ITEM NO.
4.C (1)

INFORMATIONAL MEMORANDUM
Tukwila Metropolitan Park District

TO: **Tukwila Pool MPD Board President**

FROM: **Rick Still, Parks and Recreation Director**

DATE: **May 9, 2012**

SUBJECT: **Draft Energy Services Proposal – presentation and discussion**

ISSUE
McKinstry will be presenting a draft version of the Energy Services Proposal (ESP).

FINANCIAL IMPACT
No financial impact at this time.

BACKGROUND
On January 12th, the MPD Board approved the Energy Service Performance Contracting (ESPC) process, authorized McKinstry Energy Services (McKinstry) as the Energy Services Company (ESCO) and authorized the initiation of the investment grade audit for the Tukwila Pool. At the April 9, 2012 Board meeting the Rough Order of Magnitude (ROM), a 70% preliminary plan, was brought forth as a special item to update the Board on the progress of this project and to seek guidance on a some of the potential additional items to be included in the project scope if additional funding was available. Since then McKinstry has been working on the Energy Services Proposal (ESP) and has a draft version (Attachment 1) of it for tonight's meeting.

DISCUSSION
McKinstry will be presenting the Draft ESP and then facilitating discussion and fielding any questions as needed.

RECOMMENDATION
No recommendations at this time.

ATTACHMENTS
1. Draft ESP

Tukwila Pool - DRAFT Energy Services Proposal

TUKWILA, WA
02 MAY 2012

FOR THE LIFE OF YOUR BUILDING

Contents

Executive Summary

1.1 OVERVIEW

McKinstry Essention, Inc. (herein after as McKinstry) is pleased to present this proposal for the implementation of energy efficiency measures at the Tukwila Pool in Tukwila, WA.

This proposal follows the outline contained in Section 2 of the Energy Services Agreement. It presents the contractual terms under which McKinstry and Tukwila Parks & Recreation will work together over the term of the project. This Proposal describes the scope, costs, guarantees, and other aspects of the project.

The services included in this Proposal include design, construction, and system verification. Although Anacortes School District will operate and maintain the new equipment, McKinstry will provide an initial commissioning of the systems installed and will provide commissioning documentation of system operation and performance, proving the ability to realize the necessary savings.

1.2 PROJECT DESCRIPTION

This project includes renovations to the existing HVAC, controls, and lighting systems. Envelope and pool specific measures are also included in this project.

1.3 SUMMARY OF BENEFITS

FINANCIAL BENEFITS

Section 4 of the proposal provides information related to specific project financials related to this project. The guaranteed maximum project allowable cost is $1,662,438. Including sales tax and Engineering & Architectural Services (E&AS) management fees, and before any utility incentives, the final project cost is estimated at $1,862,380. The estimated utility rebate from the Utility is approximately $21,667.

The improvements are projected to produce over $22,495 of annual energy savings to the Pool. Savings of $683/yr are projected based on a reduced repair costs and future avoided capital expenditures as agreed upon with Pool Management. Total first year savings is estimated at $23,178 annually. The estimated simple payback for this project is 78.6 years.

EMISSIONS SUMMARY

The energy savings produced will directly reduce the amount of power produced by the utility. To compute the environmental impact, McKinstry uses factors from eGRID2007 Version 1.1. The Emissions & Generation Resource Integrated Database (eGRID) is a comprehensive source of data on the environmental characteristics of electric power generated in the United States. Factors for non-electric utility savings were obtained from the US EPA.

On average, one car produces 11,470 pounds of CO2 annually and one acre of trees absorbs 8,066 pounds of CO2 annually. By implementing this building improvement, CO2 emissions will be reduced by 386,570 pounds annually, which is equivalent to removing 34 cars from the road or planting 48 acres of trees.

1.4 MAXIMUM PROJECT COST

McKinstry guarantees that the project cost, related specifically to the project scope defined herein, will not exceed the maximum price of $1,662,438. This excludes sales tax, Engineering & Architectural Services (E&AS) management fees, and before any utility incentives.

1.5 CONCLUSION

Executive Summary

This project represents an excellent opportunity for the Tukwila Pool to greatly improve its facilities while saving energy. McKinstry looks forward to working with Tukwila Parks and Recreation and the WA Department of Enterprise Services in making this project a success.

Scope of Work

2.1 FACILITY IMPROVEMENT MEASURE (FIM) SUMMARY

For detailed scope of work descriptions please refer to Attachment A – "Detailed Scope of Work."

2.2 ESCO SERVICES

McKinstry will include the following services related to this project:

1. ENERGY AUDIT: The energy audit is complete and is submitted under Exhibit 1 – "Directed Engineering Study."
2. DESIGN SERVICES: McKinstry will provide a detailed engineering design as needed to obtain Owner review and approval of the proposed system and to obtain competitive bids. In addition, McKinstry will also provide construction support services, start-up, testing, as-built drawings of systems installed, and provide relevant operations and maintenance manuals.
3. CONSTRUCTION: Provide, or cause to be provided, all material, labor, and equipment, including paying for permits, fees, bonds, and insurance, required for the complete and working installation of McKinstry's equipment.
    A. McKinstry will provide a site superintendent who will be responsible for the onsite supervision and coordination of trades and subcontractors. This individual's responsibilities will also include regular work observations, quality control, site security, enforcement of the site specific safety plan, as well as coordinating any impact upon building tenants with the Owner.
    B. McKinstry may perform portions of the contraction work or may subcontract portions to qualified firms. In either case, McKinstry will share information regarding actual costs of the work with the Owner.
    C. When McKinstry has completed the installation of the Equipment, including start-up, operations verification, and training in accordance with the Proposal, McKinstry will provide to Owner a "Notice of Commencement of Energy Savings".
    D. At the conclusion of the project, McKinstry will submit a "Notice of Substantial Completion" to the Owner.
4. CONSTRUCTION MANAGEMENT: McKinstry will provide a dedicated construction manager who will provide contract administration services for the project. The Owner is expected to coordinate day-to-day communications with tenants and any scheduling of tenant relocations in and around occupied areas.
5. OPERATION TRAINING: McKinstry will provide on-going training of building staff during construction and a minimum of two hours of training on the energy management control system.
6. PERFORMANCE MAINTENANCE: ESCO will provide ongoing monitoring and support services to help ensure that predicted savings are achieved throughout the term of the agreement. Ongoing services shall be under separate agreement. Ongoing services shall be at the discretion of the District to terminate. Specific tasks associated with proposed ongoing performance assurance tasks can be found in Table 3.2.
7. EQUIPMENT MAINTENANCE: McKinstry will provide no equipment maintenance or repairs after the warranty period. Following the completion of the installation and Owner acceptance of the Equipment, the Owner shall provide all necessary service, repairs, and adjustments to the Equipment so that the Equipment will perform in the manner and to the extent set forth in the Proposal. McKinstry shall have no obligation to service or maintain the Equipment after the warranty period.
8. WARRANTY: McKinstry will warrant equipment for one year following Notice of Substantial Completion. Specific information regarding equipment warranty will be passed on to Owner.
9. HAZARDOUS WASTE OTHER THAN PCB LIGHTING BALLASTS: Should the project require removal or

disposal of hazardous material, McKinstry may have the hazardous material or substances removed and disposed of at the request of the Owner. McKinstry will not assume ownership of the material but may act on behalf of the Owner to properly remove and dispose of the material. The Owner shall pay McKinstry for the cost of such work. The Owner agrees and acknowledges that it has not relied on or employed McKinstry to analyze or identify the presence of any hazardous substance on the Owner's premises. The cost of hazardous material abatement and disposal is not included in this proposal.

10. HAZARDOUS WASTE ASSOCIATED WITH PCB LIGHTING BALLASTS: Where PCB ballasts are discovered as part of lighting retrofit work, McKinstry shall dispose of PCB ballasts through an approved hazardous waste vendor. The cost of hazardous material abatement and disposal associated with PCB ballasts is included in this proposal.

2.3 EXTENT OF SUBCONTRACTING

McKinstry may subcontract the energy audit, design, construction management, start-up, and training portions of this Contract to qualified firms upon review and approval by Owner. Construction subcontracts will be awarded competitively. McKinstry will endeavor to satisfy the MWBE goals of Washington State.

2.4 PROJECT SCHEDULE

The following information lists several milestone dates for the project. McKinstry will develop a detailed schedule outlining all of the various design, pre-construction, construction, and closeout tasks associated with the project and that interfaces with other construction work not under this proposal.

	Start	Finish
ESP Review and Approval Process	5/14/12	6/11/12
McKinstry Design and Pre-Construction	6/25/12	6/01/12
Final Construction Docs	6/04/12	11/2/12
Construction	11/5/12	3/18/12

Attachment A - Detailed Scope of Work

ITEM #1

Pool Liner, Water Edge Tile & Main Drains

Scope of work for this item includes the following:

Demolition – Remove fiberglass liner. Remove deteriorated or un-sound plaster by water blasting. Remove racing lane targets and breakpoint to deep water marker tiles. Remove water level bullnose tile and bedding. Remove water line tile band. Remove recessed steps and setting grout. Sawcut and remove concrete around main drain sumps, and remove sumps and piping between.

New work – At main drain sump replacement area, set two " VGB compliant" sumps with covers and pipe between them with new piping to establish a hydraulically balanced flow, connect to existing drain pipe. Drill slab edges and dowel in with epoxy set rebar and epoxy bond new to existing concrete at sump cut out areas. Set racing lane targets tile and breakpoint to deep water tile markings. Set tile around water inlets. Set water level bullnose (2 - 90 degree corner tiles to match existing) and bedding. Set water line tile band. Set "Pentair Cycolac" step inserts into existing step recesses with grout. Re-plaster surfaces with "Diamond Brite" or equal pre-packaged integrally colored plaster. Note: Racing lane markings will be set only for the 75' course at north side of bulkhead.

ITEM #2

Pool Recirculation Pump & VFD

Scope of work for this item includes the following:

Demolition – Remove existing pool circulation pump. Remove piping as necessary for relocating pump.

New work - Provide new recirculation pump for pool. Modify existing piping at filter tank to locate pump on floor-mounted pad rather than on side of balance/filter tank, for better vibration isolation. Provide pool-industry-specific VFD with pressure sensor to control pump. Configure VFD to control pump to meet discharge pressure setpoint and maintain code-required recirculation flow rate regardless of filter loading. VFD shall be enclosed in NEMA 12 or 4X enclosure, and all internals shall be epoxy-coated for corrosion and chemical resistance in pool environments. VFD shall be programmable, with several modes including backwash and normal circulation, and shall be configured to be controlled by pool chemistry controller or autobackwash controller.

Pool Water Plumbing / Valve Replacement

Scope of work for this item includes the following:

Demolition – Sawcut and remove concrete around bottom return inlets. Excavate to expose vertical (steel) piping at inlets. Cut out steel piping and fittings. In the mechanical room, remove existing pipe sections and valves.

New work – At pool bottom, set PVC fittings on existing main lines, set vertical PVC piping and set flow adjustable bottom return inlets. Backfill excavation areas with pea gravel. Drill slab edges and dowel in with epoxy set rebar and epoxy bond new to existing concrete at cut out areas.

In the mechanical room, replace PVC piping & valves. Valves shall be butterfly type with gear operators. Piping shall be configured so that valves are more accessible than current design if possible. Provide new

digital totalizing flowmeter to replace existing failed digital flowmeter. Configure piping so that flowmeter meets manufacturer's installation requirements for straight pipe sections upstream & downstream for proper flow measurement.

ITEM #3

ADA Pool Chair Lift

Scope of work for this item includes the following:

Demolition – Sawcut edge recess and chip out deck slab to receive overlay. Core drill deck slab for insert.

New work – Connect Insert to existing deck reinforcing to establish an electrical ground (bonding). Set insert into core drilled hole at deck slab with epoxy grout. Overlay deck slab with cementitious leveling bed to create a "flat" loading area (slope at 1/8" per foot for positive drainage). Block off deck drain inlet holes prior to setting overlay. Assemble and set "Aqua Creek, Revolution Lift" or equal. This lift is to be centered on the bulkhead at minimum setback from pool edge (12") and shall provide user access to water areas on each side of the bulkhead.

ITEM #4

Chemtrol Replacement

Scope of work for this item includes the following:

Demolition – Remove the existing Chemtrol system.

New Work – Replace the existing pool chemical treatment system.

Attachment A - Detailed Scope of Work

ITEM #5
FIM# 04.01
Controls Upgrades and Air Handling Unit Retrofit
Tukwila Pool

GENERAL

This measure is to provide direct digital controls and retrocommissioning for (2) air handling units and (1) exhaust fan.

SCOPE OF WORK INCLUDES

1. Mechanical
   A. Provide (1) new outside air and (2) new return air dampers.
   B. Provide (1) new 15 HP natatorium supply fan.

2. Controls
   A. Provide DDC control of air handling units, including new temperature sensors, humidity sensors, controllers, wiring, and appurtenances.

3. Electrical
   A. Provide all line voltage power required by controls components.
   B. Connect new natatorium supply fan to existing natatorium fan motor circuit.

4. Structural
   A. Provide fan mounting rails and structural attachments.

5. Architectural
   A. Provide temporary wall opening in west wall to accommodate removal of existing supply fan and installation of new supply fan.

6. Commissioning
   A. Provide point-to-point and functional performance testing of the natatorium air handling unit, lobby and locker room air handling unit, locker room exhaust fan, and new DDC controls and sequences
   B. Interview site staff, assemble documents, develop site specific RCx Plan, document issues found on prioritized observation log, document existing schedules and setpoints and review with property manager and adjust as appropriate.
   C. Implement low cost repairs as they are identified during the investigation. This project includes an allotment for $2,500 for repairs.
   D. Provide training to the facility operators on what was found and system modifications or repairs to ensure operators understand the impacts of the findings.
   E. Provide pre and post airflow testing.
   F. Provide duct cleaning of return ductwork, mixed air plenum, and return air grilles and dry-ice cleaning of the existing natatorium hot water heating coil.
   G. Provide final RCx report and training.

Attachment A - Detailed Scope of Work

7. Demolition and Removal
   A. Remove existing supply fan. Remove existing ductwork as required to install new supply fan.

8. Allotments
   A. None.

EXCLUSIONS AND CLARIFICATIONS

1. Excludes hazardous material abatement.
2. Work to be performed during normal business hours on weekdays
3. Excludes correction of unknown existing system or code deficiencies
4. It appears there are issues with the existing air distribution system, excludes condensation issues caused by existing inadequate air distribution
5. New supply fan will have different sound characteristics than existing fan, excludes interior acoustical analysis, duct silencers, and sound abatement.

Attachment A - Detailed Scope of Work

ITEM #6

Building Heating Pump & Motor Replacement

Scope of work for this item includes the following:

Demolition – Remove the existing building hot water heating pump and motor.

New work – Replace the existing building hot water heating pump and motor.

Attachment A - Detailed Scope of Work

ITEM #7
FIM# 01.02
Burner Upgrade
Tukwila Pool

GENERAL

Replace existing burner on boiler B-1 with new high efficiency burner.

SCOPE OF WORK INCLUDES

1. Mechanical
   A. None.
2. Controls
   A. None.
3. Electrical
   A. None.
4. Structural
   A. None.
5. Architectural
   A. None.
6. Acoustical
   A. None.
7. Commissioning
   A. None.
8. Demolition and Removal
   A. None.
9. Allotments
   A. None.
10. Specialty
    A. Boiler B-1: Remove existing burner and replace with new high efficiency burner. Provide new burner mounted controls.
    B. Provide new boiler control panel.
11. Schedule
    A. Work to be done during normal business hours.

CLARIFICATIONS

1. Daytime work hours.

EXCLUSIONS

1. Hazardous material abatement.

Attachment A - Detailed Scope of Work

2. Building code upgrades.
3. Excludes correction of unknown existing system deficiencies.

Attachment A - Detailed Scope of Work

ITEM #8
FIM# 9.01
Pool Lighting Upgrade
City of Tukwila

GENERAL

Replace existing 250W-1000W HID pool fixtures with linear fluorescent high bay fixtures. Retrofit existing T12 magnetic ballast fixtures with T8 electronic ballast fixtures in administration ad locker room areas.

SCOPE OF WORK INCLUDES

A. Lighting
   1. Replace existing 400W-1000W HID pool fixtures with aircraft cable hung architectural fluorescent high bays operating T5HO lamps. Light levels will increase both on the pool deck and pool surface.
   2. Retrofit existing T12 magnetic ballast fixtures with T8 electronic ballast fixtures in administration, lobby and locker room areas. Lamp and ballast retrofit only (re-using existing fixtures).
   3. Replace exterior entry fixtures with new wet location rated fluorescent fixtures operating T8 lamps and electronic ballasts.
   4. Install dual-tech occupancy sensors in offices and locker rooms.
   5. Add relay/shunt to control emergency night light fixtures.

EXCLUSIONS/CLARIFICATION

1. This proposal does not include repairs to existing electrical code violations or upgrades unless otherwise stated in the ESP.
2. This proposal is based on re-using existing circuits and controls unless otherwise stated in the ESP.
3. This proposal assumes proper grounding exists on existing fixtures.
4. This proposal does not include PCB recycling costs. (Fixtures sampled did not contain PCB's)
5. Scaffolding provided by others.

Attachment A - Detailed Scope of Work

ITEM #9

Remove Natatorium Ceiling Tiles

Scope of work for this item includes the following:

Demolition – Set scaffolding and remove all ceiling tiles, grid and suspension system throughout natatorium.

New work – See Item 14. Note: Scaffolding cost is split with Item 14, assuming both Items 13 and 14 will be performed.

ITEM #10

Locker Room Tile (Showers & Walls) – FRP

Scope of work for this item includes the following:

Demolition – Remove existing wall tile at showers and toilet areas. Diamond grind the remaining wall surfaces to provide a uniform flat mounting surface.

New work – Install Fiber Reinforced Plastic Panels (FRP) to replace wall tile areas. FRP shall be "Marlite, Symmetrix" or equal, colored/patterned material to simulate tile and grout joints.

Attachment A - Detailed Scope of Work

ITEM #11 & 12
FIM# 08.01
Motors and Pumps
Tukwila Pool

GENERAL

Provide deduct meter on pool fill and charge meter on pool drain.

SCOPE OF WORK INCLUDES

1. Mechanical
   A. None.
2. Controls
   A. None.
3. Electrical
   A. Replace (3) existing 2 HP pump and fan motors with new premium efficiency motors.
4. Structural
   A. None.
5. Architectural
   A. None.
6. Acoustical
   A. None.
7. Commissioning
   A. Provide functional performance testing.
8. Demolition and Removal
   A. None.
9. Allotments
   A. None.

CLARIFICATIONS

1. Daytime work hours.

EXCLUSIONS

1. Hazardous material abatement.

Attachment A - Detailed Scope of Work

ITEM #13
FIM# 18.01
Water Conservation
Tukwila Pool

GENERAL

This measure includes new water closets, lavatories, showerheads, and column showers.

SCOPE OF WORK INCLUDES

1. Mechanical
   A. Replace (7) existing wall mount water closets with new low flow fixtures.
   B. Replace flushometers on (3) existing full height urinals.
   C. Replace (8) existing wall mount lavatories with new low flow fixtures. Include (8) thermostatic mixing valves, one installed under each lavatory.
   D. Replace showerheads and valves for (2) existing showers with new low flow fixtures.
2. Controls
   A. None.
3. Electrical
   A. None.
4. Structural
   A. None.
5. Architectural
   A. None.
6. Acoustical
   A. None.
7. Commissioning
   A. None.
8. Demolition and Removal
   A. None.

CLARIFICATIONS

1. Daytime work hours.
2. Assumes existing plumbing walls are in good condition and are capable of supporting replacement fixture carriers.
3. Assumes any tilework will be completed in the scope of the associated locker room/restroom remodeling FIM.

EXCLUSIONS

1. Hazardous material abatement.

Attachment A - Detailed Scope of Work

Item #14

Pool Cover / Blanket

Scope of work for this item includes the following:

New work – Provide a manual pool cover / blanket.

ITEM #15

Pool Filter Conversion (Vac DE Option)

Scope of work for this item includes the following:

Demolition - Remove existing 26″ round DE grid filter elements, along with existing manifolds & piping in filter tank.

New work - Provide new 24″x45″ vacuum DE grid elements, increasing the total amount of filter area installed to reduce maintenance & backwash requirements. Configure filter leaves to be removable from top of filter pit without removal of piping manifold. Provide new piping manifold and hold-down hardware to accommodate new rectangular grid filters. Extend overflow pipe to increase water depth for larger filters. Provide patching/repair of filter tank including welding steel shell & patching fiberglass lining where required to accommodate new filter configuration. Revise piping & fittings inside & outside the filter tank to accommodate new filter configuration. Valving system for this configuration shall remain manual type.

ITEM #16

Bulkhead Renovation

Scope of work for this item includes the following:

Demolition – Remove wheels and lift unit out of place, set in pool for repairs. Remove bent axle at east end . Remove one damaged racing line cup anchor at northwest side.

New work – Replace stainless steel axle to match original construction. Set new cup anchor to match existing into face of bulkhead with fiberglass. Prepare surfaces and epoxy paint all exterior surfaces including marking of the north side racing lane targets. Re-set in place and install new wheels.

ITEM # 17

Add Natatorium Sound Abatement

Scope of work for this item includes the following:

Demolition – See item 13

Attachment A - Detailed Scope of Work

New work – Set scaffolding and install "Acoustical Solutions, Alpha Enviro" or equal, colored PVC coated hanging baffle / banner style treatment. Primary banners are located directly above racing lanes as a visual reference for swimmers, one additional row is provided over the east deck and two additional rows are provided over the west deck. Secondary banners are set perpendicular. Suspension system shall be stainless steel drill-in anchors to roof structure and other non-corrosive type mounting as recommended by manufacturer. Note: Scaffolding cost is split with Item 13, assuming both Items 13 and 14 will be performed.

ITEM # 18

ADA Improvements (Parking Lot)

Scope of work for this item includes the following:

Demolition – Per design

New work – Provide parking lot ADA improvements for improved facility access.

ITEM # 19

Interior Doors Replacement (Partial)

Scope of work for this item includes the following:

Demolition – Remove (11) existing interior doors

New work – Replace (11) existing interior doors

Attachment A - Detailed Scope of Work

ITEM #20
FIM# 17.04
Pool Tank Heating Unit Replacement
Tukwila Pool

GENERAL

Replace existing pool water heat exchanger.

SCOPE OF WORK INCLUDES

1. Mechanical
   B. Provide new tank heating unit to replace existing tank heating unit.
2. Controls
   A. None.
3. Electrical
   B. None.
4. Structural
   B. None.
5. Architectural
   A. None.
6. Acoustical
   A. None.
7. Commissioning
   A. Provide pre and post testing and test and balance on pool water circulation pump. And pool heating water pump.
8. Demolition and Removal
   A. Demo existing pool water heating unit.
9. Allotments
   A. Drain and fill of pool filter tank.
   B. Pressure and leak test of new tank heating unit.

CLARIFICATIONS

1. Daytime work hours.
2. Assumes existing filter tank and heat exchanger isolation valves are in good working order.

EXCLUSIONS

1. Hazardous material abatement.
2. Building code upgrades.
3. Excludes correction of unknown existing system deficiencies.

Attachment A - Detailed Scope of Work

Item 21 – Gutter / Deck Tile

Scope of work for this item includes the following:

Demolition – Remove tile along deck edge to approx 4" back from edge, vertical face and wrap around bottom above gutter. Remove 6" square areas in field tile for no diving tile insets. Diamond grind remaining surfaces where tile is removed to provide a flush condition when new tile is set. Remove sealant joints, grout, paint & scale from remaining deck tile.

New work – Set tile along deck edge, vertical face and wrap around bottom above gutter. These tiles are to be thru color, installed with an "eased square edge detail". Set "Inlays Inc" or equal 6"x6"pre-manufactured depth marking tiles and racing lane number marker tiles at vertical face (cut to fit available vertical space). Set "Inlays Inc" or equal 6"x6" pre-manufactured no diving symbol tiles in deck field areas. Re-grout all tile and re-caulk all sealant joints.

Item 22 – Locker Room Painting

Scope of work for this item includes the following:

New work – Paint the men's and women's locker rooms.

Item 23 – New Lockers

Scope of work for this item includes the following:

Demolition – Remove (30) existing lockers

New work – Replace (30) existing lockers in the men's and women's locker rooms.

Item 24 – Exterior Door Replacement

Scope of work for this item includes the following:

Demolition – Remove (3) existing exterior doors.

New work – Replace (3) existing exterior door. Replace hardware on (6) doors.

Item 25 – Deep End Guard Chair

Scope of work for this item includes the following:

Demolition – No demolition required, deck inserts are existing from previously installed guard chair.

New work – Assemble and install "Paragon, Ladder at Sides" or equal guard chair to fit existing deck inserts.

Provide anchor bolts for center mount flange and provide escutions for ladder inserts.

Item 26 – Privacy Changing Areas

Scope of work for this item includes the following:

New work – Provide one new changing room in each locker room.

Item 27 – Locker Room Floor Resurfacing

Scope of work for this item includes the following:

Demolition – Remove existing tile floor finish. Remove existing tile wall base. Diamond grind remaining floor and wall base surfaces. Remove sealant and clean the remaining joints.

New work – Fill cleaned out sealant joints with rigid material per flooring manufacturer's recommendations. Install "Miracote Color Quartz" or equal epoxy flooring system. This system shall include manufacturer's moisture barrier and flooring coats with anti-microbial additive. Flooring shall be seamless continuous up walls onto previous wall base areas with a coved wall base profile. At FRP areas, the flooring shall be installed first to extend up behind the FRP at base of walls.

Item 28 – Deck Resurfacing and Deck Drain

Scope of work for this item includes the following:

Demolition – Remove tile wall base, Diamond grind exposed aggregate deck and wall base surfaces. Special care shall be used when grinding along tile edges and lineal deck drain to remain. Remove sealant and clean the remaining joints.

New work – Fill cleaned out sealant joints with rigid material per flooring manufacturer's recommendations. Fill per flooring manufacturer's recommendations, any remaining rough areas of exposed aggregate surface that were not smoothed out by grinding. Install "Miracote Color Quartz" or equal epoxy flooring system. This system shall include manufacturer's moisture barrier and flooring coats with anti-microbial additive. Flooring shall be seamless continuous up walls onto previous wall base areas with a coved wall base profile. Clean out lineal deck drain body by mechanical means and high volume water flushing, cleaning shall include reaming all inlet holes to remove debris.

Item 29 – Enclosure

Scope of work for this item includes the following:

New work – Per sketch.

Attachment A - Detailed Scope of Work

Item 30 – Modify Front Desk Reception

Scope of work for this item includes the following:

New work – Remodel existing reception area.

Item 31 – Admin Offices Remodel

Scope of work for this item includes the following:

New work – Remodel the administration offices.

Item 32 – Modify family changing Rooms

Scope of work for this item includes the following:

New work – Modify family changing rooms.

Item 33 – Modify Supply Staff / Break Room

Scope of work for this item includes the following:

New work – Modify supply staff / break room.

Item 34 – Staff Locker Rooms Renovation

Scope of work for this item includes the following:

New work – Provide renovation of existing staff locker room, including repair of failed plumbing and upgrade to high efficiency plumbing fixtures.

Item 35 – New Entry – Women's Locker Room

Scope of work for this item includes the following:

New work – Provide new entry door into Women's Locker Room.

Attachment A - Detailed Scope of Work

ITEM #36
FIM# 07.01
Pool Fill Deduct Meter
Tukwila Pool

GENERAL

Provide deduct meter on pool fill and charge meter on pool drain.

SCOPE OF WORK INCLUDES

1. Mechanical
   A. Provide new deduct meter on pool fill and new charge meter on pool drain line in mechanical room.
2. Controls
   B. None.
3. Electrical
   A. Provide line voltage point of connection for meter power.
4. Structural
   B. None.
5. Architectural
   A. None.
6. Acoustical
   A. None.
7. Commissioning
   A. Provide functional performance testing.
8. Demolition and Removal
   A. None.
9. Allotments
   A. Submit meter and installation schematic for review and approval by Valley View Sewer District prior to meter purchase and installation.

CLARIFICATIONS

1. Daytime work hours.

EXCLUSIONS

1. Hazardous material abatement.

Attachment A - Detailed Scope of Work

Item 37 –New Roof

Scope of work for this item includes the following:

New work – Replace the existing roof with new membrane roofing.

Item 38 – Solar Thermal

Scope of work for this item includes the following:

New work – Install a new evacuated tube solar collect to preheat the domestic and pool water.

Item 39 – UV System

Scope of work for this item includes the following:

Revise piping to accommodate new UV treatment unit. UV system will be approximately 5.5kW max output, with power stepping system to reduce energy usage under low treatment loads. UV system includes both treatment chamber (8"), and wall-mounted control panel, with interconnecting cable.

Item 40 – Add Windows in Natatorium

Scope of work for this item includes the following:

Provide new natatorium glazing on the North exposure

Item 41 – Privacy Showers & Changing Areas

Scope of work for this item includes the following:

Provide new changing rooms and private showers for locker rooms

Item 42 – New Natatorium Supply Air Ductworks

Scope of work for this item includes the following:

Provide new supply air ductwork to improve air flow to natatorium

Attachment A - Detailed Scope of Work

Item 43 – Vending Machines Power Control

Scope of work for this item includes the following:

Provide vending power management control for two existing refrigerated vending machines.

