



Seattle Housing Authority's
Jefferson Terrace
Energy and Water Survey

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**Energy and Water Survey
For Jefferson Terrace Apartments**

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I. Project Description

Jefferson Terrace Apartments is a 17-story public housing complex owned and operated by the Seattle Housing Authority (SHA). The building was built in 1967 of concrete construction. Portions of the building have been upgraded over the years, including windows, toilets, roofing and roof insulation. The building uses gas and steam as a heat source.

The building provides 299 low income dwelling units in a mix of studios and 2 bedroom units. Each dwelling unit has a kitchen and a bathroom.

II. Energy and Water Survey

A. Objective of Energy and Water Survey

SHA is submitting an application to HUD for funding under the Capital Fund Recovery Competition Grant. The funding category is Category 4: Creation of Energy Efficient Green Communities, Option 2. DKA has requested assistance with Rating Factor 2 – Strategies for Energy Efficient Communities, which is worth up to 45 points. Applicants are awarded funding based on ranking. Ranking is determined by the number of points a project scores. For Rating Factor 2, points are awarded for the percentage of reduction in energy and water consumption as follows:

Greater than 35% savings in energy/water consumption: 45 points

Greater than 25%, but less than or equal to 35% savings in energy/water consumption: 35 points

Greater than 15%, but less than or equal to 25% savings in energy/water consumption: 25 points

Greater than 5%, but less than or equal to 15% savings in energy/water consumption: 10 points

5% or less savings in energy/water consumption: 0 points.

The percent savings in energy and water consumption is determined by the following formula:

$(\% \text{ energy savings} \times 70\%) + (\% \text{ water savings} \times 30\%) = \text{Total percentage of energy/water consumption savings.}$

The objective of the survey is to identify capital improvements and corresponding utility savings to achieve the highest possible score for Rating Factor 2, and qualify the project for federal funding.

B. Description of Data Collection Method

A site tour was conducted on June 23, 2009. Attendees included representatives from ArchEcology, Seattle Housing Authority and DKA. Major characteristics of the building, occupancy types, and patterns were noted. The building was not inspected exhaustively. All building common areas were toured along with several vacant residential units. DKA provided ArchEcology with original drawings of the building, a detailed building evaluation prepared by DKA, and AutoCAD files.

C. Utility Data

The owner provided utility data for each meter in the building. There are four meters in the building, one for electricity, steam, natural gas and water. Each meter has approximately three years of data. The utility meter information provided to ArchEcology is attached in Appendix C.

D. Baseline Building Data

The following information was compiled from the site tour, drawings and interview with property manager. Detailed inputs are provided in Appendix A.

1. Building Area

The building area is derived from original architectural drawings, and AutoCAD files provided by DKA.

2. Space Use and Occupancy Type

Baseline building reflects an estimate of occupant, visitor, employee, and part time worker's profiles and schedules. The estimate was provided by SHA's on-site manager. SHA does not keep records of occupants or their guests. There are 289 leasable residential units housing 331 residents. The majority of occupants has some form of physical or developmental disability, and do not work outside the home. The occupancy rate averages 95% and consists mostly of single occupants, a few couples, and a few families. 92-95% of residents are on a fixed income. The gender split is about 75% male / 25% female.

3. Schedules

Schedule information was provided by the on-site property manager, and is representative of his observations and does not represent an actual tracking of occupant movements.

Resident Schedules:

Since the majority of residents stay at home during the day with about 15% working seasonal part-time, we assumed a high daytime use of the building.

Non-Resident Schedules:

Office hours are 9am-5pm M-F; closed on weekends and observed holidays.

There are 31 FTE's, including office staff and Eldercare.

There are 40 non-resident Eldercare clients that stay each day for about half a day. The property manager estimates there are about 335 visitors daily with the average stay of one hour.

Common Area Use:

The lounge is used daily for a few hours each morning for coffee, reading, and socializing. The community room is often empty during the weekday, but is used on weekends. The adjoining kitchen is also seldom used.

One vocational and one computer room are in use a few times a week for a couple of hours at a time.

4. Utility Meters

Electricity: One meter for all electrical end uses.

Steam: One meter.

Natural Gas: One meter, only serves laundry facility.

Water/Sewer: One meter.

5. HVAC Equipment

Heating for the entire building is radiant hot water that is heated with municipally provided steam. The only cooling for the building is a DX cooling coil serving the community room at 5,500 CFM with a water cooled-condenser.

There are three hot water loops serving the north and south portions of the building and community room. The south zone is a 210 GPM pump, the North zone a 255 GPM pump, and the community room is a 45 GPM pump. They are assumed operating at constant speed and standard efficiency. The primary loop is set to 210°F when outside air temperature is 15°F and set to 100°F when the outside air temperature is 65°F.

The steam source to site efficiency is 60% and the cooling efficiency is an assumed EER of 8.9.

The community room has a kitchen with a 1,350 CFM exhaust hood serving as its ventilation. The rest of the building is served by roof top exhaust fans that are in constant operation and operable windows.

The heating setpoint in the residential units was assumed to be 75°F, although the heating equipment does not have a thermostat, only a crude "on-off" dial.

The cooling setpoint for the community room was assumed to be 75°F.

6. Lighting

Lighting power densities were determined by fixture counts and types of bulbs installed.

Interior Area Lighting:

In all common areas light fixtures were counted and type and wattage noted. Residential lighting power densities were determined by touring several units and noting the installed lighting in each room. We then calculated the total lighting watts per unit and divided it by the area of the residential units.

There are no automatic lighting controls for interior spaces. Corridor lights are on 24/7.

Exterior Lighting:

Exterior light fixtures were counted and wattage recorded. The total lighting wattage is divided by building area. Exterior lighting is controlled by photocell.

7. Receptacle Loads

A value of 0.30 W/SF was estimated for residential units based on occupancy profiles and schedules. 1.50 W/SF was assumed for the office space based on occupancy and type of equipment being used. The kitchen associated with the community room was estimated at 0.20 W/SF based on the frequency of use and installed equipment. Mechanical spaces were estimated based on observation and provided schedules.

8. Water Heating

Water Heaters:

Domestic hot water is provided to all of the building and is supplied by two steam heated boilers located in the northeast mechanical room on the fourth floor.

Supplied water temperature is set at 140 degrees with an assumed loss of 15 degrees. Daily hot water use is estimated to be 20 gal/person/day. The city supplied steam has an efficiency of 60%.

Pumps:

The water heaters have recirculation pumps. We have assumed a constant flow.

9. Water Fixtures

The building fixtures meet 1992 EPA fixture flow requirements. Consistent with this are 1.6 gpf water closets throughout the building, 2.5 gpm showerheads in all residential units, and 1.0 gpf urinals on the fourth floor. Over time aerators of varying flow rates have been installed on many of the kitchen and lavatory faucets. We did not inspect every unit so we chose to use an average of 2.2 gpm.

10. Laundry Equipment

The building has a laundry facility with coin operated leased equipment. Based on information from the vendor, we calculated an average of 1.6 loads of laundry per week per occupant.

11. Commercial Dishwasher

Based on provided schedule information and type of equipment it was estimated that the dishwasher in the kitchen of the community room is used about ten times a week consuming six gallons per cycle.

E. Energy Simulation Procedures

The project team developed two energy simulations – a baseline case which reflects “as-built” conditions and a proposed case, which incorporates several energy conservation measures (ECM’s). Three runs of the proposed case simulation were provided with different combinations of ECM’s.

Energy simulation Software:

Equest version 3.6.

Weather File:

The weather file used is a TMY3 (Typical Meteorological Year) file for Boeing Field (WA_Seattle_Boeing_Field.bin).

Definition of Thermal Zones:

Thermal zones were defined in accordance with ASHRAE 90.1-2004 Appendix G: Residential units are one thermal zone, except where units have the same solar orientation they are combined into one thermal block. Corner units and units with floor or roof exposure are separate thermal blocks. The baseline model was calibrated to reflect actual zoning of HVAC system and size of area served.

