

Lake Washington School District

FACTS

LOCATION

Redmond, WA

PROJECT DATES

07/2001 - Ongoing

PROJECT SIZE

Buildings: 50+

Square Feet: 3.5 million

CONTRACT

Total: >\$17.2 million

REBATES

\$110,000

GRANTS

\$1,625,505



CONTACTS

ENERGY SERVICES WORK

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FACILITY CONDITION ASSESSMENT

Lake Washington School District
Forrest Miller, Director of Support
Services

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NEW HIGH SCHOOL CONSTRUCTION

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Lake Washington School District

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PROJECT OVERVIEW

Lake Washington School District (LWSD) is the fifth largest district in the state with a student enrollment of 26,708, spanning >76 square miles and five cities. LWSD manages 31 grades K-5 elementary schools, 13 grades 6-8 middle schools, and 9 grades 9-12 high schools. This includes 1,381 total classrooms—1,253 permanent and 128 relocatable. Between October 2011-2013, LWSD had the highest growth rate of any school district in King County, and the second highest in the state.

McKinstry has worked with LWSD since 2001, implementing more than \$17.2 million in projects and professional services. We have helped the district secure \$1.6 million in grants and rebates. Our partnership has resulted in more than \$9 million in cumulative utility savings and \$64,000 annual avoided cost for storm water.

LWSD's total average electric consumption has been reduced by 20%, natural gas and domestic water consumption have been reduced 30% respectively, irrigation water use has been reduced by 80%, and the district has reduced its total waste by 42%, freeing up resources to better serve the students. The district has stabilized their facilities at a cost of \$1.45 per square foot cost vs. the \$2.00 per square foot if the district continued with business-as-usual. The district has 11 schools actively participating in King County Green Schools program.

OUTCOME SNAPSHOT



20% electric consumption
reduction



30% natural gas reduction



\$9,00,000 utility savings
\$64,000 storm water cost
savings



30% domestic water reduction
80% irrigation water reduction



42% waste cost reduction

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PHASE 1.1 FACTS

PROJECT DATES
07/2001 – 08/2001
CONTRACT
\$380,036

PHASE 1.2 FACTS

PROJECT DATES
11/2001 – 1/2002
CONTRACT
\$108,237

PHASE 2.1 FACTS

PROJECT DATES
03/2002 – 08/2002
CONTRACT
\$1,237,193

PHASE 3.1 FACTS

PROJECT DATES
Consultation: 03/2004 – 09/2004
Implementation: 07/2004 – 08/2004
CONTRACT
Consultation: \$15,401
Implementation: \$325,798

PHASE 4.1 FACTS

PROJECT DATES
09/2004 – 11/2004
CONTRACT
\$376,328

PHASE 5.1 FACTS

PROJECT DATES
05/2007 – 09/2007
CONTRACT
\$2,969,828

PHASE 1.1 – 2.1

McKinstry's first project—improving the efficiency of lighting lamps and ballasts at nine LWSD facilities—dates back to 2001. This work was followed by replacing several locker room shower units, installing operable windows, a back-up fuel system, two rooftop air-handling units, demand base ventilation, aerators, flush valves, and waterless urinals at Juanita High School.

The balancing (TAB) and commissioning for these phases of work was performed by McKinstry's dedicated TAB and Commissioning teams. The teams were charged with optimizing system operations and energy saving performance while focusing on improving the occupant experience.

At Frost Elementary and Kamiakin Junior High McKinstry upgraded DDC controls, installed demand base ventilation, install aerators, and flush valves.

At Sandburg Elementary, Rush Elementary, and Inglewood Junior High we upgraded DDC controls, install demand base ventilation, installed occupancy sensors, installed aerators and flush valves.

At the Support Services building McKinstry rebalanced ventilation, installed aerators, and flush valves. Finally, at Muir Elementary we installed demand-based ventilation and installed aerators.

PHASE 3.1 – 5.1

After consulting on the new energy management control system for Evergreen Junior High School and Best High School, McKinstry retrofit the controls, including replacing hot water control valves on all VAV boxes, replacing air valves on Trane VAV boxes, adding air compressor for existing vane axial actuators, and balancing water at Best High School; controls verification at Best High School & Evergreen Junior High; and VAV box calibration at both schools.

For Phase 4.1 McKinstry performed lighting upgrades at nine schools. For Phase 5 McKinstry upgraded the HVAC system (converted old multi-zone units), replaced the toilet exhaust, repaired the roof, and upgraded light switching in classrooms at Juanita High School.

The balancing (TAB) and commissioning for these phases of work was performed by McKinstry's dedicated TAB and Commissioning teams. The teams were charged with optimizing system operations and energy saving performance while focusing on improving the occupant experience.

