solutions to a diverse customer base. This customer base includes facilities of every existing size and complexity… Industrial facilities, food processing plants, medical centers, hi-tech, data centers, public & commercial office space, power plants, and wastewater treatment plants.

These are just a few of the markets to which UMC has provided mechanical solutions over the past 90 years…and to which UMC will continue to provide quality services in the years to come.

UNIVERSITY MECHANICAL CONTRACTORS, INC.

We Build Value



Energy-Based Retro-Commissioning

How to keep your facility operating at peak efficiency is an ongoing concern. UMC provides an energy focused approach to facility retro-commissiong that not only improves your facility operation, but reduces your on-going utility costs through intelligent implementation of conservation measures.

Design/Build Conservation Services

Our design/build team has a hard fought reputation as one of the best in the business. UMC has the engineering and construction management depth to handle any size project; from scope development… to engineering design… to construction management…to ongoing commissioning and performance assurance.

Funding Support (incentives, Grants, Financing)

The ability to find and secure outside funding sources is a key aspect for a successful project. UMC's experienced team will act as a facilitator and client advocate in acquiring outside funding.

UMC Energy Process Roadmap: Focused Efforts Lead to Positive Results

To insure success, we make it a point to begin each project with specific objectives in mind. Goals are identified and documented at the outset, and a plan is put into place to make these goals a reality.

Each UMC energy conservation project starts with a focus on **Phase I - Explore Possibilities:** During this phase, our Development Team assesses the project potential as it relates to realizing specific objectives. Once a project has been identified, the Development Team will take care to enthusiastically guide you through the process and each successive phase of project development.

Phase II - Target Opportunities: Our Development Team will focus resources towards pinpointing the conservation measures that will have the greatest impact on your facility. Most projects are developed with the intent to optimize utility savings, increase energy efficiency, reduce operating budgets, improve occupant comfort, upgrade infrastructure and eliminate deferred maintenance. All while identifying and securing any available outside funding resources (grants, incentives, tax credits, financing)

Phase III - Design Solutions: UMC's team of Professional Engineers, Certified Energy Managers and construction professionals will finalize a plan that converts the "targeted opportunities" into an innovative and cost-effective engineering solution. As the overall project scope is honed to a final implementation plan, the driving financial impact will be measured through the use of a Total Cost of Ownership model.

Phase IV - Implement Solutions: Once the actual construction project begins, it's imperative that the team overseeing the construction has a complete understanding of the project development history. This is why our construction managers are also a part of our Development Team. This way they are involved early in the process and will make sure that the final result meets the documented project goals.

Phase V - Optimize Performance: Once construction is complete, the actual long-term success of a project will depend on the next steps taken. These crucial steps include proper energy commissioning, customer training, ongoing service & maintenance and continuous monitoring of key indicators. Our team will guide you through these steps, and help to implement actions for continued efficiency improvements.

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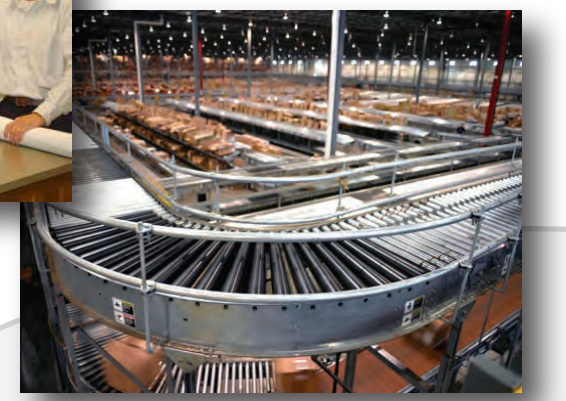
UMC Energy Process Roadmap

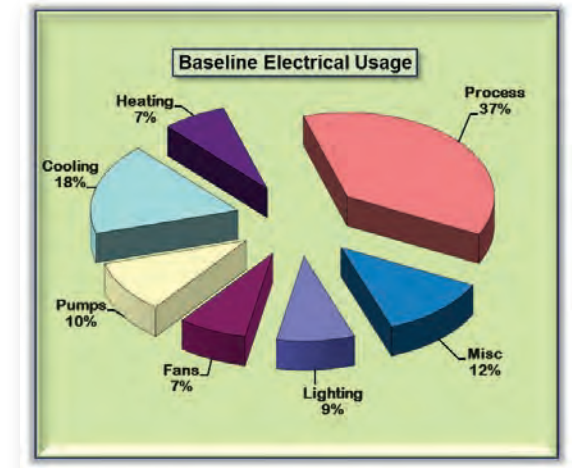


PHASE I:
Explore Possibilities

- Define Purpose & Goals
- Develop an Energy Team & Site Champion
- Develop Criteria for Success
- Benchmark Facility Performance
- Perform Site Feasibility Analysis
- Initial Scope Assessment

PHASE II:
Target Opportunities

- Develop Energy Baseline
- Identify Opportunities
- Engage Utility Partners
- Determine Energy Action Plan
- Analyze & Review Constructability
- Develop ROM Cost & Savings
- Review versus Project Goals



PHASE III:
Design Solutions

- Finalize Project Design Scope
- Finalize Projected Cost & Savings
- Quantify Incentives & Rebates
- Complete Financials & TCO

PHASE IV:
Implement Solutions

- Construction Services
- Planning & Scheduling
- Site Coordination
- Project Implementation
- Energy Commissioning
- Determine Performance Metrics

PHASE V:
Optimize Performance

- Commissioning and QA/QC Plan
- Train On-Site Personnel
- Performance Assurance Plan
- Service & Maintenance Program
- Long Term Monitoring Plan
- Review Performance and Adjust Program Accordingly

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"UMC does a great job working with the design team, owner, subcontractors, and GLY to identify risks, conflicts, propose solutions, and implement solutions. Thanks for UMC's hard work and continued hard work. This commitment plays a key role in the success of future projects."