F. Water Consumption Calculation Procedures

Total building water use was from utility data. The team estimated daily use patterns based on occupancy type and schedules. The laundry water use was estimated based on information provided by the appliance vendor on the number of times the washers are used monthly. Detailed water consumption calculations are provided in Appendix B.

There are two calculation runs for water conservation measures. The difference between the two is the water closet consumption. The first run has a 1.1 gpf water closet, and the second run has a 1.28 gpf water closet.

G. Baseline Accuracy Objectives

Energy Use: The baseline model energy use was calibrated within 5% of the averaged annual utility data for each electric meter. The baseline was not modeled with separate meters for individual residential units. The annual average utility data for all residential

meters combined was used as the baseline from which to calibrate the residential electric meter.

Water Use: The baseline water use was calibrated within 5% of the actual metered water consumption.

H. Expected Uncertainty in Savings

The baseline simulation calibration was rigorous. The software used is commercially available and is capable of modeling the facility and the ECM's. However, there are specific areas of uncertainty which reduce the confidence level. The areas of uncertainty include:

- Number of occupants is estimated
- Occupant schedules are estimated
- Gender split of occupants is estimated
- Receptacle load for residential units is estimated
- Malfunctioning equipment is not accounted for
- Window performance data is estimated
- Energy consumption could not be calibrated by end use. Although overall energy consumption is calibrated very closely, there may be considerable discrepancy between the actual end use consumption and that projected by the simulation. This could have a significant impact on the actual energy savings realized by the proposed ECM's.
- The building has one water meter, and therefore, water consumption could not be calibrated by end use. Overall water use is also calibrated very closely; however there may be discrepancy between the actual end use consumption and the calculated baseline.
- Weather file represents a typical year. Actual weather may be different and affect the savings realized.

Given these uncertainties, we anticipate the actual savings to be within 20% of the projected savings with an 80% confidence level.

I. Results and Recommendations

The proposed case looked at two simulation runs with a number of ECM's. The results of these runs were then combined with the results of the water reduction calculations. Details of the energy simulation runs and the combined energy/water conservation results are found in Appendix A. Water calculations are detailed in Appendix B. A summary of the results is listed below.

The combined energy/water conservation percentage for each of the runs is calculated according the formula provided by HUD:

$$(\% \text{ energy savings} \times 70\%) + (\% \text{ water savings} \times 30\%) = \text{Total percentage of energy/water consumption savings.}$$

Summary of Results:

Run 1 (gas boilers, new AC unit for community room)

Energy Savings:	34%
Water Savings:	37%
Combined Energy/Water Savings:	34.9%

Run 2 (electric boilers, new heat pump for community room)

Energy Savings:	39.9%
Water Savings:	33%
Combined Energy/Water Savings:	37.8%

Recommended upgrades:

Run 2 achieved the maximum score available for the grant application. Run 1 falls just short of the 35% mark. Run 1 used ultra low-flow toilets, which should be beta-tested with residents before widespread use. We are recommending a combination of improvements from each run:

A. Envelope

1. No envelope improvements recommended.

B. Lighting:

1. Replace incandescent residential light fixtures with fluorescent fixtures.
2. Reduce lighting power density throughout common areas.
3. Add occupancy sensors in corridors and common areas.
4. Replace exterior light fixtures, with more efficient fixtures.

C. HVAC:

1. Add thermostats in residential units.
2. Replace rooftop fans with premium efficiency fans.
3. Replace Community Room AC unit with higher efficiency unit.
4. Replace existing steam boilers with new high efficiency (92%) natural gas boiler.

D. Domestic Hot Water

1. Replace existing boilers with new high efficiency (92%) natural gas boiler.

E. Water Fixtures and Appliances

1. Replace all existing toilets with 1.28 gpf
2. Replace all existing lavatory faucets with 0.5 gpm, or add aerators to existing faucets. Add autoflow control to common area fixtures.
3. Replace all existing shower heads with new 1.8 gpm fixtures.
4. Replace all kitchen faucets with new 1.8 gpm, or add aerators
5. Replace laundry equipment with new low water use models.

III. Quality Assurance

A post-retrofit analysis will be performed to determine the realized savings from building upgrades. A process similar to that described above will be undertaken after the building upgrades have been in stable operation for a period of one year.

Appendix A

Energy Simulation Inputs

Jefferson Terrace Input Data

General Project Site Description

Building Description	Baseline	Proposed Run #1	Proposed Run #2
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Site/Utility Data

Building Location	Seattle, WA	Same	Same
Weather File	TMY3 Boeing Field	Same	Same
Electricity Provider	Seattle City Light	Same	Same
Steam Provider	Seattle Steam	Same	Same
Natural Gas Provider	Puget Sound Energy	Same	Same
Water Provider	Seattle Public Utilities	Same	Same
Building Operation Hours	24/7, year round	Same	Same

Space Type/Use

Residential Dwelling Units	148,654 SF	Same	Same
Circulation/Janitor	47,911 SF	Same	Same
Office (SHA)	3,034 SF	Same	Same
Office (Eldercare)	12,285 SF	Same	Same
Community Room and Kitchen	2,885 SF	Same	Same
Laundry/Trash	1,722 SF	Same	Same
Utility Tunnel	1,110 SF	Same	Same

Occupancy Assumptions

Occupant Type	Baseline	Proposed Run #1	Proposed Run #2
Residents	331 Full time residents - 75% male / 25% female	Same as baseline	Same as baseline
Working Residents	50	Same as baseline	Same as baseline
Office staff (includes Eldercare)	31 FTE's	Same as baseline	Same as baseline
Eldercare clients	40 non-resident clients (approximately half day)	Same as baseline	Same as baseline
Visitors	335 visitors daily	Same as baseline	Same as baseline

Energy Simulation Input Data

End Use	Baseline	Proposed Run #1	Proposed Run #2
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Envelope Elements

Exterior Wall Construction	8" concrete walls with 2" meta furring and 5/8" drywall. No insulation. U = 0.471	Same as baseline	Same as baseline
Roof Construction	8" concrete deck with R-30 rigid insulation. Medium color built up roof. U - 0.03	Same as baseline	Same as baseline
Floor/Slab Construction	6" concrete slab on grade with Linoleum tile U=0.813	Same as baseline	Same as baseline
Shading Devices	No shading devices were modeled	No shading devices were modeled	No shading devices were modeled
Fenestration			
Window-to-gross wall ratio	22.4%	Same as baseline	Same as baseline
Fenestration type	Aluminum frame, double glazed, 1/2" gap, air filled.	Same as baseline	Same as baseline
Fenestration U-factor	Assembly U=0.46	Same as baseline	Same as baseline
Fenestration SHGC	SHGC = 0.76	Same as baseline	Same as baseline

Lighting and Equipment

Area Lighting			
Interior Lighting Power Density (W/SF)	Residential Units-0.82 W/sf; Corridors-2.0 W/sf; Mech. Rooms-0.5 W/sf; Offices - 1.0 W/sf; Community Rm - 1.0 W/sf; Laundry - 1.0 W/sf	Reduce Residential Units to 0.5 W/sf; Corridors to 1.0 W/sf	Reduce Residential Units to 0.25 W/sf; Corridors to 1.0 W/sf; Community Rm to 0.8 W/sf; Laundry Room to 0.8 W/sf

