THERMAL ENERGY AGREEMENT
ARTICLE I

This Thermal Energy Agreement ("Agreement") is made and entered into as of the date last signed below by and between the City of Duluth, (the "City" or "DES") and St. Luke's Hospital of Duluth a Minnesota nonprofit corporation, ("St. Luke's" or "Customer"). The City and St. Luke's are referred to in this Agreement individually as a "Party" and collectively as the "Parties."

RECITALS

A. St. Luke's has put forward a proposal (the "Project"), further described on Exhibit A attached hereto and made a part hereof, to redevelop St. Luke's Duluth based health care system facilities in the area of Duluth commonly referred to as the medical district which is generally located in an area bounded by 3rd Avenue East, 5th Street, 12th Avenue East and Superior Street (the "Medical District");

B. The City is committed to working cooperatively with St. Luke's to advance the Project and address public infrastructure issues relating thereto;

C. Much of the Medical District is currently served by the City's District Energy System ("DES") for the provision of Thermal Energy in the form of high pressure steam and low pressure steam and it is the City's intent to augment its DES by the addition of hot water Thermal Energy facilities and to extend DES facilities to provide Thermal Energy to the remaining portions of the District that are occupied by Project facilities or that will be occupied by Project facilities when such extensions would render the provision of Thermal Energy by DES economically advantageous for both the City and St. Luke's.

D. St. Luke's is currently a customer of DES's existing Thermal Energy system for its existing facilities (the "Existing Facilities"), which facilities are hereinafter described on Exhibit B attached hereto and made a part hereof;

E. The City has established certain environmental goals it is committed to achieving by 2050 and the provision of Thermal Energy to St. Luke's facilities by DES is critical to meeting those goals;

F. The City has requested a commitment from St. Luke's that St. Luke's current and future facilities located within the Medical District will utilize DES's Thermal Energy Systems for their Thermal Energy requirements;

G. Based on the Life Cycle Cost Analysis ("LCCA") developed jointly by St. Luke's and DES for the St. Luke's campus and attached hereto as Exhibit D, St. Luke's is willing to commit, as provided herein, that St. Luke's current and future facilities located within the Medical District will utilize DES's Thermal Energy System for their Thermal Energy requirements as hereinafter provided for;

H. This Agreement formalizes the commitment of the City and St. Luke's for DES to supply Thermal Energy to St. Luke's.

AGREEMENT
DEFINITIONS

Unless the context otherwise requires or as otherwise modified herein, the terms defined in this ARTICLE 1 shall, for all purposes of this Agreement, have the meanings herein specified, to be equally applicable to both the singular and plural forms of any of the terms herein defined:

"Agreement": means this document and all exhibits herein referenced and attached to this agreement.

"Billing Period" means a "month" which may be any period between 28 and 33 consecutive days (except for February which may be 26 days); provided that in any calendar year there shall be twelve (12) such discrete consecutive months.

"Capacity" means the Customer's maximum anticipated Thermal Energy usage and is the basis for the Capacity Charge.

"Capacity Charge" has the meaning as described in Article VI.

"Consumption Charge" has the meaning as described in Article VII.

"Customer's Initial Capacity" means the then-current actual steam capacity for St. Luke's Existing Facilities plus the Hot Water Capacity for the portion of the load of Building A served by hot water (per LCCA is 9720 MMBtu) less the portion of the steam capacity of building A converted to hot water (total then-current Building A steam capacity less 1080 MMBtu per LCCA).

"First Service Date" means the date the Customer first receives Hot Water at the Premises Delivery Point.

"First Shut-off Valve" means the isolating device located at the respective Point of Delivery for each type of Thermal Energy provided to Customer by DES.

"Infrastructure Charge" has the meaning as described in Article VIII.

"Life Cycle Cost Analysis" or "LCCA" means that cost analysis developed jointly by St. Luke's and DES for the St. Luke's campus and attached hereto as Exhibit D.

"Metering Equipment" has the meaning as described in Article IX.

"Point of Delivery" means the point established in Exhibit F or Exhibit G to which Thermal Energy shall be delivered through the Thermal Energy System to the Customer and the point at which residue of such Thermal Energy shall be returned from the Customer's Premises Heating System to the Thermal Energy System; a Point of Delivery shall demarcate the Premises Heating System from the Thermal Energy System.

"Premises" means each location where Customer will receive and utilize Thermal Energy from DES pursuant to this Agreement.

"Premises Heating System" means the equipment within the Premises that distributes Thermal Energy received from DES throughout the Premises. Exhibit I attached hereto further describes the demarcation point between the Thermal Energy System and the Premises Heating System.

"Premises Conversion" means a modification of or alteration to a Premises and its Premises Heating System to make the Premises Heating System compatible with (a) the performance specifications required by DES, as specified in the Standards, and (b) utilization of Thermal Energy in accordance with this Agreement.

"Preventative Maintenance" has the meaning as described in Article XII.

"Service Bill" means the bill sent by DES to the Customer for the total of the Capacity Charges, the Consumption Charges, the Infrastructure Charges and the Service Connection Charges incurred during a Billing Period.

"Service Connection Charges" means the total costs incurred to connect the Customer to DES's Thermal Energy System including but not limited to actual construction costs, design and other professional fees, equipment, permit, insurance and financing costs incurred to complete the connection. The Service Connection Charges will be zero dollars ($0.00) upon the fulfillment of all the obligations of this Agreement. For the avoidance of doubt, Service Connection Charges do not include historical charges incurred to connect the Existing Facilities for the provision of steam services pursuant to the current agreements with the City.

"Standards" means the DES Customer Connection Standards in Exhibits F and G.

"Thermal Energy" means the media for transferring Thermal Energy from DES to the Premises Heating System including high pressure steam, low pressure steam, and hot water for space heating, domestic water heating, steam humidification, laundry processing, and equipment sterilization

"Thermal Energy System" means all equipment, facilities and materials, including boiler, heat exchangers, heating sources, pumps, pressurizers, pipes, lines, gauges and controls, and any other type of property now or hereafter owned, operated, or controlled by DES for the purpose of or incidental or useful to heating, distributing, receiving, collecting, monitoring and metering Thermal Energy, excluding any part of any Customer's Premises Heating System. DES shall own all hot water and steam within the Thermal Energy System.

NOW, THEREFORE, the Parties agree as follows:

A. To the extent provided herein, St. Luke's will utilize DES as the exclusive source for all Thermal Energy to all of the Existing Facilities and the Project facilities. In addition, St. Luke's commits to convert or connect any building in the Medical District acquired or constructed by St. Luke's after the date of this Agreement (and not then served by DES) to use Thermal Energy supplied by DES where it is mutually economically advantageous to do so using the same methodology as described in paragraph C. It is the Parties intent that, except as provided below, all Existing Facilities will be converted to hot water service

where the LCCA has demonstrated that it is mutually beneficial to do so. In the event it is not mutually beneficial to convert Existing Facilities to hot water service, the Existing Facilities will continue to receive Thermal Energy in the form of steam pursuant to the terms hereof. Notwithstanding the foregoing, the St. Luke's Hospital Building as further described in Exhibit B, shall be subject to such conversion to hot water service only upon the written agreement of St. Luke's and the City. In the absence of such agreement, the building will continue to receive Thermal Energy in the form of steam pursuant to the terms and for the duration of this Agreement.

B. DES shall connect the Existing Facilities and the Project facilities to the DES Thermal Energy System as described in "DES Connection Narrative" (Exhibit C) up to the Point of Delivery at no up-front cost to St. Luke's. St. Luke's will connect all portions of all of its facilities to the Point of Delivery in conformance with this Agreement and with said DES Connection Narrative at its sole cost.

C. St. Luke's will pay DES for Thermal Energy services in accordance with rates established therefore by the Duluth City Council and consistent with the LCCA. The LCCA includes consideration of conversion, upgrade and similar costs to be incurred by St. Luke's for current and proposed buildings to be constructed, as established by the parties hereto during the planning and design of the Project. Costs for Thermal Energy services including both steam and hot water will include the Consumption Charge, Capacity Charge, and Infrastructure Charge, as applicable to each form of Thermal Energy. City commits that the charges per unit of energy for hot water Thermal Energy will, throughout the term of this Agreement, be less than the cost for the same unit of energy provided by steam.