Item 44 - Addition

Scope of work for this item includes the following:

Per sketch

Energy Cost Savings Guarantee

3.1 GUARANTEE OVERVIEW

1. Philosophy: McKinstry is prepared to guarantee any portion of a project over which it has direct control. Where McKinstry does not have direct control (such as burn hours associated with lighting), we are prepared to work with the customer to devise a method of Measurement and Verification (M&V), which will provide the highest degree of assurance that the energy cost savings exist.
2. This Project: For this project, McKinstry is prepared to guarantee the performance of the installed initiatives to reduce energy consumption. For the target energy reductions for the initiatives that will be implemented please refer to Table 3.1. Based upon the stipulated conditions as enumerated by the Pool personnel and the utility rates as described below, the utility cost savings are also shown in Table 3.1.
3. On-going Services: The cost of the first year of Performance Assurance is included in the project scope. The cost of On-going Performance Assurance in years 2-10 is at the discretion of Tukwila Pool. McKinstry is prepared to continue the guarantee as long as the District continues the on-going services as described herein. When the District chooses to cancel the ongoing services, the guarantee will also be terminated at the same point in time.

For this project, Tukwila Pool has elected not to have McKinstry provide on-going performance assurance services past year one.

3.2 FIM SPECIFIC PERFORMANCE ASSURANCE METHODOLOGY

1. Guarantees: Tables 3.1 and 3.2 provide the specific energy consumption savings for each field improvement measure and the guarantee that McKinstry will provide associated with that measure. The guarantee is based on the aggregate savings for all FIMs, not on individual FIM savings. Savings calculations are based upon both baseline operating characteristics and proposed operation criteria:
    A. Baseline: "Baseline" refers to the existing operating characteristics that were used to calculate energy cost savings. The baseline operating characteristics, including system performance and operational expenditures, which were used for this project are provided in Tables 3.1 and 3.2. In general, all parties acknowledge the baseline associated with any specific measure has been derived from the following sources:
        1) Actual operating information gathered through field observation, measurement, micro-data loggers, and owner's operating log books.
        2) Owner provided information concerning stipulated factors such as burn hours, occupancy, or operational expenditures.
        3) In some instances, a modified baseline may have been developed to address areas whereby pre-retrofit conditions do not reflect a system that is operating per current code or what the client may deem as normal operation.
    B. Proposed: The proposed operating criteria, including system performance and operational expenditures, which were used for savings calculations are provided in Tables 3.1 and 3.2. Systems must be operated per the proposed criteria to ensure energy cost savings are realized. McKinstry will provide the initial start-up, commissioning, and programming of the system to ensure that the systems operate per the proposed operating criteria. The Pool acknowledges their responsibility to ensuring that these criteria are maintained and associated energy savings are realized. Energy

Savings Guarantees are predicated on the District maintaining their responsibilities as provided below in "On-Going Owner Responsibilities."

2. Performance Assurance (PA): Table 3.2 provides the specific on-going reporting tasks that McKinstry will perform to verify that the systems are performing as specified. The intent of the verification is to measure and verify leading indicators on which the energy savings are based. Once these leading indicators are measured and are verified to be in accordance with the proposed criteria, the savings due to the performance of the equipment or measure shall be deemed as met. McKinstry has proposed measurement of these indicators. The site specific Performance Assurance Program encompasses the following elements:

   A. Closeout Commissioning Report: McKinstry will provide a closeout commissioning report during the one month period starting three months after the Notice of Commencement of Energy Savings. The scope of this report consists of the tasks outlined under the "Post-Retrofit" stage of Table 3.2.

   B. First Year On-going Reporting: For this project, McKinstry proposes reporting of the first year PA tasks as provided in Table 3.2 on a one-time basis. The scope of this report consists of the tasks outlined under the "First Year" stage of Table 3.2. The first report shall be provided no later than one year after last date of Notice of Commencement of Energy Savings. However, if additional phases of work are involved, a single PA Report may be provided at regular interval(s) that reports across all relevant phases of work.

   C. Years 2 – 3 On-going Reporting: At this point, this proposal does not contain guarantees past Year 1.

3.3 UTILITY RATES

1. Utility Rate: For the purpose of calculating savings, the utility rates used will be the utility rates as paid by the Tukwila Pool to the utility company during the pertinent period, adjusted for any rate schedule changes made by the utility company, except that the utility rate used for calculation will never go below the Floor Rate, or above the Ceiling Rate, as described below. In the event that a building has multiple meters on different rate schedules, the per-unit cost of the utility will be the average of all the rate schedules in effect at that facility.

2. Base Utility Rate: Refer to table 3.3 for the Base Utility Rates (including sales tax).

3. Floor Utility Rate: For the purpose of calculation of savings, the utility rate shall never drop below the base utility rates described above. This shall be known as the Floor Utility Rate.

4. Ceiling Utility Rate: For the purpose of calculation of savings, the utility rate shall never exceed 1.5 times the base utility rate described above. This shall be known as the Ceiling Utility Rate.

5. Rate Schedule Changes: When the utility company makes a change to the rate schedule, the new rate will be used for calculating savings realized during a given period. If a rate schedule change occurs partway through a period, an aggregate rate comprised of a weighted average between the old and the new rate will be used. The weighting will be based upon the portion of the period that each rate applied.

3.4 STANDARDS OF COMFORT SERVICE

The following section provides the standards of comfort, which the Tukwila Pool must maintain to ensure the comfort of the students, faculty, and staff, and upon which all energy calculations were based.

HVAC COMFORT

Heating, ventilating and air conditioning (HVAC) systems provided by McKinstry will provide comfort and indoor air quality in accordance with the Standards of Comfort below. This standard will pertain only to buildings and areas of buildings in which the McKinstry is installing HVAC equipment that has direct control over space comfort conditions. HVAC comfort conditions cannot be guaranteed when operable windows or doors are open.

Indoor Conditions

Occupied:
Winter Heating Minimum Setpoint – 70 degrees F
Winter Heating Maximum Setpoint – 74 degrees F
Summer Cooling Minimum Setpoint - 72 degrees F (where mechanical cooling systems are employed)
Summer Cooling Maximum Setpoint - 78 degrees F (where mechanical cooling systems are employed)

Unoccupied:
Minimum - 55 degrees F
Maximum - 85 degrees F (where mechanical cooling systems are employed)

Relative Humidity (If humidity control provided):
Minimum - 40%
Maximum - 60%

Minimum outside air per occupant:

In accordance with ASHRAE standards and Washington State Ventilation and Indoor Air Quality Code.

LIGHTING

Illumination Levels Verification:

Illumination levels shall be as recommended by the Illuminating Engineer's Society of North America (IESNA).

For primary and secondary schools, illumination will also meet 1997 WAC 246-366-120 lighting requirements (for Washington state school districts only).

Illumination Levels Design:

The lighting and illumination levels for lighting systems provided by McKinstry will meet or exceed current recommended practices by the Illuminating Engineering Society of North America for illumination levels for the various tasks that are conducted throughout the District.

3.5 ON-GOING OWNER RESPONSIBILITIES

The Tukwila Pool shall provide the following services as part of this energy services project. In the event that these services are not provided, energy savings and associated guarantees will be modified to reflect the associated impact.

1. Maintain all equipment per manufacturer's recommendations and proposed maintenance schedule.
2. Maintain all sequence of operations and performance criteria related to installed systems as proposed and designed.
3. Provide other FIM specific on-going responsibilities as provided in Table 3.2.
4. Provide McKinstry with copies of actual monthly utility billing information on a quarterly basis for the duration of the ongoing service period. This includes electric, natural gas, and fuel oil. For this project, the ongoing service period shall be one year. The associated facilities where utility information shall be provided include all meters providing direct or indirect service to all buildings included in this project.
5. Provide McKinstry all internal sub-meter data, including electric and condensate meters, providing direct or indirect service to all buildings included in this project.
6. Provide McKinstry access to Energy Management and Control Systems for the purpose of collecting and logging data over time as required for performance verification.
7. Anacortes School District shall notify McKinstry in writing with regards to any changes or alterations to buildings that will affect energy usage. This notification must be provided within two weeks of the change. This includes occupancy or use changes, computer load or other load changes, scheduling changes, and sequence of operations changes.

3.6 NON-PERFORMANCE

In the event the equipment performance is not met, McKinstry accepts responsibility for additional electricity used by the equipment as a result of the reduced performance. McKinstry may, at its option, execute any of the following options:

1. Repair or replace equipment as required to meet required performance.
2. Make payments for the extra energy consumption to the Tukwila Pool. In the event that McKinstry chooses the payment option, McKinstry reserves the right to select either an annual payment for the duration of the finance term or a one-time lump-sum payment of the same amount. In either case, the payment will be calculated based upon the quantity of additional electricity used and the Base Utility Rate as described above.

3.7 CHANGE OF USE

In the event that the Tukwila Pool chooses to make changes to the facility that require set point adjustments, longer operating hours, or continuous equipment operation, the Pool agrees that:

1. Savings deemed as met described above will continue to be deemed as met.
2. Additional cost of extended equipment operation is a cost of the change, not due to a failure of McKinstry or their equipment.
3. McKinstry shall not be responsible for any increase in energy, maintenance, or any other costs incurred as a result of the extended equipment operation.
4. McKinstry at its option may make a baseline energy use adjustment to account for a change-of-use at any facility.

Table 3.1 - Energy Savings Summary

Project	Tukwila Pool Phase I
Scenario	Pre-Final
Date	5/1/2012

					Electricity				Natural Gas		Water		Sewer		Total **
Facility Improvement Measures	Building	Guarantee Multiplier for Positive Numbers *	Guarantee Multiplier for Negative Numbers *	Net Effective Guarantee Multiplier *	kW	kW ($)	kWh	kWh ($)	Therm	Therm ($)	CCF	CCF ($)	CCF	CCF ($)	($)
01.02 Burner Upgrade	Tukwila Pool	90.0%	110.0%	90.0%	0.0	$0	0	$0	4,920	$4,861	0	$0	0	$0	$4,861
04.01 Air Handling Unit Controls and Retrocommissioning	Tukwila Pool	90.0%	110.0%	90.0%	0.0	$0	0	$0	12,194	$12,047	0	$0	0	$0	$12,047
08.01 Motors and Pumps	Tukwila Pool	90.0%	110.0%	90.0%	0.0	$0	14,031	$906	0	$0	0	$0	0	$0	$906
09.01 Lighting Upgrades	Tukwila Pool	90.0%	110.0%	90.0%	140.4	$177	60,367	$3,900	224	$221	0	$0	0	$0	$4,298
12.01 Condensing Domestic Water Heater	Tukwila Pool	90.0%	110.0%	90.0%	0.0	$0	0	$0	161	$159	0	$0	0	$0	$159
13.01 Exterior Door Replacement	Tukwila Pool	90.0%	110.0%	90.0%	0.0	$0	0	$0	0	$0	0	$0	0	$0	$0
17.01 Sand Filter Conversion	Tukwila Pool	90.0%	110.0%	90.0%	0.0	$0	0	$0	0	$0	0	$0	0	$0	$0
17.02 Pool Circulation Pump VFD and Valve Replacement	Tukwila Pool	90.0%	110.0%	90.0%	54.0	$68	47,900	$3,094	0	$0	0	$0	0	$0	$3,162
17.03 Chemtrol Replacement	Tukwila Pool	90.0%	110.0%	90.0%	0.0	$0	0	$0	0	$0	0	$0	0	$0	$0
17.04 Pool Water Heat Exchanger	Tukwila Pool	90.0%	110.0%	90.0%	0.0	$0	0	$0	0	$0	0	$0	0	$0	$0
18.01 New Plumbing Fixtures	Tukwila Pool	90.0%	110.0%	90.0%	0.0	$0	0	$0	493	$487	185	$658	185	$677	$1,822
30.01 Pool Liner, Edge Tile, and Drains	Tukwila Pool	90.0%	110.0%	90.0%	0.0	$0	0	$0	0	$0	0	$0	0	$0	$0
30.02 Bulkhead Renovation	Tukwila Pool	90.0%	110.0%	90.0%	0.0	$0	0	$0	0	$0	0	$0	0	$0	$0
30.03 ADA Pool Chair Lifts	Tukwila Pool	90.0%	110.0%	90.0%	0.0	$0	0	$0	0	$0	0	$0	0	$0	$0
30.04 Parking Lot ADA Improvements	Tukwila Pool	90.0%	110.0%	90.0%	0.0	$0	0	$0	0	$0	0	$0	0	$0	$0
30.05 Deep end Guard Chair	Tukwila Pool	90.0%	110.0%	90.0%	0.0	$0	0	$0	0	$0	0	$0	0	$0	$0
30.06 Remove Natatorium Ceiling Tiles	Tukwila Pool	90.0%	110.0%	90.0%	0.0	$0	0	$0	0	$0	0	$0	0	$0	$0
30.07 Locker Room Tile Replacement	Tukwila Pool	90.0%	110.0%	90.0%	0.0	$0	0	$0	0	$0	0	$0	0	$0	$0
30.08 Gutter/Deck Tile Replacement	Tukwila Pool	90.0%	110.0%	90.0%	0.0	$0	0	$0	0	$0	0	$0	0	$0	$0
30.14 Interior Door Replacement	Tukwila Pool	90.0%	110.0%	90.0%	0.0	$0	0	$0	0	$0	0	$0	0	$0	$0
30.29 Natatorium Sound Abatement	Tukwila Pool	90.0%	110.0%	90.0%	0.0	$0	0	$0	0	$0	0	$0	0	$0	$0
			Totals ***	**Totals** ***	**194.4**	**$245**	**122,297**	**$7,900**	**17,993**	**$17,776**	**185**	**$658**	**185**	**$677**	**$27,256**

* The savings shown in this table are less than the calculated savings unless a guarantee multiplier of 100% is shown.

** The guarantee is based on Key Performance Indicators shown in Table 3.2. Refer to Section 3 of the ESP for the method of converting Key Performance Indicators to dollars during the M&V period.

*** The guarantee is based on the aggregate savings for all FIMs, not on individual FIM savings.

Table 3.2 - M&V Plan Outline

Project:	Tukwila Pool Phase 1
Scenario:	Pre-Final
Date:	5/1/2012

							Audit Stage (Baselining)		Post Retrofit (Commissioning)						
ECM Name	Building	IPMVP Option	ID#	Key Performance Indicator	Baseline Value(s)	Proposed Value	Tasks	Party Responsible for Data	Tasks	Party Responsible for Data	Setup Timeline	Remote Alarming and/or Monitoring	Annual Tasks	Ongoing Owner Responsibilities	Agreed Upon Factors
04.01 Air Handling Unit Controls and Retrocommissioning	Tukwila Pool		1.	Minimum outside air percentage as fraction of total system airflow	44% based on 2 week temperature log	20%	Survey existing airside systems, operation, and conditions. Log HRU-1 supply, return, exhaust, outside air, space temperatures, and supply fan motor status for 2 week duration.		FPT and PTP testing of new AHU, including control sequence, and verification of setpoints			Alarm on operator override or alteration to outside air damper position or minimum position setpoint.	BMS trend or log supply, return, mixed, and outside air temperatures, mixed air damper position, space temperature and space temperature setpoints for 2 week duration.	Maintain equipment per manufacturer requirements. Avoid making unnecessary changes to equipment control sequences anc setpoints.	Owner driven changes to outside air minimum airflow setpoints, internal loads, weather conditions, sensor calibration errors, natural gas utility rate.
			2.	Annual operating hours	8,760 hours/year	Same as baseline	Survey existing airside system, operation, and conditions, Log supply fan status for 2 week duration.		Verify air handling unit schedule.			None proposed.	BMS trend or log supply fans to verify boiler schedule.	Maintain equipment per manufacturer requirements	Owner driven changes to equipment run schedules
			3.	Natatorium maximum humidity level	No control	55%	Survey existing airside system, operation, and conditions, Log space humidity for 2 week duration.		FPT and PTP testing of economizer based control of space humidity.			Alarm on operator override of space humidity setpoint below 55%.	BMS trend or log space humidity for 2 week duration.	Maintain equipment per manufacturer requirements	Owner driven changes to humidity setpoints, internal loads, weather conditions, sensor calibration errors, natural gas utility rate.
			4.	Natatorium average air temperature	87 F	87 F	Survey existing airside system, operation, and conditions, Log space temperature for 2 week duration.		None proposed.			None proposed.	BMS trend or log space temperatures for 2 week duration.	Maintain equipment per manufacturer requirements	Owner driven changes to space temperature setpoints, internal loads, weather conditions, sensor calibration errors, natural gas utility rate.
			1.	Pool makeup water demand	264,600 gallons/year	264,600 gallons/year	Survey existing pool condition, air temperature and humidity, water temperature.		FPT of meter to ensure proper functionality			None proposed.	Verify deduct being applied to utility bills	Maintain equipment per manufacturer requirements	Owner driven changes to space temperature and humidity setpoints, operation and maintenance of the pool requiring pool drainage, internal loads, weather conditions, pool condition, utility acceptance of deduct metering, affect of pool covers on evaporation rates
12.01 Condensing Domestic Water Heater	Tukwila Pool		1.	Domestic water heater combustion efficiency	83% based on water heater nameplate	90%	Survey existing water heater, operation, and condition.		None proposed.			None proposed.	None proposed.	Maintain equipment per manufacturer requirements.	Domestic hot water demands, existing plumbing insulation and pipe condition, natural gas rate, equipment condition.
17.02 Pool Circulation Pump VFD and Valve Replacement	Tukwila Pool		1.	Pressure differential across automatic flow control device.	12 psi	5 psi	Survey existing pool circulation pump condition, operation, pressure differential across autflow		FPT and PTP test of pump control of pressure differential across autoflow.			Alarm on operator override of pressure differential setpoint.	BMS trend or log pump speed or pump kW, pressure differential across autoflow.	Maintain equipment per manufacturer requirements.	Owner or operator changes to circulation pump speed or pressure differential setpoint, autoflow condition.
			1.	Annual facility operating hours	4,797 hours/year	4,797 hours/year	Survey facility daily schedules and equipment calendar, interview facility staff about times of day when employees and patrons are active in the building.		FPT test of new automatic pool covers			None proposed.	None proposed.	Maintain equipment per manufacturer requirements	Pool daily schedule, operator pool cover deployment, equipment condition, internal loads, equipment operating hours, weather conditions, natatorium space temperature and humidity setpoints.
18.01 New Plumbing Fixtures	Tukwila Pool		1.	Plumbing fixture flow rates	3 gpf water closets, 2.2 gpm lavatories, 2.5 gpm showers	1.6 gpf water closets, 0.5 gpm lavatories, 2.0 gpm showers	Survey existing domestic water fixtures for usage and flow rates.		Verify installed fixture flow rates as indicated on the equipment submittal meets or exceeds the proposed flows			None proposed.	None proposed.	Maintain equipment per manufacturer requirements	Pool daily schedule, water fixture usage, occupant count, equipment condition.
			2.	Daily occupant/patron count	5 full time employees, 105 patrons	5 full time employees, 105 patrons	Survey facility usage and anc event calendar		None proposed.			None proposed.	None proposed.	Maintain equipment per manufacturer requirements	Occupant counts, pool daily schedule.

Table 3.3 - Base Utility Rates

Project	Tukwila Pool Phase I
Scenario	Pre-Final
Date	5/2/2012

Building_Name	Utility_Provider	Rate_Name	Utility_Type	Dollars_Per_Unit	Units	Published_Date_Effective
Tukwila Pool	Puget Sound Energy (PSE)	31	Natural Gas	$0.987960	Therms	1/1/2012
Tukwila Pool	Temporary	Com PW	Water	$3.550000	CCF	1/1/2011
Tukwila Pool	Temporary	Com SW	Sewer	$3.650000	CCF	1/1/2011
Tukwila Pool	Seattle City Light	MDT	Electricity	$0.064600	kWh	1/1/2012
Tukwila Pool	Seattle City Light	MDT Demand	Electricity Demand	$1.260000	kW	1/1/2011

Project Financials

4.1 MAXIMUM PROJECT COST

McKinstry guarantees that the Maximum Project Cost will not exceed $1,662,438. This cost does not include sales tax, WA State Interagency fees, or the Utility rebate, which are estimated. With sales tax and interagency fees included, the estimated Project Cost will be $1,862,380. (McKinstry does not guarantee the value of sales tax, State fees, or the utility incentive.)

4.2 PROJECT COST TABLE

See Table 4.1 – "Budget Summary Breakdown" - all fee percentages and costs are unique to the project.

4.3 ITEMS INCLUDED IN MAXIMUM PROJECT COST

Maximum project costs include the following:

1. Engineering audit, including the cost for preparation of this proposal.
2. Engineering design.
3. Construction management services.
4. Installation of McKinstry equipment including the following costs as specified in the scope of work:
   - A. All costs paid by McKinstry for the installation of the equipment. This includes costs paid to subcontractors or directly to McKinstry personnel, when related to installation or system verification of McKinstry equipment.
   - B. The portion of reasonable travel, lodging, and meal expenses of officers or employees incurred while traveling in discharge of duties connected with the Work.
   - C. Cost of all equipment, materials, supplies, and equipment incorporated in the Work, including costs of transportation thereof.
   - D. Cost or rental charges, including transportation and maintenance, of all materials, supplies, equipment, temporary facilities, and hand tools not owned by the workers, which are consumed in the performance of the Work and cost less salvage value on such items used but not consumed which remain the property of McKinstry.
   - E. Cost of premiums for all bonds and insurance, which McKinstry is required to purchase and maintain.
   - F. Sales, use or similar taxes related to the Work and for which McKinstry is liable imposed by a governmental authority.
   - G. Permit fees, royalties, and deposits lost for causes other than McKinstry's negligence.
   - H. Losses and expenses not compensated by insurance or otherwise, sustained by McKinstry in connection with the Work, provided they have resulted from causes other than the fault or neglect of McKinstry. Such losses shall include settlements made with the written consent and approval of the Owner. If, however, such loss requires reconstruction and McKinstry is placed in charge thereof, he shall be paid for his services a fee.
   - I. Minor expenses such as telegrams, long distance telephone calls, telephone service at the site, express mail services, and similar petty cash items.

J. Demolition cost and cost of removal of all debris.

K. Costs incurred due to an emergency affecting the safety of persons and property.

L. Other costs incurred in the performance of the Work if and to the extent approved in advance in writing by the Owner.

M. The cost of contingency and an allowance for Owner initiated scope improvements.

N. Cost of equipment startup, training, system verification and balancing performed by McKinstry.

5. Construction Bonds (including Performance & Payment and Retention bonds), Liability Insurance, and Builder's Risk Insurance.

6. McKinstry fee. This includes McKinstry's remuneration for compensation of personnel, expenses, risks related to the project, overhead, and profit.

7. McKinstry shall provide a Schedule of Values. The schedule of values will include all costs related to the installation of McKinstry's equipment. See TABLE 4.5 – "Construction Schedule of Values/Projected Progress Billings."

4.4 CONSTRUCTION CONTINGENCY

A construction contingency of the direct construction costs has been established for this project. McKinstry is authorized to expend the contingency for items necessary to complete the original scope of this project pending review by the Owner and the Department of Enterprise Services (WaDES). The intent of the contingency is for ESCO requested changes, unforeseen conditions or latent changes, and owner directed changes beyond what was originally estimated and scoped by the ESCO. Contingency funds should be held in reserve until released in writing by McKinstry.

ESCO mark-ups on contingency funds will be addressed as follows:

- ESCO requested changes outside of scope– OH&P and CM only, design to be discussed
- ESCO requested changes inside of scope – CM only, design to be discussed
- Unforeseen or latent conditions – OH&P, CM, and applicable design
- Owner directed changes – All applicable mark-ups

All unused construction contingency funds shall reduce the overall project cost to the owner. The Owner, State WaDES, and McKinstry will jointly manage any contingency left after the project scope is completed.

4.5 ALLOWANCES

McKinstry may set aside allowances as identified in TABLE 4.1 - "Budget Summary Breakdown" for specific areas of work that have been identified as a potential cost impact but cannot be determined at this stage. Should the allowance not be adequate, the Owner will be advised and McKinstry will be compensated for any additional costs.

4.6 ONGOING SERVICES

No On-going Services in years 2-10 have been proposed for this phase of the project.

Project Financials

4.7 ACCOUNTING RECORDS

McKinstry shall check all material, equipment, and labor entering into the Work and shall keep account as may be necessary for proper financial management under this Agreement. The Owner shall be afforded access to all the ESCO's records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to this Contract, and the Contract shall preserve all such records for a period of three years, or for such longer period as may be required by law, after the final payment.

4.8 RECONCILIATION OF LABOR & MATERIAL COSTS

The maximum project allowable cost is based on firm and estimated labor and material costs. In recognition that actual Labor & Material costs may vary from the estimate, the following procedures are established to reconcile this difference:

1. If the total project cost at completion exceeds the estimated amount (plus contingency), the additional costs will be borne by McKinstry at their expense.

2. If the total project costs at completion are less than the estimated proposal amount (less contingency), the savings will be retained by the Owner.

There shall be no cost savings split between the Owner and McKinstry

The following table outlines whether the Labor and Material costs are Estimated or Firm in this Energy Services Proposal. It further defines the method for providing firm costs during the pre-construction period (after authorization of this Energy Services Proposal). The table also clearly identifies which items are subject to reconciliation at the end of the project. As a general rule, those costs that are estimated in the proposal and bid or quoted during the pre-construction phase are reconciled at the end of the project. Those items that are firm in the proposal will be firm throughout the project, and not reconciled at the end of the project. End of Project reconcile shall be through subcontractor invoice substantiation.

L&M Costs	As Proposed In ESP	Pre-Construction Costing	End of Project - Reconciled
Controls Systems	Estimated	Proposal	Yes
Major Equipment	Estimated	Proposal	Yes
Mechanical	Estimated	Proposal	Yes
Electrical	Estimated	Proposal	Yes
ESCO Fees	Firm – Fee	Firm - Fee	No
Contingency	Estimated	Estimated	Yes

4.9 ESCO COMPENSATION

1. Terms: Net 30 days from the date of invoice, monthly billing as the job progresses.
2. Payments: At a minimum, payments will be made in the amount of 100%, less retention of five percent per the contract, at the completion and implementation of any individual Facility Improvement Measure (FIM) in the amount of that FIM as delineated in the contract. If more than one FIM is completed in a monthly period, all of those FIM's will be paid.
3. Finance Charges on Unpaid balances: Payments due and unpaid shall be subject to interest charges per RCW 39.76.

4. Construction Period Finance: McKinstry may charge construction period finance for projects whereby the anticipated billing lags the earned schedule of values by more than 90 days. Table 4.5 provides the anticipated construction period finance charges for this project based on the estimated earned value each month vs. the anticipated billing collection schedule. Construction period finance will be calculated on the un-billed balance in excess of three months at the rate of Prime plus 2% per annum. Charges accrue until balances are paid in full. Interest charges will be calculated daily, compounded monthly.
5. Substantiation: McKinstry will do an accounting of finance charges progressively through the project, and at contract completion submit a change request itemizing the summary of additional costs for implementation. The contract will then be increased to reflect the same and finance charges will be paid within thirty days of the date of approved substantiation.

4.10 FINANCING

McKinstry enjoys over 45 years of experience within the engineering and contracting industry and its financial strength exceeds the industry average. This strength makes it possible to provide and assist with the financing needs of its customers. Long standing relationships with vendors assures reasonable pricing and excellent payment terms.

4.11 THIS PROJECT-LONG TERM FINANCING

WA State Agency:

Through the Washington State LOCAL (Local Option Capital Asset Lending) program, state agencies can easily access low cost financing. Financing terms are dependent on the life of the equipment, with a current maximum of twelve years. The program uses the State of Washington's credit (currently Moody's Aa2), resulting in a low fixed rate.

Other Public/Private/Non –Profit:

McKinstry Capital can help Public and Private entities access third party financing through our network of national, regional and local financiers. Interest rate depends on the borrower's credit, collateral, size of the transaction, tenor, technology, and numerous other criteria.

Financed Amount	$1,569,585
Utility Rebate	$21667
Capital Infusion	$250,000
Term of Loan	15
Interest Rate	3.0%
Number of Payment per Year	2
Annual Payment	$130,712

Table 4.3 in the end of section provides a Cash Flow Analysis for this project over 20 years.

Project Financials

4.12 TERMINATION VALUE

Refer to program guidelines for information on Termination values.

4.13 TERMS AND CONDITIONS

TERMS OF AGREEMENT

The Contract shall be effective and binding upon the parties immediately upon its execution and the period from contract execution until the Commencement Date shall be known as the "Interim Period". All energy savings achieved during the interim period will be fully credited to Owner, and may be used to offset any loss of energy savings; as mutually agreed to by the Owner and McKinstry.

INSURANCE AND BONDING

McKinstry shall provide a Payment and Performance bond, Retention bond and Builder's Risk Insurance.

For the purposes of this agreement, the "Sum Amount of Bond" shall be (See Table 4.1 –"Budget Summary Breakdown").