Appendix A

Energy Simulation Inputs

Jefferson Terrace Input Data

Daylighting Controls	None	None	None
Other Lighting Controls	None	None	None
Exterior Lighting Power (kW)	2.5 KW	1.5 KW	1.5 KW
Process Lighting	None	None	None
Receptacle Equipment Power Density (W/SF)	Residential Units-0.3 W/sf; Corridors-0 W/sf; Mech. Rooms-0 W/sf; Offices - 1.5 W/sf; Community Room - 0 W/sf	Same as baseline	Same as baseline
Appliance Power Density (W/SF)	Residential Units-0.02 W/sf; Corridors-0 W/sf; Mech. Rooms-0 W/sf; Offices - 1.5 W/sf; Community Room Kitchen - 0.3 W/SF	Same as baseline	Same as baseline
HVAC			
Heating System Description	Radiant Hot Water. Water heated with municipally provided steam.	Radiant hot water with (2) new natural gas boilers	Radiant Hotwater w/ (2) Electric Boilers
Hot Water Loop and pump parameters	Three hot water loops (north and south portions of building and community room). South zone 210 GPM pump, North zone 255 GPM pump, Community Room 45 GPM pump; Assume constant speed and standard efficiency. Primary loop set to 210 F when outside air temperature is 15 F, set to 100 f when outside air temperature is 65 F.	Primary loop set to 185 F when outside air temperature is 15 F, set to 100 F when outside air temperature is 65 F.	Same as Run #1
Boiler Efficiency	N/A - Steam source to site efficiency of 60%.	92% AFUE	EIR 1.0
Cooling System Description	DX cooling coil for community room. 5,500 CFM, water cooled condenser	Same as baseline	Change to Heat Pump
Cooling Equipment Efficiency	Assume EER 8.9	Upgrade unit to EER of 10.5	EER 11; COP 3.0
Ventilation System Description	Residential Units - Constant operation roof top exhaust fans. Community Room Kitchen Exhaust - 1,350 CFM hood.	Replace rooftop fans with premium efficiency fans	Same as Run #1
Fan Power Efficiency		Upgrade fans to VSD	Same as Run #1
Domestic Hot water			
Domestic Hot Water loop and pump parameters	One DHW loop recirc. Assume constant speed and standard efficiency. Hot water set point 140 degrees 15 degree drop.	Same loop, Change to high efficiency natural gas boiler. Change to high efficiency pumps with VSD and demand controls.	Same loop and pump parameters change to electric boilers.
Boiler Efficiency	N/A - Steam source to site efficiency of 60%.	92% AFUE	EIR 1.0

Water Reduction Assumptions

Fixture	Baseline	Proposed Run #1	Proposed Run #2
Water Closet	1.6 GPF	New WC's at 1.1 GPF	New 1.28 GPF WC's
Urinal	None	Same as Run #1	Same as Run #1
Lavatory	2.2 GPM	Aerators added to Lavs 0.5 GPM	Same as Run #1
Shower Head	2.5 GPM	New shower heads @ 1.8 GPM	Same as Run #1
Kitchen Sink	2.5 GPM	New aerators or new kitchen faucet @ 1.8 GPM	Same as Run #1
Washers	18 gallons per cycle/1.6 uses per week/occupant	New washers at 11 gallons per cycle	Same as Run #1
Dishwasher (Community Room)	6 gallons per cycle 10 uses per week	New dishwasher @ 4 gallons per cycle	Same as Run #1

Appendix A

Energy Simulation Results - Run 1

Jefferson Terrace Run 1 Data

Proposed Case Data

Energy Summary by End Use

End Use		Electric	Gas	Steam	Energy Use	Cost
		[kWh]	[MBtu]	[MBtu]	[10 ³ Btu]	[\$]
Area Lighting	Electricity	616,600.00			2,103,839.20	\$29,982.79
Space Heating	Gas		5,580.20		5,580,200.00	\$75,890.72
Space Cooling (Community Room)	Electricity	5,600.00			19,107.20	\$272.31
Pumps & Aux	Electricity	17,400.00			59,368.80	\$846.09
Ext. Usage	Electricity	5,600.00			19,107.20	\$272.31
Ventilation Fans	Electricity	149,900.00			511,458.80	\$7,289.04
Service Water Heating	Gas		1,563.00		1,563,000.00	\$21,256.80
Laundry Equipment	Gas		125.80		125,800.00	\$1,710.88
Misc. Equipment (plug loads & appliances)	Electricity	226,000.00			771,112.00	\$10,989.48
TOTAL BUILDING CONSUMPTION		1,021,100.00	7,269.00	0.00	10,752,993.20	\$148,510.41
						Electric \$49,652.01
						Gas \$98,858.40

Baseline Case Data

Energy Summary by End Use

End Use		Electric	Gas	Steam	Energy Use	Cost
		[kWh]	[MBtu]	[MBtu]	[10 ³ Btu]	[\$]
Area Lighting	Electricity	1,094,100.00			3,733,069.20	\$53,201.71
Space Heating	Steam			7,704.00	7,704,000.00	\$167,413.85
Space Cooling (Community Room)	Electricity	8,800.00			30,025.60	\$427.91
Pumps & Aux	Electricity	26,300.00			89,735.60	\$1,278.86
Ext. Usage	Electricity	8,500.00			29,002.00	\$413.32
Ventilation Fans	Electricity	148,200.00			505,658.40	\$7,206.37
Service Water Heating	Steam			3,293.00	3,293,000.00	\$71,559.42
Laundry Equipment	Gas		125.85		125,850.00	\$1,711.56
Misc. Equipment (plug loads & appliances)	Electricity	226,000.00			771,112.00	\$10,989.48
TOTAL BUILDING CONSUMPTION		1,511,900.00	125.85	10,997.00	16,281,452.80	\$314,202.48
						Electric \$73,517.65
						Steam \$238,973.27
						Gas \$1,711.56

Appendix A

Energy Simulation Results - Run 1

Jefferson Terrace Run 1 Performance

Energy Summary by End Use

End Use	Energy Type	Proposed Building Energy [10 ³ Btu]	Baseline Building Energy [10 ³ Btu]	Optimized Energy Performance [%]
Area Lighting	Electricity	2,103,839.20	3,733,069.20	56%
Space Heating	Gas/Steam	5,580,200.00	7,704,000.00	72%
Space Cooling	Electricity	19,107.20	30,025.60	64%
Pumps & Aux	Electricity	59,368.80	89,735.60	66%
Exterior Usage	Electricity	19,107.20	29,002.00	66%
Ventilation Fans	Electricity	511,458.80	505,658.40	101%
Domestic Water Heating	Gas/Steam	1,563,000.00	3,293,000.00	47%
Laundry Equipment	Gas	125,800.00	125,850.00	100%
Misc. Equipment	Electricity	771,112.00	771,112.00	100%
TOTAL BUILDING CONSUMPTION		10,752,993.2	16,281,452.8	66%
By Fuel				
	Gas/Steam	7,269,000.0	11,122,850.0	
	Electricity	3,483,993.2	5,158,602.8	

Energy and Cost Summary by Fuel Type

Type	Proposed Use [10 ³ Btu/hr]	Proposed Cost [\$]	Baseline Use [10 ³ Btu/hr]	Baseline Cost [\$]	Proposed / Baseline Energy %	Proposed / Baseline Cost %
Electricity	3,483,993	\$49,652	5,158,603	\$73,518	68%	68%
Natural Gas	7,269,000	\$98,858	125,850	\$1,712	5776%	5776%
Other	-	\$0	10,997,000	\$238,973	0%	0%
Total Nonrenewable	10,752,993	\$148,510	16,281,453	\$314,202		
Renewable						
Total including Renewable	10,752,993	\$148,510	16,281,453	\$314,202		

Percent Cost Savings 52.7%

Percent Energy Savings 34.0%

Water and Energy Combination Savings Calculation

(% energy savings x 70%) + (% water savings x 30%)

Energy Savings	34.0%
Water Savings	37.0%
70% of Energy Savings	23.8%
30% of Water Savings	11.1%
Total Energy/Water savings	34.9%