1. Any Infrastructure Charge under this Agreement, as determined in the LCCA, relating to Thermal Energy service provided to St. Luke's at the commencement of this Agreement shall not exceed $22,500.00 per year at any time during the first ten (10) years of this Agreement. No Infrastructure Charge shall be applicable to Thermal Energy in the form of steam.

2. In any determination of conversion or connection of an after-acquired St. Luke's building to DES under paragraph A. above, all then current, future and contemplated Infrastructure Charges and, for any buildings not considered Existing Facilities or Project facilities, Service Connection Charges shall be taken into consideration, in addition to other factors considered in the development of the LCCA.

D. All St. Luke's buildings served by the DES will receive the largest prescribed Capacity Charge discount established by City and applicable to DES customers through aggregation of all St. Luke's buildings using Thermal Energy acquired from DES.

E. The term of this Agreement will be for a period of 30 years from the start of hot water energy service to St. Luke's, which shall commence on the First Service Date, which shall be a date mutually determined by the City and St. Luke's that is anticipated to be not later than November 1, 2021.

F. The provision of Thermal Energy to St. Luke's under this Agreement will be governed by the terms of the Thermal Energy Service Agreement attached hereto as Exhibit E except to the extent inconsistent with the terms of this Agreement or other attachments thereto, in which case the terms of this Agreement and such attachments shall be governing.

G. As of the First Service Date, St. Luke's existing agreement with the City for steam service, shall be superseded by this Agreement and have no further force and effect, except for rights, duties, obligations and liabilities under such existing agreement accruing or related to the period of time prior to the First Service Date.

H. The service and connection standards set forth in Exhibits F and G – "Customer Connection Standards for District Heating" are incorporated into this Agreement. Notwithstanding the standards set forth in Exhibits F and G, the normal water return temperature from St. Luke's to DES may exceed 140 degrees without cost, penalty or other consequence to St. Luke's provided that St. Luke's is working diligently and in good faith to resolve issues causing the higher return temperature.

I. The City's policy and methodology for determining the Capacity Charge and Consumption Charge payable by St. Luke's under this Agreement (as provided in Exhibit E) is attached hereto as Exhibit H. The anticipated costs in this Agreement are based on present estimates and the Parties anticipate that the actual financial amounts resulting from the application of actual costs and other numbers by the City as set forth in Exhibit H may vary from those set forth in Exhibit D. Notwithstanding anything in this Agreement to the contrary:

1. The Capacity Charge shall escalate annually at a rate no higher than the annual percentage increase in the Consumer Price Index for All Urban Customers (CPI-U), Midwest region starting with a base rate of $7.249892 per MMBtu (December 2019 dollars) in accordance with Group 9 Capacity Charge Rate in Exhibit H.

OTHER PROVISIONS

A. Relationship between the Parties. The Parties expressly acknowledge that nothing in this Agreement is intended nor may be construed to create an employer/employee or joint venture relationship between the Parties.

B. Confidentiality. This Agreement and all data related thereto is subject to the provisions of Minnesota Statutes Chapter 13, The Minnesota Government Data Practices Act. Subject to the provisions thereof, all non-public, confidential, or proprietary information of either Party ("Confidential Information"), including, but not limited to, specifications, samples, patterns, designs, plans, drawings, documents, data, business operations, lists, pricing, discounts, or rebates disclosed by either Party, whether disclosed orally or disclosed or accessed in written, electronic, or other form or media, and whether or not marked, designated, or otherwise identified as "confidential," in connection with this Agreement is confidential, solely for the other Party's use in performing this Agreement and may not be disclosed or copied unless authorized by the disclosing Party in writing. Confidential Information does not include any information that: (a) is or becomes generally available to the public other than as a result of either Party's breach of this Agreement; (b) is obtained

by either Party on a non-confidential basis from a third-party that was not legally or contractually restricted from disclosing such information; (c) either Party establishes by documentary evidence, was in its possession prior to the disclosing Party's disclosure hereunder ; or (d) was or is independently developed by the receiving Party without using any Confidential Information. Upon the disclosing Party's request, receiving Party shall promptly return all documents and other materials received from the disclosing Party. Either Party shall be entitled to injunctive relief for any violation of this Section.

C. Termination. Unless terminated earlier as provided herein, this Agreement will shall continue after the thirtieth (30th) anniversary of the First Service Date, subject to the right of either party to terminate it without cause, effective on or after such anniversary date, on one hundred eighty (180) days prior written notice to the other party.

D. Recitals and Exhibits; Defined Terms. The recitals and Exhibits are incorporated into and made a part of this Agreement. Any capitalized terms not defined in this Agreement or any Exhibit shall have their common and ordinary meaning, as the context may require.

E. Entire Agreement. This Agreement and the exhibits referenced herein, and Customer's existing agreements with the City for steam service, sets forth and constitutes the entire agreement between the Parties with respect to the subject matter as of the date hereof, and supersedes any and all other prior agreements or understandings concerning the subject matter.

F. Amendments. No amendments to this Agreement will be binding unless in writing and signed by the Parties.

G. Binding Agreement. The Parties intend that this Agreement be binding upon each of them upon signing.

H. Counterparts. This Agreement may be executed simultaneously in any number of counterparts, all of which shall constitute one and the same instrument.

(The remainder of this page is intentionally left blank.)

IN WITNESS WHEREOF, the Parties hereto have executed this Agreement on the dates indicated below.

CITY OF DULUTH, a Minnesota municipal corporation development authority

By:_____
Its: Mayor
Date: _____

Attest:

By:_____
Its: City Clerk
Date: _____

Approved:

By:_____
Its: Assistant City Attorney
Date: _____

Countersigned:

By:_____
Its: City Auditor
Date: _____

ST. LUKE'S HOSPITAL OF DULUTH

By:_____
Its: President/CEO
Date: April 9, 2020

EXHIBIT LIST

Exhibit A - St. Luke's Medical District Plans

Exhibit B - St. Luke's Existing Facilities

Exhibit C - DES Connection Narrative and attached Erdman Company Basement HVAC Plan which must include mobile boiler connections in order to meet DES obligations contained in Exhibit E, Section 13.5.

Exhibit D – Life Cycle Cost Analysis

Exhibit E – Thermal Energy Service Agreement

Exhibit F – Duluth Energy Systems Customer Connection Standards for District Heating (hot water services)

Exhibit G– Duluth Energy Systems Customer Connection Standards for District Heating (steam services)

Exhibit H - City Rate Standards

Exhibit I – Ownership and Maintenance Responsibility Schematic

Exhibit A - St. Luke's Medical District Plans

1. **Building A Addition** - anticipated complete 2025
2. **Bed Tower** – anticipated complete 2031

Exhibit B - St. Luke's Existing Facilities

1. **St. Luke's Hospital (Acct. 3330)**
2. **St. Luke's Pavilion (Acct. 3370)**
3. **St. Luke's Building A (Acct. 3375)**
4. **St. Luke's Lakeview (Acct. 3385)**

