



## DOUGLAS H. MURRAY, PE

PRINCIPAL MECHANICAL ENGINEER

### OVERVIEW

Doug Murray is the Southcoast Region lead for the Facilities market sector and has frequently led multidisciplinary projects. More than 25 years of experience on the City and Borough of Juneau Code Advisory Committee has provided Doug with a well-versed background of building codes. As principal mechanical engineer and quality assurance/quality control (QA/QC) manager, Doug is responsible for ensuring that each element is technically accurate. He leads technical peer reviews and constructability reviews. He confirms the design philosophy and process at several steps along the way to ensure that each element and its presentation are clear, constructible, and economically viable. Doug's particular value lies in his ability to bring his many years of expertise in design, renovation, and troubleshooting mechanical systems to a new project. He can quickly identify the areas requiring special attention. Doug is known for developing standards, designs, and programs that result in high-quality, complete solutions. He always ensures that these solutions answer today's demands and function well into tomorrow and beyond. Doug was an employee of PDC Engineers, Inc., which RESPEC acquired in 2020.

### PROJECT EXPERIENCE

**Mount Edgecumbe Hospital Emergency Room Remodel, SouthEast Alaska Regional Health Consortium (SEARHC), Sitka, Alaska.** Doug was the mechanical engineer of record for a renovation of the emergency ward in the existing SEARHC hospital in Sitka, Alaska. Mechanical systems included a new variable volume air-handling unit that serves only the emergency ward; variable air-exhaust air systems to maintain room pressurizations; medical gas systems for trauma and examination rooms; plumbing, air heating, and sprinkler system modifications; and upgrades to building automation controls. Commissioning was part of the project. Challenging aspects were the renovation of the facility in an occupied hospital building and planned hazardous materials abatement. A temporary emergency ward was set up adjacent to the space until the ward renovation was complete. This project was completed in 2018.

**The Cordova Center, City of Cordova, Cordova, Alaska.** Doug was on the team that provided the mechanical design for a new, multiuse community building that housed an auditorium, museum, library, and administrative offices. Mechanical systems included ventilation, staged oil-fired hydronic boilers, radiant floor heating, air heating, domestic plumbing, aboveground oil storage, automatic sprinklers, and direct digital controls (DDC). The library area is served by displacement-type ventilation, reducing the fan volume by nearly half from a traditional ventilation system and lowering the initial cost for the ventilation equipment while saving energy with smaller motors. The project was designed anticipating at least a Leadership in Energy and Environmental Design (LEED) Silver certification.

**Dimond Pool Aquatic Center Mechanical Design and Construction Services, City and Borough of Juneau, Juneau, Alaska.** Doug was the mechanical engineer of record for this project. As part of the team, Doug provided the mechanical engineering design and construction services for an aquatic facility with a therapy pool and eight-lane pool. Mechanical systems included ground-source heating and cooling systems with vertical borehole loopfields and manifolded geothermal variable-speed piping; a backup electric hydronic boiler; heat recovery ventilation for diversity of heating, ventilation, and humidity control; radiant floor heating for the locker room and office areas; domestic plumbing; exhaust fans for mechanical rooms; a wet sprinkler system; and a DDC system. Construction was completed in 2011.

**Design and Construction Services for a Ferry Terminal, Kake, Alaska.** As the mechanical engineer of record for a ferry terminal passenger facility with restrooms and an air-source heat pump (ASHP), Doug provided design and construction services, including inspections. Mechanical systems included plumbing for the men's and women's restrooms using low-flow fixtures, automatic-flush valves, and wall-mounted fixtures.

### TECHNICAL EXPERTISE

- / Mechanical Consulting Engineering
- / Project Management
- / Peer Review
- / Commercial, Medical, Educational, and Industrial Facilities
- / Specialty Plumbing Systems
- / Heating and Ventilation Systems
- / Building Controls
- / Air- and Water-Source Heat Pumps
- / Geothermal Loopfields

### EDUCATION

- / BS in Mechanical Engineering, University of Alaska Fairbanks, Fairbanks, AK (1983)

### REGISTRATIONS & LICENSES

- / Professional Mechanical Engineer in Alaska (No. AELM7870)