FACILITY CONDITION ASSESSMENT

LWSD was experiencing significant challenges identifying existing conditions and requirements for their 50+ schools and facilities. Although they had an extremely dedicated and skilled staff, capital planning was overshadowed by day-to-day operations. Additionally, LWSD did not have a consistent set of facility management tools, prioritization programs, or measurement methods.

In 2007, McKinstry provided a thorough Facility Condition Assessment to the district

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FACILITY CONDITION ASSESSMENT FACTS

PROJECT DATES

06/2007 – 08/2007

PROJECT SIZE

Buildings: 50+

Square Feet: 3.2 million

CONTRACT

Amount: \$38,000

Type: Lump Sum

TEMPORARY WORK FACTS

PROJECT DATES

Boiler: 06/2008 – 08/2008

Services: 09/2008 – 11/2008

CONTRACT

Boiler: \$459,133

Services: \$22,500

NEW HIGH SCHOOL CONSTRUCTION FACTS

LOCATION

Kirkland, Washington

PROJECT DATES

05/2009 – 08/2011

PROJECT SIZE

Two buildings, 214,144 sq. ft.

CONTRACT

Mechanical Amount: \$7,777,330

Low-Voltage Amount: \$195,000

(initial) & \$245,000 (final)

Type: Lump Sum

WEATHER STATION FACTS

PROJECT DATES

03/2011 – 04/2012

CONTRACT

\$50,100

that included the following:

1. A review of past studies, key personnel interviews, and fact-finding conducted to understand current practices related to management, repair, maintenance, and operations.
2. On-site assessments performed at every location to catalog maintenance and facility requirements for the next 20 years.
3. A capital-planning tool for the district's use.
4. Uploaded deferred maintenance items into their work order management system.

The information provided by the assessment is used by the district to prioritize capital expenses, catch up on deferred maintenance, and plan for future expenses. LWSD is experiencing easier bond and levy planning, more buy-in with future capital projects, and more detailed capital budgeting with increased reporting as well.

TEMPORARY WORK

McKinstry installed a temporary boiler and parking lot lighting, including utilities work associated with moving NorthSTAR portables and Storefront portables. McKinstry also completed mechanical, electrical, and plumbing work inside the main building and extended conduit for Comcast, including locating dead UG wiring.

NEW HIGH SCHOOL CONSTRUCTION

McKinstry helped build Lake Washington High School, which was approximately 214,144 square feet of new construction on three levels, replacing the existing high school over a two-year period. McKinstry provided mechanical, DDC controls, and architectural metal services.

This innovative project, designed and engineered by ATS, connected all the classrooms via DDC and centralized the data in the facilities maintenance shop. McKinstry installed all the controls and components for the building.

McKinstry's building technology team was asked to provide the technical review of the control vendor responses and technical solutions, interface with LWSD in meetings for review of information related to the development of standard DDC requirements, protocols, and technical specifications.

McKinstry's commissioning team provide the mechanical contractor QA/QC, start up, coordinated, and demonstrated operation to the district's third party commissioning agent.



DISTRICT-WIDE WEATHER DATA COLLECTION SYSTEM

McKinstry provided professional and related services for the design, fabrication, and installation of weather stations at Redmond Middle School, Wilder Elementary School, Inglewood Middle School, Rose Hill Elementary School, Lake Washington

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ENERGY EFFICIENCY GRANT FACTS

PROJECT DATES
04/2011 – 08/2011
CONTRACT
\$3,395,575

DDC CONSULTING FACTS

PROJECT DATES
03/2011 – 06/2011
CONTRACT
\$24,000

DATA CENTER FACTS

PROJECT DATES
05/2012 – 12/2012
CONTRACT
\$246,273

ACCESS, SECURITY & FIRE ALARM CONSULTING FACTS

PROJECT DATES
04/2013 – 06/2013
CONTRACT
\$31,150

INFOCENTRE FACTS

PROJECT DATES
Phase 1: 07/2013 – 09/2013
Phase 2: 07/2013 – 09/2013
Phase 3: 09/2014 – 08/2014
CONTRACT
Phase 1: \$56,000
Phase 2: \$162,412
Phase 3: \$584,284

powerED FACTS

PROJECT DATES
05/2014 – 07/2015
CONTRACT
\$173,000

High School, and Finn Hill Junior High School. This installation included a web-based dashboard that all collected data is published to. The district used this data for both curriculum based activities and operational planning in inclement weather.

ENERGY EFFICIENCY GRANT WORK – GROUP 5

After working with another energy services company to secure a \$1,123,925 grant from the Washington State Energy Efficiency Grant program, LWSD was unable to contract with the company to implement the work. McKinstry was able to step in and upgrade the lighting, boiler, HVAC, and controls at Juanita High School, Kamiakin Junior High School, Redmonds Junior High School, Kirkland Junior High School, and the district support center. We also installed a roof and solar array at McAuliffe Elementary School. The first year savings of this project totaled \$34,920.