EXHIBIT C

EVER-GREEN ENERGY™
AA/EEO Employer/M/F/Veterans/Disability

305 St. Peter Street
Saint Paul, MN 55102 - 1607

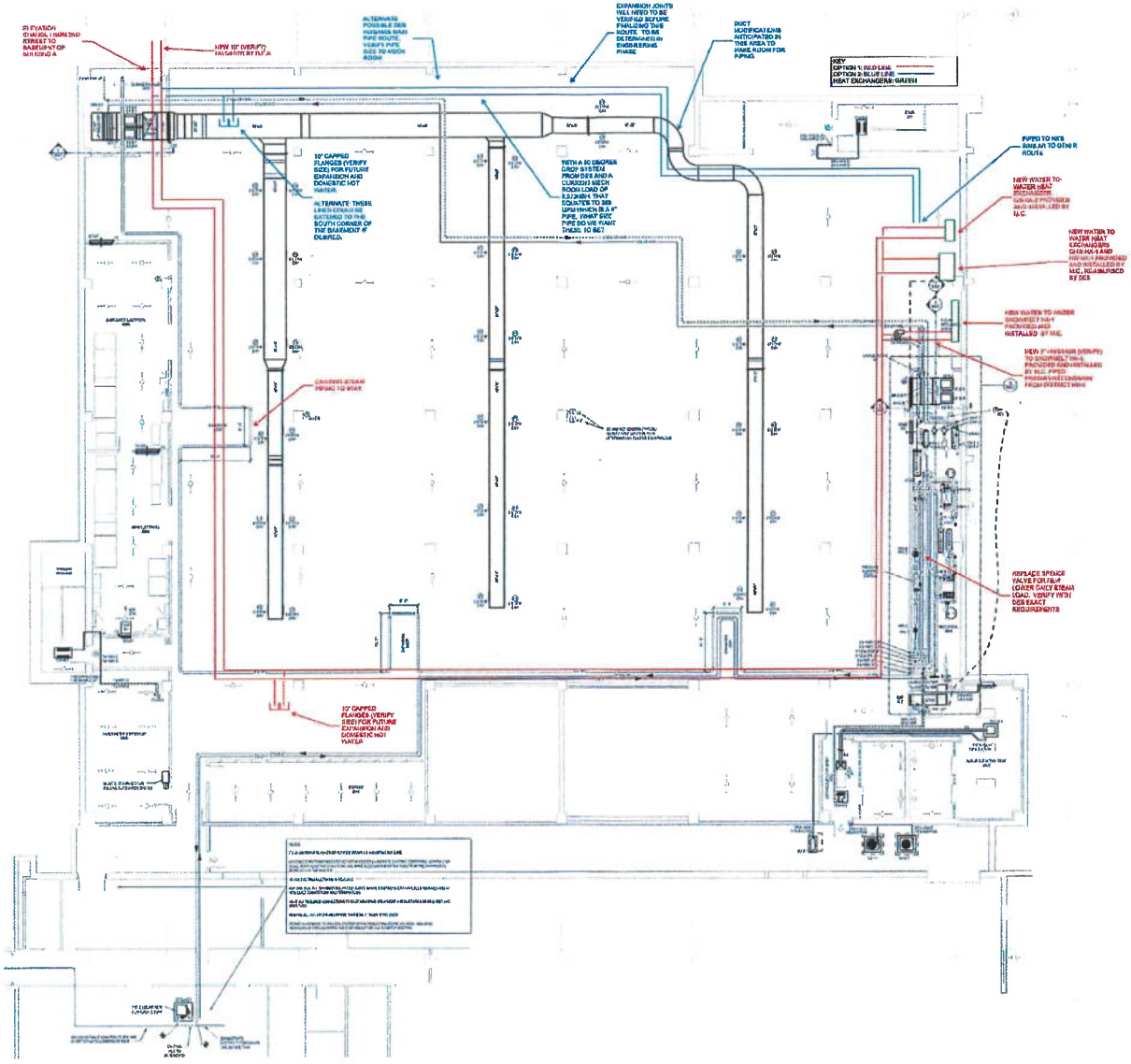
Tel: 651.290.2812
Fax: 651.292.9709
www.ever-greenenergy.com

To: Michael Boeselager
From: Ryan Johnson
Date: August 15, 2019
Subject: Duluth Energy Systems Hot Water Service Connection to St. Luke's Hospital

Duluth Energy Systems (DES) will extend 10-inch hot water piping to the St. Luke's Campus. The service will connect Building A and the future building expansions to the DES hot water network. The DES steam service piping will remain in service. DES will provide the following for the hot water service connection:

- 10-inch hot water service into the building.
- Service isolation valves and shunt assembly at the service entry.
- Energy metering equipment; including the flow meter, totalizer, and RTDs.
- Primary side hot water piping, insulation, and supports through Building A's parking garage. Piping shall terminate at the hot water heat exchangers.
- Space heating and domestic hot water heat exchangers.
- Capped tees to serve the subsequent Building A expansions.
- Capped tees for connection to the snow melting system to be installed by St. Luke's.

The primary side hot water piping through the parking garage shall follow the route as laid out in blue on A.W. Kuettel's *Bldg A Full Basement Revised* drawing dated June 19th, 2019.



ERDMAN

ERDMAN COMPANY

St. Luke's

ST. LUKE'S

MEDICAL OFFICE BUILDING & PARKING GARAGE

1013 E. SECOND ST.
DULUTH, MN 55805

No.	Description	Date
	Document Release	

Sheet Name
BASEMENT HVAC PLAN

Scale: 1/8" = 1'-0"

Sheet Number
M101

DULUTH, MN
55805

30 Year DES Life Cycle Cost Analysis
Using Recommended Energy Estimates

Heating (MMBtu)	*2022*	*2023*	*2024*	*2025*	*2026*	*2027*	*2028*	*2029*	*2030*	*2031*	*2032*
Steam	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080
Hot Water	9,720	9,720	9,720	19,911	19,911	19,911	19,911	19,911	19,911	35,136	35,136
Production Equipment Install, Replace, and/or Repair (MMBtu/hr)	***2022***	***2023***	***2024***	***2025***	***2026***	***2027***	***2028***	***2029***	***2030***	***2031***	***2032***
Boiler Plant Install/Replacement	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Boiler Plant Repair	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Energy Rate Escalation											
Year	1	2	3	4	5	6	7	8	9	10	11
Natural Gas	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Electricity	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
DES - Capacity	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
DES - Energy	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%

DES Steam Service											
Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Years from Base Year	2.833	3.833	4.833	5.833	6.833	7.833	8.833	9.833	10.833	11.833	12.833
Analysis Period	1	2	3	4	5	6	7	8	9	10	11
Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Steam Regulator Valve (Each)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Flash Tank	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capacity Charge	$ 80,892	$ 82,836	$ 84,996	$ 169,187	$ 173,386	$ 177,794	$ 182,202	$ 186,820	$ 191,438	$ 338,620	$ 346,949
Energy Charge - Steam	$ 78,192	$ 79,812	$ 81,324	$ 161,211	$ 164,569	$ 167,718	$ 171,077	$ 174,645	$ 178,004	$ 313,268	$ 319,787
Total	$ 159,084	$ 162,648	$ 166,320	$ 330,398	$ 337,955	$ 345,512	$ 353,279	$ 361,465	$ 369,442	$ 651,888	$ 666,737

District Service (Steam and Hot Water)											
Year	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Years from Base Year	2.833	3.833	4.833	5.833	6.833	7.833	8.833	9.833	10.833	11.833	12.833
Analysis Period	1	2	3	4	5	6	7	8	9	10	11
Capital Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Costs Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Energy Charge - Steam	$ 7,819	$ 7,981	$ 8,132	$ 8,294	$ 8,467	$ 8,629	$ 8,802	$ 8,986	$ 9,158	$ 9,342	$ 9,536
Energy Charge - HW	$ 49,280	$ 50,252	$ 51,224	$ 107,121	$ 109,311	$ 111,502	$ 113,692	$ 115,882	$ 118,271	$ 212,924	$ 217,140
Infrastructure Charge	$ 22,500	$ 22,500	$ 22,500	$ 22,500	$ 22,500	$ 22,500	$ 22,500	$ 22,500	$ 22,500	$ 22,500	$ -
Capacity Charge	$ 80,892	$ 82,836	$ 84,996	$ 169,187	$ 173,386	$ 177,794	$ 182,202	$ 186,820	$ 191,438	$ 338,620	$ 346,949
Total	$ 160,492	$ 163,570	$ 166,853	$ 307,103	$ 313,664	$ 320,425	$ 327,196	$ 334,188	$ 341,368	$ 583,386	$ 573,626
DES Hot Water Savings	$ (1,408)	$ (922)	$ (533)	$ 23,295	$ 24,291	$ 25,087	$ 26,083	$ 27,278	$ 28,074	$ 68,502	$ 93,110

	30 Year Cost	**NPV**
DES Steam Service	$19,871,000	$9,550,000
DES Hot Water Service	$17,390,000	$8,425,000
Savings	$2,481,000	$1,125,000
Percent Savings	12.5%	11.8%

30 Year DES Life Cycle Cost Analysis

Using Recommended Energy Estimates

Heating (MMBtu)	*2033*	*2034*	*2035*	*2036*	*2037*	*2038*	*2039*	*2040*	*2041*	*2042*	*2043*
Steam	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080
Hot Water	35,136	35,136	35,136	35,136	35,136	35,136	35,136	35,136	35,136	35,136	35,136
Production Equipment Install, Replace, and/or Repair (MMBtu/hr)	***2033***	***2034***	***2035***	***2036***	***2037***	***2038***	***2039***	***2040***	***2041***	***2042***	***2043***
Boiler Plant Install/Replacement	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Boiler Plant Repair	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Energy Rate Escalation											
Year	12	13	14	15	16	17	18	19	20	21	22
Natural Gas	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Electricity	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
DES - Capacity	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
DES - Energy	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%