1. The bond amount consists of Labor and Materials and State Sales Tax.
2. This bond does not include any construction contingencies.
3. Certificates of General Liability Insurance will be provided prior to Contract Signing. The State Of Washington shall be named as An Additional Insured on all insurance certificates.
4. McKinstry shall provide a payment and performance bond in the amount of 100% of the construction cost, as defined in the Energy Services Agreement Addendum. The amount shall include all authorized changes and state sales tax. The Bond shall be in the form attached to the Conditions of the Energy Services Agreement. The Contract listed on the bond form shall be the Addendum No. and Agreement No. which incorporates the work and the "Contract Date" shall be the date of the Addendum. The full and just sum of the Bond shall be as defined above and shall include the actual cost of purchasing and installing McKinstry's Equipment. The Bond shall specifically exclude coverage for those portions of the Energy Services Agreement and/or Energy Services Agreement Addendum pertaining to design services, energy cost savings guarantee, maintenance guarantee, utility incentives, efficiency guarantees, and any other clauses which do not relate specifically to construction management and supervision of work for purchasing and installing of McKinstry's Equipment, or for work to be accomplished by the Owner. The Bond shall be with a Surety or Bonding Company that is registered with the State of Washington Insurance Commissioner's Office.

TABLE 4.1 BUDGET SUMMARY

Date: 5/2/2012

Project: **Tukwila Pool Phase I**

Budget Phase: **DRAFT**

Building: ***Pre-Final***

Estimator: **SH**

FIM	FIM Description	Mechanical	Electrical	EMCS	Lighting	General	Equipment	Other	TOTAL
13784	30.01 Pool Liner, Edge Tile, and Drains	$0	$0	$0	$0	$150,217	$0	$0	$150,217
13788	17.02 Pool Circulation Pump VFD and Valve Replac	$0	$0	$0	$0	$63,410	$0	$0	$63,410
13789	30.03 ADA Pool Chair Lifts	$0	$0	$0	$0	$24,012	$0	$0	$24,012
13793	17.03 Chemtrol Replacement	$0	$0	$0	$0	$12,000	$0	$0	$12,000
13803	04.01 Air Handling Unit Controls and Retrocommissi	$46,857	$2,286	$120,828	$0	$6,822	$17,856	$0	$194,650
13806	08.01 Motors and Pumps	$2,372	$1,187	$0	$0	$0	$0	$0	$3,559
14860	01.02 Burner Upgrade	$38,735	$571	$1,664	$0	$0	$0	$0	$40,970
13786	12.01 Condensing Domestic Water Heater	$8,483	$3,571	$0	$0	$699	$32,082	$0	$44,836
13787	17.01 Sand Filter Conversion	$0	$0	$0	$0	$79,080	$0	$0	$79,080
13785	30.02 Bulkhead Renovation	$0	$0	$0	$0	$7,788	$0	$0	$7,788
13791	09.01 Lighting Upgrades	$0	$0	$0	$56,781	$0	$0	$0	$56,781
13794	30.06 Remove Natatorium Ceiling Tiles	$0	$0	$0	$0	$27,150	$0	$0	$27,150
14457	30.29 Natatorium Sound Abatement	$0	$0	$0	$0	$70,317	$0	$0	$70,317
13790	30.04 Parking Lot ADA Improvements	$0	$0	$0	$0	$67,364	$0	$0	$67,364
13795	30.07 Locker Room Tile Replacement	$0	$0	$0	$0	$25,752	$0	$0	$25,752
13809	30.14 Interior Door Replacement	$0	$0	$0	$0	$28,824	$0	$0	$28,824
13807	17.04 Pool Water Heat Exchanger	$14,227	$0	$0	$0	$0	$9,902	$0	$24,129
13808	18.01 New Plumbing Fixtures	$15,647	$0	$0	$0	$3,500	$0	$0	$19,147
13796	30.08 Gutter/Deck Tile Replacement	$0	$0	$0	$0	$34,038	$0	$0	$34,038
13797	13.01 Exterior Door Replacement	$0	$0	$0	$0	$10,125	$0	$0	$10,125
13792	30.05 Deep end Guard Chair	$0	$0	$0	$0	$5,640	$0	$0	$5,640
	Site Supervision / Safety								$133,580
A 1. SUBTOTAL		**$126,320**	**$7,616**	**$122,492**	**$56,781**	**$616,738**	**$59,840**	**$0**	**$1,123,368**
A 2. SUBTOTAL		**$126,320**	**$7,616**	**$122,492**	**$56,781**	**$616,738**	**$59,840**	**$0**	**$1,123,368**
1 Construction Bonds	1.1%	$1,390	$84	$1,347	$625	$6,784	$658	$0	$12,357
TOTAL CONSTRUCTION COST (A1+Bond) = A									**$1,135,725**
B. PROFESSIONAL SERVICES									
1 Audit Fee	$29,151	lump sum							$29,151
2 Design - Mech/plbg/elec/arch/struct	10.0%	B2 (%) x A1							$112,337
3 Construction Management & Project Admin	6.0%	B3 (%) x A1							$67,402
TOTAL PROFESSIONAL SERVICES (B1+B2+B3) = B									**$208,890**
C. OTHER COSTS									
1 Project Contingency	10.0%	C1 (%) x (A total)							$113,573
2 Performance Assurance (M&V)	$ 2,044	lump sum							$2,044
TOTAL OTHER COSTS = C									**$115,617**
D. OVERHEAD COSTS AND FEE									
1 Overhead/Fee	18.0%	D1 (%) x A1							$202,206
TOTAL ESCO FEES = D									**$202,206**
E. TOTAL GUARANTEED CONSTRUCTION & ESCO SERVICES (A + B + C + D) = E									**$1,662,438**
F. NON-GUARANTEED COSTS									
1 Sales Tax	9.5%	F1% x E (Excluding Contigency)							$147,142
2 WA Department of Enterprise Services Fee	$ 52,800	lump sum							$52,800
TOTAL NON-GUARANTEED COSTS = F									**$199,942**
G. TOTAL MAXIMUM PROJECT COST									**$1,862,380**
H. Allotments (NIC)									
1 30.03 UV	$ 74,850								$74,850
2 17.05 Pool Covers	$ 199,483								$199,483
3 30.33 Locker Room Privacy Improvements	$ 39,860								$39,860
4 30.11 Locker Room Floor Resurfacing	$ 92,208								$92,208
5 30.15 Deck Resurfacing	$ 145,432								$145,432
6 30.26 New Enrance, Vestibule, and Hallways	$ 164,410								$164,410
7 30.19 Reception Desk Remodel	$ 17,369								$17,369
8 30.17 Admin Office Remodel	$ 32,087								$32,087
9 30.28 Modify Family Changing Rooms	$ 11,320								$11,320
10 30.09 Staff Locker Room Renovation	$ 20,319								$20,319
11 13.02 Natatorium Glazing	$ 36,409								$36,409
12 7.01 Pool Fill Deduct Meter	$ 7,540								$7,540
13 30.27 New Entry Womens Locker Room	$ 14,112								$14,112
TOTAL ALLOTMENTS = H									**$855,397**

Table 4.2 - Facility Improvement Measure (FIM) Summary

Project	Tukwila Pool Phase I
Scenario	Pre-Final
Date	May 2, 2012

	Facility Improvement Measures	FIM Description	Building	Budget *	Annual Utility Savings	Annual Operational Savings **	Simple Payback (SPB)	Potential Incentives ***	Non-Guaranteed Net Customer Cost (with Incentives)	Non-Guaranteed Simple Payback (SPB) (with Incentives)
14860	01.02 Burner Upgrade	The current boiler burner system is experiencing numerous failures and other maintenence issues, provide new high efficiency burner and linkageless controls.	Tukwila Pool	$77,240	$0	$0	0.0	$0	$77,240	0.0
13803	04.01 Air Handling Unit Controls and Retrocommissioning	Provide DDC controls upgrades, control damper repairs, and retrocommissioning services to the natatorium and locker room air handling units.	Tukwila Pool	$366,972	$12,047	$0	30.5	$0	$366,972	30.5
13806	08.01 Motors and Pumps	Replace the building HW pump and motor. Replace the Locker Room SFAN and EFAN motors.	Tukwila Pool	$6,709	$906	$0	7.4	$2,339	$4,370	4.8
13791	09.01 Lighting Upgrades	Re-design pool area lighting to increase both energy and illumination efficiency. Existing office area and storage area lighting will be retrofitted with energy efficient lighting and stand alone occupancy based	Tukwila Pool	$107,049	$4,298	$683	21.5	$10,777	$96,272	19.3
13786	12.01 Condensing Domestic Water Heater	Replace existing domestic water heater with new condensing domestic water heater.	Tukwila Pool	$84,528	$259	$0	326.7	$0	$84,528	326.7
13797	13.01 Exterior Door Replacement	Replace existing exterior doors.	Tukwila Pool	$19,089	$0	$0	0.0	$0	$19,089	0.0
13787	17.01 Sand Filter Conversion	Replace existing vacuum DE filter system with new filter type.	Tukwila Pool	$149,089	$0	$0	0.0	$0	$149,089	0.0
13788	17.02 Pool Circulation Pump VFD and Valve	Convert existing pool circulation pumps to variable flow control, replace broken valves.	Tukwila Pool	$119,546	$2,586	$0	46.2	$8,551	$110,995	42.9
13793	17.03 Chemtrol Replacement	Replace existing pool chemical treatment system.	Tukwila Pool	$22,624	$0	$0	0.0	$0	$22,624	0.0
13807	17.04 Pool Water Heat Exchanger	Provide new pool water heat exchanger.	Tukwila Pool	$45,490	$0	$0	0.0	$0	$45,490	0.0
13808	18.01 New Plumbing Fixtures	Provide retrofit to or replacement of existing plumbing fixtures, including lavatories, showers, water closets, and urinals.	Tukwila Pool	$36,098	$1,822	$0	19.8	$0	$36,098	19.8
13784	30.01 Pool Liner, Edge Tile, and Drains	Provide new pool liner, water edge tile, and main drains.	Tukwila Pool	$283,203	$0	$0	0.0	$0	$283,203	0.0
13785	30.02 Bulkhead Renovation	Renovate existing bulkhead.	Tukwila Pool	$14,683	$0	$0	0.0	$0	$14,683	0.0
13789	30.03 ADA Pool Chair Lifts	Provide (2) new ADA pool chair lifts.	Tukwila Pool	$22,635	$0	$0	0.0	$0	$22,635	0.0
13790	30.04 Parking Lot ADA Improvements	Provide parking lot ADA improvements for improved facility access.	Tukwila Pool	$127,000	$0	$0	0.0	$0	$127,000	0.0
13792	30.05 Deep end Guard Chair	Replace existing deep end guard chair.	Tukwila Pool	$10,633	$0	$0	0.0	$0	$10,633	0.0
13794	30.06 Remove Natatorium Ceiling Tiles	Remove existing suspended ceiling in natatorium, add sound abatement.	Tukwila Pool	$51,186	$0	$0	0.0	$0	$51,186	0.0
13795	30.07 Locker Room Tile Replacement	Replace existing locker room tile, including shower and wall tiles.	Tukwila Pool	$48,550	$0	$0	0.0	$0	$48,550	0.0
13796	30.08 Gutter/Deck Tile Replacement	Replace existing gutter and tile deck.	Tukwila Pool	$64,172	$0	$0	0.0	$0	$64,172	0.0
13809	30.14 Interior Door Replacement	Replace existing interior doors.	Tukwila Pool	$54,342	$0	$0	0.0	$0	$54,342	0.0
14457	30.29 Natatorium Sound Abatement	Add sound abatement to natatorium.	Tukwila Pool	$132,568	$0	$0	0.0	$0	$132,568	0.0
			Totals	**$1,843,406**	**$21,918**	**$683**	**81.6**	**$21,667**	**$1,821,739**	**80.6**

* Since design cost, audit cost, etc. are distributed among the FIMs, the total project cost will not go up or down by exactly the amounts shown here if a FIM or FIMs are dropped.
** For non recurring operational savings, the values are averaged over the 30 year length of this analysis.
*** Incentives are contingent on final approval and are not guaranteed. Funds are shown for reference only.

Table 4.2 - Facility Improvement Measure (FIM) Summary

Project	Tukwila Pool Phase I
Scenario	Pre-Final
Date	May 2, 2012

	Facility Improvement Measures	FIM Description	Building	Budget *	Annual Utility Savings	Annual Operational Savings **	Simple Payback (SPB)	Potential Incentives ***	Non-Guaranteed Net Customer Cost (with Incentives)	Non-Guaranteed Simple Payback (SPB) (with Incentives)
14860	01.02 Burner Upgrade	The current boiler burner system is experiencing numerous failures and other maintenence issues, provide new high efficiency burner and linkageless controls.	Tukwila Pool	$77,240	$0	$0	0.0	$0	$77,240	0.0
13803	04.01 Air Handling Unit Controls and Retrocommissioning	Provide DDC controls upgrades, control damper repairs, and retrocommissioning services to the natatorium and locker room air handling units.	Tukwila Pool	$366,972	$12,047	$0	30.5	$0	$366,972	30.5
13815	07.01 Pool Fill Deduct Meter	Provide deduct and charge meters for pool fill and blow down. Coordinate with local water utilities for rate modifications.	Tukwila Pool	$7,554	$1,163	$0	6.5	$0	$7,554	6.5
13806	08.01 Motors and Pumps	Replace the building HW pump and motor. Replace the Locker Room SFAN and EFAN motors.	Tukwila Pool	$6,709	$906	$0	7.4	$2,339	$4,370	4.8
13791	09.01 Lighting Upgrades	Re-design pool area lighting to increase both energy and illumination efficiency. Existing office area and storage area lighting will be retrofitted with energy efficient lighting and stand alone occupancy based lighting controls.	Tukwila Pool	$107,049	$4,298	$683	21.5	$10,777	$96,272	19.3
13786	12.01 Condensing Domestic Water Heater	Replace existing domestic water heater with new condensing domestic water heater.	Tukwila Pool	$84,528	$259	$0	326.7	$0	$84,528	326.7
13797	13.01 Exterior Door Replacement	Replace existing exterior doors.	Tukwila Pool	$19,089	$0	$0	0.0	$0	$19,089	0.0
13816	13.02 Natatorium Glazing	Provide new natatorium glazing.	Tukwila Pool	$36,480	$0	$0	0.0	$0	$36,480	0.0
13787	17.01 Sand Filter Conversion	Replace existing vacuum DE filter system with new filter type.	Tukwila Pool	$149,089	$0	$0	0.0	$0	$149,089	0.0
13788	17.02 Pool Circulation Pump VFD and Valve Replacement	Convert existing pool circulation pumps to variable flow control, replace broken valves.	Tukwila Pool	$119,546	$2,586	$0	46.2	$8,551	$110,995	42.9
13793	17.03 Chemtrol Replacement	Replace existing pool chemical treatment system.	Tukwila Pool	$22,624	$0	$0	0.0	$0	$22,624	0.0
13807	17.04 Pool Water Heat Exchanger	Provide new pool water heat exchanger.	Tukwila Pool	$45,490	$0	$0	0.0	$0	$45,490	0.0
13814	17.05 Pool Covers	Provide automatic pool covers.	Tukwila Pool	$199,875	$8,570	$0	23.3	$43,092	$156,783	18.3
13808	18.01 New Plumbing Fixtures	Provide retrofit to or replacement of existing plumbing fixtures, including lavatories, showers, water closets, and urinals.	Tukwila Pool	$36,098	$1,822	$0	19.8	$0	$36,098	19.8
13784	30.01 Pool Liner, Edge Tile, and Drains	Provide new pool liner, water edge tile, and main drains.	Tukwila Pool	$283,203	$0	$0	0.0	$0	$283,203	0.0
13785	30.02 Bulkhead Renovation	Renovate existing bulkhead.	Tukwila Pool	$14,683	$0	$0	0.0	$0	$14,683	0.0
13789	30.03 ADA Pool Chair Lifts	Provide (2) new ADA pool chair lifts.	Tukwila Pool	$22,635	$0	$0	0.0	$0	$22,635	0.0
13790	30.04 Parking Lot ADA Improvements	Provide parking lot ADA improvements for improved facility access.	Tukwila Pool	$127,000	$0	$0	0.0	$0	$127,000	0.0
13792	30.05 Deep end Guard Chair	Replace existing deep end guard chair.	Tukwila Pool	$10,633	$0	$0	0.0	$0	$10,633	0.0
13794	30.06 Remove Natatorium Ceiling Tiles	Remove existing suspended ceiling in natatorium, add sound abatement.	Tukwila Pool	$51,186	$0	$0	0.0	$0	$51,186	0.0
13795	30.07 Locker Room Tile Replacement	Replace existing locker room tile, including shower and wall tiles.	Tukwila Pool	$48,550	$0	$0	0.0	$0	$48,550	0.0
13796	30.08 Gutter/Deck Tile Replacement	Replace existing gutter and tile deck.	Tukwila Pool	$64,172	$0	$0	0.0	$0	$64,172	0.0
13798	30.09 Staff Locker Room Renovation	Provide renovation of existing staff locker room, including repair of failed plumbing and upgrade to high efficiency plumbing fixtures.	Tukwila Pool	$20,360	$0	$0	0.0	$0	$20,360	0.0

	Facility Improvement Measures	FIM Description	Building	Budget *	Annual Utility Savings	Annual Operational Savings **	Simple Payback (SPB)	Potential Incentives ***	Non-Guaranteed Net Customer Cost (with Incentives)	Non-Guaranteed Simple Payback (SPB) (with Incentives)
13800	30.11 Locker Room Floor Resurfacing	Resurface locker room flooring.	Tukwila Pool	$92,389	$0	$0	0.0	$0	$92,389	0.0
13809	30.14 Interior Door Replacement	Replace existing interior doors.	Tukwila Pool	$54,342	$0	$0	0.0	$0	$54,342	0.0
13810	30.15 Deck Resurfacing	Resurface existing deck and repair deck drains.	Tukwila Pool	$145,718	$0	$0	0.0	$0	$145,718	0.0
13817	30.17 Admin Office Remodel	Remodel administration offices.	Tukwila Pool	$32,151	$0	$0	0.0	$0	$32,151	0.0
13819	30.19 Reception Desk Remodel	Remodel existing reception area.	Tukwila Pool	$17,403	$0	$0	0.0	$0	$17,403	0.0
13826	30.26 New Entrance, Vestibule, and Hallways	Provide new natatorium entrance and vestibule, including bleacher access control.	Tukwila Pool	$164,734	$0	$0	0.0	$0	$164,734	0.0
14456	30.28 Modify Family Changing Rooms	Modify family changing rooms.	Tukwila Pool	$11,343	$0	$0	0.0	$0	$11,343	0.0
14457	30.29 Natatorium Sound Abatement	Add sound abatement to natatorium.	Tukwila Pool	$132,568	$0	$0	0.0	$0	$132,568	0.0
14458	30.30 UV	Add UV treatment system to pool.	Tukwila Pool	$74,997	$0	$0	0.0	$0	$74,997	0.0
14631	30.33 Locker Room Privacy Improvements	Provide new changing rooms and private showers for locker rooms.	Tukwila Pool	$39,938	$0	$0	0.0	$0	$39,938	0.0
			Totals	**$2,686,348**	**$31,652**	**$683**	**83.1**	**$64,759**	**$2,621,589**	**81.1**

* Since design cost, audit cost, etc. are distributed among the FIMs, the total project cost will not go up or down by exactly the amounts shown here if a FIM or FIMs are dropped.
** For non recurring operational savings, the values are averaged over the 30 year length of this analysis.
*** Incentives are contingent on final approval and are not guaranteed. Funds are shown for reference only.

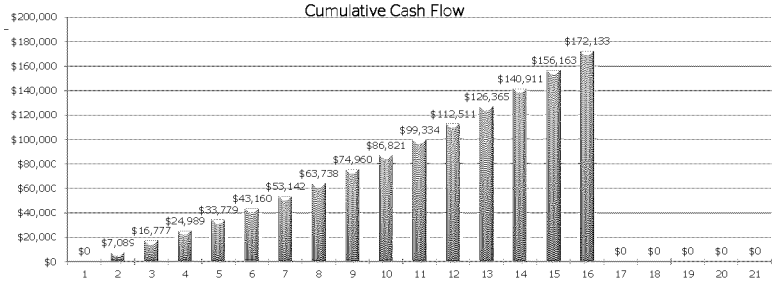
Table 4.3 - Cash Flow Analysis

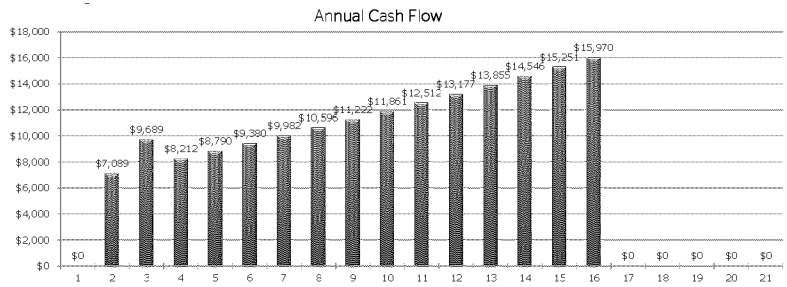
Project	Tukwila Pool Project
Scenario	All FIMs
Date	January 3, 2012

Annual Tax Revenue	$100,000
First Cost	$1,841,252
Utility Rebate	$21,667
Net Customer Cost	$1,819,585
Initial Capital Infusion	$250,000
Amount Financed	$1,569,585
Annual Utility Savings	$27,256
Future Capital Infusion	$0
Total Capital Infusion	**$250,000**
Cash Flow Analysis Period	15

Annual Measure and Verification Fee	$2,044
% M&V of Utility Savings	7.5%
M&V Start Year	2.0
M&V End Year	2.0

Financing Term (Years)	15.00
Annual Interest Rate (%)	3.00%
Payments per Year	2.00
First Payment Due Date	11/1/12





Cash Flow Analysis:

Period		0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0
Year		2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
First & Replacement		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Equipment Depreciation		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Tax Credit Impact		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Subtotal		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Annual Utility Savings			$27,256	$27,256	$27,256	$27,256	$27,256	$27,256	$27,256	$27,256	$27,256	$27,256	$27,256	$27,256	$27,256	$27,256	$27,256
Utility Escalation	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Total Utility Savings		**$0**	**$27,801**	**$28,357**	**$28,924**	**$29,503**	**$30,093**	**$30,695**	**$31,309**	**$31,935**	**$32,573**	**$33,225**	**$33,889**	**$34,567**	**$35,259**	**$35,964**	**$36,683**
Annual Tax Revenue			$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000	$100,000
Tax Revenue Escalation	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total Tax Revenue		**$0**	**$100,000**	**$100,000**	**$100,000**	**$100,000**	**$100,000**	**$100,000**	**$100,000**	**$100,000**	**$100,000**	**$100,000**	**$100,000**	**$100,000**	**$100,000**	**$100,000**	**$100,000**
Annual O&M Savings			$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000
O&M Escalation	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total O&M Savings		**$0**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**	**$10,000**
M&V Fee	0.0%	$0	$0	$2,044	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Annual Savings		$0	$137,801	$140,401	$138,924	$139,503	$140,093	$140,695	$141,309	$141,935	$142,573	$143,225	$143,889	$144,567	$145,255	$145,964	$146,683
Accumulated Savings		**$0**	**$137,801**	**$278,202**	**$417,127**	**$556,629**	**$696,722**	**$837,417**	**$978,725**	**$1,120,660**	**$1,263,234**	**$1,406,459**	**$1,550,348**	**$1,694,915**	**$1,840,174**	**$1,986,137**	**$2,132,820**
Annual Finance/Lease Payment		$ -	($130,712)	($130,712)	($130,712)	($130,712)	($130,712)	($130,712)	($130,712)	($130,712)	($130,712)	($130,712)	($130,712)	($130,712)	($130,712)	($130,712)	($130,712)
Annual Cash Flow		$0	$7,089	$9,689	$8,212	$8,790	$9,380	$9,982	$10,596	$11,222	$11,861	$12,512	$13,177	$13,855	$14,546	$15,251	$15,970
Cumulative Cash Flow:		**$0**	**$7,089**	**$16,777**	**$24,989**	**$33,779**	**$43,160**	**$53,142**	**$63,738**	**$74,960**	**$86,821**	**$99,334**	**$112,511**	**$126,365**	**$140,911**	**$156,163**	**$172,133**
Present Value (PV) Factor		1.00	1.00	0.95	0.91	0.86	0.82	0.78	0.75	0.71	0.68	0.64	0.61	0.58	0.56	0.53	0.51
Annual Cash Flow PV		$0	$7,089	$9,227	$7,448	$7,593	$7,717	$7,821	$7,907	$7,975	$8,028	$8,066	$8,089	$8,101	$8,100	$8,088	$8,066
Cumulative PV		**$0**	**$7,089**	**$16,316**	**$23,764**	**$31,358**	**$39,075**	**$46,896**	**$54,803**	**$62,779**	**$70,807**	**$78,872**	**$86,962**	**$95,062**	**$103,162**	**$111,250**	**$119,316**

Notes (1) _____

(2) _____

(3) _____

Tukwila Pool

Directed Engineering Study

DRAFT

Location: Tukwila, WA

Date: 02 May 2012

McKinstry
For The Life Of Your Building

Section 5.0 Directed Engineering Study

Table of Contents

Section 5.0 Directed Engineering Study

1. PURPOSE AND ORGANIZATION

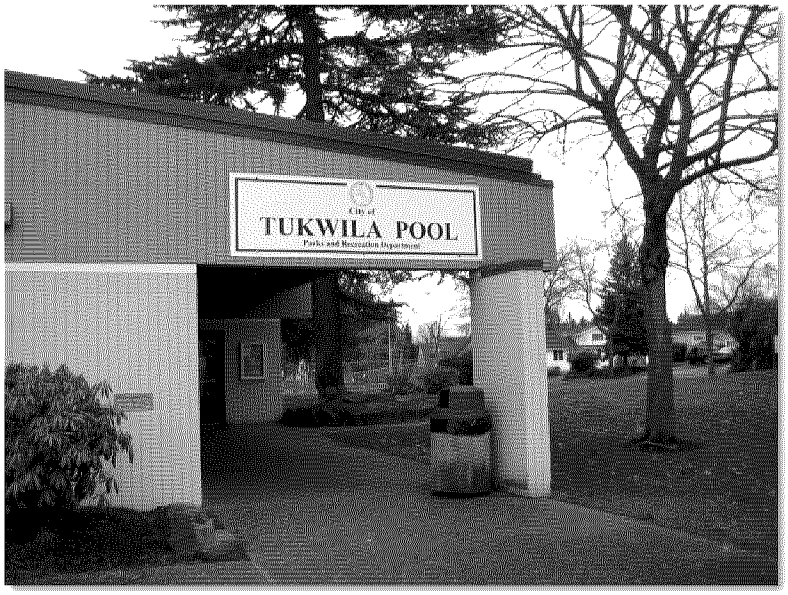
This exhibit documents the analysis performed to establish the utility and operational savings for the project.

The information is included as follows:

- Facility description
- Calculations (including methodology)
- FIM's considered, but not included in the Final Proposal.
- Energy Use Indexes (EUI's) and the 12 months used for the EUI basis.

2. EXISTING FACILITY DESCRIPTION

The Mount Rainier Pool is located at 4414 144th Avenue South, Tukwila, Washington, 98168. The building consists of a natatorium, two locker rooms, office areas, and mechanical areas containing the boiler plant and pool filters. The total building area is approcimately 14,500 square feet. The building was originally constructed in 1974 and a plumbing and pool liner retrofit was performed in 1990.



The building envelope consists of uninsulated concrete masonry unit exterior walls and a concrete sloped roof with rigid insulation underneath built up roofing. Singe pane windows are located in the front lobby.

The pool has approximately 4,900 square feet of surface area and is 3'-0" deep at the shallow end, and 12'-0" deep at the deep end. Pool temperatures are maintained at 84 F during occupied hours. The pool has a conventional chemical based treatment system.

The hours of operation are 5:30 am to 9:00 pm Monday, Wednesday, and Friday, 8 am to 8 pm Tuesday and Thursday, 12 pm to 2 pm Saturday, and available for rental on Sunday. Natatorium usage is a mix of school related events and public and lap swim events.

Electricity is supplied by Seattle City Light. Natural gas is supplied by Puget Sound Energy. The local water utility is King County Water District 125, and the local sewer utility is the Valley Vue Sewer District.

HVAC SYSTEM SUMMARY

The building hydronic system consists of (1) non-condensing boiler, pool heating hot water circulation pump, airside heating hot water circulation pump, and small boiler recirculation pump. The building airside systems consist of (1) air handling unit serving the natatorium, one air handling unit serving the lobby, locker rooms, and offices, and exhaust fan serving the locker rooms. The unit serving the natatorium is a single zone unit, and the unit serving the rest of the building serves (3) zones, each conditioned with a dedicated hot water heating coil. There is no mechanical cooling provided.

Section 5.0 Directed Engineering Study

HYDRONIC HEATING SYSTEM

The boiler is a De Dietrich model GTE 518A boiler, with an input capacity of 4,489 mbh. The boiler is a dual fuel model, but the boiler currently only operates using natural gas. It was installed in 2003, and includes an outdoor fuel oil storage tank. The boiler has numerous operational issues related to an unreliable burner. There is a small recirculation pump that injects water from the boiler supply to the return as a way of elevating water temperatures at the boiler and reducing the risk of condensation. The temperature of the airside system heating water loop is maintained by a three-way valve.

Heat is provided to the pool by way of a dedicated circulation pump connected to the hydronic loop and pool water heat exchanger located in the surge tank. A dedicated 3 horsepower circulation pump provided heating hot water to the heating coils in both air handling units and zone heating coils. All air handler and zone coils have pneumatic two-way control valves, with the exception of the locker room air handling unit heating coil which has a three way pneumatic control valve.