Appendix A

Energy Simulation Results - Run 2

Jefferson Terrace Run 2 Data

Proposed Case Data

Energy Summary by End Use

End Use		Electric	Gas	Steam	Energy Use	Cost	
		[kWh]	[MBtu]	[MBtu]	[10 ³ Btu]	[\$]	
Area Lighting	Electricity	509,700.00			1,739,606.10	\$24,784.67	
Space Heating (Heat Pump)	Electricity	1,511,400.00			5,158,408.20	\$73,493.34	
Space Cooling (Community Room)	Electricity	5,600.00			19,112.80	\$272.31	
Pumps & Aux	Electricity	17,500.00			59,727.50	\$850.96	
Ext. Usage	Electricity	5,600.00			19,112.80	\$272.31	
Ventilation Fans	Electricity	153,100.00			522,530.30	\$7,444.64	
Service Water Heating	Electricity	424,300.00			1,448,135.90	\$20,632.01	
Laundry Equipment	Gas		125.85		125,850.00	\$1,711.56	
Misc. Equipment (plug loads & appliances)	Electricity	226,000.00			771,338.00	\$10,989.48	
TOTAL BUILDING CONSUMPTION		2,853,200.00	125.85	0.00	9,863,821.60	\$140,451.26	
						Electric	\$138,739.70
						Gas	\$1,711.56

Baseline Case Data

Energy Summary by End Use

End Use		Electric	Gas	Steam	Energy Use	Cost	
		[kWh]	[MBtu]	[MBtu]	[10 ³ Btu]	[\$]	
Area Lighting	Electricity	1,094,100.00			3,734,163.30	\$53,201.71	
Space Heating	Steam			7,704.00	7,704,000.00	\$167,413.85	
Space Cooling (Community Room)	Electricity	8,800.00			30,034.40	\$427.91	
Pumps & Aux	Electricity	26,300.00			89,761.90	\$1,278.86	
Ext. Usage	Electricity	8,500.00			29,010.50	\$413.32	
Ventilation Fans	Electricity	148,200.00			505,806.60	\$7,206.37	
Service Water Heating	Steam			3,293.00	3,293,000.00	\$71,559.42	
Laundry Equipment	Gas		125.85		125,850.00	\$1,711.56	
Misc. Equipment (plug loads & appliances)	Electricity	226,000.00			771,338.00	\$10,989.48	
TOTAL BUILDING CONSUMPTION		1,511,900.00	125.85	10,997.00	16,282,964.70	\$314,202.48	
						Electric	\$73,517.65
						Steam	\$238,973.27
						Gas	\$1,711.56

Appendix A

Energy Simulation Results - Run 2

Jefferson Terrace Run 2 Performance

Energy Summary by End Use

End Use	Energy Type	Proposed Building Energy [10 ³ Btu]	Baseline Building Energy [10 ³ Btu]	Optimized Energy Performance [%]
Area Lighting	Electricity	1,739,606.10	3,734,163.30	47%
Space Heating (Heat Pump)	Electricity/Steam	5,158,408.20	7,704,000.00	67%
Space Cooling	Electricity	19,112.80	30,034.40	64%
Pumps & Aux	Electricity	59,727.50	89,761.90	67%
Ext. Usage	Electricity	19,112.80	29,010.50	66%
Ventilation Fans	Electricity	522,530.30	505,806.60	103%
Domestic Water Heating	Electricity/Steam	1,448,135.90	3,293,000.00	44%
Laundry Equipment	Gas	125,850.00	125,850.00	100%
Misc. Equipment	Electricity	771,338.00	771,338.00	100%
TOTAL BUILDING CONSUMPTION		9,863,821.6	16,282,964.7	61%
By Fuel				
	Gas/Steam	125,850.0	11,122,850.0	
	Electricity	9,737,971.6	5,160,114.7	

Energy and Cost Summary by Fuel Type

Type	Proposed Use [10 ³ Btu/hr]	Proposed Cost [\$]	Baseline Use [10 ³ Btu/hr]	Baseline Cost [\$]	Proposed / Baseline Energy %	Proposed / Baseline Cost %
Electricity	9,737,972	\$138,740	5,160,115	\$73,518	189%	189%
Natural Gas	125,850	\$1,712	125,850	\$1,712	100%	100%
Other	-	\$0	11,122,850	\$238,973	0%	0%
Total Nonrenewable	9,863,822	\$140,451	16,408,815	\$314,202		
Renewable						
Total including Renewable	9,863,822	\$140,451	16,408,815	\$314,202		

Percent Cost Savings 55.3%

Percent Energy Savings 39.9%

Water and Energy Combination Savings Calculation

(% energy savings x 70%) + (% water savings x 30%)

Energy Savings	39.9%
Water Savings	33.0%
70% of Energy Savings	27.9%
30% of Water Savings	9.9%
Total Energy/Water savings	37.8%

Appendix B

Water Use Calculations

Water Use Reduction Calculations with 1.1 GPF Toilets

Jefferson Terrace - Design Case Table

Flush Fixture	Daily Uses	Flowrate [GPF]	Duration [flush]	Auto Controls N/A	Occupants	Water Use [gal]	User Definition
---------------	------------	----------------	------------------	-------------------	-----------	-----------------	-----------------

Assumes 289 Leasable Units; 331 FTE Residents with 15% working and (75/25) gender split
 Assumes Eldercare Admin - 6th Flr West wing - 15 staff (8hr) + 8 visitors; assume 50:50 gender split
 Assumes Eldercare Progr - 6th Flr East wing - 15 staff + 1 Kitchen staff; assume 50:50 split
 Assumes Eldercare Progr - 6th Flr East wing - Clients of 40 non-Res & 10 Resident clients 4.5 hrs/day; assume 50:50 split
 Assumes Eldercare Progr - 6th Flr East Kitchen - Dishwasher run x2/day - 60 lunch/day-(3-4 /week catered meal re-heated); few breakfast snack
 Assumes 331 Visitors to Residents daily (1 visitor per occupant daily); Assumes 50:50 gender split

Flush Fixture	Daily Uses	Flowrate [GPF]	Duration [flush]	Auto Controls N/A	Occupants	Water Use [gal]	User Definition
Low-Flow Water Closet	▼ 1.1gpf						Resident - stay at home
Male	8	1.1	1	--	223	1,962	
Female	8	1.1	1	--	58	510	
Low-Flow Water Closet	▼ 1.1gpf						6th Flr - Ofc, Clinic & Kitch Staff
Male - Ofc & Clinic Staff	3	1.1	1	--	15	50	
Female - Ofc/Clinic/Kitch Staff	3	1.1	1	--	16	53	
Low-Flow Water Closet	▼ 1.1gpf						Working Residents
Male	5	1.1	1	--	25	138	
Female	5	1.1	1	--	25	138	
Low-Flow Water Closet	▼ 1.1gpf						Visitors & Clinic Clients (4.5hr/day)
Visitor to Resident	0.5	1.1	1	--	331	182	
Male - Clinic Res & Non-Res Clients	1.5	1.1	1	--	29	48	
Female - Clinic/Kitchen Visitor	1.5	1.1	1	--	29	48	

Flow Fixture	Daily Uses	Flowrate [GPM]	Duration [sec]	Auto Controls [% savings]	Occupants	Water Use [gal]	User Definition
--------------	------------	----------------	----------------	---------------------------	-----------	-----------------	-----------------

Assumes 289 Leasable Units; 331 FTE Residents with 15% working and (75/25) gender split
 Assumes Eldercare Admin - 6th Flr West wing - 15 Ofcs (8hr); assume 50:50 gender split
 Assumes Eldercare Progr - 6th Flr East wing - 15 staff + 1 Kitchen staff; assume 50:50 split
 Assumes Eldercare Progr - 6th Flr East wing - Clients of 40 non-Res & 10 Resident clients 4.5 hrs/day; assume 50:50 split
 Assumes Eldercare Progr - 6th Flr East Kitchen - Dishwasher run x2/day - 60 lunch/day-(3-4 /week catered meal re-heated); few breakfast snack
 Assumes 331 Visitors to Residents daily (1 visitor per occupant daily); Assumes 50:50 gender split