### PROFESSIONAL MEMBERSHIPS

- / American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE)
- / National Society of Professional Engineers (NSPE)
- / National Fire Protection Association
- / International Ground Source Heat Pump Association (IGSHPA)

### CERTIFICATIONS & TRAINING

- / Ground Source Heat Pump System Designer Certification (2009)

### HONORS & AWARDS

- / Alaska Engineer of the Year, ASHRAE (1999)
- / Southeast Alaska Engineer of the Year, American Society of Civil Engineers (ASCE) (2011)

### WORK HISTORY

- / RESPEC (2020–Present)
- / PDC Engineers (2016–2020)
- / Murray & Associates (1992–2016)
- / Vernon Akin & Associates (1984–1992)



Additional plumbing fixtures included a janitorial service sink and drinking fountain. Ventilation systems included exhaust ventilation from toilet rooms and a ceiling fan over the public seating area. Heating and cooling are accomplished from an ASHP with an interior wall-mounted fan coil unit, room thermostat controller, and exterior condenser unit. Welsh-Whitely was the prime consultant and architect for this project.

**Mechanical Design and Construction Services, Juneau Police Station, Juneau, Alaska.** Doug was the mechanical engineer of record on this project, for which the team provided mechanical engineering design and construction services. Mechanical systems comprised domestic plumbing, including acid-resistive waste and vent piping, a ventilation system consisting of variable-frequency drive fan systems and variable-volume terminal units, a hydronic heating system, wet and dry sprinkler systems, and a building automation system (BAS). Specialty systems included security-type equipment for the holding cell areas, fume hood exhaust systems, dual separate air-conditioning systems for the communication area, and low-temperature hydronic panel heating for public areas. Energy and life-cycle-cost analysis was performed during the schematic design to help determine building features specific to the project, including optimum building insulation thickness and window thermal values, as well as efficient mechanical systems. Construction was completed in 1998.

**Mendenhall Valley Public Library, Juneau, Alaska.** Doug was the mechanical engineer of record for a new, 21,000-square-foot library building in the Mendenhall Valley. Mechanical systems included geothermal heating and cooling, a central air-handling unit with displacement ventilation and exhaust air, radiant floor heating, plumbing, a wet sprinkler system, and DDC. The geothermal loopfield consisted of 18 vertical boreholes 350 feet deep under the parking lot of the library. The project received LEED Gold certification and was completed in 2016.

**Walter Soboleff Center Mechanical Engineering Services, Sealaska Heritage Institute, Juneau, Alaska.** Doug was part of the team that provided mechanical engineering services for a 30,000-square-foot, four-story building in downtown Juneau that houses administrative offices, rental office space, archives, collections, and a gift store. Doug was the mechanical engineer of record for the project. Mechanical systems included wood-fired pellet boilers and interior pellet storage, variable-speed pumps for the heating system, variable-speed air-handling units with variable-air-volume (VAV) terminal boxes, humidity control for collections and archives, a specialized exhaust for collections and conservative areas, radiant floor heating, plumbing, a wet sprinkler and pre-action sprinkler system for collections, a sewage ejector for basement plumbing fixtures, and DDC. An exterior carving area is also included on the building site. Design challenges included specialized treatment of various system characteristics, including accurate and stable temperature and humidity control, enhanced levels of filtration and indoor-air treatment, space pressurization and air-movement control, special exhaust systems and containment control, specialized fire protection, and specialized lighting applications. This project also included biomass boilers, which helped the project to achieve LEED Gold accreditation. The project was completed in 2013.

**Community House Construction Documents and Inspection Services, Sitka Tribe of Alaska, Sitka, Alaska.** Doug was the mechanical engineer of record for this project and provided construction documents and inspection services for the Sitka Tribe of Alaska community house. Mechanical systems included ventilation, heating, domestic plumbing, automatic sprinklers, BAS controls, and an exhaust system for the interior firepit in the performance amphitheater.