Jon Friedrichsen, Sr.
Project Manager
GLY Construction

"UMC engineers completed the energy audit and designed a much improved heating system...The new system was fully up and running...on schedule and below budget, and with minimal inconvenience to the building occupants."

J. Hayes
Dept. of Enterprise Services

We build value for our clients by providing innovative mechanical solutions and superior project planning. As a result, University Mechanical Contractors, Inc. (UMC) consistently delivers quality, meets project deadlines, and exceeds client expectations.

UMC brings a unique blend of strengths that differentiate us in the marketplace

- Over 90 years of mechanical experience
- Exceptional design and pre-construction services capabilities
- In-house pricing and budgeting capabilities for all mechanical trades
- Diverse contracts in hard-bid market, as well as negotiated design-build, keeping our prices extremely competitive
- Utilization and representation of new technologies such as Turbocor™ compressors

UMC brings innovation that differentiates us in the marketplace

-
- Utilize Spiral-Quad for productivity & safety during sheet-metal installations
- Focus on modularized / manufacturing process and delivery during prefabrication process
- Many awards for safety as a result of safety innovations that added in production and safety
- Awarded TSI's Innovator of the Year for 2010 (BIM / Virtual Construction Services)
- While utilizing the IPD process we see a 30% reduction of total time off the construction schedule.

Project Types

- New Construction
- Special projects (TI's, Remodels, Retrofits, & Small Scale / Fast Track)
- Design-Build / Design-Assist
- Integrated Project Delivery (IPD)
- Leader in ESCO & LEED Certified Design & Construction
- Full Service Group w/ Facility Maintenance

For over 90 years, we have retained our greatest strengths: a culture that is team-oriented and collaborative, a commitment to superior project planning, efficient execution, and a passion for doing right by our clients.

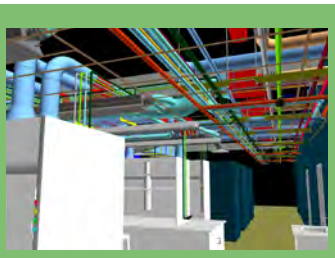
Mechanical Design

UMC builds value with innovative mechanical designs, incorporating real-world lessons from over nine decades in construction. Our designs start with close attention to the programmed use of the facility, and seek the most functional, cost-effective and practical strategies for achieving the owner's goals. We work successfully either as a single source for design/build services, or as a design/assist partner.

Commercial Construction

UMC thrives on the tough projects. Our competitive delivery method, pre-construction expertise, value engineering solutions, and proactive approach have won us contracts on many premier commercial buildings. Our team is experienced in constructing quality projects in various delivery methods: plan / spec; design/assist and design/build through both negotiated lump sum and GMAX contracts.

- Virtual Construction Services
- Plumbing
- HVAC Piping



University Mechanical Contractors has long been recognized for its exceptional leadership, expertise, and innovation of building methods that save money, time, and energy.

- Process Piping
- Sheet Metal
- Service & Facility Maintenance
- Energy Services
- DDC Controls
- Building Commissioning

Markets We Serve

We help owners and construction teams assess potential risks, and create detailed management plans to keep your facility operating efficiently and cost-effectively. The markets we serve include:

- Medical / Healthcare / Lab Facilities
- Hi-Tech / Data Center
- Commercial Office / Hi-Rise / Mixed Use
- Manufacturing / Food Processing / Mills
- Power / Industrial Wastewater

About UMC

University Mechanical Contractors, Inc. (UMC) has operated in the Seattle area since 1920. The company is currently under the ownership of three partners, including one member of the fourth generation of UMC's founder. The long established history of successful company performance and responsible service provides our customers the security of continued operation in the Pacific Northwest.

Notable Projects

Medical / Healthcare / Lab

- Swedish Hospital & MOB, Issaquah
- Good Samaritan Hospital, Puyallup
- ZymoGenetics
- Fred Hutchinson Cancer Research Center, Seattle, WA

Hi-Tech / Data Center

- Yahoo! Data Center
- WA State DIS - Wheeler Data Center
- Wenatchee Data Center
- Confidential Client - Onelab Data Center

Office / Mixed Use / Other

- SeaTac International Concourse A & South Arrivals Hall; SeaTac Airport Energy Project
- Amazon SLU, 1918, Block 26 & 32, WA
- Old Capitol Building, Olympia, WA
- Federal Center South, Seattle, WA

Manufacturing / Food Processing / Mills

- Boeing 5-50 Paint Hangar, Renton, WA
- Boeing - Ongoing projects on nearly all Boeing campuses in the Northwest
- Continental Mills
- Simpson Pulp /Energy Paper Plant Retrofits, Tacoma, WA
- Nucor - Multiple projects
- Kimberly Clark - Multiple projects

Power / Industrial Wastewater

- Portland Steel Mill, Portland, OR
- Brightwater WWTP, King County, WA
- Spokane Waste Water Treatment Plant
- Hanford 200W Pump & Treat
- Seattle Steam Wood Fire Boiler
- Big Hanaford Power Plant, Centralia, WA
- Satsop Power Plant, Satsop, WA
- Amway/Nutrilite, Quincy, WA
- Ste. Michelle Winery Estates, Woodinville, WA
- Uline, Auburn, WA