Low-Flow Lavatory	▼ 8	0.5	12		281	225	Resident - stay at home
Low-Flow Lavatory	▼ 3	0.5	12		31	9	6th Flr - Ofc, Clinic & Kitch Staff
Low-Flow Lavatory	▼ 1.5	0.5	12		58	9	6th Flr - Ofc Visitors & Clients
Low-Flow Kitchen Sink	▼ 3	1.8	60		331	1,787	Residents
Low-Flow Kitchen Sink	▼ 3	1.8	60		4	22	6th Flr - E-Kitch Staff + addl help
Low-Flow Shower	▼ 0.5	1.8	300		331	1,490	Resident
Low-Flow Lavatory	▼ 0.5	0.5	12		331	17	Visitor - to Resident
Low-Flow Lavatory	▼ 5	.5	12		50	25	Working Residents

Total Daily Volume [gal] 6,711

Work Outside Home/ Days 365

Annual Volume [gal] 2,449,406

Annual Graywater or Stormwater Reuse [gal] 0

TOTAL ANNUAL DESIGN CASE VOLUME [gal] 2,449,406

TOTAL ANNUAL DESIGN CASE - PROCESS WATER [gal] 266,573

TOTAL DESIGN VOLUME [gal] 2,715,978

Appendix B

Water Use Calculations

Water Use Reduction Calculations with 1.1 GPF Toilets

Jefferson Terrace - *Baseline Case Table

Flush Fixture	(LEED default) Daily Uses	Flowrate [GPF]	Duration [flush]	Auto Controls N/A	Occupants	Water Use [gal]	User Definition
---------------	---------------------------	----------------	------------------	-------------------	-----------	-----------------	-----------------

Assumes 289 Leasable Units; 331 FTE Residents with 15% working and (75/25) gender split
 Assumes Eldercare Admin - 6th Flr West wing - 15 Ofcs (8hr); assume 50:50 gender split
 Assumes Eldercare Progr - 6th Flr East wing - 15 staff + 1 Kitchen staff; assume 50:50 split
 Assumes Eldercare Progr - 6th Flr East wing - Clients of 40 non-Res & 10 Resident clients 4.5 hrs/day; assume 50:50 split
 Assumes Eldercare Progr - 6th Flr East Kitchen - Dishwasher run x2/day - 60 lunch/day-(3-4 /week catered meal re-heated); few breakfast snack
 Assumes 331 Visitors to Residents daily (1 visitor per occupant daily); Assumes 50:50 gender split

Conventional Water Closet	▼						Resident - stay at home
Stay at home Male		8	1.6	1	--	223	2,854
Stay at home Female		8	1.6	1	--	58	742
Conventional Water Closet	▼						6th Flr - Ofc, Clinic & Kitch Staff
6th Floor Office - Male		3	1.6	1	--	15	72
6th Floor Office - Female		3	1.6	1	--	16	77
Conventional Water Closet	▼						Working Residents
Working Male Resident		5	1.6	1	--	25	200
Working Female Resident		5	1.6	1	--	25	200
Conventional Water Closet	▼						Visitors & Clinic Clients (4.5hr/day)
Visitor - to Resident		0.5	1.6	1	--	331	265
Male - Clinic/Kitchen Visitor		1.5	1.6	1	--	29	70
Female - Clinic/Kitchen Visitor		1.5	1.6	1	--	29	70

Flow Fixture	Daily Uses	Flowrate [GPM]	Duration [sec]	Auto Controls N/A	Occupants	Water Use [gal]	User Definition
--------------	------------	----------------	----------------	-------------------	-----------	-----------------	-----------------

Assumes 289 Leasable Units; 331 FTE Residents with 15% working and (75/25) gender split
 (247 single occup studio + 54 @ double occup studio + 15 @ double occup 2 bedrm)
 Assumes Eldercare Admin - 6th Flr West wing - 15 Ofcs (8hr); assume 50:50 gender split
 Assumes Eldercare Progr - 6th Flr East wing - 15 staff + 1 Kitchen staff; assume 50:50 split
 Assumes Eldercare Progr - 6th Flr East wing - Clients of 40 non-Res & 10 Resident clients 4.5 hrs/day; assume 50:50 split
 Assumes Eldercare Progr - 6th Flr East Kitchen - Dishwasher run x2/day - 60 lunch/day-(3-4 /week catered meal re-heated); few breakfast snack
 Assumes 331 Visitors to Residents daily (1 visitor per occupant daily); Assumes 50:50 gender split

Conventional Lavatory	▼	8	2.2	15	--	281	1,236	Resident - stay at home
Conventional Lavatory	▼	3	2.2	15	--	31	51	6th Flr - Ofc, Clinic & Kitch Staff
Conventional Lavatory	▼	1.5	2.2	15	--	58	48	6th Flr - Clients & Visitors
Kitchen Sink	▼	3	2.5	60	--	331	2,483	Residents
Kitchen Sink	▼	3	2.5	60	--	4	30	6th Flr - E-Kitch Staff + addl help
Shower	▼	0.5	2.5	300	-	331	2,069	Resident
Conventional Lavatory	▼	0.5	2.2	15	--	331	91	Visitor - to Resident
Conventional Lavatory	▼	5	2.2	15	--	50	138	Working Residents

Total Daily Volume [gal]	10,695
Fulltime Home/ Days	365
TOTAL ANNUAL BASELINE CASE - NON-PROCESS WATER [gal]	3,903,593
TOTAL ANNUAL BASELINE CASE - PROCESS WATER [gal]	435,926
TOTAL ANNUAL BASELINE CASE VOLUME [gal]	4,339,519
TOTAL ACTUAL ANNUAL VOLUME [gal]	4,091,560
DIFFERENCE	247,959

Water Use Reduction	37%
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Appendix B

Water Use Calculations

Water Use Reduction Calculations with 1.1 GPF Toilets

Flush Fixture Chart

Flush Fixture Type	Water Use [GPF]
Conventional Water Closet	1.6
Low-Flow Water Closet	1.1
Ultra Low-Flow Water Closet	0.8
Conventional Urinal	1.0
Low Flow Urinal	0.1

Flow Fixture Chart

Flow Fixture Type	Water Use [GPM]
Conventional Lavatory	2.2
Low-Flow Lavatory	0.5
Kitchen Sink	2.5
Low-Flow Kitchen Sink	1.8
Shower	2.5
Low-Flow Shower	1.8

Usage based on 6/23/09 AE walk-through of facility and follow-up emails.

*** Baseline is based on actual consumption figures:**

12/8/2007 - 12/8/2008 AND assumed daily use and time of use

Factors contributing to consumption include:

- daily use pattern
- time(s) of use
- fixtures installed

Appendix B
Water Use Calculations

Laundry Water Use Calculations

Design Case Table

Appliance	Annual Uses Per Dwelling Unit ⁴	Water Use per Cycle [gal]	# of Dwelling Units	Annual Water Use [gal]
Energy Star Washer	83.20	11.0	289	264,493
Energy Star Dishwasher	520	4.0	1	2,080
TOTAL ANNUAL VOLUME [gal]				266,573

Baseline Case Table

Appliance	Annual Uses per Dwelling Unit ⁴	Water Use per Cycle ¹ [gal]	Dwelling Units	Water Use [gal]
Maytag Front Load Washer	83.20	18.00	289	432,806
Conventional Dishwasher	520	6.0	1	3,120
TOTAL ANNUAL VOLUME [gal]				435,926

Non-Regulated Water Use Reduction	39%
Volume of Non-Regulated Water Reduction	169,354
Percent of Design Regulated Water Use	16%

Water Consumption Per Cycle is based on the following:

- Conventional washer is based on Energy Star average of 32.5 gallons per cycle.
- Energy Star washer is based on annual water use from Energy Star database.
- Maytag Front Load Washer est'd water use per load is 18 gallons (based on Energy Star).
- Dishwasher in Community Kitchen run x2/daily @ 5 times wk x 52 wks = 520/yr uses
- Est of 1.6 laundry loads/week is an average of **83.20** uses per dwelling unit annually.