DES Steam Service											
Year	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
Years from Base Year	13.833	14.833	15.833	16.833	17.833	18.833	19.833	20.833	21.833	22.833	23.833
Analysis Period	12	13	14	15	16	17	18	19	20	21	22
Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Steam Regulator Valve (Each)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Flash Tank	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capacity Charge	$ 355,641	$ 364,695	$ 373,749	$ 383,165	$ 392,581	$ 402,360	$ 412,500	$ 423,003	$ 433,506	$ 444,370	$ 455,235
Energy Charge - Steam	$ 325,944	$ 332,463	$ 339,344	$ 345,863	$ 352,744	$ 359,987	$ 367,230	$ 374,473	$ 382,079	$ 389,684	$ 397,290
Total	$ 681,585	$ 697,158	$ 713,093	$ 729,028	$ 745,325	$ 762,347	$ 779,730	$ 797,476	$ 815,584	$ 834,054	$ 852,525

District Service (Steam and Hot Water)											
Year	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
Years from Base Year	13.833	14.833	15.833	16.833	17.833	18.833	19.833	20.833	21.833	22.833	23.833
Analysis Period	12	13	14	15	16	17	18	19	20	21	22
Capital Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Costs Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Energy Charge - Steam	$ 9,720	$ 9,914	$ 10,120	$ 10,314	$ 10,519	$ 10,735	$ 10,951	$ 11,167	$ 11,394	$ 11,621	$ 11,848
Energy Charge - HW	$ 221,357	$ 225,924	$ 230,492	$ 235,060	$ 239,628	$ 244,547	$ 249,466	$ 254,385	$ 259,304	$ 264,574	$ 269,844
Infrastructure Charge	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capacity Charge	$ 355,641	$ 364,695	$ 373,749	$ 383,165	$ 392,581	$ 402,360	$ 412,500	$ 423,003	$ 433,506	$ 444,370	$ 455,235
Total	$ 586,718	$ 600,534	$ 614,361	$ 628,539	$ 642,728	$ 657,642	$ 672,917	$ 688,555	$ 704,203	$ 720,565	$ 736,927
DES Hot Water Savings	$ 94,867	$ 96,624	$ 98,732	$ 100,489	$ 102,597	$ 104,705	$ 106,813	$ 108,922	$ 111,381	$ 113,489	$ 115,597

30 Year DES Life Cycle Cost Analysis
Using Recommended Energy Estimates

Heating (MMBtu)	*2044*	*2045*	*2046*	*2047*	*2048*	*2049*	*2050*	*2051*
Steam	1,080	1,080	1,080	1,080	1,080	1,080	1,080	1,080
Hot Water	35,136	35,136	35,136	35,136	35,136	35,136	35,136	35,136
Production Equipment Install, Replace, and/or Repair (MMBtu/hr)	*2044*	*2045*	*2046*	*2047*	*2048*	*2049*	*2050*	*2051*
Boiler Plant Install/Replacement	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Boiler Plant Repair	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Energy Rate Escalation								
Year	23	24	25	26	27	28	29	30
Natural Gas	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Electricity	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
DES - Capacity	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
DES - Energy	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%

DES Steam Service									
Year	2043	2044	2045	2046	2047	2048	2049	2050	
Years from Base Year	24.833	25.833	26.833	27.833	28.833	29.833	30.833	31.833	Total
Analysis Period	23	24	25	26	27	28	29	30	Total
Steam Traps	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Steam Regulator Valve (Each)	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Flash Tank	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capacity Charge	$ 466,824	$ 478,413	$ 490,365	$ 502,678	$ 515,354	$ 528,029	$ 541,429	$ 554,829	$ 5,556,320
Energy Charge - Steam	$ 405,257	$ 413,587	$ 421,916	$ 430,246	$ 438,938	$ 447,630	$ 456,684	$ 465,738	$ 5,069,735
Total	$ 872,081	$ 892,000	$ 912,281	$ 932,924	$ 954,292	$ 975,659	$ 998,113	$ 1,020,567	

District Service (Steam and Hot Water)									
Year	2043	2044	2045	2046	2047	2048	2049	2050	
Years from Base Year	24.833	25.833	26.833	27.833	28.833	29.833	30.833	31.833	Total
Analysis Period	23	24	25	26	27	28	29	30	Total
Capital Costs	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Capital Costs Payment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Energy Charge - Steam	$ 12,085	$ 12,334	$ 12,582	$ 12,830	$ 13,090	$ 13,349	$ 13,619	$ 13,889	$ 317,228
Energy Charge - HW	$ 275,466	$ 280,737	$ 286,358	$ 291,980	$ 297,953	$ 303,926	$ 309,900	$ 316,224	$ 6,313,726
Infrastructure Charge	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 225,000
Capacity Charge	$ 466,824	$ 478,413	$ 490,365	$ 502,678	$ 515,354	$ 528,029	$ 541,429	$ 554,829	$ 10,533,847
Total	$ 754,376	$ 771,484	$ 789,305	$ 807,489	$ 826,397	$ 845,304	$ 864,948	$ 884,942	
DES Hot Water Savings	$ 117,706	$ 120,516	$ 122,976	$ 125,436	$ 127,895	$ 130,355	$ 133,165	$ 135,625	

EXHIBIT E

ARTICLE II
THERMAL ENERGY SERVICE AGREEMENT

2.1 DES represents that it operates a Thermal Energy distribution system in the City of Duluth, Minnesota and that it owns a thermal energy plant, and, as necessary, has access to and may utilize sufficient additional sources of energy in the generation of Thermal Energy giving it the capability to produce all Thermal Energy needed to meet the aggregate capacity of all DES Thermal Energy Customers.

2.2 DES represents that it has constructed or will construct and place such piping and equipment as necessary to connect its heat sources to Customer's Point of Delivery.

2.3 DES acknowledges that Customer's Initial Capacity is reasonable, based upon DES's estimates or verification of Customer's records.

2.4 DES agrees to continuously furnish needed Thermal Energy and sell Thermal Energy to Customer, subject to the contingencies, terms, and conditions set forth herein.

ARTICLE III
TERM

This Agreement shall be from the date hereof and continue in force unless terminated by mutual agreement of the parties and/or in accordance with the provisions of Article XIV. The Term of this Agreement shall commence First Service Date or as otherwise stated in Article I. Subject to Section 14.3, the Customer may terminate this Agreement at any time upon 180 days written notice to DES. Customer is obligated to pay the Capacity Charge from the termination date through the end of the calendar year along with any other charges contained herein.

ARTICLE IV
CONVERSION OF PREMISES

4.1 To the extent not inconsistent with the Standards, Customer may design any Premises Conversion to the specifications desired by Customer.

4.2 Unless otherwise provided in Article I, Customer shall complete any mutually agreed upon Premises Conversion prior to the First Service Date for such Premises, so that it may receive Thermal Energy from the Point of Delivery and utilize Thermal Energy.

ARTICLE V
CONNECTION TO DISTRICT HEATING SYSTEM

5.1 Prior to the First Service Date, DES shall cause the District Heating System to be constructed or expanded in such a manner as may be required to enable the delivery of Thermal Energy to Customer's Point of Delivery and the return of Thermal Energy therefrom to the District Heating System in accordance herewith.

5.2 All property constituting a part of the District Heating System in or on the Premises, or its surrounding premises, shall at all times be the property of DES; and upon the earlier of termination or expiration of this Agreement, DES shall have the right at its option to remove such property from the Premises and its premises, provided that promptly after such removal DES shall cause the Premises and premises to be returned to substantially the same condition as would have existed but for such removal. DES shall inform Customer of its intention to remove the property from the Premises and premises within thirty (30) days after the earlier of the termination or expiration of this Agreement, or such property shall become the property of Customer. If DES shall elect to cause the removal of its property (and thus, also restoration of Customer's Premises and premises), it shall do so within sixty (60) days following the date of notice of its intention to remove, or such property shall become the property of Customer.

5.3 Unless otherwise provided in Article I, Customer shall be responsible for all Service Connection Charges related to connecting Customer's Premises to the District Heating System. Customer acknowledges by execution hereof that in the absence of a written agreement to the contrary, Customer is solely responsible for all said Service Connection Charges.