CONSULTING – CONTROLS, ACCESS, SECURITY & FIRE ALARM

McKinstry documented a technical review of the control vendor responses and technical solutions and partnered with LWSD in reviews of information related to standard DDC requirements, protocols, and technical specifications. We also consulted on the creation of standards for security, access, and fire alarm systems and how they integrate to DDC.

DATA CENTER

McKinstry revised the duct layout and added cooling to the LWSD data center. This project reduced energy consumption, improved humidity, and temperature control at the server units and improved maintenance access to the equipment.

INFOCENTRE

Beginning with 11 schools, McKinstry implemented InfoCentre, our web-based application backed by a 24x7 customer service center unique to serving LWSD. InfoCentre is used to dispatch to on-site technicians service vendors, which LWSD can monitor and track through this system. LWSD personnel can access the data necessary to make policy and process enhancements anytime and from anywhere. For Phase 2, LWSD expanded this service to include 33 schools. In 2014, McKinstry implemented InfoCentre at 43 buildings, totaling 3,700,000 sq. ft.

powerED

LWSD has had a Resource Conservation Management (RCM) program since 2006, focusing on energy efficiency, water conservation, and waste reduction. McKinstry has historically supported and consulted with the RCM team to ensure new buildings were built to maximum efficiency, ensuring that LWSD lifecycle and maintenance standards were met. By helping the RCM team act as the clearinghouse for the various energy, water, and waste reduction tasks, LWSD maximized the efficiency of their work. Key examples include:

1. Reduced sewer connection fees by over \$100,000 through proper classification of plumbing design and coordination with King County;
2. Implemented the Puget Sound Energy's commissioning process and grants in design, construction, and post-occupancy construction phase, standardizing the Cx professional services agreements in the process;

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3. Created standards for controls sequences, lighting controls, plumbing fixtures, irrigation systems, and more; and
4. Completed design reviews that eliminated over \$70,000 in unnecessary lighting and irrigation controls, and prevented simultaneous heating and cooling occurrences at a newly constructed elementary school.

In 2014, McKinstry launched a new RCM program called powerED, which is designed to bring new levels of effort and tools to conserve utilities, further integrate and increase efficiencies, and promote sustainability in the schools. McKinstry monitors, analyzes, and quantifies LWSD's energy use, costs, and savings with the goal of sharing results with and engaging the community. This includes approximately 200 accounts for electricity, natural gas, and water for all facilities.

MUIR ELEMENTARY FACTS

PROJECT DATES

Consultation: 09/2014 – 12/2014
 Construction: 12/2014 – 02/2016

CONTRACT

Consultation: \$15,225
 Construction: \$109,500

PHASE 7 FACTS

PROJECT DATES

01/2014 – 12/2015

CONTRACT

\$331,933

MUIR ELEMENTARY FORENSICS

This first phase of forensics work identified deficiencies in the mechanical system at Muir Elementary. At the time, the school was two years old and had comfort and performance issues. McKinstry provided modifications to increase water bypass flow in all four hybrid-heat pump systems to help stabilize the waterside operations of the systems, remedying the issues.

PHASE 7

McKinstry is currently replacing water heaters, upgrading high bay, stadium, and entrance lighting, providing perimeter insulation, and retro-commissioning. McKinstry also replaced a single 500-gallon water heater with two new PVI water heaters.

McKINSTRY TEAM

<i>Energy Savings Work</i>	<i>Commissioning</i>	<i>InfoCentre</i>
ACCOUNT MANAGER	COMMISSIONING ENGINEER	ACCOUNT MANAGER
Mike Locke	Sam Wong	Cory Sparling
ACCOUNT EXECUTIVE	<i>powerED</i>	PROJECT MANAGER
Melissa Pendleton	PROGRAM MANAGER	Tina McDade
PROJECT DIRECTOR	Lauren Frugé	<i>New High School Construction</i>
Clint Hawn	TECHNICAL PROGRAM MANAGER	PROJECT EXECUTIVE
PROGRAM MANAGER	Jed Reynolds & Mike Talarico	Marco Navlet
Gerry Galvin		PROJECT MANAGER
ENGINEERS	<i>Facility Condition Assessment</i>	Ed Storton
Ron Fues (energy), Kristina Sing & Seth Davis (design)	PROJECT DIRECTOR	LOW-VOLTAGE PROJECT MANAGER
	Dan Caldwell	Jeff Kiggins
CONSTRUCTION MANAGER	PROGRAM MANAGER	LOW-VOLTAGE TECHNICIANS
Justin Fallstrom	Ryan Dickerson	Pete Shanaman & Matt Duclos