Appendix B

Water Use Calculations

Water Use Reduction Calculations with 1.28 GPF Toilets

Jefferson Terrace - Design Case Table

Flush Fixture	Daily Uses	Flowrate [GPF]	Duration [flush]	Auto Controls N/A	Occupants	Water Use [gal]	User Definition
Assumes 289 Leasable Units; 331 FTE Residents with 15% working and (75/25) gender split							
Assumes Eldercare Admin - 6th Flr West wing - 15 Ofcs (8hr); assume 50:50 gender split							
Assumes Eldercare Progr - 6th Flr East wing - 15 staff + 1 Kitchen staff; assume 50:50 split							
Assumes Eldercare Progr - 6th Flr East wing - Clients of 40 non-Res & 10 Resident clients 4.5 hrs/day; assume 50:50 split							
Assumes Eldercare Progr - 6th Flr East Kitchen - Dishwasher run x2/day - 60 lunch/day-(3-4 /week catered meal re-heated); few breakfast snack							
Assumes 331 + 2 Visitors - 331 to Resident's unit/daily (1 visitor per occupant daily); 2 visitors to 6th flr Admin; Assumes 50:50 gender split							
Low-Flow Water Closet	▼ 1.1gpf						Resident - stay at home
Male	8	1.3	1	--	223	2,284	
Female	8	1.3	1	--	58	594	
Low-Flow Water Closet	▼ 1.1gpf						6th Flr - Ofc, Clinic & Kitch Staff
Male - Ofc & Clinic Staff	3	1.3	1	--	15	58	
Female - Ofc/Clinic/Kitch Staff	3	1.3	1	--	16	61	
Low-Flow Water Closet	▼ 1.1gpf						Working Residents
Male	5	1.3	1	--	25	163	
Female	5	1.3	1	--	25	163	
Low-Flow Water Closet	▼ 1.1gpf						Visitors & Clinic Clients (4.5hr/day)
Visitor to Resident	0.5	1.3	1	--	331	215	
Male - Clinic Res & Non-Res Clients	1.5	1.3	1	--	29	57	
Female - Clinic/Kitchen Visitor	1.5	1.3	1	--	29	57	

Flow Fixture	Daily Uses	Flowrate [GPM]	Duration [sec]	Auto Controls [% savings]	Occupants	Water Use [gal]	User Definition
Assumes 289 Leasable Units; 331 FTE Residents with 15% working and (75/25) gender split							
Assumes Eldercare Admin - 6th Flr West wing - 15 Ofcs (8hr); assume 50:50 gender split							
Assumes Eldercare Progr - 6th Flr East wing - 15 staff + 1 Kitchen staff; assume 50:50 split							
Assumes Eldercare Progr - 6th Flr East wing - Clients of 40 non-Res & 10 Resident clients 4.5 hrs/day; assume 50:50 split							
Assumes Eldercare Progr - 6th Flr East Kitchen - Dishwasher run x2/day - 60 lunch/day-(3-4 /week catered meal re-heated); few breakfast snack							
Assumes 331 + 2 Visitors - 331 to Resident's unit/daily (1 visitor per occupant daily); 2 visitors to 6th flr Admin; Assumes 50:50 gender split							
Low-Flow Lavatory	▼ 8	0.5	12		281	225	Resident - stay at home
Low-Flow Lavatory	▼ 3	0.5	12		31	9	6th Flr - Ofc, Clinic & Kitch Staff
Low-Flow Lavatory	▼ 1.5	0.5	12		58	9	6th Flr - E-Clinic & Clients
Low-Flow Kitchen Sink	▼ 3	1.8	60		331	1,787	Resident
Low-Flow Kitchen Sink	▼ 3	1.8	60		4	22	6th Flr - E-Kitch Staff + addl help
Low-Flow Shower	▼ 0.5	1.8	300		331	1,490	Resident
Low-Flow Lavatory	▼ 0.5	0.5	12		331	17	Visitor - to Resident
Low-Flow Lavatory	▼ 5	0.5	12		50	25	Working Residents
Total Daily Volume [gal]						7,233	
Work Outside Home/ Days						365	
Annual Volume [gal]						2,639,892	
Annual Graywater or Stormwater Reuse [gal]						0	
TOTAL ANNUAL DESIGN CASE VOLUME [gal]						2,639,892	
TOTAL ANNUAL DESIGN CASE - PROCESS WATER [gal]						266,573	
TOTAL DESIGN VOLUME [gal]						2,906,465	

Appendix B

Water Use Calculations

Water Use Reduction Calculations with 1.28 GPF Toilets

Jefferson Terrace - *Baseline Case Table

Flush Fixture	(LEED default) Daily Uses	Flowrate [GPF]	Duration [flush]	Auto Controls N/A	Occupants	Water Use [gal]	User Definition
Assumes 289 Leasable Units; 331 FTE Residents with 15% working and (75/25) gender split							
Assumes Eldercare Admin - 6th Flr West wing - 15 Ofcs (8hr); assume 50:50 gender split							
Assumes Eldercare Progr - 6th Flr East wing - 15 staff + 1 Kitchen staff; assume 50:50 split							
Assumes Eldercare Progr - 6th Flr East wing - Clients of 40 non-Res & 10 Resident clients 4.5 hrs/day; assume 50:50 split							
Assumes Eldercare Progr - 6th Flr East Kitchen - Dishwasher run x2/day - 60 lunch/day-(3-4 /week catered meal re-heated); few breakfast snack							
Assumes 331 + 2 Visitors - 331 to Resident's unit/daily (1 visitor per occupant daily); 2 visitors to 6th flr Admin; Assumes 50:50 gender split							
Conventional Water Closet							Resident - stay at home
Stay at home Male	8	1.6	1	--	223	2,854	
Stay at home Female	8	1.6	1	--	58	742	
Conventional Water Closet							6th Flr - Ofc, Clinic & Kitch Staff
Working Male	3	1.6	1	--	15	72	
Working Female	3	1.6	1	--	16	77	
Conventional Water Closet							Working Residents
Male - Clinic Staff	5	1.6	1	--	25	200	
Male - Res & non-Res Client	5	1.6	1	--	25	200	
Conventional Water Closet							Visitors & Clinic Clients (4.5hr/day)
Visitor - to Resident	0.5	1.6	1	--	331	265	
Male - Clinic/Kitchen Visitor	1.5	1.6	1	--	29	70	
Female - Clinic/Kitchen Visitor	1.5	1.6	1	--	29	70	
Flow Fixture	Daily Uses	Flowrate [GPM]	Duration [sec]	Auto Controls N/A	Occupants	Water Use [gal]	User Definition
Assumes 289 Leasable Units; 331 FTE Residents with 15% working and (75/25) gender split							
Assumes Eldercare Admin - 6th Flr West wing - 15 Ofcs (8hr); assume 50:50 gender split							
Assumes Eldercare Progr - 6th Flr East wing - 15 staff + 1 Kitchen staff; assume 50:50 split							
Assumes Eldercare Progr - 6th Flr East wing - Clients of 40 non-Res & 10 Resident clients 4.5 hrs/day; assume 50:50 split							
Assumes Eldercare Progr - 6th Flr East Kitchen - Dishwasher run x2/day - 60 lunch/day-(3-4 /week catered meal re-heated); few breakfast snack							
Assumes 331 + 2 Visitors - 331 to Resident's unit/daily (1 visitor per occupant daily); 2 visitors to 6th flr Admin; Assumes 50:50 gender split							
Conventional Lavatory	8	2.2	15	--	281	1,236	Resident - stay at home
Conventional Lavatory	3	2.2	15	--	31	51	6th Flr - Ofc, Clinic & Kitch Staff
Conventional Lavatory	1.5	2.2	15	--	58	48	6th Flr - E-Clinic & Clients
Kitchen Sink	3	2.5	60	--	331	2,483	Resident
Kitchen Sink	3	2.5	60	--	4	30	6th Flr - E-Kitch Staff + addl help
Shower	0.5	2.5	300	-	331	2,069	Resident
Conventional Lavatory	0.5	2.2	15	--	331	91	Visitor - to Resident
Conventional Lavatory	5	2.2	15	--	50	138	Working Residents
Total Daily Volume [gal]						10,695	
Fulltime Home/ Days						365	
TOTAL ANNUAL BASELINE CASE - NON-PROCESS WATER [gal]						3,903,593	
TOTAL ANNUAL BASELINE CASE - PROCESS WATER [gal]						435,926	
TOTAL ANNUAL BASELINE CASE VOLUME [gal]						4,339,519	
TOTAL ACTUAL ANNUAL VOLUME [gal]						4,091,560	
DIFFERENCE						247,959	
Water Use Reduction						33%	