ARTICLE VI
CAPACITY CHARGE

6.1 Customer shall pay the "Capacity Charge" for the steam and hot water Thermal Energy supplied to Premises. The monthly Capacity Charge shall be determined annually by DES according to policy approved by the Duluth City Council. The City Council approved policy in effect as of the Effective Date of this Agreement is provided as Exhibit H. The Capacity Charge reflects the anticipated fixed costs of DES incurred in supplying Thermal Energy to Customer on a monthly basis during the ensuing twelve-month period.

6.2 Fixed costs used to determine the Capacity Charge include, but are not limited to, the amortized costs of acquiring, installing and constructing the Thermal Energy District Energy System and financing costs related thereto, and projected maintenance and operational costs of the Thermal Energy District Energy System. The Capacity Charge is an annual charge, which shall be billed to Customer in twelve (12) equal consecutive monthly installments spread over the course of the ensuing calendar year, provided,

however, that Customer may, at its sole discretion, elect to pay the Capacity Charge as determined hereunder in one lump sum on or before January 31st of any given year. The Capacity Charge shall be established by DES pursuant to this Agreement in each calendar year, with the first monthly payment of the Capacity Charge appearing on the January Invoice.

6.3 The Capacity Charge payable by Customer shall be based on Customer's projected Thermal Energy consumption in relation to the projected aggregate steam and hot water consumption by all District Energy System customers. The Capacity Charge shall remain unchanged until it is adjusted again pursuant to the terms of this Article VI.

6.4 Unless otherwise stipulated in Article I, the Capacity Charge payable by Customer shall be recalculated annually each December for the ensuing twelve (12) month period based on the methodology approved by the Duluth City Council and as adjusted in this Agreement. The approved methodology as of the Effective Date of this Agreement is provided as Exhibit H.

ARTICLE VII
CONSUMPTION CHARGE

7.1 Customer shall also pay to DES the monthly "Consumption Charge" for Thermal Energy actually provided to Customer during each month. The Consumption Charge rate shall be based on the variable costs incurred by DES in providing Thermal Energy, including, but not limited to, the cost of fuel, water, electricity, and additives.

7.2 Customer's Consumption Charge shall be calculated by measuring the volume of Thermal Energy consumed in Customer's Premises using DES's Meter and multiplying the measured consumption by the Consumption Charge rate as per the City Council approved method in effect as of the Effective Date of this Agreement set forth in Exhibit H.

7.3 In the case of failure of DES's Meter to accurately measure the amount of Thermal Energy consumed by Customer, an estimate of the Thermal Energy actually consumed shall be made by DES based upon the average consumption of the Customer or of customers similarly situated to Customer during prior periods with similar outside temperatures; provided however, that such estimated adjustment period shall not exceed the beginning of the current calendar year.

7.4 7.4 In the event DES reasonably determines the Premises Heating System is deficient or being operated by Customer in a manner which results in less than complete metering of all consumed Thermal Energy, DES shall:

(a) Immediately provide Customer with written notice of the discovered deficiency or inappropriate operation;

(b) Estimate, based on the best data and information available, the consumption charge for Thermal Energy consumed but not metered. In no single incident shall DES bill customer for more than 90 days of inadvertently un-metered Thermal Energy consumption.

(c) Provide Customer with a written explanation of how the estimate was arrived at. Customer shall be obligated to pay all undisputed charges over a period of time not to exceed ninety (90) days.

ARTICLE VIII
INFRASTRUCTURE CHARGE

8.1 Customer shall pay an Infrastructure Charge as determined under this Article VIII.

8.2 Customer's Infrastructure Charge for a given Billing Period shall be as shown on the LCCA.

ARTICLE IX
METERING

9.1 Prior to Customer's First Service Date, DES shall install, at DES's expense, all equipment ("Metering Equipment") necessary to accurately measure and record Customer's Thermal Energy utilization.

9.2 Customer shall permit DES to install Metering Equipment in Customer's Premises or on Customer's premises in the area adjacent to the Point of Delivery or such other area as may be specified by mutual agreement of the parties, taking into account accessibility and Customer's need for Premises security.

9.3 DES shall own and maintain DES Metering Equipment in good repair and operating condition at DES's expense.

9.4 Any electricity required for the operation or maintenance of the Metering Equipment shall be supplied by Customer at Customer's expense.

9.5 Customer shall promptly notify DES if at any time Customer has reason to believe the Metering Equipment is not accurately measuring the Thermal Energy used by the Premises Heating System or Customer's Capacity.

9.6 DES shall cause such testing and calibration of the Metering Equipment as a Customer shall request, provided that the cost of any such testing and calibration shall be borne by the Customer if such testing does not disclose an inaccuracy of more than five percent (5%) in measuring utilization of Thermal Energy or Capacity. Upon the discovery of any such inaccuracy, the Metering Equipment shall be promptly adjusted or replaced at

DES's sole expense to accurately measure utilization of Thermal Energy or Capacity. If any measuring inaccuracy of greater than five percent (5%) is discovered, an appropriate adjustment to the Customer's Service Bill shall be made in respect of the month immediately preceding such discovery and until the time of repair or replacement, based on the assumption that the same degree of inaccuracy existed throughout such period until repair or replacement unless a particular event or accident is reasonably shown to have caused meter inaccuracy, in which event the date for billing adjustment shall be established thereby. No other adjustments shall be made except an appropriate adjustment may be also made to earlier Service Bills (hereinafter defined) at DES's selection if DES has reasonable cause to believe that a Customer did not timely act in good faith to notify DES of a suspected measuring inaccuracy.

9.7 Notwithstanding the foregoing Section 9.6, in any Billing Period during which the Metering Equipment shall fail to register utilization of Thermal Energy by a Customer, the amount of Thermal Energy utilized by such Customer during such period shall be estimated by DES based on the Thermal Energy utilized by the Customer in the past and the Thermal Energy utilized by other Customers with similar usage characteristics during the period in question.

ARTICLE X
BILLING AND PAYMENT

10.1 Unless Customer is otherwise notified by DES, the Metering Equipment shall be read to determine the Customer's Thermal Energy utilization at least once each Billing Period.

10.2 Unless Customer is otherwise notified by DES, DES shall within thirty (30) days following the end of a Billing Period send to Customer by U.S. Mail, or otherwise deliver to Customer, a Service Bill bearing the date of sending or delivery and setting forth amounts due by Customer to DES hereunder in respect of such Billing Period or any prior Billing Periods.

10.3 DES shall have the right, upon notice to Customer, to estimate Customer's utilization of Thermal Energy during any Billing Period and submit to Customer a Service Bill based on such estimate, provided that at least quarterly, DES shall read the Metering Equipment and thereafter appropriately credit or charge Customer for the Thermal Energy it actually utilized in comparison with the previously estimated utilization which was billed to and paid by Customer.

10.4 A Service Bill shall be due and payable immediately upon receipt by Customer without set-off, counterclaim, abatement, or reduction by Customer. Customer's prompt payment of Service Bills shall not diminish or constitute a waiver of, Customer's claims or remedies in subsequent legal proceedings, or in any other way, including challenging the billed amount itself.

10.5 If the Service Bill of Customer has not been paid in full within forty-five (45) days after the date thereof, DES may thereupon or thereafter suspend the delivery of Thermal Energy to Customer, provided Customer has been given written warning thereof at least fifteen (15) days prior to such suspension, and take such lawful action to effect collection of such bill, including commencement of legal proceedings, as DES shall deem desirable. Customer shall be liable for all costs and expenses (including attorney's fees) personally incurred by DES in connection with any attempt to make such collection (whether or not a lawsuit is commenced).

ARTICLE XI
ADDITIONAL CUSTOMER COVENANTS AND OBLIGATIONS

11.1 Without the consent of DES, Customer shall not cause or voluntarily permit any modification or alteration to any part of the Metering Equipment or the District Heating System, except in an emergency situation where life, health or property is threatened.

11.2 Without the consent of DES, Customer shall not cause or voluntarily permit any action which interferes with the delivery or return of Thermal Energy, the utilization of Thermal Energy or the operation, maintenance, repair, replacement, construction, installation, expansion, removal or alteration of the District Heating System or the Metering Equipment, except in an emergency situation where life, health or property is threatened.