AIRSIDE HVAC SYSTEM

The natatorium is served by a constant volume air handling unit with air economizer and heating coil, and the locker rooms, offices, and lobby is served by a constant volume 100% outside air unit with heating coil and matching exhaust fan.

The airside system serving the natatorium is a built-up air handling unit original to the 1974 building build-out. The unit consists of a supply fan, air economizer, hot water heating coil, and filter bank. The supply fan is constant volume. The economizer dampers modulate to provide for free cooling and to control to a return air humidity setpoint. Supply air is delivered to the space by way of a single linear slot diffuser above the spectator area on the west side of the pool. Air is returned to the unit by way of a pair of return grilles installed in a high-low configuration, located in the northwest corner of the natatorium. Air is relieved from the natatorium by way of four relief dampers and louvers on the east side of the building.

The unit is in poor condition. There are numerous duct and flexible connection failures resulting in significant air leakage. All economizer dampers have failed; the pneumatic actuators are decoupled from the dampers, and one of the return dampers has had its blades cut out when the damper failed in the closed position. There is no means of space humidity control as the unit is supplying 45% outside air to the space in its current condition. Space temperatures are maintained between 77 F and 91 F, with an average temperature of 87 F. Space humidity levels averaged around 35%. The unit operates 24/7.

The locker rooms, offices, and lobby areas are served by a 100% outside air unit with hot water heating coils and a matching exhaust fan. There is no heat recovery system in place. The units operate 24/7, and maintain a space temperature between 70 F and 74 F

Section 5.0 Directed Engineering Study

BUILDING CONTROLS

The building HVAC controls system was upgraded in 1991 and is a Robert Shaw pneumatic control system. The damper actuators in the natatorium air handling unit are failed and are in need of replacement. Damper actuators are original to the control system install and all are likely in need of replacement. There is no equipment or temperature schedule based control; equipment enable/disable control and temperature setbacks all must be enabled manually. Since the 1997 renovation there has been no concerted effort to re-commission the building mechanical and controls systems.

PLUMBING AND LOCKER ROOM EQUIPMENT

Aside from maintenance related changeouts and some other exceptions, the building plumbing fixtures, including the water closets, lavatories, and urinals are largely original to 1974. The water closets are carrier hung with flow rates of 3.5 gallons per flush. The urinals are full height with flow rates of approximately 1.5 gallons per flush. Lavatories have metering faucets without aerators and have flow rates of around 2 gallons per minute and the metering mechanism appears to have failed for some faucets. Stand alone showers have flow rates of approximately 3.0 gallons per minute.

Section 5.0 Directed Engineering Study

3. FACILITY IMPROVEMENT MEASURES – CALCULATIONS

FIM Detail Report

Project	Tukwila Pool Phase I
Scenario	Pre-Final
Company	City of Tukwila
Report Generated On:	2-May-12

Component Number 04860 (Tukwila Pool)

Component Description 01.02 Burner Upgrade

The current boiler burner system is experiencing numerous failures and other maintenance issues, provide new high efficiency burner and linkageless controls.

Methodology

Combustion efficiency testing was performed and showed a high level of existing efficiency, so no substantial savings is anticipated. Operation and maintenance savings is based on improved reliability and reduced need for maintenance and service.

Cost/Benefit

Utility Type	Utility Unit	Quantity Savings	Dollar Savings
Electricity	kWh	0	$0
Electric Demand	kW	0	$0
Natural Gas	Therm	0	$0
Water	CCF	0	$0
Sewer	CCF	0	$0
Total			**$0**

Other Savings *

Type		Amount	Frequency (Years)	First Year	Last Year	Notes
Utility Rebate		$0	1	1	1	

Cost (Rough Estimate Only) **

Total	$77,240
Net After Rebate	$77,240

Other FIM Considerations

Annual Operational Savings	$1,000
Simple Payback (Years)	77.2

* Incentives are contingent on final approval. Funds are shown for reference only.

** Since design cost, audit cost, etc. are distributed among the FIMs, the total project cost will not go up or down by exactly the amounts shown here if a FIM or FIMs are

FIM Detail Report

Project	Tukwila Pool Phase I
Scenario	Pre-Final
Company	City of Tukwila
Report Generated On:	2-May-12

Component Number 03303 (Tukwila Pool)

Component Description 04.01 Air Handling Unit Controls and Retrocommissioning

Provide DDC controls upgrades, control damper repairs, and retrocommissioning services to the natatorium and locker room air handling units. Replace existing natatorium supply fan.

Methodology

Savings is based on restoring control to the airside economizer and controlling the ventilation rate to maintain space humidity levels at 50%. Currently the facility is being overventilated resulting in excessive heating energy usage and pool evaporation losses. Savings was calculated using an eQUEST based energy model calibrated to match existing utility bills as closely as possible.

Cost/Benefit

Utility Type	Utility Unit	Quantity Savings	Dollar Savings
Electricity	kWh	0	$0
Electric Demand	kW	0	$0
Natural Gas	Therm	12,194	$12,047
Water	CCF	0	$0
Sewer	CCF	0	$0
Total			**$12,047**

Other Savings *

Type		Amount	Frequency (Years)	First Year	Last Year	Notes
Utility Rebate		$0	1	1	1	

Cost (Rough Estimate Only) **

Total	$366,972
Net After Rebate	$366,972

Other FIM Considerations

Annual Operational Savings	$0
Simple Payback (Years)	30.5

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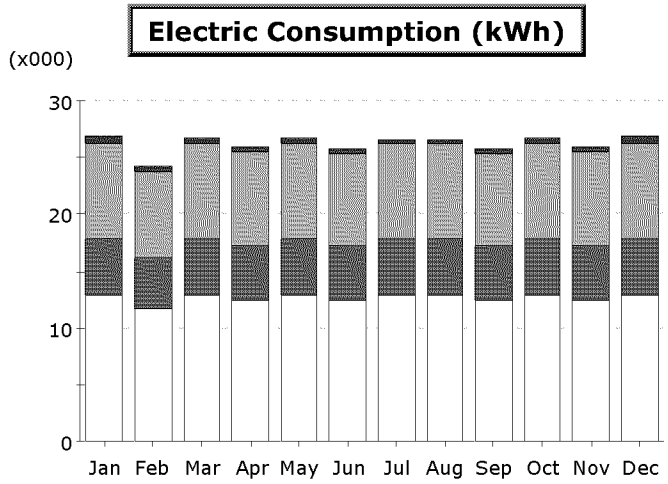
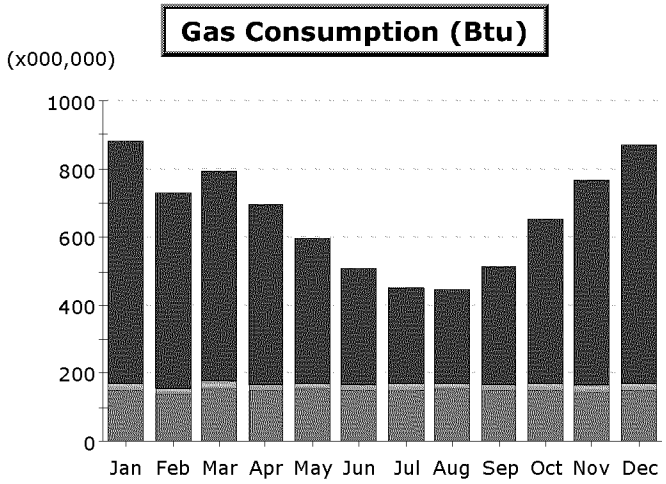
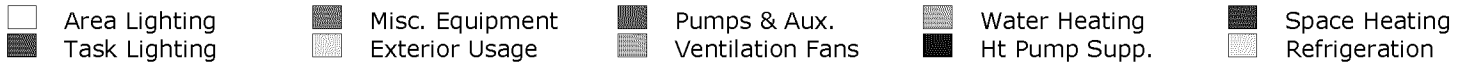




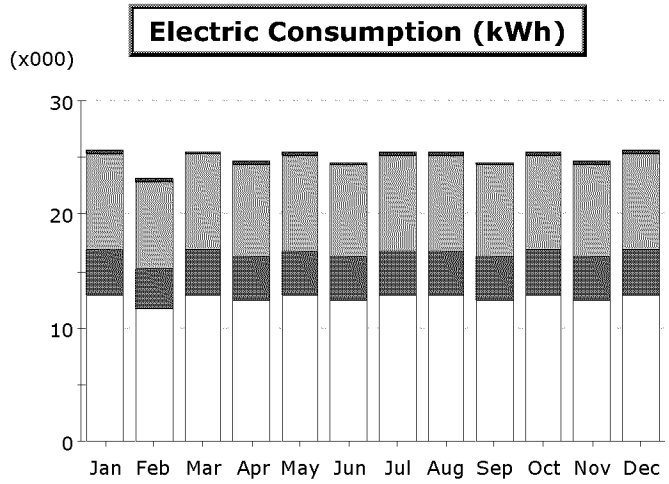


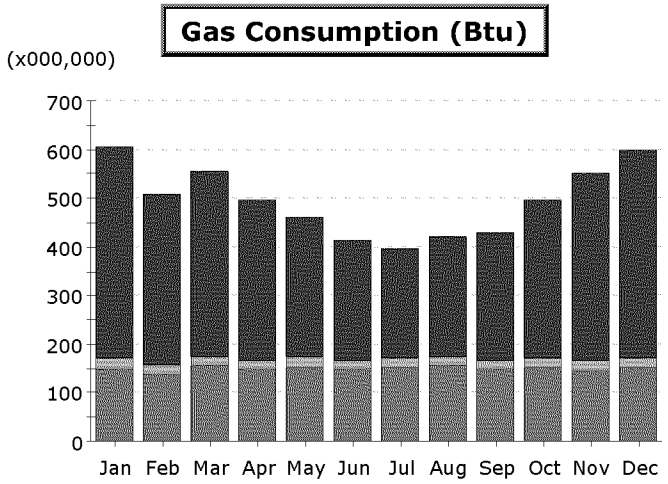
Electric Consumption (kWh x000)

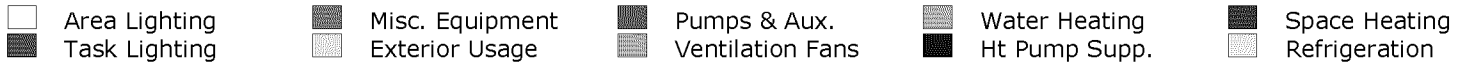
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	0.55	0.47	0.52	0.47	0.45	0.41	0.39	0.40	0.40	0.47	0.50	0.55	5.59
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	8.38	7.57	8.38	8.11	8.38	8.11	8.38	8.38	8.11	8.38	8.11	8.38	98.72
Pumps & Aux.	4.98	4.49	4.97	4.80	4.95	4.79	4.94	4.94	4.79	4.95	4.81	4.98	58.39
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	12.93	11.68	12.93	12.51	12.93	12.51	12.93	12.93	12.51	12.93	12.51	12.93	152.23
Total	26.85	24.22	26.80	25.90	26.72	25.82	26.65	26.65	25.82	26.74	25.94	26.84	314.94

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	709.3	574.5	615.7	525.4	423.5	339.0	278.0	271.4	346.3	481.8	603.7	697.8	5,866.5
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	19.9	18.0	19.9	19.1	19.4	18.4	18.7	18.5	18.0	18.8	18.6	19.6	226.9
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	150.0	137.6	154.8	148.0	153.2	149.6	151.6	154.8	148.0	151.6	146.4	151.6	1,797.2
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	879.2	730.1	790.4	692.6	596.0	507.0	448.3	444.7	512.3	652.2	768.7	869.0	7,890.7







Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	0.34	0.27	0.30	0.26	0.24	0.21	0.20	0.21	0.22	0.26	0.30	0.34	3.14
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	8.38	7.57	8.38	8.11	8.38	8.10	8.37	8.37	8.10	8.38	8.11	8.38	98.64
Pumps & Aux.	3.96	3.58	3.96	3.82	3.94	3.80	3.93	3.93	3.80	3.94	3.83	3.96	46.43
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	12.93	11.68	12.93	12.51	12.93	12.51	12.93	12.93	12.51	12.93	12.51	12.93	152.23
Total	25.62	23.10	25.57	24.70	25.48	24.63	25.43	25.43	24.63	25.50	24.75	25.61	300.44

Gas Consumption (Btu x000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	436.0	351.5	378.8	330.1	287.5	246.9	225.2	245.8	260.9	325.9	385.3	427.5	3,901.3
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	20.8	18.6	20.5	19.5	19.6	18.5	18.7	18.6	18.1	19.1	19.2	20.4	231.5
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	150.0	137.6	154.8	148.0	153.2	149.6	151.6	154.8	148.0	151.6	146.4	151.6	1,797.2
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	606.7	507.6	554.1	497.6	460.2	415.0	395.5	419.2	427.0	496.6	550.9	599.5	5,929.9

FIM Detail Report

Project	Tukwila Pool Phase I
Scenario	Pre-Final
Company	City of Tukwila
Report Generated On:	2-May-12

Component Number 05B13.5 (Tukwila Pool)

Component Description 07.01 Pool Fill Deduct Meter

Provide deduct and charge meters for pool fill and blow down. Coordinate with local water utilities for rate modifications.

Methodology

Savings is based on calculated annual pool evaporation losses based on observed pool water temperatures and indoor air temperature and humidity levels.

Cost/Benefit

Utility Type	Utility Unit	Quantity Savings	Dollar Savings
Electricity	kWh	0	$0
Electric Demand	kW	0	$0
Natural Gas	Therm	0	$0
Water	CCF	0	$0
Sewer	CCF	319	$1,163
Total			**$1,163**

Other Savings *

Type		Amount	Frequency (Years)	First Year	Last Year	Notes
Utility Rebate		$0	1	1	1	

Cost (Rough Estimate Only) **

Total	$7,554
Net After Rebate	$7,554

Other FIM Considerations

Annual Operational Savings	$0
Simple Payback (Years)	6.5

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McKinstry For The Life Of Your Building	**Project: Tukwila Pool**	Page 1/1
	Description: FIM 07.01 Pool Water Evaporation Loss Calculation	By MBG
		Date 5/2/2012

Pool Water Savings

Day and night hours correlate to the operating schedule of the pool. Logger trends showed a mean air temperature of 86 F and 37% RH.

Annual Gallons used at present conditions		
Description		
Area of pool	4,900	
Saturation vapor pressure taken at surface water temperature (83°F)	1.14	in. Hg
Saturation pressure at room air dew point (86 F, 37% RH).	0.46	in. Hg
Average evaporation rate (50%RH, Activity Factor = 1.0)	331.65	lbs/hr
Evaporation rate during night (50%RH, Activity Factor = 0.5)	165.82	lbs/hr
Total day hours/year	4797	hours/year
total night hours/year	3963	hours/year
Total gallons lost during day	191498	gallons
Total gallons lost during night	79102	gallons
Annual gallons lost	**270600**	**gallons**

FIM Detail Report

Project	Tukwila Pool Phase I
Scenario	Pre-Final
Company	City of Tukwila
Report Generated On:	2-May-12

Component Number 08305 (Tukwila Pool)

Component Description 08.01 Motors and Pumps

Replace the building HW pump and motor. Replace the Locker Room SFAN and EFAN motors.

Methodology

Savings based on the replacement of the existing standard efficiency motors with new premium efficiency motors.

Cost/Benefit

Utility Type	Utility Unit	Quantity Savings	Dollar Savings
Electricity	kWh	14,031	$906
Electric Demand	kW	0	$0
Natural Gas	Therm	0	$0
Water	CCF	0	$0
Sewer	CCF	0	$0
Total			**$906**

Other Savings *

Type		Amount	Frequency (Years)	First Year	Last Year	Notes
Utility Rebate		$2,339	1	1	1	

Cost (Rough Estimate Only) **

Total	$6,709
Net After Rebate	$4,370

Other FIM Considerations

Annual Operational Savings	$0
Simple Payback (Years)	4.8

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Energy Saved: ***2566.0 kWh***
Demand Savings: ***0.0 kW***

Baseline

A	B	D	F	G	H	J
Motor Label	From Survey	From Survey	Assumed	Assumed	B*0.75*0.746/D	F*G*H
Fans and Pumps	**Motor HP**	**Existing Nameplate Efficiency**	**Current Operating Hours (Baseline)**	**Motor Load Factor**	**Calculated Existing Power (kW)**	**Baseline Elec. Use (kWh)**
Pool Heating Water Pump	**2**	81.5%	3,000	75%	1.37	3,089
Air Handler Heating Water Pump	**5**	84.0%	8,760	75%	3.33	21,880
Lobby/Locker Supply Fan	**2**	81.5%	8,760	75%	1.37	9,021
Locker Room Exhaust Fan	**2**	81.5%	8,760	75%	1.37	9,021
Totals:						**43,011**

Proposed

K	L	N	P	Q	R	T
Motor Label	From Plans	Assumed	F*O	Assumed	L*0.75*0.746/N	P*Q*R
Fans and Pumps	**Motor HP**	**Proposed Motor Efficiency**	**Proposed Operating Hours (Proposed)**	**Motor Load Factor**	**Calculated Proposed Power (kW)**	**Proposed Elec. Use (kWh)**
SF-1	**2**	86.5%	3,000	75%	1.29	2,911
EF-1	**5**	89.5%	8,760	75%	3.13	20,536
SF-2	**2**	86.5%	8,760	75%	1.29	8,499
EF-2	**2**	86.5%	8,760	75%	1.29	8,499
Totals:						**40,445**

Notes
1. Baseline motor efficiencies from motor nameplate data
2. Proposed motor efficiencies from NEMA nominal and minimum efficiency levels
4. Facility staff indicate that heating water pump and supply and exhaust fans operate 24/7

FIM Detail Report

Project	Tukwila Pool Phase I
Scenario	Pre-Final
Company	City of Tukwila
Report Generated On:	2-May-12

Component Number 09.01 (Tukwila Pool)

Component Description 09.01 Lighting Upgrades

Re-design pool area lighting to increase both energy and illumination efficiency. Existing office area and storage area lighting will be retrofitted with energy efficient lighting and stand alone occupancy based lighting controls.

Methodology

0.00

Cost/Benefit

Utility Type	Utility Unit	Quantity Savings	Dollar Savings
Electricity	kWh	60,367	$3,900
Electric Demand	kW	140	$177
Natural Gas	Therm	224	$221
Water	CCF	0	$0
Sewer	CCF	0	$0
Total			**$4,298**

Other Savings *

Type		Amount	Frequency (Years)	First Year	Last Year	Notes
Utility Rebate		$10,777	1	1	1	

Cost (Rough Estimate Only) **

Total	$107,049
Net After Rebate	$96,272

Other FIM Considerations

Annual Operational Savings	$335
Simple Payback (Years)	20.8

* Incentives are contingent on final approval. Funds are shown for reference only.

** Since design cost, audit cost, etc. are distributed among the FIMs, the total project cost will not go up or down by exactly the amounts shown here if a FIM or FIMs are

FIM Detail Report

Project	Tukwila Pool Phase I
Scenario	Pre-Final
Company	City of Tukwila
Report Generated On:	2-May-12

Component Number 05785 (Tukwila Pool)

Component Description 12.01 Condensing Domestic Water Heater

Replace existing domestic water heater with new condensing domestic water heater.

Methodology

Savings is based on calculated domestic hot water gas consumption based on observed occupancy, facility schedule, and new low flow water fixtures, and improved combustion efficiency of the new hot water heater versus the existing.

Cost/Benefit

Utility Type	Utility Unit	Quantity Savings	Dollar Savings
Electricity	kWh	0	$0
Electric Demand	kW	0	$0
Natural Gas	Therm	262	$259
Water	CCF	0	$0
Sewer	CCF	0	$0
Total			**$259**

Other Savings *

Type		Amount	Frequency (Years)	First Year	Last Year	Notes
Utility Rebate		$0	1	1	1	

Cost (Rough Estimate Only) **

Total	$84,528
Net After Rebate	$84,528

Other FIM Considerations

Annual Operational Savings	$0
Simple Payback (Years)	326.7

* Incentives are contingent on final approval. Funds are shown for reference only.

** Since design cost, audit cost, etc. are distributed among the FIMs, the total project cost will not go up or down by exactly the amounts shown here if a FIM or FIMs are

McKinstry For The Life Of Your Building	**Tukwila Pool**	**JOB NO. P10792**	**PAGE** 1/1
	DESCRIPTION: 12.01 Condensing Water Heaters		**BY** MBG
	Replace existing water heater with condensing water heaters		**DATE** 5/2/2012

This spreadsheet calculates the reduction in natural gas use due to improving the boiler overall thermal efficiency.

$$Therm_S = Therm_B \times (1 - \frac{Eff_B}{Eff_P})$$

Where:

$Therm_S$ = Annual Gas Savings in Therms
$Therm_B$ = Existing Annual Gas Use from Billing History
Eff_B = Existing Boiler Thermal Efficiency
Eff_P = Proposed Boiler Thermal Efficiency

System Calculation

A	2,300	Therm	Therms boiler energy usage, annually*
B	100%	%	Heating load served by condensing boiler
C	83%	%	Existing Boiler Thermal Efficiency
D	95%	%	Proposed Boiler thermal Efficiency to be Verified with Manufacturer's Published Data

E	**291**	**Therm**	**Annual Gas Savings (A x B x (1 - C / D))**

FIM Detail Report

Project	Tukwila Pool Phase I
Scenario	Pre-Final
Company	City of Tukwila
Report Generated On:	2-May-12

Component Number 15Y2B (Tukwila Pool)

Component Description 17.02 Pool Circulation Pump VFD and Valve Replacement

Replace existing pool water circulation pump and piping in the mechanical room and inlet drains at the pool bottom. Provide variable speed control of new pool water circulation pump, differential pressure transducer, flow meter, and controls.

Methodology

Savings is based on a reduction in the pool circulation pump head pressure by eliminating the automatic flow control valve and controlling pump speed based on a flow meter and differential pressure transducer.

Cost/Benefit

Utility Type	Utility Unit	Quantity Savings	Dollar Savings
Electricity	kWh	38,993	$2,519
Electric Demand	kW	53	$67
Natural Gas	Therm	0	$0
Water	CCF	0	$0
Sewer	CCF	0	$0
Total			**$2,586**

Other Savings *

Type		Amount	Frequency (Years)	First Year	Last Year	Notes
Utility Rebate		$8,551	1	1	1	

Cost (Rough Estimate Only) **

Total	$119,546
Net After Rebate	$110,995

Other FIM Considerations

Annual Operational Savings	$0
Simple Payback (Years)	42.9

* Incentives are contingent on final approval. Funds are shown for reference only.

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Pool Circulation Pump VFD and Valve Replacement

INPUTS:

AA	Pool Water Pump Peak Brake Horsepower	17.7	bhp
AA.1	New Pool Water Pump Peak Brake Horsepower	11.4	bhp
AB	Pool Pump Head Pressure	78	ft hd
AB.1	New Pool Pump Head Pressure	50	ft hd
AC	kW Exponent Used for Pump Affinity Laws (Theoretical is 3)	2.5	
AD	Pump Efficiency	72.0%	Percent
AD.1	New Pump Efficiency	72.0%	Percent
AD.2	Motor Efficiency	90.0%	
AD.3	New Motor Efficiency	90.0%	
AE	Peak kW without VFD	14.69	kW
AE.1	New Peak KW without VFD	9.45	KW
AF	VFD Efficiency	97%	Percent
AG	Peak kW with VFD	9.74	kW
AH	Minimum kW % of Peak kW	8.83%	Percent
AJ	Peak Design Coil Flow	650.0	gpm
AK	Design Delta T	5.0	Degrees F
AL	Design Peak Capacity	1,625	MBH
AM	Proposed Design Flow	650.0	gpm
AN	Proposed Minimum Delta T	5.00	Degrees F
AO	System Minimum Flow Rate	650.0	gpm

Summary:

Existing Energy Use	128,653 kWh
Proposed Energy Use	85,327 kWh
Savings Summary:	**43,326 kWh**

A	B	C	D	E	F	G	J	K	L	M
BIN NUMBERS	BIN HOURS	Drawings	Linear Fit	C/AJ	E^AC*AE	F*B	MAXIMUM OF D/500/AN*1000 OR AO	J/AM	MAXIMUM OF K^AC*AG OR AH*AG	L*B
OSAT (°f)	**BIN (Hours) (1)**	**Existing Coil Flow (gpm)**	**Existing Coil Load (MBH)**	**Existing Pump Load %**	**Power Existing (kW)**	**Power Consumption Existing (kWh)**	**Proposed Flow (gpm)**	**Proposed Pump Load %**	**VSD Power Proposed (kW)**	**VSD Power Consumption Proposed (kWh)**
92.5										
87.5	0		0							
82.5	32	650.0	-	100.0%	14.69	470	650.0	100.0%	9.74	312
77.5	101	650.0	125	100.0%	14.69	1,483	650.0	100.0%	9.74	984
72.5	198	650.0	250	100.0%	14.69	2,908	650.0	100.0%	9.74	1,929
67.5	347	650.0	375	100.0%	14.69	5,096	650.0	100.0%	9.74	3,380
62.5	897	650.0	500	100.0%	14.69	13,174	650.0	100.0%	9.74	8,737
57.5	1257	650.0	625	100.0%	14.69	18,461	650.0	100.0%	9.74	12,244
52.5	1529	650.0	750	100.0%	14.69	22,455	650.0	100.0%	9.74	14,893
47.5	1492	650.0	875	100.0%	14.69	21,912	650.0	100.0%	9.74	14,533
42.5	1822	650.0	1,000	100.0%	14.69	26,759	650.0	100.0%	9.74	17,747
37.5	979	650.0	1,125	100.0%	14.69	14,378	650.0	100.0%	9.74	9,536
32.5	105	650.0	1,250	100.0%	14.69	1,542	650.0	100.0%	9.74	1,023
27.5	1	650.0	1,375	100.0%	14.69	15	650.0	100.0%	9.74	10
22.5	0	650.0	1,500	100.0%	14.69	0	650.0	100.0%	9.74	0
17.5	0	650.0	1,625	100.0%	14.69	0	650.0	100.0%	9.74	0
	8,760					128,653				85,327

Notes:
1. Hours of operation assumed to be 24-7 year-round. excluding major holidays

FIM Detail Report

Project	Tukwila Pool Phase I
Scenario	Pre-Final
Company	City of Tukwila
Report Generated On:	2-May-12

Component Number 03B1K2 (Tukwila Pool)

Component Description 17.05 Pool Covers

Provide new automatic pool covers.

Methodology

Savings is based on a reduction in after hours pool water evaporation and pool heating when the pool covers are deployed.

Cost/Benefit

Utility Type	Utility Unit	Quantity Savings	Dollar Savings
Electricity	kWh	0	$0
Electric Demand	kW	0	$0
Natural Gas	Therm	8,183	$8,084
Water	CCF	68	$240
Sewer	CCF	68	$246
Total			**$8,570**

Other Savings *

Type		Amount	Frequency (Years)	First Year	Last Year	Notes
Utility Rebate		$0	1	1	1	

Cost (Rough Estimate Only) **

Total	$199,875
Net After Rebate	$199,875

Other FIM Considerations

Annual Operational Savings	$0
Simple Payback (Years)	23.3

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McKinstry — For The Life Of Your Building	**Project: Tukwila Pool**	Page 1/1
	Description: Pool Water Savings	By MBG
		Date 5/2/2012

Pool Water Savings

Day and night hours correlate to the operating schedule of the pool. Logger trends showed a mean air temperature of 86 F and 37% RH. This calc assumes that 1.5 hrs/day pool cover deployment time. It also assumes once the cover is placed on the pool the evaporation rate is approximately 0 lbs/hr.

Annual Gallons used at present conditions			**Annual Gallons used with cover used at night**		
Description			Description		
Area of pool	4,900		Area of pool	4,900	
Saturation vapor pressure taken at surface water temperature (83*F)	1.14	in. Hg	Saturation vapor pressure taken at surface water temperature (83*F)	1.14	in. Hg
Saturation pressure at room air dew point (86 F, 50% RH).	0.58	in. Hg	Saturation pressure at room air dew point (86 F, 50% RH).	0.58	in. Hg
Average evaporation rate (50%RH, Activity Factor = 1.0)	273.53	lbs/hr	Average evaporation rate (50%RH, Activity Factor = 1.0)	273.53	lbs/hr
Evaporation rate during night (50%RH, Activity Factor = 0.5)	136.77	lbs/hr	Evaporation rate during night (50%RH, Activity Factor = 0.5)	136.77	lbs/hr
Total day hours/year	4797	hours/year	Total day hours/year	4797	hours/year
total night hours/year	3963	hours/year	total night hours/year (1.55 hours per night to roll out and retract the cover)	566	hours/year
Total gallons lost during day	157943	gallons	Total gallons lost during day	157943	gallons
Total gallons lost during night	65242	gallons	Total gallons lost during night	9318	gallons
Annual gallons lost	**223185**	**gallons**	**Annual gallons lost**	**167261**	**gallons**

Pool Hours	Weekly	Annual

Summary		
Gallons saved at 50% RH with Pool cover	**75**	**CCF**
Baseline heating water energy	26410	therms
Heating water energy at 50% RH with Pool cover (includes 80% boiler efficiency)	17319	therms
Annual heating energy savings	**9092**	**therms**

FIM Detail Report

Project	Tukwila Pool Phase I
Scenario	Pre-Final
Company	City of Tukwila
Report Generated On:	2-May-12

Component Number 18305 (Tukwila Pool)

Component Description 18.01 New Plumbing Fixtures

Provide retrofit to or replacement of existing plumbing fixtures, including lavatories, showers, water closets, and urinals.