Appendix B

Water Use Calculations

Water Use Reduction Calculations with 1.28 GPF Toilets

Flush Fixture Chart

Flush Fixture Type	Water Use [GPF]
Conventional Water Closet	1.6
Low-Flow Water Closet	1.3
Ultra Low-Flow Water Closet	0.8
Conventional Urinal	1.0
Low Flow Urinal	0.1

Flow Fixture Chart

Flow Fixture Type	Water Use [GPM]
Conventional Lavatory	2.2
Low-Flow Lavatory	0.5
Kitchen Sink	2.5
Low-Flow Kitchen Sink	1.8
Shower	2.5
Low-Flow Shower	1.8

Usage based on 6/23/09 AE walk-through of facility and follow-up emails.

* **Baseline is based on actual consumption figures:**

12/8/2007 - 12/8/2008 AND assumed daily use and time of use

Factors contributing to consumption include:

- daily use pattern
- time(s) of use
- fixtures installed

Appendix C

Utility Data - Electric Meter

Seattle City Light

Account Number: 1-452459-191599
 Service Address: 800 JEFFERSON STREET
 Meter Number: 508454
 Rate Type: 34

Fiscal_Yr	From_Date	To_Date	Amt_Consumed-kWh	Amt_Due
2009	2/23/2009	3/23/2009	126280	\$6,136.45
2009	1/21/2009	2/23/2009	148,490	\$7,250.10
2009	12/17/2008	1/21/2009	164,250	\$8,089.61
2008	11/17/2008	12/17/2008	136,580	\$6,725.90
2008	10/15/2008	11/17/2008	142,340	\$6,949.02
2008	9/16/2008	10/15/2008	121,860	\$5,919.42
2008	8/15/2008	9/16/2008	123,600	\$5,977.91
2008	7/17/2008	8/15/2008	109,070	\$5,289.79
2008	6/17/2008	7/17/2008	114,570	\$5,555.29
2008	5/16/2008	6/17/2008	131,680	\$6,436.82
2008	4/17/2008	5/16/2008	120,470	\$5,848.84
2008	3/19/2008	4/17/2008	125,520	\$6,096.31
2008	2/20/2008	3/19/2008	117,200	\$5,696.65
2008	1/18/2008	2/20/2008	147,340	\$7,123.14
2008	12/19/2007	1/18/2008	131,320	\$6,368.10
Total 2008			1,521,550	\$73,987.19
2007	11/14/2007	12/19/2007	148,350	\$7,155.68
2007	10/17/2007	11/14/2007	113,530	\$5,585.33
2007	9/14/2007	10/17/2007	135,570	\$6,554.73
2007	8/15/2007	9/14/2007	110,910	\$5,377.57
2007	7/17/2007	8/15/2007	108,280	\$5,254.54
2007	6/18/2007	7/17/2007	113,950	\$5,526.54
2007	5/17/2007	6/18/2007	127,650	\$6,167.57
2007	4/18/2007	5/17/2007	115,660	\$5,616.90
2007	3/20/2007	4/18/2007	119,790	\$5,814.30
2007	2/20/2007	3/20/2007	120,970	\$5,886.72
2007	1/18/2007	2/20/2007	145,040	\$7,012.54
2007	12/19/2006	1/18/2007	136,700	\$7,178.41
			1,496,400	\$73,130.83
2006	11/14/2006	12/19/2006	153,880	\$8,973.64
2006	10/13/2006	11/14/2006	137,500	\$8,036.34
2006	9/14/2006	10/13/2006	121,240	\$7,106.99
2006	8/15/2006	9/14/2006	114,280	\$6,775.50
2006	7/17/2006	8/15/2006	109,990	\$6,532.25
2006	6/16/2006	7/17/2006	119,530	\$7,073.17
2006	5/16/2006	6/16/2006	128,210	\$7,646.02
2006	4/18/2006	5/16/2006	116,770	\$6,916.68
2006	3/21/2006	4/18/2006	119,460	\$7,069.20

Appendix C

Utility Data - Steam Meters

Seattle Steam

Account Number: 21210

Service Address: 800 JEFFERSTON ST

Meter Number: 102F

Fiscal_Yr	From_Date	To_Date	Amt_Consumed_MLB	Amt_Due	Amount			
					Over-consumed	Adjusted_Consump	Credit	Adjusted Amount Due
2009	3/23/2009	4/22/2009	1,046	\$28,544.58				
2009	2/19/2009	3/23/2009	1,220	\$33,725.69				
2009	1/22/2009	2/19/2009	1,091	\$31,470.41				
2009	12/19/2008	1/22/2009	1,399	\$40,959.30				
2008	11/19/2008	12/19/2008	947	\$29,192.99				
2008	10/23/2008	11/19/2008	0	(\$65,998.16)				*credit issued for heat exchanger leak
2008	10/23/2008	11/19/2008	688	\$20,478.29				
2008	9/22/2008	10/23/2008	653	\$19,462.50				
2008	8/21/2008	9/22/2008	170	\$5,318.41				
2008	7/23/2008	8/21/2008	149	\$4,674.81				
2008	6/20/2008	7/23/2008	212	\$6,680.68				
2008	5/21/2008	6/20/2008	693	\$23,237.63				
2008	4/22/2008	5/21/2008	1,118	\$34,909.16				
2008	3/21/2008	4/22/2008	1,497	\$44,674.85	1,026	471	(\$13,832.31)	\$32,339.54
2008	2/21/2008	3/21/2008	1,793	\$52,267.78	884	909	(\$26,148.84)	\$27,911.94
2008	1/23/2008	2/21/2008	1,652	\$47,583.91	506	1,146	(\$14,321.23)	\$34,914.68
2008	12/20/2007	1/23/2008	1,643	\$45,843.28	430	1,213	(\$11,695.78)	\$35,790.50
2008	11/21/2007	12/20/2007	1,017	\$27,228.05				
			9,386	\$236,141.02				
2007	10/23/2007	11/21/2007	834	\$22,619.32				
2007	9/20/2007	10/23/2007	751	\$20,234.91				
2007	8/23/2007	9/20/2007	173	\$4,819.68				
2007	7/23/2007	8/23/2007	199	\$5,528.38				
2007	6/21/2007	7/23/2007	320	\$8,826.51				
2007	5/22/2007	6/21/2007	985	\$26,386.76				
2007	4/20/2007	5/22/2007	1,049	\$28,409.55				
2007	3/22/2007	4/20/2007	731	\$19,709.10				
2007	2/20/2007	3/22/2007	941	\$25,230.01				
2007	1/24/2007	2/20/2007	910	\$24,710.15				
2007	12/19/2006	1/24/2007	1,316	\$37,531.35				
2007	11/20/2006	12/19/2006	900	\$18,651.41				
2007	10/23/2006	11/20/2006	688	\$15,388.73				
2007	9/21/2006	10/23/2006	673	\$14,066.79				
Total 2007			10,470	\$272,112.65				
2006	8/22/2006	9/21/2006	165	\$3,587.30				
2006	7/21/2006	8/22/2006	186	\$4,031.05				
2006	6/22/2006	7/21/2006	198	\$4,284.63				
2006	5/22/2006	6/22/2006	699	\$14,591.90				
2006	4/20/2006	5/22/2006	783	\$16,288.40				

Heat Exchanger Leak

*Note that Seattle Steam credited SHA for 2,846 MLBs of over-usage from Jan-08 to April-08. The over-usage was caused by a heat exchanger leak that allowed City water to register as steam usage in the condensate meter, (see adjusted values shaded green below).