11.3 No Thermal Energy Customer, including Customer, shall provide heating service from its Premises Heating System to any other premises other than such Customer's Premises or premises and appurtenant structures without the consent of DES.

11.4 DES shall not be liable to Customer or such Customer's officers, agents, employees, lessees, licensees, invitees or trespassers in respect of, and each Customer shall hold harmless and indemnify DES from and against liabilities, losses, damages, costs, expenses (including attorney's fees), claims, actions, judgments, and settlements of any nature whatsoever for any personal injury, death, or property or economic damage arising out of or incidental in any manner whatsoever to the operation of the Customer's Premises Heating System, but only to the extent such injury, death or damage was not caused by the negligence, recklessness or intentional misconduct of DES or its officers, employees, agents, lessees, licensees, invitees, trespassers or contractors.

11.5 Customer shall not be liable to DES or DES's officers, agents, employees, lessees, licensees, invitees or

trespassers in respect of, and DES shall hold harmless and indemnify Customer from liabilities, losses, damages, costs, expenses (including attorney's fees), claims, actions, judgments, and settlements of any nature whatsoever for any personal injury, death or property or economic damage arising out of or incidental in any manner whatsoever to the operation of the District Heating System or Metering Equipment, but only to the extent such injury, death, or damage was not caused by the negligence, recklessness, or intentional misconduct of Customer or its officers, employees, agents, lessees, licensees, invitees, trespassers or contractors.

ARTICLE XII
ADDITIONAL DES COVENANTS AND OBLIGATIONS

12.1 DES shall maintain the District Heating System in good repair and operating condition and cause it to be operated in a safe and efficient manner.

12.2 Subject to Article XIII, DES agrees to provide Customer with a continuous, non-interruptible supply of Thermal Energy at Customer's Point of Delivery.

12.3 DES shall use its best efforts to secure and maintain in good standing all necessary permits, easements, licenses, franchises and rights necessary or desirable to make and continue the delivery of Thermal Energy to all DES Thermal Energy Customers.

12.4 DES agrees to maintain the District Heating System and the Metering Equipment, utilizing Preventive Maintenance. "Preventive Maintenance" means undertaking, where economically practicable, to repair existing DES equipment to minimize the need for costly major repair work or replacement.

12.5 Subject to Article XIII, commencing on the First Service Date and thereafter while this Agreement is in effect, DES shall deliver to Customer's Point of Delivery sufficient Thermal Energy to meet all Customer's Thermal Energy requirements from time to time.

ARTICLE XIII
INTERRUPTION OF SERVICE

13.1 Customer's obligation hereunder to make payments, and DES's obligation to charge, in respect of a Capacity Charge shall be adjusted by appropriate reduction with respect to any Billing Period during which DES is unable for 24 consecutive hours to fully perform its obligations to deliver Thermal Energy in accordance herewith; to the extent reasonably determinable in good faith by DES, any such Capacity Charge, as adjusted, shall equal an amount which bears the same ratio to the Capacity Charge, before adjustment, in a given Billing Period, as the amount of Thermal Energy utilized by Customer in such Billing Period bears to the total Thermal Energy Customer would have used if DES had fully performed in accordance with Customer's Agreement.

13.2 In the event that the District Heating System is unable to supply all Thermal Energy to meet the needs of all Thermal Energy Customers in accordance with their respective Agreements, DES shall reasonably attempt to allocate delivery of Thermal Energy first to each such Customer in such amounts as necessary to maintain the maximum warmth possible for all Thermal Energy Customers, and thereafter in proportion to the Capacity of each Thermal Energy Customer, subject only to such exceptions as are necessary to protect human life, health, and safety.

13.3 Notwithstanding anything to the contrary herein, DES shall have the right without any liability to Customer, or its officers, employees, agents, or any person to interrupt, reduce or discontinue the delivery of Thermal Energy for purposes of inspection, maintenance, repair, replacement, construction, installation, removal or alteration of the District Heating System or the Metering Equipment. DES shall use its best efforts to give written notice to Customer of any expected interruption of delivery of Thermal Energy at least sixty (60) days prior to the date of such interruption and shall use its best efforts to inform Customer of the expected length of any interruption. DES shall reasonably attempt to schedule non-emergency interruptions during the months from May through September. DES shall not be required to supply Thermal Energy to Customer at any time DES reasonably believes Customer's Premises Heating System to be unsafe, provided DES shall have given written notice of the basis for such belief at least thirty (30) days prior to suspension or termination of Thermal Energy delivery for such reason unless such condition constitutes an emergency condition in which case DES shall have the immediate right to interrupt service. In the event, during such 30-day period Customer cures, or demonstrates to the reasonable satisfaction of DES that it has made progress toward cure of such unsafe condition, then such suspension or termination shall be cancelled or delayed by DES.

13.4 If either party to this Agreement is prevented from or delayed in performing any of its obligations under this Agreement by reason of a Force Majeure Event, including but not limited to strikes, labor unrest, war, acts of nature, acts of God, or acts of terrorism, such party shall notify the other party in writing as soon as practicable after the onset of such Force Majeure Event and shall be excused from the performance of its obligations under this Agreement to the extent such Force Majeure Event has interfered with such performance. The party whose performance under this Agreement is prevented or delayed as the result of a Force Majeure Event shall use reasonable efforts to remedy its inability to perform. If a party's failure to perform its obligations under this Agreement is due to a Force Majeure Event, then such failure shall not be deemed a DES Default or a Customer Default.

Notwithstanding anything in this Section to the contrary, the easement rights of the DES under this Agreement shall not be interfered with, excused or delayed as the result of a Force Majeure Event.

13.5 In the event DES interrupts service and this Agreement has not been terminated, DES shall, at no additional cost and expense to Customer, provide Customer with a temporary source of heat, such as mobile boilers or temporary reconfiguration of internal building piping to use other available sources of Thermal Energy, to support Customer's ordinary activities and operations, unless such Customer's service has been disconnected for non-payment, unsafe conditions in Customer's equipment or by order of lawful authority. DES will waive the installment of Customer's Capacity Charge and Infrastructure Charge for any month in which service is interrupted and temporary measures are not implemented for a period in excess of twenty-four (24) hours. Customer will remain responsible for all applicable Consumption Charges. In the event DES fails to provide Customer with the aforementioned temporary source of heat for the continued provision of Thermal Energy within forty-eight (48) hours of any service interruption, Customer shall be entitled to provide for its own Thermal Energy until service is restored by DES. In the event the Customer provides for the provision of its own Thermal Energy during such service interruption, DES will reimburse Customer for all commercially reasonable and necessary out of pocket costs incurred during the service interruption to replace the Thermal Energy provided by DES. Provided that any reductions in rates or reimbursement of costs or charges authorized under this paragraph F.5. shall apply only to Capacity Charges and Infrastructure Charges, and shall specifically not be interpreted to require any reduction of or reimbursement for Consumption Charges for the energy actually acquired by or consumed by St. Luke's from DES arising out of actions taken by St. Luke's pursuant to this paragraph. St. Luke's shall be entitled to recover from DES its out of pocket incremental costs incurred for replacement energy acquired from other sources during the service interruption. No provision of this Agreement regarding or creating DES' right to notice or an opportunity to cure shall apply to, nor be construed to modify, diminish or delay, DES' obligations to Customer regarding the provision of a substitute source of heat in the event of a service interruption.

ARTICLE XIV
TERMINATION

14.1 Notwithstanding anything to the contrary herein, if one or more of the following events or conditions shall exist or occur, DES may elect at its option to terminate this Agreement by giving notice to Customer of such fact not less than thirty (30) days prior to the date of such termination:

(a) Customer fails to pay any amounts due under a Service Bill to such Customer within forty-five (45) days from the date thereof except as provided in Section 10.4;

(b) Customer fails to duly observe or perform any covenant or obligation to be observed or performed by Customer pursuant to this Agreement (other than non-payment of Service Bills) and Customer fails to cure such failure or to observe or perform (or demonstrate to the reasonable satisfaction of DES that Customer has made progress toward cure with a reasonable expectation of full cure within a reasonable period) within the aforesaid forty-five (45) days following a written, specific request from DES to do so;

(c) Customer's Premises, or any substantial portion of the District Heating System is abandoned, destroyed, demolished, substantially destroyed or demolished, becomes permanently inoperable or is taken by right of eminent domain; or

(d) It becomes unlawful under any valid federal or state law, regulation or rule for either DES to deliver to the Customer or the Customer to receive and pay for Thermal Energy.