Methodology

Savings is based on reducing domestic water flow rates through lavatories and showers and reducing flow volume at water closets and urinals.

Cost/Benefit

Utility Type	Utility Unit	Quantity Savings	Dollar Savings
Electricity	kWh	0	$0
Electric Demand	kW	0	$0
Natural Gas	Therm	493	$487
Water	CCF	185	$658
Sewer	CCF	185	$677
Total			**$1,822**

Other Savings *

Type		Amount	Frequency (Years)	First Year	Last Year	Notes
Utility Rebate		$0	1	1	1	

Cost (Rough Estimate Only) **

Total	$36,098
Net After Rebate	$36,098

Other FIM Considerations

Annual Operational Savings	$0
Simple Payback (Years)	19.8

* Incentives are contingent on final approval. Funds are shown for reference only.

** Since design cost, audit cost, etc. are distributed among the FIMs, the total project cost will not go up or down by exactly the amounts shown here if a FIM or FIMs are

FIM-18.01 New Plumbing Fixtures
Baseline Water Consumption for Affected Fixtures

Attachment A - Water

Prepared By:	Max Greenheck				
Agency:					
Facility:	Tukwila Pool				
Contact Name:					
Address:	4414 South 144th Street				
City	Tukwila	State:	WA	Zip:	98168
Phone/Fax:					
Date of Audit:	3/1/2012				

Buildings included in Survey:
Water Provider(s): King County Water District #125
Number of Water Meters: 1
Account/Meter Numbers: N/A

DOMESTIC WATER USE

Toilets

	Nameplate:	Fixture Type	GPF	Count	User Count Female	User Count Male	GPX	GPD
1		valve	3	7	55	55	29.46428571	206.25
							Total GPD=	206.25

Calculations:
GPF=Gallons per flush, estimated or measured
GPD=GPF x (3 x Female Count + 1 x Male Count)
= Average gallons per day for all toilets
GPX=GPD/Fixture Count
=Average gallons per day per fixture

Urinals

	Nameplate:	Fixture Type	GPF	Count	User Count Male	GPX	GPD
1		valve	1.00	3	55	18.33333333	55
						Total GPD=	55

Calculations:
GPD=GPF x (2 x Male Count)
=Average gallons per day urinals

Lavatory Sinks

	Nameplate:	Fixture Type	GPM	Count	User Count Female	User Count Male	Wash duration (min.)	GPD
1		sink	2.2	8	55	55	0.17	102.85
							Total Hand Washing GPD=	102.85

Assume 3 hand washings per 8 hour work day per male, 4 per female.
Unless otherwise indicated, assume 10 sec. of flow per hand washing.

Calculations:
GPM=Measured gallons per minute of faucet flow
GPD= 0.17 GPM x (3 x Male Count + 4 x Female Count)
=Average gallons per day for hand washing

Showers

	Location:	GPM	Count	Avg. Use per Day		daily GPD
1	Level 1	2.5	18	30.555556	min.	1375
					Total GPD=	1375

Calculations:
GPD= Time on x GPM x Fixture Count
=Average gallons per day for leaks

SUMMARY

TOTAL DAILY DOMESTIC WATER USAGE:	1739 gal/day	**does not include boiler use or landscape use.*
TOTAL ANNUAL DOMESTIC WATER USAGE:	608,685 gal/yr	**assumes 260 operational days per year (see Inputs & Assumptions sheet to change).*

FIM-12.01 Plumbing Fixture Upgrades
Baseline Water Consumption for Affected Fixtures

Attachment A - Water

Prepared By:	Max Greenheck				
Agency:					
Facility:	Tukwila Pool				
Contact Name:					
Address:	4414 South 144th Street				
City	Tukwila	State:	WA	Zip:	98168
Phone/Fax:					
Date of Audit:	3/1/2012				

Buildings included in Survey:
Water Provider(s): **King County Water District #125**
Number of Water Meters: **1**
Account/Meter Numbers: **N/A**

DOMESTIC WATER USE

Toilets

	Nameplate:	Fixture Type	GPF	Count	User Count Female	User Count Male	GPX	GPD
1		valve	1.6	7	55	55	15.71428571	110
							Total GPD=	110

Calculations:
GPF=Gallons per flush, estimated or measured
GPD=GPF x (3 x Female Count + 1 x Male Count)
= Average gallons per day for all toilets
GPX=GPD/Fixture Count
=Average gallons per day per fixture

Urinals

	Nameplate:	Fixture Type	GPF	Count	User Count Male	GPX	GPD
1		valve	1.00	3	55	18.33333333	55
						Total GPD=	55

Calculations:
GPD=GPF x (2 x Male Count)
=Average gallons per day urinals

Lavatory Sinks

	Nameplate:	Fixture Type	GPM	Count	User Count Female	User Count Male	Wash duration (min.)	GPD
1		sink	0.5	8	55	55	0.17	23.375
							Total Hand Washing GPD=	23.375

Assume 3 hand washings per 8 hour work day per male, 4 per female.
Unless otherwise indicated, assume 10 sec. of flow per hand washing.

Calculations:
GPM=Measured gallons per minute of faucet flow
GPD= 0.17 GPM x (3 x Male Count + 4 x Female Count)
=Average gallons per day for hand washing

Showers

	Location:	GPM	Count	Avg. Use per Day	daily GPD
1	Level 1	2	18	30.555556 min.	1100
				Total GPD=	1100

Calculations:
GPD= Time on x GPM x Fixture Count
=Average gallons per day for leaks

SUMMARY

TOTAL DAILY DOMESTIC WATER USAGE:	1288 gal/day	**does not include boiler use or landscape use.*
TOTAL ANNUAL DOMESTIC WATER USAGE:	450,931 gal/yr	**assumes 260 operational days per year (see Inputs & Assumptions sheet to change).*

Section 5.0 Directed Engineering Study

4. FIM's CONSIDERED BUT NOT USED

The following FIM's were considered but are not recommended:

- 15 DE Filter System-Vacuum DE Remodel
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 16 Bulkhead Renovation
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 17 Add Natatorium Sound Abatement
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 18 ADA Improvements (Parking Lot)
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 19 Indoor Doors Replacement (partial)
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 20 Heat Exchanger (Pool Water Heat)
  - Conversion of the existing heat exchanger from a tube bundle to a plate and frame type heat exchanger is not recommended due to measure cost and lack of energy savings. It is instead recommended that the existing tube bundle be replaced with a new tube bundle that can be installed within the existing surge tank.
- 21 Gutter/Deck Tile
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 22 Locker Room Painting
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 23 New Lockers
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 24 Exterior Doors Replacement
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 25 Deep End Guard Chair
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 26 Privacy Changing Areas
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 27 Locker Room Floor Resurfacing
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 28 Deck Resurfacing
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 29 Enclosure
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 30 Modify Front Desk Reception (if no enclosure)
  - This measure did not fit within the scope budget and is recommended for a future phase.

Section 5.0 Directed Engineering Study

- 31 Admin Offices Remodel
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 32 Modify Family Changing Rooms
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 33 Modify Staff / Break Room
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 34 Staff Locker Rooms Renovation
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 35 New Entry-Women's Locker Room
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 36 Sewer Deduct Meter
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 37 New Roof
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 38 Solar Thermal (system only)
  - This measure was eliminated from the project scope because it did not fit within the scope budget and has an extremely long payback period relative to the other energy saving measures.
- 39 UV
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 40 Add Windows in Natatorium
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 41 Privacy Showers & Changing Areas
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 42 New Natatorium Supply Air Ductwork
  - This measure did not fit within the scope budget and is recommended for a future phase.
- 43 Vending Machines Power Control
  - This measure was eliminated from the project scope due to the small scope and simplicity of the measure and agreements between the Tukwila Pool and the vending services company. It is recommended that the Tukwila Pool self perform this measure if the solution is acceptable to the vending services company.
- 44 Addition
  - This measure did not fit within the scope budget and is recommended for a future phase.

Section 5.0 Directed Engineering Study

5. UTILITY DATA

McKinstry
For The Life Of Your Building

Building Information

	Area:	13,769 ft²
CityofTukwilaPool		

Energy Information

Year 1:	Nov 2009	to	Oct 2010
	EUI = 652.4 kBTU/ft²		Cost = $7.442 / ft²
Year 2:	Nov 2010	to	Oct 2011
	EUI = 638.2 kBTU/ft²		Cost = $7.845 / ft²

Historical Utility Data

Month	Electric Consumption (kWh)	Electric Cost ($)	Electric Demand (kW)	NG Use (MMBtu)	NG Cost($)	Total Energy (kBTU)	Total Cost ($)	Energy Use Index (kBTU/ft²)	Cost Index ($/ft²)
Nov-09	36,206	$ 1,920.84	52	682	$ 6,978.78	805,083	$ 8,899.62	58.47	$0.65
Dec-09	32,623	$ 1,730.49	53	928	$ 9,487.04	1,038,944	$ 11,217.53	75.46	$0.81
Jan-10	35,988	$ 2,061.57	51	819	$ 8,386.60	941,975	$ 10,448.17	68.41	$0.76
Feb-10	30,004	$ 1,808.61	50	806	$ 8,254.98	908,456	$ 10,063.59	65.98	$0.73
Mar-10	29,893	$ 1,801.30	53	730	$ 7,481.24	832,229	$ 9,282.54	60.44	$0.67
Apr-10	32,076	$ 1,936.83	50	705	$ 7,290.39	814,314	$ 9,227.22	59.14	$0.67
May-10	27,764	$ 1,726.03	49	677	$ 7,047.14	772,190	$ 8,773.17	56.08	$0.64
Jun-10	28,946	$ 1,829.25	49	543	$ 5,763.30	641,981	$ 7,592.55	46.63	$0.55
Jul-10	33,841	$ 2,138.88	48	453	$ 4,836.47	568,272	$ 6,975.35	41.27	$0.51
Aug-10	28,010	$ 1,769.91	49	403	$ 4,304.98	498,275	$ 6,074.89	36.19	$0.44
Sep-10	28,408	$ 1,794.56	48	444	$ 4,743.41	540,963	$ 6,537.97	39.29	$0.47
Oct-10	28,518	$ 1,806.58	48	522	$ 5,575.85	619,659	$ 7,382.43	45.00	$0.54
Nov-10	31,597	$ 2,002.23	47	622	$ 6,740.60	730,143	$ 8,742.83	53.03	$0.63
Dec-10	27,490	$ 1,738.32	47	881	$ 9,593.47	975,268	$ 11,331.79	70.83	$0.82
Jan-11	31,486	$ 2,249.58	48	861	$ 9,375.41	968,224	$ 11,624.99	70.32	$0.84
Feb-11	28,551	$ 2,038.54	48	776	$ 8,461.98	873,855	$ 10,500.52	63.47	$0.76
Mar-11	29,212	$ 2,085.73	49	704	$ 7,670.14	803,171	$ 9,755.87	58.33	$0.71
Apr-11	31,644	$ 2,259.38	49	706	$ 7,780.30	813,717	$ 10,039.68	59.10	$0.73
May-11	24,935	$ 1,780.36	50	667	$ 7,410.57	752,240	$ 9,190.93	54.63	$0.67
Jun-11	29,186	$ 2,083.88	48	557	$ 6,201.08	656,611	$ 8,284.96	47.69	$0.60
Jul-11	32,194	$ 2,298.66	49	447	$ 4,984.52	556,983	$ 7,283.18	40.45	$0.53
Aug-11	28,029	$ 2,001.27	49	412	$ 4,594.19	507,514	$ 6,595.46	36.86	$0.48
Sep-11	29,349	$ 2,095.52	49	394	$ 4,392.63	493,810	$ 6,488.15	35.86	$0.47
Oct-11	26,654	$ 1,903.10	47	565	$ 6,282.18	655,445	$ 8,185.28	47.60	$0.59

Year 1	372,277	$22,325	599	7,712	$80,150	8,982,341	$102,475	652.36	$7.44
Year 2	350,327	$24,537	580	7,592	$83,487	8,786,982	$108,024	638.17	$7.85

McKinstry
For The Life Of Your Building

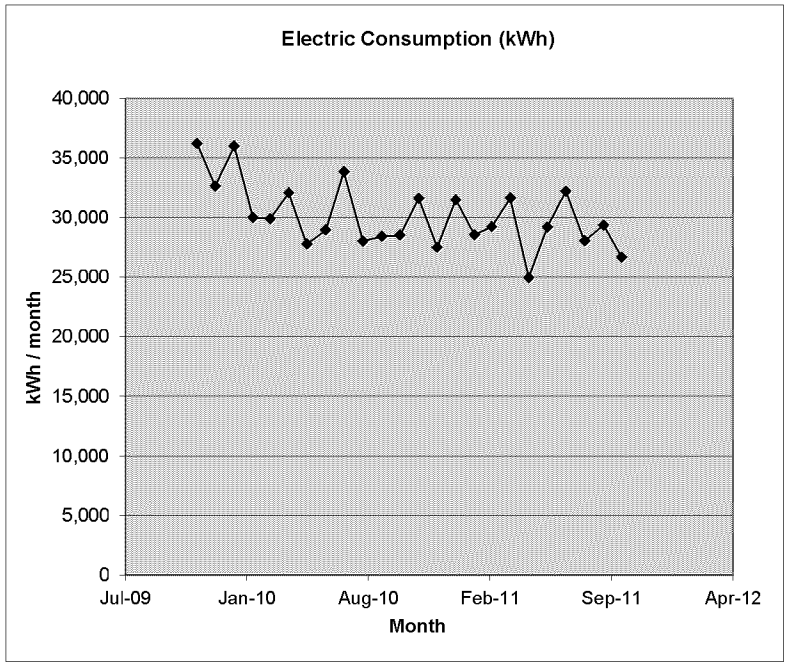
Building Information

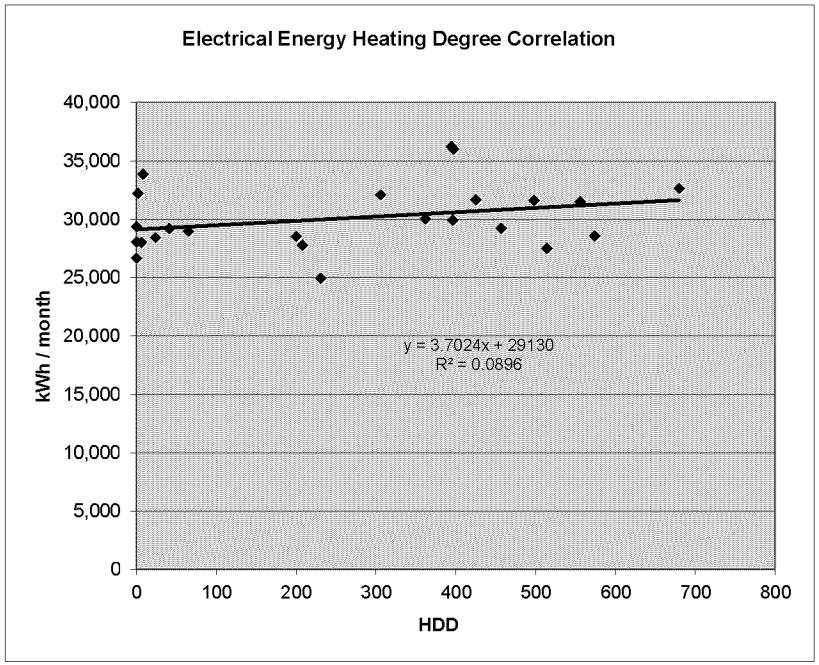
	Area:	13,769 ft²
CityofTukwilaPool		

Energy Information

Year 1:	Nov 2009	to	Oct 2010
	EUI = 652.4 kBTU/ft²		Cost = $7.442 / ft²
Year 2:	Nov 2010	to	Oct 2011
	EUI = 638.2 kBTU/ft²		Cost = $7.845 / ft²

Electrical Energy Consumption





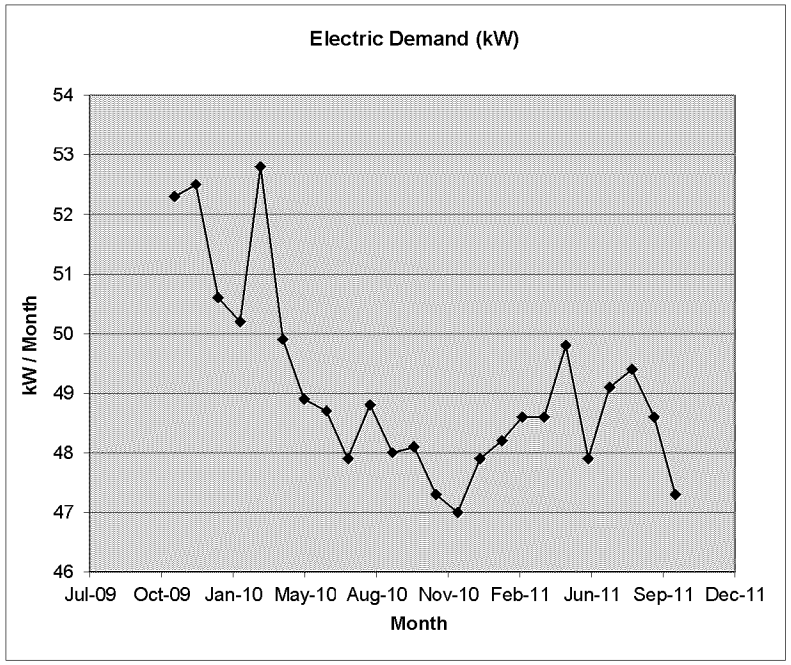
Building Information

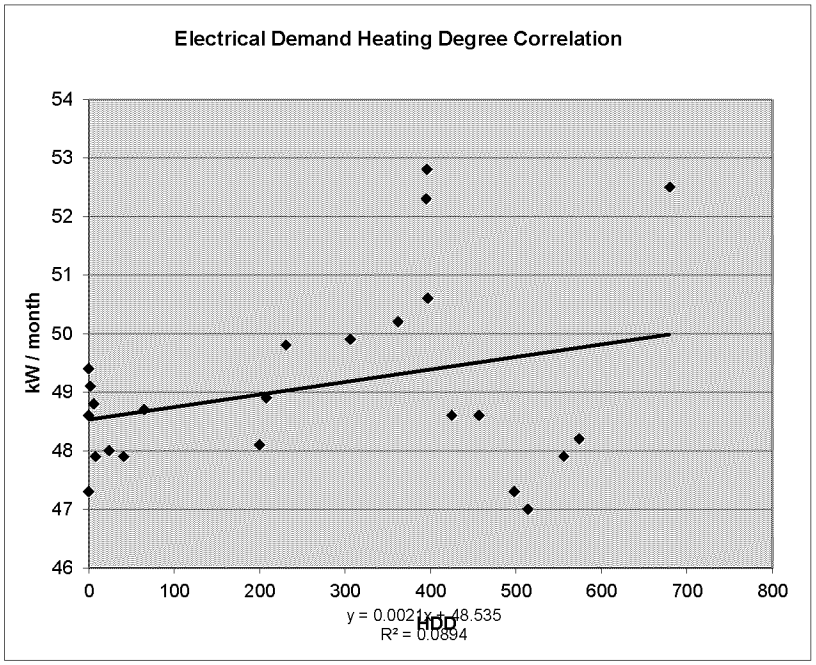
	Area:	13,769 ft²
CityofTukwilaPool		

Energy Information

Year 1:	Nov 2009	to	Oct 2010
	EUI = 652.4 kBTU/ft²		Cost = $7.442 / ft²
Year 2:	Nov 2010	to	Oct 2011
	EUI = 638.2 kBTU/ft²		Cost = $7.845 / ft²

Electrical Demand





McKinstry
For The Life Of Your Building

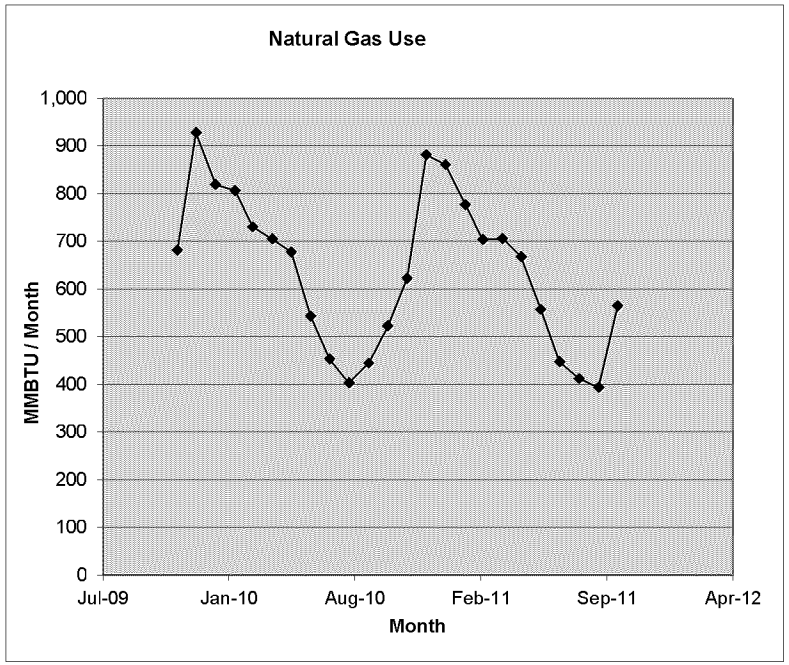
Building Information

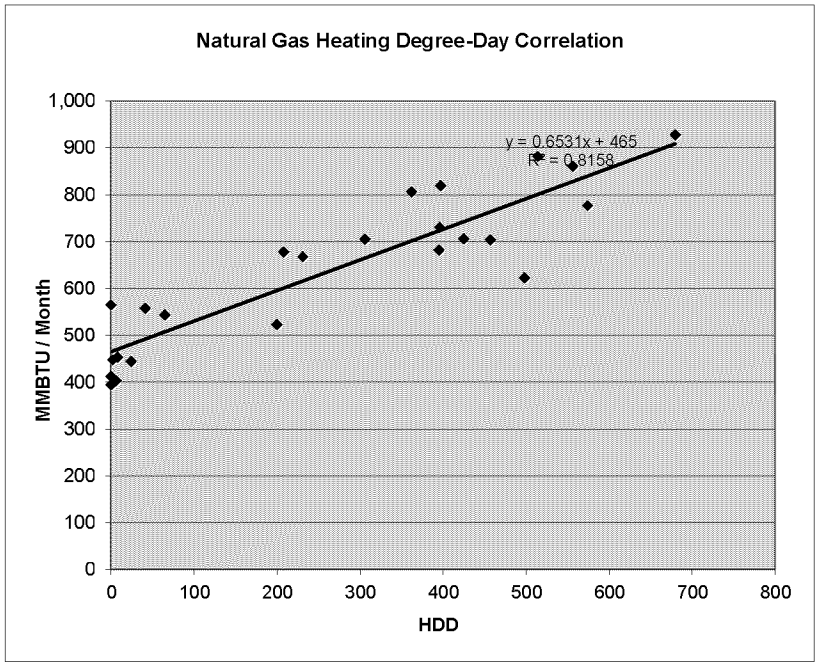
	Area:	13,769 ft²
CityofTukwilaPool		

Energy Information

Year 1:	Nov 2009	to	Oct 2010
	EUI = 652.4 kBTU/ft²		Cost = $7.442 / ft²
Year 2:	Nov 2010	to	Oct 2011
	EUI = 638.2 kBTU/ft²		Cost = $7.845 / ft²

Natural Gas Consumption





McKinstry
For The Life Of Your Building

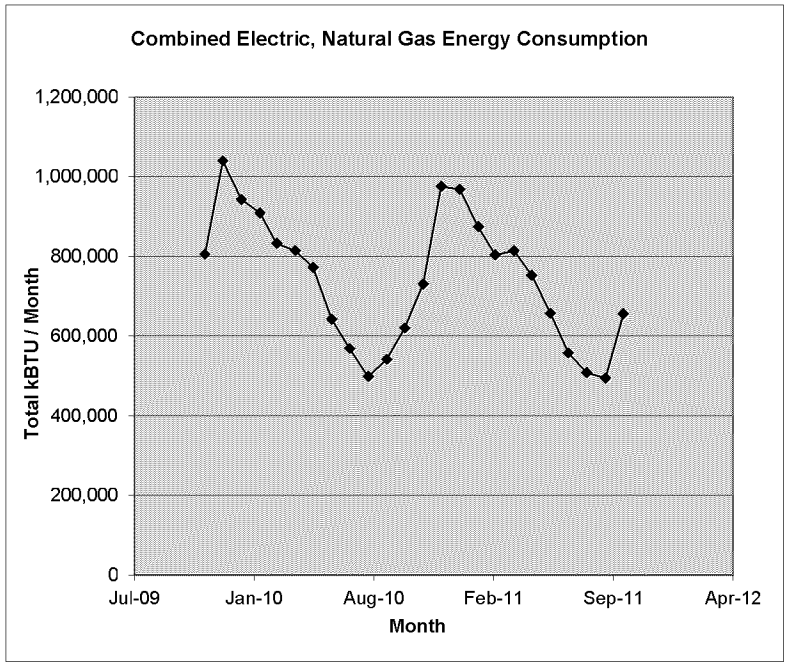
Building Information

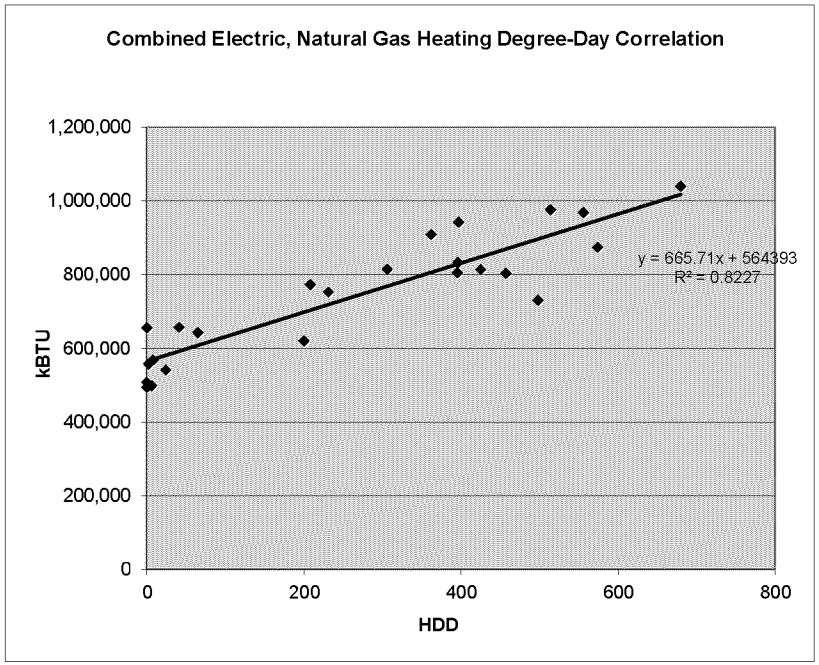
	Area:	13,769 ft²
CityofTukwilaPool		

Energy Information

Year 1:	Nov 2009	to	Oct 2010
	EUI = 652.4 kBTU/ft²		Cost = $7.442 / ft²
Year 2:	Nov 2010	to	Oct 2011
	EUI = 638.2 kBTU/ft²		Cost = $7.845 / ft²

Combined Electrical, Natural Gas Consumption





McKinstry
For The Life Of Your Building

Building Information

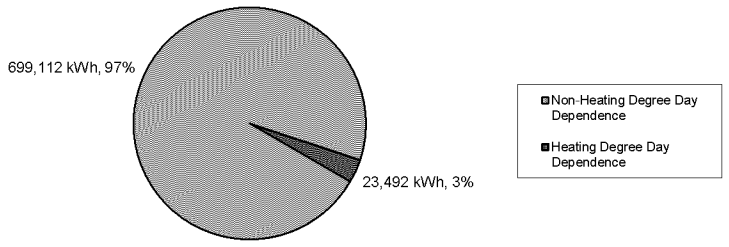
	Area:	13,769 ft²
CityofTukwilaPool		

Energy Information

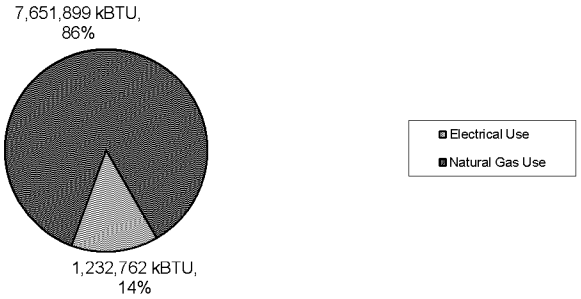
Year 1:	Nov 2009	to	Oct 2010
	EUI = 652.4 kBTU/ft²		Cost = $7.442 / ft²
Year 2:	Nov 2010	to	Oct 2011
	EUI = 638.2 kBTU/ft²		Cost = $7.845 / ft²