**Mechanical Engineering Services, Treadwell Ice Arena, Juneau, Alaska.** This project involved a recreational facility consisting of an ice rink arena; locker and toilet areas; janitorial rooms; offices; and retail space, including a future kitchen and storage areas. Doug was the mechanical engineer of record. Mechanical systems included plumbing; an oil-fired, cast-iron sectional boiler with domestic hot water generation by several indirect, double-wall, heated storage vessels for potable and non-potable hot water use, including ice-resurfacing use (Zamboni applied); a dry sprinkler system; an aboveground oil tank and double-wall, underground oil piping; heat recovery ventilation of locker and office areas; exhaust fan/gravity outside-air systems for the arena area; emergency exhaust fan systems and carbon dioxide levels; an automatic sprinkler system; plumbing; and electronic automatic control systems. The project was completed in 2002.

**Pacific Northwest Forest Service Laboratory, United States Forest Service, Juneau, Alaska, Alaska.** Doug Murray was the designer of record for geothermal and plumbing engineering for the facility. He provided geothermal and plumbing engineering services including design and construction administration. Systems included plumbing, fire protection, process gases, laboratory plumbing, and a 28 hole vertical borehole geothermal loopfield split into two equal sections routed to a main header in the Mechanical Room. Heat pumps provide the heating and cooling via radiant floor heating and variable ventilation systems for the laboratory. Dawson Construction was the General Contractor and Schmolck Mechanical the Mechanical Contractor. The project was delivered using a design/build delivery method. Originally, a LEED Silver certification was planned for, but the team was ultimately able to achieve a Leadership in Energy and Environmental Design (LEED) Gold certification. Completed in 2013.



**Facility Expansion and Wash Bay Addition, Capital Transit, Juneau, Alaska.** Doug was the mechanical engineer of record for a renovation and addition to the Capital Transit facility, including a wash bay addition. Mechanical systems included oil-fired furnaces, an oil-fired boiler with radiant floor heating, specialized exhaust-air systems for indoor vehicle operation, sanitary drainage systems with an oil-water separator, and extension of the wet and dry sprinkler systems. The project was completed in 2017.

**Brewing Facility Renovation, Devil's Club Brewing Company, Juneau, Alaska.** Doug was the mechanical engineer of record for the renovation of an old building in downtown Juneau for the Devil's Club Brewing Company, which included the brewery, restaurant, and support facilities. Mechanical systems included hydronic heating from an electric boiler, air-handling units with variable-speed ventilation, specialized exhaust systems, water and exhaust support for brewery operation, commercial kitchen plumbing, and restrooms. The project was completed in 2018.

**Dental Clinic Remodel, SEARHC, Juneau, Alaska.** This project was a renovation of an existing medical-dental facility to include a pediatric dental facility. Mechanical systems comprised an air-handling unit for the renovated space, air/vacuum systems for dental chairs, specialized exhaust systems for dental operatories, renovations to the sprinkler, and automatic control systems. The project was completed in 2017.

**North Terminal Renovation, Juneau International Airport, Juneau, Alaska.** Doug was part of the team that provided the mechanical design, contract documents, construction services, and inspections of mechanical systems for additions and modifications to Juneau International Airport. Doug served as the mechanical engineer of record. The project included a multiphase renovation to the commercial portion of the airport. Mechanical features included a ground-source heating and cooling system with a vertical borehole loopfield, variable-speed geothermal fluid-circulation systems, zoned heat pumps supplying heating and cooling air, a sidewalk snowmelt system from geothermal heat pumps, converting pneumatic controls to DDC, and modifications to plumbing and sprinkler systems. Interesting energy-saving features included geothermal heating from a 108 vertical borehole loopfield that also provided cooling and geothermal fluid circulation within the building that allows for thermal load sharing between simultaneous cooling and heating zones. Most of the airport entry areas are also served by geothermal-provided heating, which has a cooling mode as well. Energy analysis showed that the geothermal system would provide a complete energy savings payback in 8 years. The project was completed in 2011. The total project cost was \$10.6 million with an interior mechanical cost of \$1.2 million. The horizontal loopfield cost was \$1 million and was installed under a separate project.

**Adventure Landing Complex and Cruise Ship Onshore Facilities, Icy Strait Point, Hoonah, Alaska.** Doug was the mechanical engineer of record for a tourist destination facility at Icy Strait Point in Hoonah, Alaska. The project was a design-build project that included a full-scale restaurant and commercial kitchen, welcome facilities with radiant floor heating and variable-speed ventilation, large toilet room facilities for tourists, a sprinkler system, and a propane gas piping system for exterior firepits. The project was completed in 2019.