14.2 If one or more of the following events or conditions shall exist or occur, Customer may elect at its option to terminate this Agreement by giving notice to DES of such fact no less than thirty (30) days prior to the date of such termination:

(a) Customer's Premises is permanently abandoned, destroyed, or demolished; or substantially destroyed or demolished for which rebuilding or substantial repairs are not commenced within six (6) months following such destruction;

(b) Customer's Premises, or any substantial portion thereof, is taken by right of eminent domain or becomes, in substantial part, permanently inoperable and has been so for a period in excess of six (6) months;

(c) It becomes unlawful under any valid federal or state law, regulation or rule for either DES to deliver to Customer or Customer to receive and pay for Thermal Energy; or

(d) For a continuous period of thirty (30) days, DES is unable to deliver Thermal Energy to the Customer in substantial compliance with this Agreement.

14.3 Without prejudice to any party's rights to such damages for breach by the other party of any term or condition hereof, upon termination of this Agreement for any reason other than those contained in Section 14.2, DES shall promptly bill Customer and the Customer shall pay DES within thirty (30) days after receipt of such bill for all unpaid amounts otherwise due

and owing pursuant to this Agreement, plus the greater of 120 months of Infrastructure Charges less the number of months of Infrastructure Charges actually paid by the Customer or the Service Connection Charges.

ARTICLE XV
RIGHT-OF-WAY; ACCESS TO PREMISES

Duly authorized agents, officers, and employees of DES shall have the right to enter into the Premises or onto the surrounding premises of Customer at reasonable times when necessary for inspection, repair, replacement,

construction, installation, removal, alteration or calibration of the Metering Equipment and the District Heating System, subject to reasonable supervision and control by Customer. Customer shall duly grant such access, to the Premises and surrounding premises to the extent reasonably necessary to cause and continue delivery of Thermal Energy hereunder, and so long as same does not impair the continued use of the premises.

ARTICLE XVI
RECORDS AND ACCOUNTS

16.1 DES shall keep and maintain such true and complete books, records, and accounts as shall be necessary to compute Service Bills, Capacity, Consumption-Related Costs, Capacity-Related Costs and Infrastructure-Related Costs preserving the same for a period not less than four (4) years following the fiscal period to which they apply. Unless otherwise determined by DES, the fiscal year of DES shall be the period from January 1 of each year to December 31 of the following year.

ARTICLE XVII
APPLICABLE LAW AND JURISDITION

The Agreement shall be construed in accordance with the laws of the State of Minnesota. The sole and exclusive forum for any proceedings between the Parties shall be the state or federal court in Duluth, Minnesota. Each Party consents to the jurisdiction of such courts and waives its right to move any action to any other court and the right to dismiss or transfer any legal proceeding under the doctrine of forum non conveniens.

ARTICLE XVIII
AMENDMENT AND WAIVER

18.1 Except otherwise expressly provided herein, neither this Agreement nor any terms herein, may be terminated, amended, altered or modified except by an instrument in writing executed by Customer and DES or except as may be agreed to in writing by DES and at least a majority of such Customers on the basis of their Capacity; provided no such amendment shall be made which shall conflict with, or cause a default, penalty, new lien or acceleration of performance, under any indenture.

18.2 Any waiver at any time by either DES or Customer of its rights concerning a default or any matter arising from or incidental to this Agreement shall not constitute a waiver concerning any subsequent default or other matter.

18.3 Failure of DES or Customer to enforce at any time any provision of this Agreement to require at any time performance by the other party of any provision herein shall not constitute or be deemed a waiver of such provision nor affect in any manner the validity of this Agreement or the right of such party thereafter to enforce any provisions herein unless such waiver be in writing and specifically referring to such matters.

18.4 In the event that any provision of this Agreement is deemed to be invalid by reason of the operation of law, or by reason of the interpretation of such provision by any administrative agency or any court of competent jurisdiction, DES and Customer shall negotiate an equitable adjustment in the provisions of the same in order to effect, to the maximum extent permitted by law, the purpose of this Agreement, and the validity and enforceability of the remaining provisions, or portions or applications thereof, shall not be affected by such adjustment and shall remain in full force and effect.

ARTICLE XIX
ASSIGNMENT; SUCCESSORS

19.1 Customer shall not assign, transfer, delegate, or subcontract any of its rights or obligations under this Agreement without the prior written consent of DES. Any purported assignment or delegation in violation of this Article XIX shall be null and void. DES may at any time assign or transfer any or all of its rights or obligations under this Agreement without Customer's prior written consent.

19.2 To the extent Customer's obligations under this Agreement are transferred and assumed in accordance with this Article XIX, and to that extent only, Customer shall be released from such obligations.

19.3 Except by the written consent of DES, Customer (if a corporation or business entity) shall not consolidate with or merge into any other person or convey or transfer all or substantially all of its properties and assets to any person unless such person shall fully assume in writing all Customer's obligations under this Agreement.

ARTICLE XX
DES MANAGEMENT

DES may take any and all steps necessary to operate and maintain the Thermal Energy District Heating System in accordance with all applicable Federal and State laws and regulations, unless otherwise restricted herein. DES shall be governed at

all times with the overall goal of providing competent and effective management and conservation of the resources of DES to assure uninterrupted, efficient and economical service to Customers.

ARTICLE XXII
SEVERABILITY

Every provision of this Agreement is intended to be severable. If any term or provision is illegal or invalid for any reason whatsoever, such illegality or invalidity shall not affect the validity or legality of the remainder of this Agreement.

ARTICLE XXIII
NOTICES

is duly authorized and empowered to enter into this Agreement on behalf of DES

Any notices, demands or requests to a party permitted or required under this Agreement, or incidental thereto, shall (if in writing containing such information as is otherwise required) be deemed given to a party on the earlier of the date on which such notice, demand or request is actually delivered or on which the same is mailed with postage prepaid by registered or certified mail, addressed to such party's billing address.

ARTICLE XXIV
MISCELLANEOUS

This Agreement, including the other documents referred to herein which form a part hereof, contains the entire understanding of the Parties hereto with respect to the subject matter contained herein and therein. This Agreement supersedes all prior agreements and understandings, oral or written, between the Parties with respect to such subject matter hereof. All Exhibits referred to herein and attached hereto are incorporated herein by reference. Neither Party has been induced to enter into this Agreement by virtue of, and is not relying upon, any representations or warranties not set forth in this Agreement, any term sheets or other correspondence preceding the execution of this Agreement, or any prior course of dealing between the parties.

This Agreement may be executed in counterparts, and all said counterparts when taken together shall constitute one and the same Agreement. The parties hereto agree that scanned or electronic signatures shall be considered as originals.

This Agreement is only for the benefit of the parties to this Agreement, their successors and permitted assigns and persons expressly benefitted by the indemnity provisions of this Agreement. Unless otherwise identified herein, no other person (including, without limitation, tenants of the Premises) shall be entitled to rely on any matter set forth in, or shall have any rights on account of the performance or non-performance by any party of its obligations under, this Agreement.

The person(s) executing this Agreement on behalf of Customer represent(s) and warrant(s) that, if Customer is a corporation or a partnership, the undersigned is/are duly authorized and empowered to execute and enter into this Agreement, and obligate and bind Customer to this Agreement and to the covenants, obligations, and requirements hereof.

This Agreement shall not be binding upon DES until such time as it is signed by a duly authorized representative of DES. DES's representative executing this Agreement also represents and warrants that he or she

EXHIBIT F

Duluth Energy Systems

CUSTOMER CONNECTION STANDARDS FOR DISTRICT HEATING

AND

RECOMMENDED PRACTICES FOR DESIGN AND MAINTENANCE OF DISTRICT HEATING SYSTEMS

TABLE OF CONTENTS

CUSTOMER CONNECTION STANDARDS FOR DISTRICT HEATING

1.0 INTRODUCTION

The following basic design standards have been prepared for Duluth Energy Systems ("DES") to assist district heating customers and engineers in understanding system connection and to provide building operation and design parameters.

This manual is designed to present technical information concerning the requirements for the installation and operation of this system and minimum standards governing system installations according to the Minnesota Building Code and all other codes referenced within.