End Use Analysis

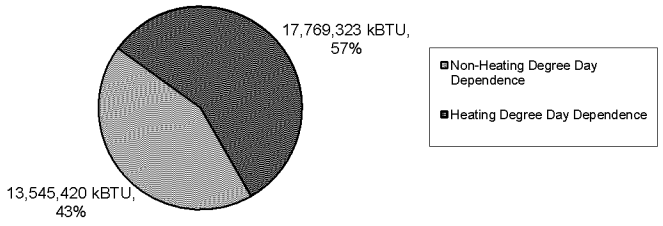
Electric Consumption End Use



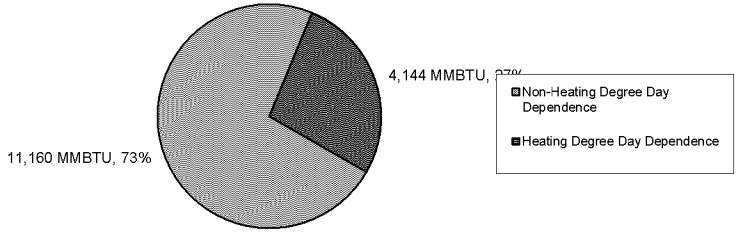
Total Energy Consumption



Total Energy Consumption End Use



Natural Gas Consumption End Use



OUTPUT SPACE

Water Usage Analysis

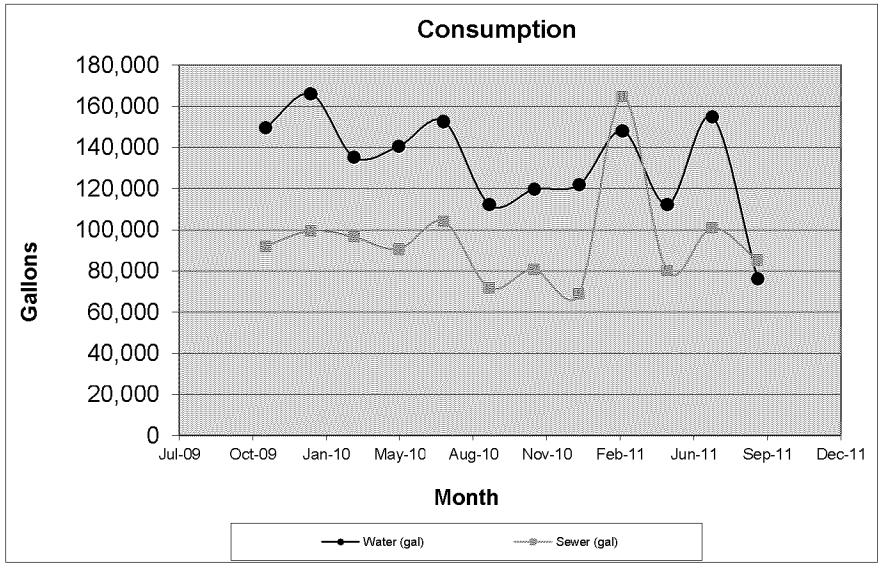
Building Information

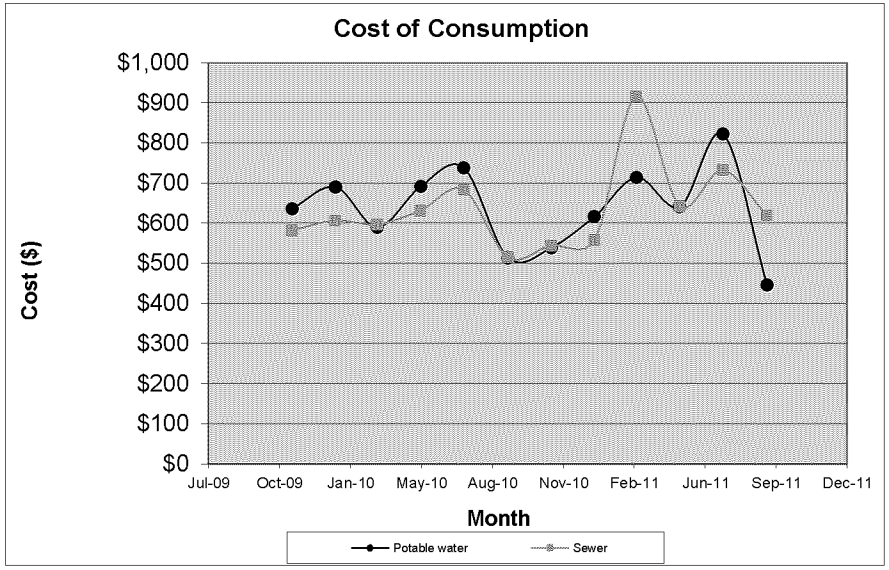
	Area:	13,769 ft²	
CityofTukwilaPool			
Occupancy (# of people)	110		

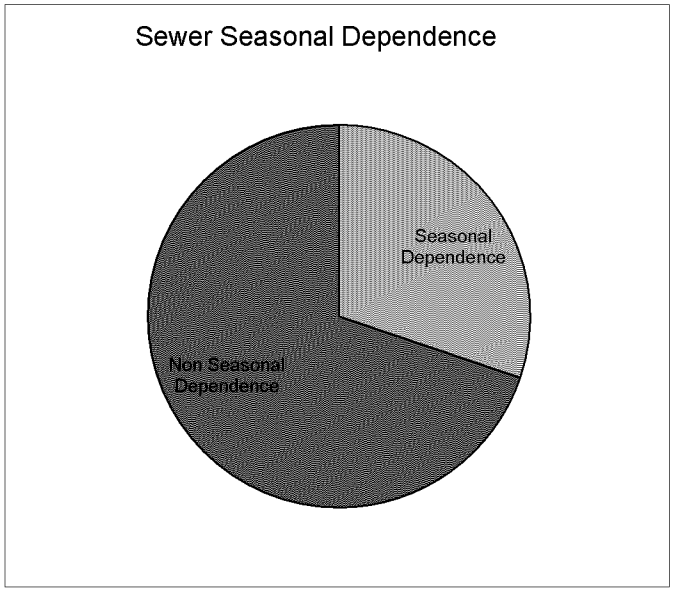
Total Water consumption Information

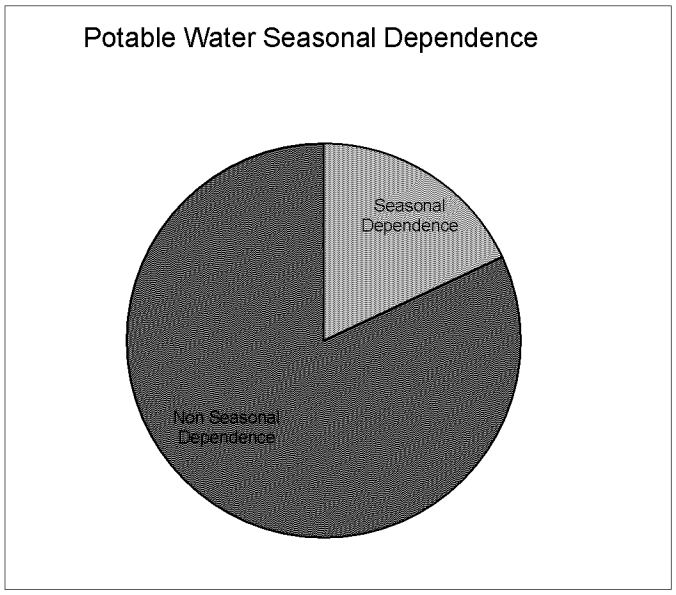
Year 1:	Nov 2009	to	Sep 2010	
Gal/Occ/Day=	21.33	Gal/ft^2/year =	62.21	
Year 2:	Nov 2010	to	Sep 2011	
Gal/Occ/Day=	18.26	Gal/ft^2/year =	53.24	

Month	Potable Water Consumption (gal)	Potable Water Cost ($)	Sewer Water Consumption (gal)	Sewer Water Cost ($)
Nov-09	149,610	$636	92,010	$581
Jan-10	166,068	$690	99,491	$606
Mar-10	135,397	$589	96,499	$596
May-10	140,634	$691	90,514	$631
Jul-10	152,603	$738	103,979	$683
Sep-10	112,208	$514	71,813	$515
Nov-10	119,688	$538	80,790	$545
Jan-11	121,932	$616	68,821	$558
Mar-11	148,114	$714	164,571	$916
May-11	112,208	$640	80,042	$642
Jul-11	154,847	$822	100,987	$732
Sep-11	76,301	$446	85,278	$619
Year 1	856,520	$3,858	554,307	$3,612
Year 2	733,091	$3,777	580,488	$4,012


Consumption
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
Gallons
Jul-09
Oct-09
Jan-10
May-10
Aug-10
Nov-10
Feb-11
Jun-11
Sep-11
Dec-11
Month
Water (gal)
Sewer (gal)


Cost of Consumption
$1,000
$900
$800
$700
$600
$500
$400
$300
$200
$100
$0
Cost ($)
Jul-09
Oct-09
Jan-10
May-10
Aug-10
Nov-10
Feb-11
Jun-11
Sep-11
Dec-11
Month
Potable water
Sewer


Sewer Seasonal Dependence
Seasonal Dependence
Non Seasonal Dependence

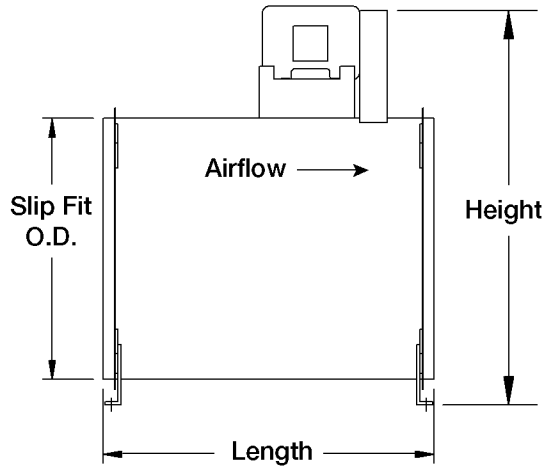

Potable Water Seasonal Dependence
Seasonal Dependence
Non Seasonal Dependence

Section 5.0 Directed Engineering Study

6. FACILITY IMPROVEMENT MEASURES – SUPPORT DOCUMENTATION

QEI Class I and II Dimensional Data

GREENHECK
Building Value in Air.

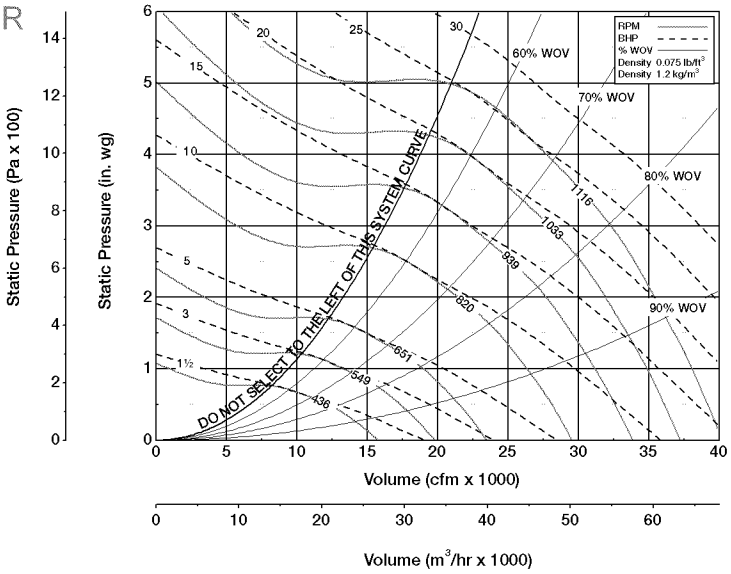


Size	Slip-Fit O.D.		QEI Class I				QEI Class II			
			Length		Height		Length		Height	
	inches	*mm*	inches	*mm*	inches	*mm*	inches	*mm*	inches	*mm*
9	17.13	*435*	NA	*NA*	NA	*NA*	28.5	*724*	36.25	*921*
12	17.13	*435*	28.5	*724*	36.25	*921*	30.13	*765*	36.25	*921*
15	20.88	*530*	31.0	*787*	41.0	*1041*	31.0	*787*	41.0	*1041*
16	23.00	*584*	33.0	*838*	44.0	*1118*	34.0	*864*	44.0	*1118*
18	25.38	*645*	35.0	*889*	46.5	*1181*	39.5	*1003*	47.5	*1207*
20	27.81	*706*	37.5	*953*	50.5	*1283*	41.5	*1054*	50.5	*1283*
22	30.88	*784*	41.0	*1041*	53.5	*1359*	44.0	*1118*	53.5	*1359*
24	34.00	*864*	44.5	*1130*	57.5	*1461*	49.0	*1245*	59.5	*1511*
27	37.44	*951*	47.0	*1194*	61.0	*1549*	53.0	*1346*	63.0	*1600*
30	41.62	*1057*	54.0	*1372*	65.0	*1651*	60.5	*1537*	72.0	*1829*
33	45.75	*1162*	58.5	*1486*	69.0	*1753*	64.5	*1638*	76.5	*1943*
36	50.56	*1284*	64.0	*1626*	75.0	*1905*	69.0	*1753*	82.5	*2096*
40	55.75	*1416*	68.5	*1740*	83.0	*2108*	75.5	*1918*	90.5	*2299*
44	61.62	*1565*	74.0	*1880*	89.5	*2273*	80.5	*2045*	97.0	*2464*
49	67.75	*1721*	80.5	*2045*	96.5	*2451*	86.5	*2197*	104	*2642*
54	75.00	*1905*	87.0	*2210*	105	*2667*	93.5	*2375*	111	*2419*
60	82.88	*2105*	91.5	*2324*	113	*2870*	102.4	*2601*	119	*3023*

Performance Data		
Maximum Fan RPM	1116	
Specification Data		
Maximum Motor Frame Size	286T	
Minimum Motor Starting hp	1½ hp	*1.1 kW*
Wheel Diameter	44.5 in.	*1130 mm*
Approximate Weight (Less Motor & Drives)	1200 lbs.	*544 kg.*
Maximum Bhp = (Fan RPM / 380)^3		
Outlet Velocity (FPM) = CFM / 13.79		
Tip Speed (FPM) = Fan RPM x 11.7		
% WOV = (CFM x 100) / (Fan RPM x 36.1)		

Imperial data — *Metric data*

15 HP FAN MOTOR



Performance Data

CFM	OV	STATIC PRESSURE (inches wg)																	
		0.25		0.5		1		1.5		2		2.5		3		3.5		4	
		RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP	RPM	BHP
10300	746	343	0.63	402	1.14	508	2.36												
12500	906	394	0.88	443	1.44	537	2.79	622	4.31										
14700	1065	448	1.22	488	1.82	571	3.27	649	4.93	720	6.71								
16900	1225	503	1.65	539	2.31	611	3.83	681	5.63	748	7.55	808	9.57	874	11.8				
19100	1385	560	2.19	592	2.90	654	4.52	718	6.39	780	8.49	839	10.7	894	12.9	950	15.4	1007	18.0
21300	1544	618	2.85	646	3.63	702	5.35	760	7.31	817	9.48	872	11.8	925	14.3	975	16.7	1022	19.3
23500	1704	677	3.64	702	4.50	753	6.33	803	8.36	857	10.6	908	13.1	958	15.7	1006	18.3	1052	21.0
25700	1863	736	4.59	758	5.51	805	7.45	851	9.59	899	11.9	946	14.4	994	17.1	1040	20.0	1084	22.9
27900	2023	795	5.69	815	6.69	859	8.76	902	11.0	943	13.4	989	16.0	1032	18.8	1076	21.7		
30100	2182	854	6.97	873	8.05	913	10.3	953	12.6	993	15.1	1033	17.8	1075	20.7	1114	23.6		
32300	2342	914	8.44	932	9.59	969	12.0	1005	14.4	1043	17.0	1079	19.8						
34500	2501	974	10.1	991	11.3	1024	13.8	1060	16.4	1094	19.1								

Inlet Sound Power, L_{Wi} [dB ref 10^{-12} watts]										
RPM	% WOV	1	2	3	4	5	6	7	8	$L_{Wi}A$
275	100	70	68	63	62	61	48	39	32	64
	80	68	67	61	61	59	49	40	34	63
	60	64	65	60	61	60	49	39	32	63
	50	66	66	61	61	59	49	39	33	63
400	100	75	76	71	70	69	58	49	45	72
	80	72	74	69	70	65	57	50	43	70
	60	70	72	67	70	65	58	51	44	70
	50	70	71	67	69	65	58	51	43	70
550	100	85	82	79	75	75	73	60	54	79
	80	81	80	76	73	72	66	60	53	76
	60	80	80	74	72	72	66	61	54	76
	50	80	80	74	72	72	66	61	55	75
800	100	87	95	89	84	81	84	71	63	89
	80	85	93	86	81	79	75	68	62	85
	60	84	91	82	77	77	74	69	64	82
	50	84	89	81	77	77	74	69	64	82
1116	100	91	100	96	94	91	89	89	74	97
	80	89	98	94	91	88	84	78	72	93
	60	88	96	89	87	84	82	78	73	90
	50	88	96	89	87	84	82	78	73	90

Outlet Sound Power, L_{Wo} [dB ref 10^{-12} watts]										
RPM	% WOV	1	2	3	4	5	6	7	8	$L_{Wo}A$
275	100	72	68	65	65	64	53	45	38	67
	80	69	69	64	65	63	53	45	38	66
	60	69	69	63	64	63	53	46	40	66
	50	69	69	63	64	64	53	47	40	66
400	100	80	76	73	72	70	61	53	45	74
	80	78	75	71	71	67	60	53	45	72
	60	77	75	69	70	67	60	53	46	71
	50	78	75	70	70	67	59	53	45	71
550	100	90	83	80	80	77	74	62	54	82
	80	88	82	78	79	75	68	61	53	80
	60	86	82	76	76	74	68	61	53	78
	50	86	82	76	76	74	67	61	54	78
800	100	88	91	89	90	85	84	75	66	91
	80	86	91	86	87	82	77	71	64	87
	60	86	89	84	84	80	76	71	65	85
	50	88	90	84	83	80	76	71	65	85
1116	100	92	97	98	99	95	92	90	77	100
	80	91	96	95	97	92	87	82	74	97
	60	93	94	93	93	89	85	80	74	94
	50	95	95	93	93	89	85	80	75	94

Performance certified is for installation type B: Free inlet, Ducted outlet. Power rating (Bhp) does not include transmission losses. Performance ratings do not include the effects of appurtenances (accessories).

CARECO

CONTROL SYSTEMS DIVISION

KING COUNTY POOLS RENOVATION
SOUTH CENTRAL POOL
SEATTLE, WASHINGTON

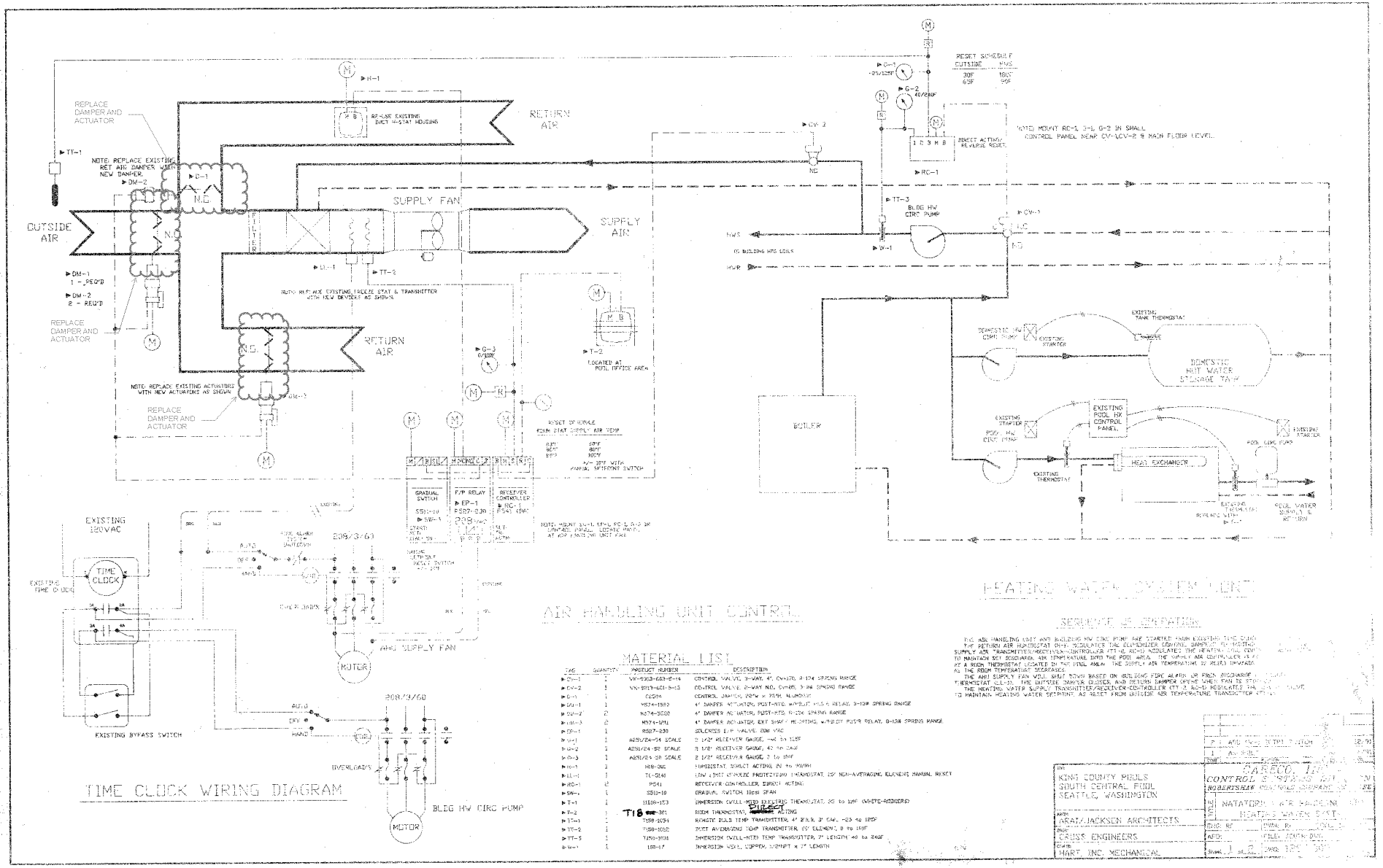
CONTROL SYSTEM DRAWINGS

AS-BUILT DRAWINGS 1-14-1991

Robertshaw

CONTROLS COMPANY

JOB: KING COUNTY POOLS, SOUTH CENTRAL POOL, SEATTLE, WASHINGTON	CONTROL SYSTEMS DIVISION
ARCH: ARAI/JACKSON ARCHITECTS	TITLE: TITLE SHEET
CIVIL: CROSS ENGINEERS	APPD:
MECH: HART, INC. MECHANICAL	Sheet 1 of 2



AIR HANDLING UNIT CONTROL

TIME CLOCK WIRING DIAGRAM

MATERIAL LIST

TAG	QUANTITY	PRODUCT NUMBER	DESCRIPTION
▶CV-1	1	VK-9313-623-E-14	CONTROL VALVE, 3-WAY, 4", CV=170, 9-174 SPRING RANGE
▶CV-2	1	VK-9317-601-E-13	CONTROL VALVE, 2-WAY NO, CV=95, 3-96 SPRING RANGE
▶D-1	1	D204	CONTROL DAMPER, 20"W x 72"H, ALUMINUM
▶DM-1	1	M974-1582	4" DAMPER ACTUATOR, POST-MTD, W/ANTI MISS RELAY, 3-12W SPRING RANGE
▶DM-2	2	M974-3002	4" DAMPER ACTUATOR, POST-MTD, 6-12W SPRING RANGE
▶DM-3	2	M974-1241	4" DAMPER ACTUATOR, EXT SHAFT, HEATING, W/ANTI MISS RELAY, 6-15W SPRING RANGE
▶EP-1	1	R827-230	SOLENOID E/P VALVE, 20W VAC
▶G-1	1	A351/24-S1 SCALE	3 1/2" RECEIVER GAUGE, -40 to 160F
▶G-2	1	A351/24-S2 SCALE	3 1/2" RECEIVER GAUGE, 40 to 240F
▶G-3	1	A351/24-S3 SCALE	3 1/2" RECEIVER GAUGE, 0 to 100F
▶H-1	1	H08-005	HUMIDISTAT, DIRECT ACTING 20 to 90%RH
▶LL-1	1	TC-0141	LOW LIMIT (FREEZE PROTECTION) THERMOSTAT, 15F NON-AVERAGING ELEMENT, MANUAL RESET
▶RC-1	2	P541	RECEIVER CONTROLLER, DIRECT ACTING
▶SW-1	1	S551-10	GRADUAL SWITCH, 10psi SPAN
▶T-1	1	11516-153	IMMERSION CWELL-MTD) FREEZE THERMOSTAT, 20 to 110F (WHITE-RODGERS)
▶T-2	1	T18-301	ROOM THERMOSTAT, [illegible] ACTING
▶TT-1	1	T350-1034	REMOTE BULB TEMP TRANSMITTER, 4" BULB, 2" EXT., -20 to 120F
▶TT-2	1	T350-1052	DUCT AVERAGING TEMP TRANSMITTER, 15' ELEMENT, 0 to 100F
▶TT-3	1	T350-1031	IMMERSION CWELL-MTD) TEMP TRANSMITTER, 2" LENGTH, 40 to 240F
▶V-1	1	188-417	IMMERSION WELL, COPPER, 1/2"NPT x 2" LENGTH

HEATING WATER SYSTEM UNIT

SEQUENCE OF OPERATION

THE AIR HANDLING UNIT AND BUILDING HW CIRC PUMP ARE STARTED FROM EXISTING TIME CLOCK. THE RETURN AIR HUMIDISTAT (H-1) MODULATES THE ELIMINATOR CONTROL DAMPER TO MAINTAIN SUPPLY AIR TRANSMITTER/RECEIVER-CONTROLLER (TT-1/RC-1) MODULATES THE HEATING WATER CONTROL VALVE TO MAINTAIN SET DISCHARGE AIR TEMPERATURE INTO THE POOL AREA. THE SUPPLY AIR CONTROLLER IS AT A ROOM THERMOSTAT LOCATED IN THE POOL AREA. THE SUPPLY AIR TEMPERATURE IS RESET TOWARDS AS THE ROOM TEMPERATURE DECREASES.

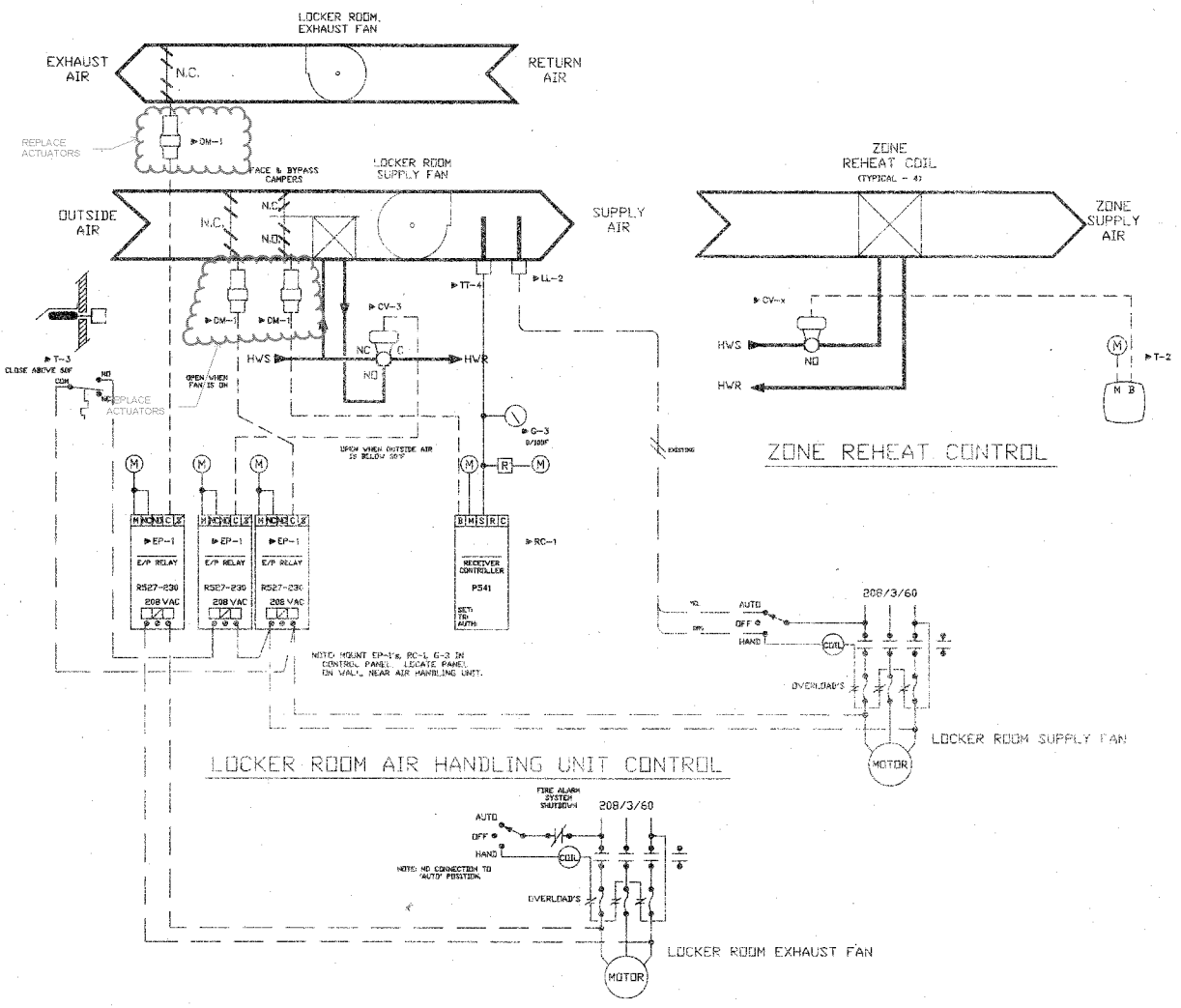
THE AHU SUPPLY FAN WILL SHUT DOWN BASED ON BUILDING FIRE ALARM OR FREEZE DISCHARGE THERMOSTAT (LL-1). THE OUTSIDE DAMPER CLOSES, AND RETURN DAMPER OPENS WHEN FAN IS STARTED. THE HEATING WATER SUPPLY TRANSMITTER/RECEIVER-CONTROLLER (TT-2/RC-1) MODULATES THE [illegible] VALVE TO MAINTAIN HEATING WATER SETPOINT AS RESET FROM OUTSIDE AIR TEMPERATURE TRANSMITTER (TT-1).