Heat Exchanger Leak History

Sept-07	steam traps on "lower" tank were by-passed
Oct-07	"lower" tank was taken off line
Jan 7, 2008	"lower" tank put back on line
June-08	"upper" tank taken off line
July-08	replacement of upper tube bundle

Appendix C

Utility Data - Natural Gas Meter

Puget Sound Energy

Account Number: 607-883-700-9
 Service Address: 800 JEFFERSTON ST
 Meter Number: 00434093
 Rate Type: 31

Fiscal_Yr	From_Date	To_Date	Amt_Consumed_Therm	Amt_Due	
2009	3/3/2009	3/31/2009	103.9	164.17	
2009	1/30/2009	3/2/2009	116.1	181.53	
2009	12/31/2008	1/29/2009	96.96	157.5	
2008	12/2/2008	12/30/2008	98.36	157.61	
2008	10/30/2008	12/1/2008	108.81	169.95	
2008	9/30/2008	10/29/2008	102.67	146.24	
2008	8/29/2008	9/29/2008	102.04	132.34	
2008	7/31/2008	8/28/2008	84.76	114.26	
2008	6/28/2008	7/30/2008	111.62	144.36	
2008	5/30/2008	6/27/2008	86.94	115.53	
2008	4/30/2008	5/29/2008	103.96	134.49	
2008	3/29/2008	4/29/2008	110.58	141.84	
2008	2/29/2008	3/28/2008	101	131.09	
2008	1/30/2008	2/28/2008	116.69	149.94	
2008	12/30/2007	1/29/2008	108.69	139.65	
		Total 2008	1,236	\$1,677	\$1.36
2007	11/30/2007	12/29/2007	-107.4	-138.2	
2007	11/30/2007	12/29/2007	107.42	138.2	
2007	11/30/2007	12/29/2007	107.42	138.2	
2007	10/30/2007	11/29/2007	113.06	144.1	
2007	9/29/2007	10/29/2007	108.08	139.8	
2007	8/30/2007	9/28/2007	92.76	138	
2007	8/1/2007	8/29/2007	96.11	142.32	
2007	6/30/2007	7/31/2007	101.96	149.85	
2007	6/1/2007	6/29/2007	100.73	148.27	
2007	5/1/2007	5/31/2007	107.8	157.37	
2007	3/31/2007	4/30/2007	104.95	153.69	
2007	3/2/2007	3/30/2007	108.84	157.97	
2007	1/31/2007	3/1/2007	112.34	162.41	
2007	12/30/2006	1/30/2007	116.3	164.86	
2006	12/1/2006	12/29/2006	96.53	136.77	
		Total 2007	1,367	\$1,934	\$1.41
2006	10/31/2006	11/30/2006	92.39	131.59	
2006	9/30/2006	10/30/2006	91.9	130.63	
2006	8/31/2006	9/29/2006	78.9	105.9	
2006	8/1/2006	8/30/2006	80.49	107.72	
2006	6/30/2006	7/31/2006	85.71	114.88	
2006	6/1/2006	6/29/2006	86.79	116.12	
2006	5/2/2006	5/31/2006	85.8	114.99	
2006	4/1/2006	5/1/2006	90.03	119.81	

Appendix C

Utility Data - Water Meter

Seattle Public Utilities

Account Number: 2-528040-191599
 Service Address: 800 JEFFERSON STREET
 Meter Number: HER-02536600-2
 Rate Type: COM

Fiscal_Yr	From_Date	To_Date	Amt_Consumed_CCF	Water_Amt_D ue	Sewer_Amt_D ue	Bill Total
2009	3/2/2009	3/31/2009	681	\$1,385.68	\$54.09	\$1,439.77
					*Credit issued for Hydrant Rebate	
2009	1/30/2009	3/2/2009	764	\$2,379.66	\$6,801.96	\$9,181.62
2009	1/6/2009	1/30/2009	569	\$1,775.99	\$5,068.41	\$6,844.40
2009	12/2/2008	1/6/2009	821	\$2,342.65	\$6,533.20	\$8,875.85
2008	10/31/2008	12/2/2008	761	\$2,127.15	\$5,897.75	\$8,024.90
2008	10/1/2008	10/31/2008	714	\$1,995.68	\$5,533.50	\$7,529.18
2008	9/3/2008	10/1/2008	663	\$2,061.16	\$5,138.25	\$7,199.41
2008	8/1/2008	9/3/2008	770	\$2,717.00	\$5,967.50	\$8,684.50
2008	7/1/2008	8/1/2008	765	\$2,691.92	\$5,928.75	\$8,620.67
2008	6/2/2008	7/1/2008	666	\$2,351.93	\$5,161.50	\$7,513.43
2008	5/1/2008	6/2/2008	866	\$2,818.47	\$6,866.50	\$9,684.97
2008	4/2/2008	5/1/2008	832	\$2,300.67	\$6,448.00	\$8,748.67
2008	3/5/2008	4/2/2008	814	\$2,249.35	\$6,318.50	\$8,567.85
2008	2/4/2008	3/5/2008	663	\$1,862.06	\$5,148.25	\$7,010.31
2008	1/4/2008	2/4/2008	721	\$2,018.19	\$5,587.75	\$7,605.94
2008	12/3/2007	1/4/2008	758	\$1,896.70	\$5,675.52	\$7,572.22
2007	11/2/2007	12/3/2007	709	\$1,748.64	\$5,292.05	\$7,040.69
2007	10/3/2007	11/2/2007	645	\$1,650.72	\$4,976.60	\$6,627.32
2007	9/4/2007	10/3/2007	631	\$1,815.67	\$4,700.95	\$6,516.62
2007	8/1/2007	9/4/2007	625	\$2,230.88	\$4,666.25	\$6,897.13
2007	7/3/2007	8/1/2007	681	\$2,398.32	\$5,073.45	\$7,471.77
2007	6/4/2007	7/3/2007	691	\$2,431.82	\$5,147.95	\$7,579.77
2007	5/3/2007	6/4/2007	735	\$2,299.16	\$5,475.75	\$7,774.91
2007	3/30/2007	5/3/2007	500	\$1,282.13	\$3,725.00	\$5,007.13
2007	3/1/2007	3/30/2007	716	\$1,756.61	\$5,334.20	\$7,090.81
2007	2/1/2007	3/1/2007	513	\$1,287.70	\$3,821.85	\$5,109.55
2007	1/6/2007	2/1/2007	659	\$1,613.98	\$4,909.55	\$6,523.53
2007	12/5/2006	1/6/2007	681	\$1,709.65	\$4,691.66	\$6,401.31
2006	11/1/2006	12/5/2006	624	\$1,589.69	\$4,228.24	\$5,817.93
2006	9/29/2006	11/1/2006	575	\$1,471.53	\$3,887.00	\$5,358.53
2006	9/1/2006	9/29/2006	680	\$2,043.02	\$4,596.80	\$6,639.82
2006	8/1/2006	9/1/2006	689	\$2,431.94	\$4,657.64	\$7,089.58
2006	7/2/2006	8/1/2006	656	\$2,317.40	\$4,434.56	\$6,751.96
2006	6/1/2006	7/2/2006	898	\$3,132.09	\$6,070.48	\$9,202.57
2006	4/29/2006	6/1/2006	736	\$2,123.31	\$4,975.36	\$7,098.67
2006	4/3/2006	4/29/2006	580	\$1,270.07	\$3,930.80	\$5,200.87
2006	3/4/2006	4/3/2006	681	\$1,489.00	\$4,613.56	\$6,102.56