OWNER:	KING COUNTY PARKS SOUTH CENTRAL FOOL SEATTLE, WASHINGTON
ARCH:	GRAY/JACKSON ARCHITECTS
ENGR:	CRUSS ENGINEERS
CONTR:	HART, INC. MECHANICAL

CARLSON, LLC
CONTROL SYSTEMS ENGINEERING
ROBERTSAW

NATATORIUM - AIR HANDLING HEATING WATER SYST.

DWG. NO. [illegible]
APD: [illegible]
SHEET 1 OF 2 SHEETS



MATERIAL LIST

TAG	QUANTITY	PRODUCT NUMBER	DESCRIPTION
▶CV-3	1	VK-9213-283-4-9	CONTROL VALVE, 2-WAY, [illegible] 0-15#, 8-13# SPRING RANGE
▶CV-x	1	VK-9213-283-4-7	CONTROL VALVE, 2-WAY [illegible], 0-5#SI, 0-13# SPRING RANGE
	3	VK-9213-283-4-5	CONTROL VALVE, 2-WAY [illegible], 0-5#SI, 3-13# SPRING RANGE
▶DM-1	23	M27-5231	4" DAMPER ACTUATOR, 90# [illegible], 0-13# SPRING RANGE
▶DM-2	1	M27-5230	4" DAMPER ACTUATOR, 90# [illegible], 0-13# SPRING RANGE
▶EP-1	3	R327-239	SOLENOID E/P VALVE, 20# MAX.
▶G-3	1	A351/24-50 SCALE	2 1/2" RECEIVER GAUGE, 0 TO 100#
▶LL-2	1	TA-3441	LOW LIMIT (FREEZE PROTECTION) THERMOSTAT 7 1/2# RIGID ELEMENT, MANUAL RESET
▶RC-1	1	P541	RECEIVER-CONTROLLER, [illegible] ACTING
▶T-2	4	T19-301	ROOM THERMOSTAT, [illegible]
▶T-3	1	T6-4311	REMOTE BULB THERMOSTAT, [illegible]
▶TT-4	1	T459-1021	DUCT RIGID TEMP TRANSMITTER, 2" LENGTH, 0 TO 100

SEQUENCE OF OPERATION

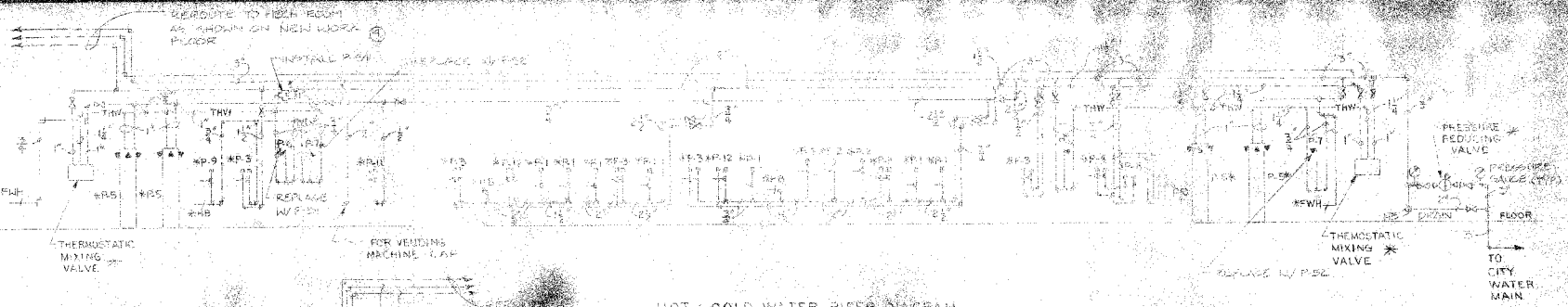
THE LOCKER ROOM SUPPLY FAN AND EXHAUST FAN ARE OPERATE[illegible] WHEN THE FAN IS STARTED, THE RESPECTIVE SHUTOFF DAMPER OPE[illegible] Y AND CLOSES WHEN THE FAN IS OFF.

THE SUPPLY AIR TRANSMITTER/RECEIVER-CONTROLLER (TT-4, R[illegible] FACE-AND-BYPASS DAMPERS TO MAINTAIN SET DISCHARGE AIR TEM[illegible] [illegible]OINT. THE HEATING COIL VALVE (CV-3) IS FULLY OPEN WHEN OUTSIDE [illegible] 45F, AND CLOSED WHEN OUTSIDE AIR IS WARMER THAN 57F.

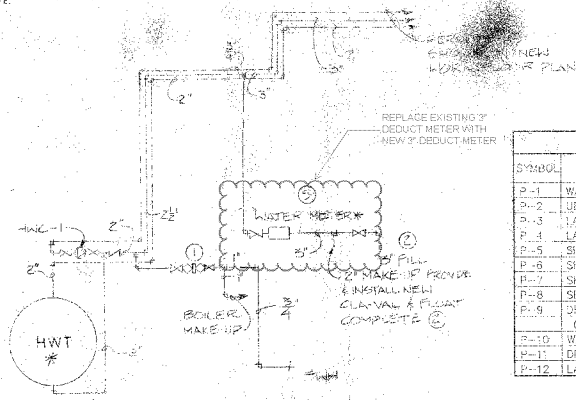
THE ZONE THERMOSTAT (T-2) MODULATES THE RESPECTIVE REHE[illegible] VE (CV-x) TO MAINTAIN SETPOINT.

THE EXHAUST FAN WILL SHUT DOWN BASED ON BUILDING FIRE A[illegible] THE SUPPLY FAN WILL SHUT DOWN FROM THE DISCHARGE LOW LIMIT (LL[illegible]

ADD: KING COUNTY POOLS SOUTH CENTRAL POOL SEATTLE, WASHINGTON	CARE[illegible] CONTROL SY[illegible] ROBERTSHAW COM[illegible]
ARCH: ARAI/JACKSON ARCHITECTS	TITLE: LOCKER ROOM ZONE REHEA[illegible]
OWNER: CROSS ENGINEERS	ENG: RP DWN: [illegible]
CONTR: HART, INC. MECHANICAL	APD: STLS: [illegible] Sheet 2 of 2 DWG: [illegible]



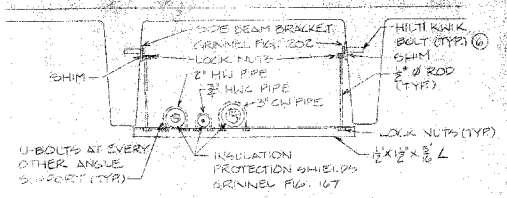
HOT & COLD WATER RISER DIAGRAM
NTS



HOT & COLD WATER RISER DIAGRAM CONT.
NTS

SOUTH CENTRAL POOL
PLUMBING FIXTURE SCHEDULE

SYMBOL	TYPE	CONN. SIZE CW	CONN. SIZE HW	NOTES
P-1	WATER CLOSET	1 1/4	–	EXISTING
P-2	URINAL	3/4	–	EXISTING
P-3	LAVATORY	1/2	1/2	EXISTING
P-4	LAVATORY – FIRST AID	1/2	1/2	EXISTING – COUNTER TOP
P-5	SHOWER	1	1	EXISTING – COLUMN
P-6	SHOWER	3/4	3/4	EXISTING
P-7	SHOWER	3/4	3/4	EXISTING – HANDICAPPED
P-8	SERVICE SINK	3/4	3/4	EXISTING
P-9	DRINKING FOUNTAIN & CUSP DOP	1/2		EXISTING
P-10	WASHER DRAIN	3/4	3/4	EXISTING
P-11	DRINKING FOUNTAIN	1/2	–	EXISTING
P-12	LAVATORY	1/2	1/2	EXISTING – HANDICAPPED



DETAIL
NTS

MECHANICAL NOTES

⑥ ① PROVIDE AND INSTALL 3/4" REDUCED PRESSURE BACKFLOW PREVENTER IN DOUBLE CONFIGURATION MAKE-UP PIPING.

② TERMINATE FILL AND MAKE-UP PIPING 6" MINIMUM OF 9" ABOVE FLOOR LEVEL RIM OF FACTOR TANK.

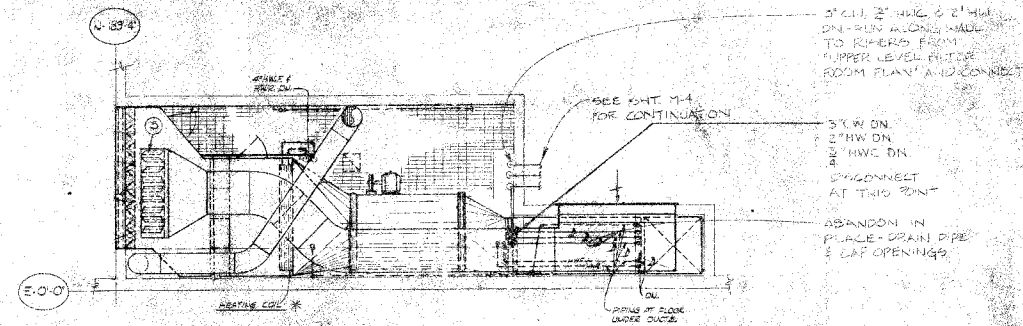
③ REPLACE RETURN AIR DAMPER (ALTERNATE #6).

④ SEE "HOT AND COLD WATER RISER DIAGRAM CONT." BELOW FOR CONTINUATION.

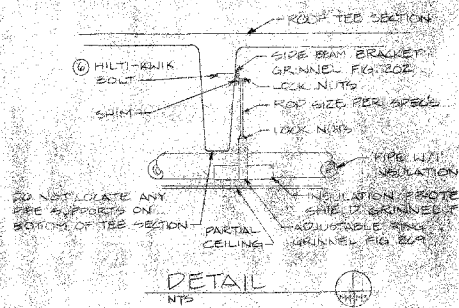
⑤ PROVIDE REDUCING FITTINGS TO INSTALL WATER METER.

⑥ TENSION CABLE RUNS GENERALLY IN THE UPPER PART OF THE BEAMS ON THE ENDS, AND TOWARDS THE LOWER PART OF THE BEAMS IN THE MIDDLE. USE CAUTION TO AVOID CABLE WHEN INSTALLING EXPANSION BOLTS.

# INDICATES ITEM TO BE REUSED, NOT PURCHASED NEW.



2ND FLOOR FAN ROOM PLAN
SCALE ¼"=1'-0"



DETAIL
NTS

M-3

REVISIONS	DATE

KING COUNTY NATURAL RESOURCES & PARKS DIVISION
3600 136th AVENUE S.E. MERCER ISLAND, WASHINGTON 98040

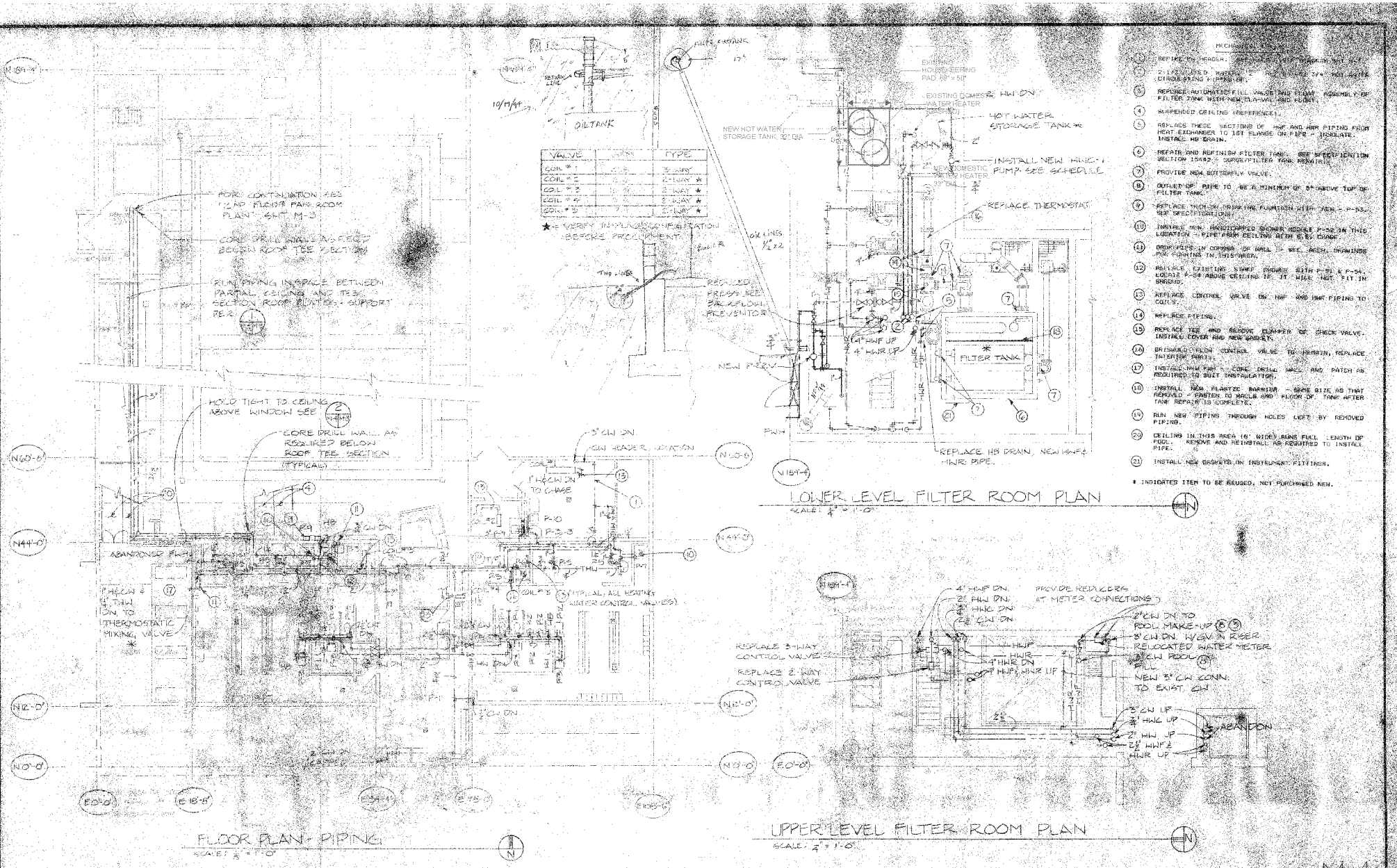
CROSS ENGINEERS, INC.
MECHANICAL & ELECTRICAL CONSULTANTS
308 Cedar Fish St. (206) 383-2344
Seattle, Washington 98102 (FAX) 223-0846

POOL REPAIRS - ISSAQUAH, MERCER ISLAND, AND SOUTH CENTRAL

AS BUILTS	
DATE	4-92
DRAWN BY	JG
JOB NO.	9225-9

SOUTH CENTRAL POOL

SHEET NO. M-3



MECHANICAL NOTES

1. REPLACE CW HEADER. SEE SPECIFICATION SECTION 15400 - PLUMBING SYSTEMS.
2. 2-1/2" COLD WATER & 2" HOT WATER (DIRECT BURIED PIPING).
3. REPLACE AUTOMATIC FILL VALVE AND FLOAT ASSEMBLY OF FILTER TANK WITH NEW CLA-VAL AND FLOAT.
4. SUSPENDED CEILING (REFERENCE).
5. REPLACE THESE SECTIONS OF HWF AND HWR PIPING FROM HEAT EXCHANGER TO 1ST FLANGE ON PIPE - INSULATE. INSTALL HB DRAIN.
6. REPAIR AND REFINISH FILTER TANK. SEE SPECIFICATION SECTION 15482 - SURGE/FILTER TANK REPAIRS.
7. PROVIDE NEW BUTTERFLY VALVE.
8. OUTLET OF PIPE TO BE A MINIMUM OF 6" ABOVE TOP OF FILTER TANK.
9. REPLACE TWO (2) SHOWER FIXTURES WITH NEW - P-93. SEE SPECIFICATIONS.
10. INSTALL NEW, HANDICAPPED SHOWER MODULE P-92 IN THIS LOCATION - PIPE FROM CEILING WITH 6.85 CODE.
11. DROP PIPE IN CORNER OF WALL - SEE ARCH. DRAWINGS FOR FURRING IN THIS AREA.
12. REPLACE EXISTING STAFF SHOWER WITH P-93 & P-94. LOCATE P-94 ABOVE CEILING IF IT WILL NOT FIT IN SHROUD.
13. REPLACE CONTROL VALVE ON HWF AND HWR PIPING TO COILS.
14. REPLACE PIPING.
15. REPLACE TEE AND REMOVE FLAPPER OF CHECK VALVE. INSTALL COVER AND NEW GASKET.
16. BRISMUND TELON CONTROL VALVE TO REMAIN, REPLACE INTERIOR PARTS.
17. INSTALL NEW P.H.W. - CORE DRILL WALL AND PATCH AS REQUIRED TO SUIT INSTALLATION.
18. INSTALL NEW PLASTIC BARRIER - SAME SIZE AS THAT REMOVED - FASTEN TO WALLS AND FLOOR OF TANK AFTER TANK REPAIR IS COMPLETE.
19. RUN NEW PIPING THROUGH HOLES LEFT BY REMOVED PIPING.
20. CEILING IN THIS AREA (6' WIDE) RUNS FULL LENGTH OF POOL. REMOVE AND REINSTALL AS REQUIRED TO INSTALL PIPE.
21. INSTALL NEW GASKETS ON INSTRUMENT FITTINGS.

* INDICATES ITEM TO BE REUSED, NOT PURCHASED NEW.

VALVE	SIZE	TYPE
COIL # 1	1-1/2"	3-WAY
COIL # 2	1-1/2"	2-WAY *
COIL # 3	1"	3-WAY
COIL # 4	1"	3-WAY *
COIL # 5	1"	2-WAY *

* VERIFY IN FIELD CONFIGURATION BEFORE PROCUREMENT

LOWER LEVEL FILTER ROOM PLAN
SCALE: 1/4" = 1'-0"

UPPER LEVEL FILTER ROOM PLAN
SCALE: 1/4" = 1'-0"

FLOOR PLAN - PIPING
SCALE: 1/8" = 1'-0"

M-4

KING COUNTY NATURAL RESOURCES & PARKS DIVISION
2040 84TH AVENUE S.E., MERCER ISLAND, WASHINGTON 98040

CROSS ENGINEERS, INC.
MECHANICAL & ELECTRICAL CONSULTANTS
250 South Fifth St. (206) 383-2544
Kirkland, Washington 98402 FAX) 272-5846

POOL REPAIRS: ESQUIM, MERCER ISLAND AND SOUTH CENTRAL

SOUTH CENTRAL POOL
NEW WORK PLAN

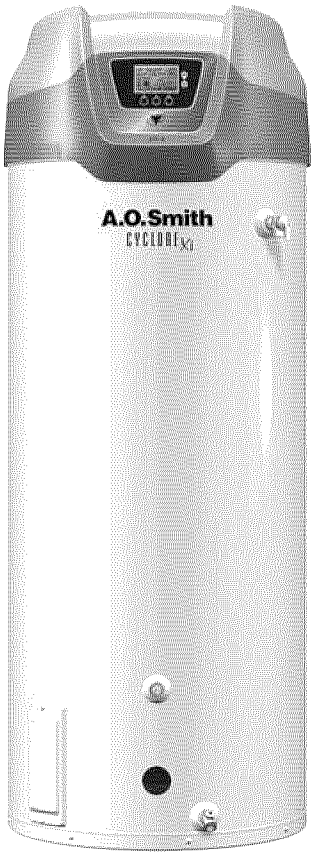
M-4

A.O. Smith | Commercial Gas Water Heaters

CYCLONE® Xi

UP TO 96% THERMAL EFFICIENCY, DIRECT VENT

BTH-120 through BTH-500



BTH-120-250

BTH-300-500

FEATURES

The A. O. Smith Cyclone Xi family of products represents the industry's most technologically advanced commercial water heaters. The innovative Cyclone Xi design takes performance to its highest level with efficiencies of 95% and 96%. Models are available from 120,000 BTUs up to 500,000 BTUs. In addition, the Cyclone Xi features an Intelligent Control System making it the smartest water heater in the industry.

Cyclone Xi provides outstanding hot water output, with dramatic savings on operating costs compared to units with standard 80% efficiency. A. O. Smith's leading-edge engineering delivers conventional power-vent or power direct-vent versatility, low NOx emissions and excellent space-saving characteristics. Powered anodes, standard on all Cyclone Xi models, provide superior tank protection for years of trouble free operation.

INTELLIGENT CONTROL SYSTEM WITH LCD DISPLAY

- Exclusive A. O. Smith designed control system
- Provides detailed water heater status information
- Precise temperature control
- Built-in diagnostics
- Run history information
- Cyclone water heaters are iCOMM™ compatible and can be monitored from remote locations. Call 1.888.WATER02 for more information.

SUBMERGED COMBUSTION CHAMBER, WITH HELICAL HEAT EXCHANGER COIL

- Positioned in center of tank, surrounded by water to virtually eliminate radiant heat loss from chamber
- Spiral heat exchanger keeps hot burner gases swirling, uses centrifugal force to maximize efficiency of heat transfer to water in tank
- Spiral shaped heat exchanger reduces the accumulation of lime scale; maintains higher efficiency performance over time.

POWERED ANODES STANDARD ON ALL MODELS

- Provides long-lasting tank protection in varying water conditions
- Anodes are of a permanent design and do not require replacement unless damaged

PERMAGLAS® ULTRA COAT™ GLASS LINING

- Exclusive process provides superior protection against corrosion
- Both sides of heat exchanger coil are lined for protection against flue gas condensate inside coil

MECHANICAL VENTING VERSATILITY

- Conventional power-venting or power-direct venting
- Vents vertically or through sidewall
- Direct-vent intake and exhaust pipe can terminate separately outside building, or through single opening, using concentric vent assembly
- Uses inexpensive PVC, CPVC or ABS pipe for intake and exhaust. Canadian installations require ULC S636 listed PVC or CPVC pipe for intake and exhaust.

HIGH EFFICIENCY PRE-MIX POWERED BURNER

- Down-fired pre-mix burner provides optimum efficiency and quiet operation
- Top-mounted radial burner design ensures optimum combustion efficiency

Revised August 2011

AOSCG10200

OTHER CYCLONE Xi FEATURES

SPACE-SAVING DESIGN FOR INSTALLATION FLEXIBILITY

- Reduced footprint, ease of service, protection from water damage in case of flooding
- Easy to remove top cover for convenient access to serviceable parts
- 0″ installation clearances on sides and rear, 1-1/2″ installation clearance on top, 4″ alcove installation clearance in front Handhole Cleanout of unit
- Handhole cleanout allows easy access to tank interior for cleaning
- 0″ clearance to combustibles, approved for installation on combustible floors

CODES AND STANDARDS

- CSA certified and ASME rated T&P relief valve
- Maximum hydrostatic working pressure: 160 PSI
- BTH-120-250 Models are design-certified by CSA International, according to ANSI Z21.10.3 - CSA 4.3 Standards governing storage-type water heaters.
- BTH-300-500 Models are design-certified by Underwriter's Laboratories (UL), Inc., according to ANSI Z21.10.3 - CSA 4.3 standards governing storage-type water heaters.
- Meets or exceeds the thermal efficiency and standby loss reqiurements of the U.S. Department of Energy and current edition ASHRAE/IESNA 90.1
- Design-certified by Underwriter's Laboratories (UL), Inc. to NSF standard 5
- Complies with SCAQMD Rule 1146.2 and other Air Quality Management Districts with similar requirements for low NOx emissions
- ASME tank construction optional on all models.

THREE-YEAR LIMITED TANK WARRANTY

- For complete warranty details, consult written warranty shipped with heater, or contact A. O. Smith (5-year extended warranty is optional).

INSTALLATION CONSIDERATIONS

1. Condensate Drain – This is a fully condensing water heater and should be located near a drain to permit proper disposal of condensate.

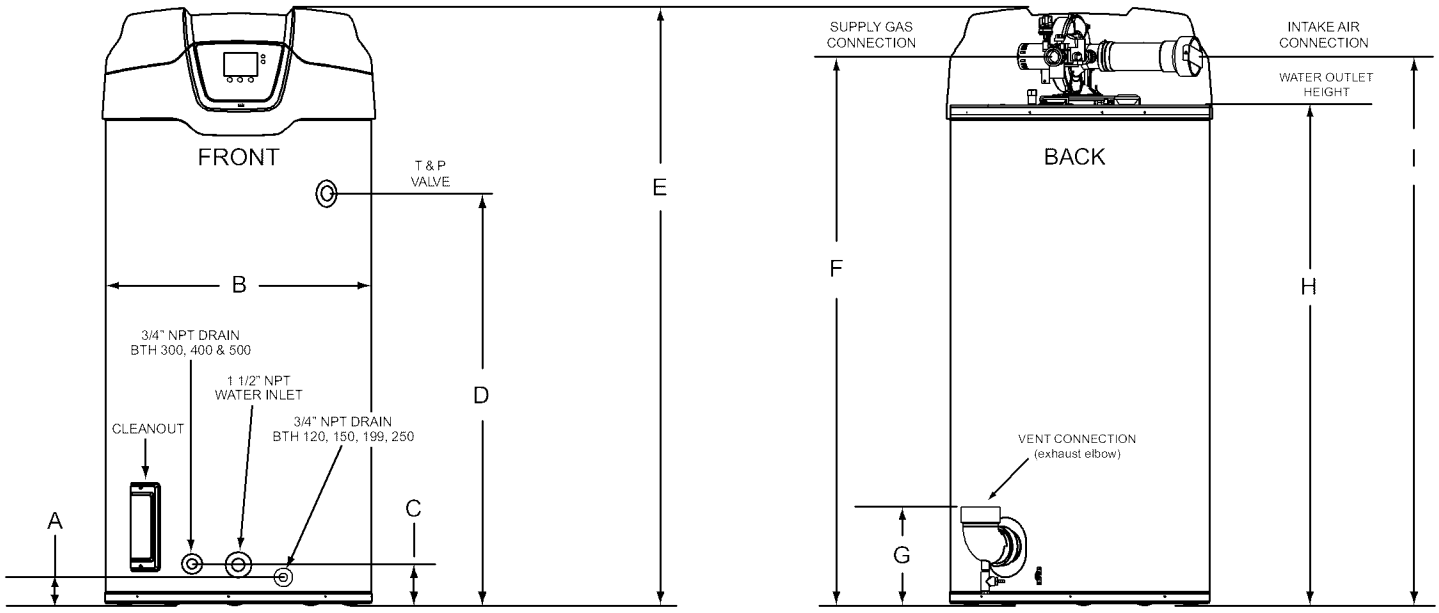
2. Vent Termination – Exhaust gases of this water heater are less than 140°F. In cold climates water vapor in flue gases will condense into a cloud of vapor where the vent exits the building. This vapor can gradually discolor exterior building surfaces. Vent termination should be located where this vapor cloud and potential discoloration are not a concern. Extending the vent termination up to 6″ from the wall helps vapor from being trapped along a building's face. To avoid this problem, the vent can be terminated on the roof. Always locate vent termination above the maximum snowline, and do not locate vent termination above a walkway.

3. Air Intake – In cold climates, air intake should be located at least four feet from the vent termination of the water heater and any other appliance vents that discharge moisture-laden air (such as clothes dryers). This will help prevent freeze-over of the intake screen required to prevent foreign objects from entering the intake pipe. Air intake should be located above the maximum snowline.

4. Blockage Sensors – The water heater is equipped with sensors to shut it down if blockage of vent or air intake occurs. The water heater control system will display detailed diagnostic information on the LCD screen to help service technicians quickly locate and correct the problem.

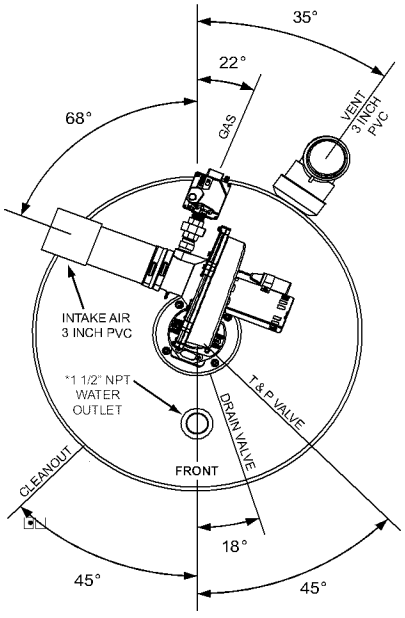
5. Noise – Vent terminal should be located away from bedroom windows or other areas where blower noise will be objectionable. Avoid venting into corners or confined areas, which will amplify sound. Anchoring intake or vent pipe to walls or ceilings can cause noise to be transmitted to living areas, and isolation mounts should be used where anchoring is required.

6. Optional Concentric Vent Kit - Helps to minimize unsightly wall/roof penetrations.
   BTH-120 - 300 vent kit p/n 9006328005
   BTH-400 - 500 vent kit p/n 9006144005

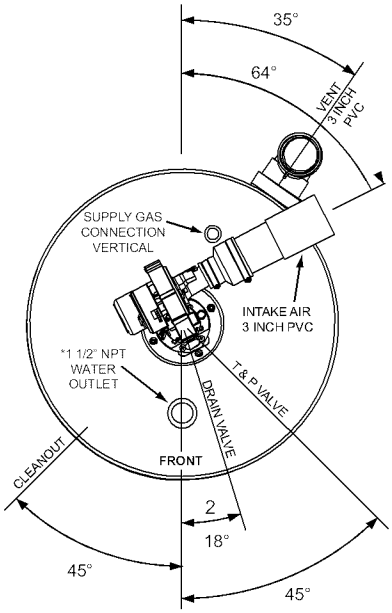


MODEL	DIMENSIONS									SHIP WEIGHT STD	SHIP WEIGHT ASME
	A	B	C	D	E	F	G	H	I		
	INCHES/CM	INCHES/CM	INCHES/CM	INCHES/CM	INCHES/CM	INCHES/CM	INCHES/CM	INCHES/CM	INCHES/CM	LBS/KG	LBS/KG
BTH 120	3/7.62	27.75/70.5	6.3/16	35/88.9	55.5/141	48/121.9	11/27.9	42/106.7	47.5/120.6	460/208	490/222
BTH 150	3/7.62	27.75/70.5	6.3/16	55.5/141	75.5/191.8	68.5/174	11/27.9	63/160	69/175.3	555/252	595/270
BTH 199, 250	3/7.62	27.75/70.5	6.3/16	55.5/141	75.5/191.8	75.5/191.8	11/27.9	63/160	69/175.3	555/252	595/270
BTH 300, 400, 500	N/A	33.12/84.1	4.86/12.34	50.77/129	75.5/191.8	69/175.3	12/30.5	63/160	69/175.3	855/408	855/408

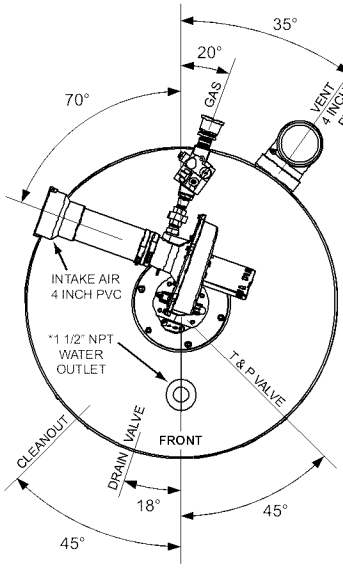
BTH 120 & 150



BTH 199 & 250



BTH 300, 400 & 500



* Center line of water outlet on top of the water heaters is approximately 7 inches from the front edge of the water heater

For Technical Information and Automated Fax Service, call 800-527-1953. A. O. Smith Corporation reserves the right to make product changes or improvements without prior notice.

MAXIMUM EQUIVALENT VENT LENGTHS BTH 120 - 250

*Number of 90° Elbows Installed	3 Inch Pipe	4 Inch Pipe
	Maximum Feet (Meters)	Maximum Feet (Meters)
One (1)	45 feet (13.7 meters)	115 feet (35.0 meters)
Two (2)	40 feet (12.2 meters)	110 feet (33.5 meters)
Three (3)	35 feet (10.7 meters)	105 feet (32.0 meters)
Four (4)	30 feet (9.1 meters)	100 feet (30.5 meters)
Five (5)	-------	95 feet (29.0 meters)
Six (6)	-------	90 feet (27.4 meters)

* Maximum number of 90° elbows allowed for the vent (exhaust) pipe is four (4) when installing 3 inch pipe and six (6) when installing 4 inch pipe. Maximum number of 90° elbows allowed for intake air pipe is four (4) when installing 3 inch pipe and six (6) when installing 4 inch pipe. Two (2) 45° elbows equal one (1) 90° elbow.

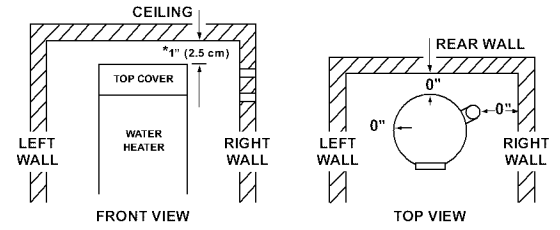
MAXIMUM EQUIVALENT VENT LENGTHS BTH 300 - 500

*Number of 90° Elbows Installed	4 Inch Pipe	6 Inch Pipe
	Maximum Feet (Meters)	Maximum Feet (Meters)
One (1)	65 feet (19.8 meters)	115 feet (35.0 meters)
Two (2)	60 feet (18.2 meters)	110 feet (33.5 meters)
Three (3)	55 feet (16.8 meters)	105 feet (32.0 meters)
Four (4)	50 feet (15.2 meters)	100 feet (30.5 meters)
Five (5)	45 feet (13.7 meters)	95 feet (29.0 meters)
Six (6)	40 feet (12.2 meters)	90 feet (27.4 meters)

* Maximum number of 90° elbows allowed for the vent (exhaust) pipe is six (6). Maximum number of 90° elbows allowed on the intake air pipe is six (6). Two (2) 45° elbows equal one (1) 90° elbow.

MINIMUM SUPPLY GAS LINE SIZE		
MODEL	NATURAL GAS	PROPANE GAS
BTH 120	1/2" NPT	1/2" NPT
BTH 150	3/4" NPT	3/4" NPT
BTH 199	3/4" NPT	3/4" NPT
BTH 250	3/4" NPT	3/4" NPT
BTH 300	1 1/4" NPT	1 1/4" NPT
BTH 400	1 1/4" NPT	1 1/4" NPT
BTH 500	1 1/2" NPT	1 1/4" NPT

INSTALLATION CLEARANCES



*Minimum clearance to remove top cover

RECOVERY CAPACITY

MODEL	TYPE OF GAS	INPUT		Thermal Efficiency	U.S. Gallons/Hr and Litres/Hr at TEMPERATURE RISE INDICATED													
		BTUH	KW		Approx. Capacity	F°	30F°	40F°	50F°	60F°	70F°	80F°	90F°	100F°	110F°	120F°	130F°	140F°
						C°	17C°	22C°	28C°	33C°	39C°	44C°	50C°	56C°	61C°	67C°	72C°	78C°
BTH 120	NATURAL/ PROPANE	120,000	35	95%	60 U.S. Gal	GPH	461	345	276	230	197	173	154	138	126	115	106	99
					227 Litres	LPH	1744	1308	1046	872	747	654	581	523	476	436	402	374
BTH 150	NATURAL/ PROPANE	150,000	44	95%	100 U.S. Gal	GPH	576	432	345	288	247	216	192	173	157	144	133	123
					379 Litres	LPH	2179	1635	1308	1090	934	817	726	654	594	545	503	467
BTH 199	NATURAL/ PROPANE	199,900	58	95%	100 U.S. Gal	GPH	767	575	460	384	329	288	256	230	209	192	177	164
					379 Litres	LPH	2904	2178	1743	1452	1245	1089	968	871	792	726	670	622
BTH 250	NATURAL/ PROPANE	250,000	73	95%	100 U.S. Gal	GPH	960	720	576	480	411	360	320	288	262	240	221	206
					379 Litres	LPH	3632	2724	2179	1816	1557	1362	1211	1090	991	908	838	778
BTH 300	NATURAL/ PROPANE	300,000	88	96%	130 U.S. Gal	GPH	1164	873	699	582	499	436	388	349	318	291	269	250
					492 Litres	LPH	4406	3304	2644	2203	1888	1652	1469	1322	1201	1102	1017	945
BTH 400	NATURAL/ PROPANE	399,900	117	96%	130 U.S. Gal	GPH	1552	1164	931	776	665	582	517	466	423	388	359	332
					492 Litres	LPH	5875	4406	3525	2938	2518	2203	1958	1763	1602	1469	1356	1259
BTH 500	NATURAL/ PROPANE	499,900	146	95%	130 U.S. Gal	GPH	1919	1439	1151	959	822	720	640	576	523	480	443	411
					492 Litres	LPH	7263	5447	4358	3631	3113	2724	2421	2179	1981	1816	1676	1556

Recovery capacities are based on heater performance at 95% and 96% thermal efficiency.
Add "A" to model number when ordering ASME.
Maximum gas supply pressure for 120-250: 10.5" W.C. natural gas 14" W.C. propane. Maximum gas supply pressure for 300-500 10.0" W.C. natural gas 12.0" W.C. propane. Electrical requirements: 120 VAC/60Hz, Blower 2.2 Amps FL, Igniter 4.0 Amps.

SUGGESTED SPECIFICATION

(Natural or Propane) gas water heater(s) shall be A. O. Smith Cyclone Xi model # _____ or equal, with up to 96% thermal efficiency, a storage capacity of _____ gallons, an input rating of _____ BTUs per hour, a recovery rating of _____ gallons per hour (gph) at 100°F rise and a maximum hydrostatic working pressure of 160 PSI. Water heater(s) shall: 1. Have seamless glasslined steel tank construction, with glass lining applied to all water-side surfaces after the tank has been assembled and welded; 2. Meet the thermal efficiency and standby loss requirements of the U. S. Department of Energy and current edition of ASHRAE/IESNA 90.1 3. Have foam insulation and a CSA Certified and ASME rated T&P relief valve; 4. Have a down-fired power burner designed for precise mixing of air and gas for optimum efficiency, requiring no special calibration on start-up; 5. Be approved for 0˝ clearance to combustibles.

Heater shall be supplied with maintenance-free powered anode.

The control shall be an integrated solid-state temperature and ignition control device with integral diagnostics, graphic user interface, fault history display, and shall have digital temperature readout.

1. The BTH-120-250 models are design-certified by CSA International, according to ANSI Z21.10.3 - CSA 4.3 standards governing storage-type water heaters. The BTH-300-500 models are design-certified by Underwriter's Laboratories (UL), Inc., according to ANSI Z21.10.3 - CSA 4.3 standards governing storage type water heaters; 2. Meet the thermal efficiency and standby loss requirements of the U. S. Department of Energy and current edition ASHRAE/IESNA 90.1. Complies with SCAQMD Rule 1146.2 and other air quality management districts with similar requirements for low NOx emissions.

120K-250K BTU Input:

For Standard Power Venting: Water heater(s) shall be suitable for standard power venting using a (3" or 4") ____ diameter PVC pipe for a total distance of (50ft. or 120 ft.) ____ equivalent feet of vent piping.

For Power Direct Venting: Water heater(s) shall be suitable for power direct venting using a (3" or 4") ____ diameter PVC pipe for a total distance of (50ft. or 120 ft.) ____ equivalent feet of vent piping and (50ft. or 120 ft.) ____ equivalent feet of intake air piping.

300K - 500K BTU Input:

For Standard Power Venting: Water heater(s) shall be suitable for standard power venting using a (4" or 6") ____ diameter PVC pipe for a total distance of (70ft. or 120 ft.) ____ equivalent feet of vent piping.

For Power Direct Venting: Water heater(s) shall be suitable for power direct venting using a (4" or 6") ____ diameter PVC pipe for a total distance of (70ft. or 120 ft.) ____ equivalent feet of vent piping and (70ft. or 120 ft.) ____ equivalent feet of intake air piping.

Operation of the water heater(s) in a closed system where thermal expansion has not been compensated for (with a properly sized thermal expansion tank) will void the warranty.

Water heater should incorporate the iCOMM™ system for remote monitoring, leak detection and fault alert.

A.O. Smith® | Commercial Storage Tanks

FACTORY JACKETED AND INSULATED STORAGE TANKS

These A. O. Smith storage tanks are designed for storing potable water. Fitting locations are designed to meet the needs of normal installations plus those for the A. O. Smith Cer-Temp 80® and Shure-Temp™ piping methods.

FEATURES

A. O. Smith storage tanks are ideal for use with gas-fired copper heat exchanger equipment for storage of any potable water at temperatures up to 180°F.

GLASS-LINED TANK - Alkaline borosilicate composition permanently fused to steel by firing at a temperature of 1600°F, providing years of corrosion protection and dependable use.

HEAVY GAUGE STEEL JACKET - With baked enamel finish.

THREADED OPENINGS - All tanks furnished with threaded openings for thermometer, relief valve, 2" recirculation lines, tankstat, and drain valve.

INSULATION - Storage Tanks meet or exceed R12.5 minimum thermal insulation requirements of the U. S. Department of Energy and current edition of ASHRAE/IESNA 90.1

TJ-80S, TJ-80A, TJV-120M and TJV-120A
- Fits through 30" door
- Magnesium anode for anti-corrosion protection

TJ-80A
- 80 gallons
- High density foam insulation saves energy, helps reduce standby heat loss
- 160 psi ASME standard working pressure

TJV-120A
- 119 gallons
- High density foam insulation saves energy, helps reduce standby heat loss
- 160 psi ASME standard working pressure

TJ-80S
- 80 gallons
- High density foam insulation saves energy, helps reduce standby heat loss
- 160 psi working pressure

TJV-120M
- 119 gallons
- High density foam insulation saves energy, helps reduce standby heat loss
- 160 psi working pressure

OPTIONS

Perfectly balanced manifold kits (120 gallon models) allow installation where 240 to 480 gallons of stored water is required.

TJV-200-M - 175 GALLONS
- 160 psi ASME standard working pressure
- 2" foam insulation
- Handhole cleanout (Standard)
- Fits through 33" door
- Storage is downsized to 175 gallons for a 32" x 77" envelope for space restrictive installations. Model TJV-200 is available with 200 gallons of storage.
- Magnesium anodes for extra corrosion protection

5 YEAR WARRANTY
If the tank should leak any time during the first 5 years, under the terms of the warranty, A. O. Smith will repair or replace the tank. Installation, labor, handling and local delivery are extra. For complete information, consult the written warranty or contact A. O. Smith.

MODELS TJ-80S, TJ-80A TJV-120A, TJV-120M & TJV-200M

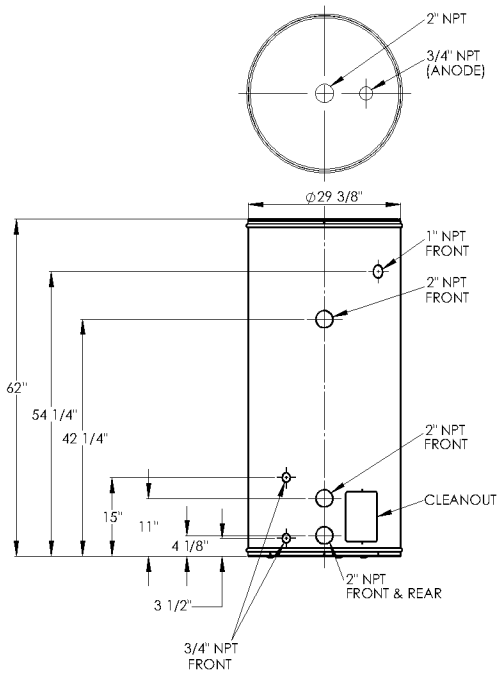
120 Gallon Model

Low Lead Content

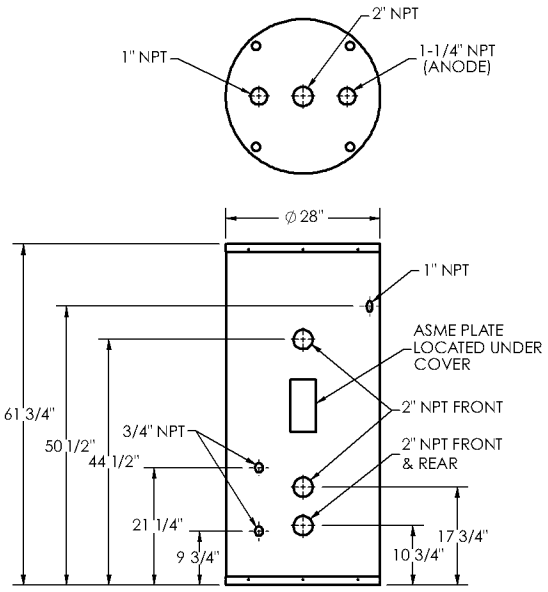
ASME
(FOR SELECT MODELS)

Revised September 2010

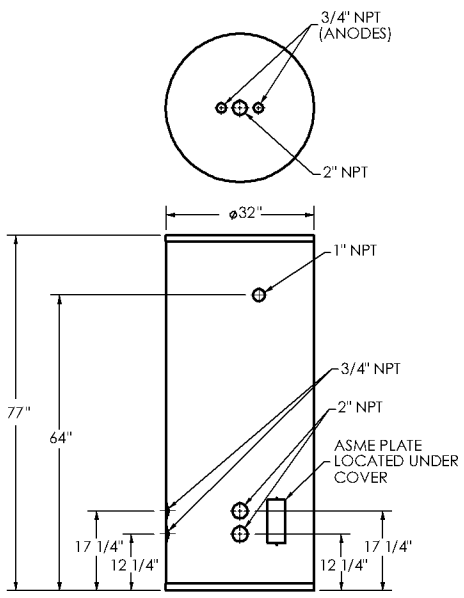
TJV-120M



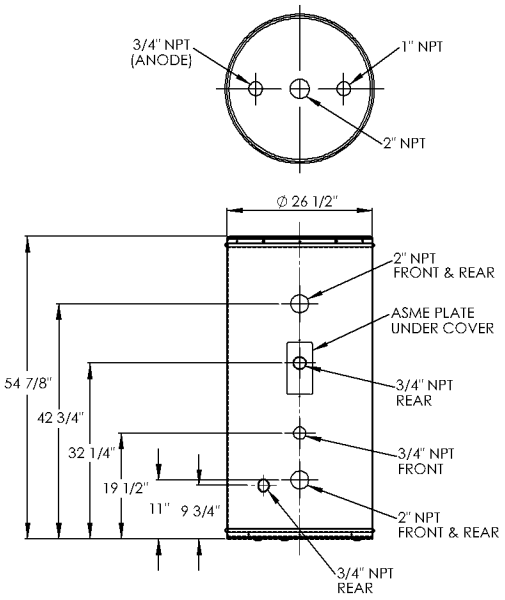
TJV-120A



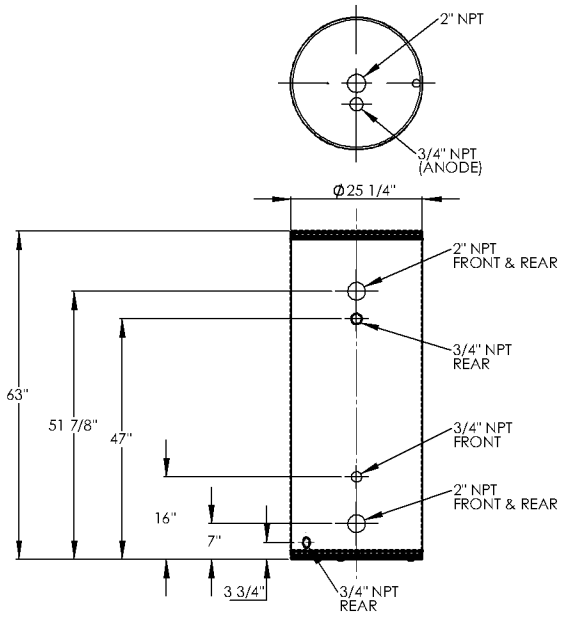
TJV-200M



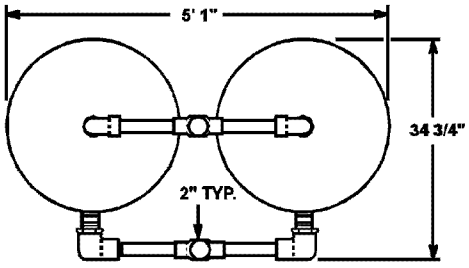
TJ-80A



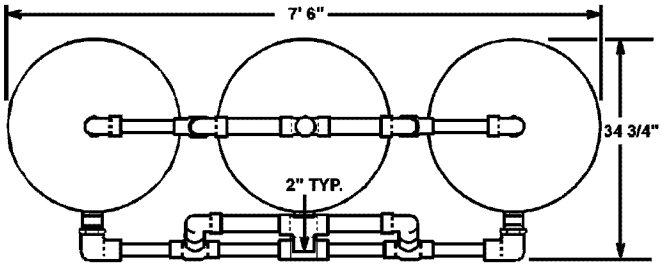
TJ-80S



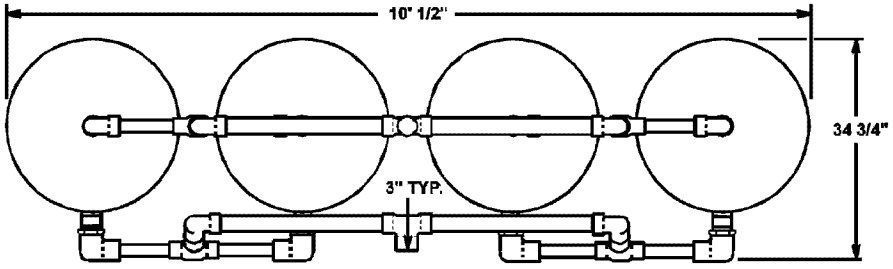
FLOOR SPACE REQUIREMENTS



(2) TANK MANIFOLD KIT #9004340205
120 GALLON MODELS



(3) TANK MANIFOLD KIT #9004341205
120 GALLON MODELS

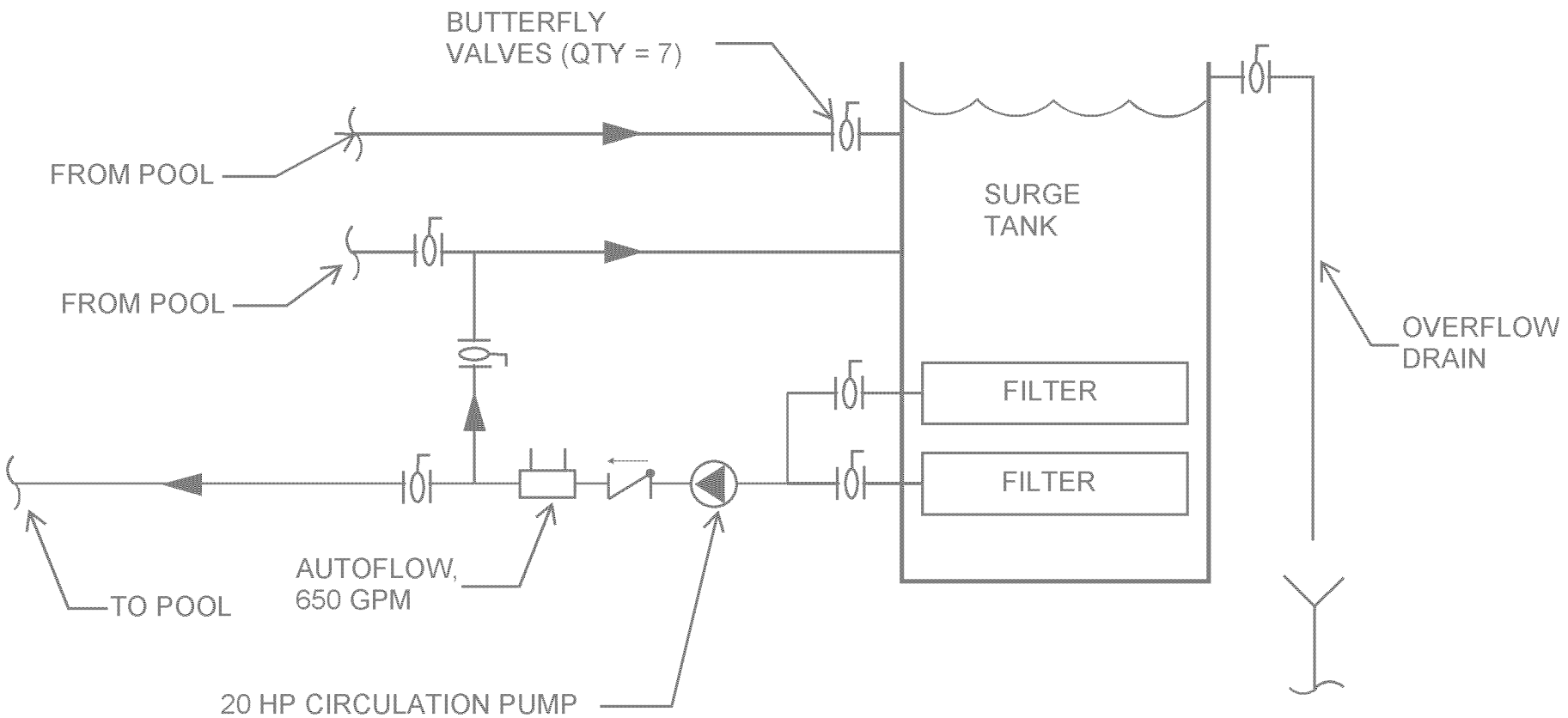


(4) TANK MANIFOLD KIT #9004342205
120 GALLON MODELS

SUGGESTED SPECIFICATION

Storage tank shall be A. O. SMITH glass-lined storage tank. Tank shall be _____" x _____" and have a nominal capacity of ____ gallons. Tank(s) shall have threaded openings as shown on drawings. Interior of tank(s) shall be glasslined with an alkaline borosilicate composition which has been fused to the steel by firing at a temperature of 1600°F. Glass coating shall be continuous over the entire inner surface of the tank. Outer jacket shall have a baked enamel finish. Meets or exceeds R12.5 minimum thermal insulation requirements of the U. S. Department of Energy and current edition of ASHRAE/IESNA 90.1. Cathodic protection shall be provided. Tank shall have a working pressure of ____ psi. Tank shall have a five year limited warranty as outlined in the written warranty.

TUKWILA POOL SCHEMATIC PIPING DIAGRAM, EXISTING SYSTEM



ALTA
ENTERPRISES, INC.
(800) 624-1235

1910 BUSTLE CREEK RD.
ALTA, WYOMING 83414

(307) 353-2407
FAX: (307) 353-8118

"HOT STOP' THERMAL POOL BLANKET QUOTE

Pool Blankets and 5 ea Automatic Reel Systems w/AutoStop

GOOD THRU: 3/19/12

SOLD TO
McKinstry

SHIP TO
Tukwila Pool
Tukwila, WA

TELEPHONE: 206.832.8471

CONTACT: Matt Montagner

TELEPHONE:

CONTACT:

ORDER NO.	DATE	☑ SCHEDULE 60-90 DAYS ☐ SHIPPED	CUST. ORD. NO.	WEIGHT	RATE	ROUTE
N/A	1/19/12		N/A	N/A	PRE-PAID	UPS+TRUCK

TERMS: NET 30

EXACT POOL SIZE: 43 FT. x 110 FT. = 4730 SQ. FT.

BLANKET COST: $ 12,362.00 TOTAL: $ 12,362.00

REEL SYSTEM COST: $ 14,280.00 EACH x 5 TOTAL: $ 71,400.00

INSTALLATION AND/OR FREIGHT: $ 6,300.00 / 1,430.00 TOTAL: $ 7,730.00

OTHER: $ _____ TOTAL: $ _____

TOTAL QUOTE: $ 91,492.00

SKETCH OF POOL WITH UNIQUE FEATURES AND DIMENSIONS

Quote assumes available 5 ea 120V 20Amp dedicated circuits in natatorium in location approved by Alta. Quote also assumes walls to be structurally sound. Structural evaluation/steel, if needed, not included. If bond is needed please add .03.

ELECTRICAL EST @ $ 9,300.00

TURNKEY @ $ 100,792.00

-- ENERGY CONSERVATION PAYS CASH DIVIDENDS --

ALTA
ENTERPRISES, INC.
(800) 624-1235

1910 BUSTLE CREEK RD.
ALTA, WYOMING 83414

(307) 353-2407
FAX: (307) 353-8118

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N/A	1/19/12		N/A	N/A	PRE-PAID	UPS+TRUCK

TERMS: NET 30

EXACT POOL SIZE: 43 FT. x 110 FT. = 4730 SQ. FT.

BLANKET COST: $ 12,362.00 TOTAL: $ 12,362.00

REEL SYSTEM COST: $ 12,460.00 EACH x 5 TOTAL: $ 62,300.00

INSTALLATION AND/OR FREIGHT: $ 6,300.00 / 1,430.00 TOTAL: $ 7,730.00

OTHER: $ TOTAL: $

TOTAL QUOTE: $ 82,392.00

SKETCH OF POOL WITH UNIQUE FEATURES AND DIMENSIONS

Quote assumes available 5 ea 120V 20Amp dedicated circuits in natatorium in location approved by Alta. Quote also assumes walls to be structurally sound. Structural evaluation/steel, if needed, not included. If bond is needed please add .03.

ELECTRICAL EST @ $ 8,700.00

Peter Staiger

Digitally signed by Peter Staiger
DN: cn=Peter Staiger, o, ou, email=pstaiger@altaenterprises.com, c=US
Date: 2012.01.19 12:43:40 -08'00'

TURNKEY @ $ 91,092.00

-- ENERGY CONSERVATION PAYS CASH DIVIDENDS --