The District Heating Customer Connection Standards have been prepared to ensure that district heating systems installed in accordance with these criteria will operate efficiently and reliably to the benefit of all customers. These standards describe the minimum connection requirements.

2.0 OWNER'S RESPONSIBILITY

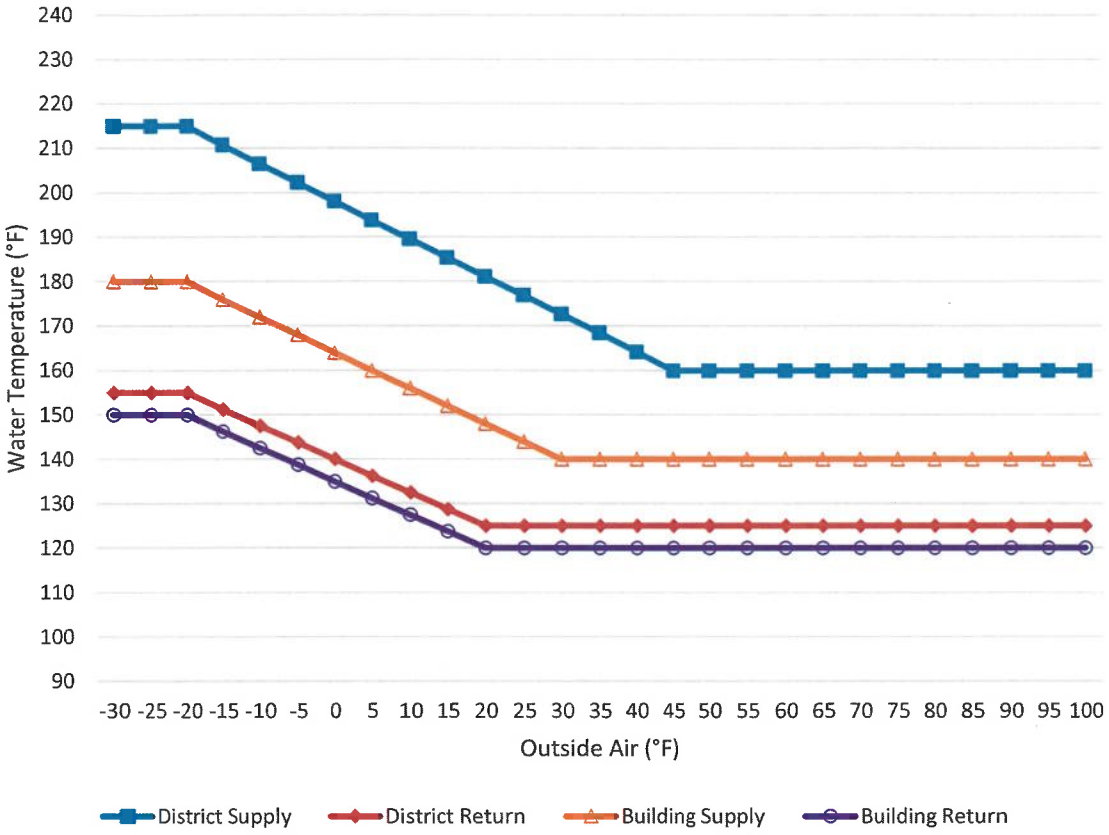
The DES will be responsible for bringing the hot water service into the building and the procurement and installation of the hot water energy transfer station to complete the service connection. After completion of the hot water interface, the DES's responsibility will end at the building wall directly after a set of DES owned isolation valves. After the service isolation valves, the owner will be responsible for the ownership, operation and maintenance of all installed equipment, with the exception of the flow meter.

3.0 PRIMARY HOT WATER SYSTEM DESIGN

3.1 Primary System Temperature

The DES supplies hot water to its distribution system at a temperature that varies according to the outside temperature. The highest District supply temperature is 215°F during the winter and the lowest is 160°F during the summer, as shown in the temperature reset Figure 3-1. To ensure the overall system efficiency is met the return temperature of the primary return water from the customer's building is maintained below 140°F. The most efficient use of low-grade heat for a district heating system is obtained when low temperature water is returned from the customer to the plant after hot water is used for the customer's heating needs. Adherence to this standard benefits everyone because system efficiency is increased, which lowers all customers' district heating costs.

Figure 3-1 Temperature Reset Schedule



3.2 Primary System Pressure

System pressure maximum is 150 psig. All DES customers are required to connect to the district service valves with piping rated for 150 psig and able to withstand 225 psig test pressure to the heat exchanger prior to permitting service. The system minimum differential pressure is 15 psig.

4.0 DISTRICT HEATING INTERFACE - PRIMARY SYSTEM DESIGN

4.1 District Piping and Insulation

All piping shall be standard weight, black steel pipe, schedule 40, unless otherwise noted. Wall thickness shall be according to the schedules listed in American Standards B36.10 and B36.19. Fittings must be of the same material, finish, and strength as its associated piping. All piping on the primary side is recommended to be welded, however threaded piping with 150 lb rated fittings is acceptable.

The piping, valve body, etc., on the primary side shall have insulation based on the peak media temperature for the thickness specified in Table 5.1 of ASHRAE (American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc.) Standard 90-75.

4.2 Isolation/Shut-off Valves

Valves on the primary district hot water supply and return piping shall be provided. Isolation valves can be of ball or high performance butterfly type, but must be designed for not less than 150 psi working pressure and ensure a positive close off.

4.3 Pressure and Temperature Gauges

Pressure gauges and thermometers shall be installed where indicated in the typical piping diagram on the primary side and across the heat exchanger on the secondary side as shown. The thermometers shall be installed into wells for ease of replacement. The unit should be an industrial thermometer with a scale graduation of 30° F to 300° F or have a digital readout and must have close accuracy, be accessible, and easy to read.

Pressure gauges should have 4-1/2" diameter dials with white backgrounds and sharp graduations or digital readouts. Gauges should be graduated in pounds per square inch (psi) and have a range of one and one-half times the operating range of the system. Accuracy of the gauge shall be Grade B, plus or minus 2 percent of middle half scale. Locating a single, common gauge with connected piping and proper isolation valves allows for accurate readings by negating any gauge offset.

4.4 Metering Equipment (Energy Meter/Flow Tube/Temperature Sensors)

Energy meters allow the DES to accurately track and invoice each customer for thermal energy. The meter collects supply and return temperature and flow information to record and transmit the building energy usage back to the DES. The meter is also useful for monitoring operations in the district heating network as well as temperatures and flows needed for troubleshooting and optimization.

The energy meter shall consist of a magnetic flow meter (other options may be approved by the DES at its sole discretion), two matched pair of 3-wire temperature sensors, and an energy calculator. Energy meter installation shall comply with manufacturer's technical requirements and advice with respect to necessary lengths of straight pipes. Temperature sensors for the meter are required to be installed with the tip of the probe in approximately the center of the pipe and positioned into the flow. An optional location for the RTDs is in a pipe 'tee', such that the sensor is placed into the flow as the flow is diverted into the branch of the tee.

4.5 Temperature Controls

The primary district water temperature varies according to outdoor temperature; therefore, the temperature on the secondary side must also be reset from the outdoor/indoor temperature controller. The secondary side temperature must be kept as low as possible to keep the coil flow close to design figures and to optimize the operation conditions for the control valves. A stand-alone or a network controller can monitor outdoor temperature and reset the building loop temperature. This technique will reduce energy costs while maintaining comfortable interior temperatures.

The controller for the control valve shall have an interface that is easy to read and to set, so the set points that can be easily checked by the building engineer or customer. The controller must be able to communicate the control valve positioning and secondary side supply and return temperatures back to the DES.

4.6 Control Valves

Depending on the heat load design, normally, one motorized control valve is installed for smaller installations with service lines under three inch. For three inch and larger service it is advisable to use two valves operating in a one-third and two-thirds sequence

for the total capacity. Care should be taken to size control valves correctly; oversized valves will shorten valve service life and cause temperature variations in the secondary system.

Hot Water District Heating System pressure varies depending on the location/elevation of the customer's building. The DES has the information on the minimum and maximum pressure anticipated. This information will be essential in the proper selection of control valves for heat exchangers. The correct size of valve should be designed for each system for proper building system control and to minimize the noise, cavitation, and general wear on valves.

The motorized control valve shall be designed for a maximum pressure of 150 psi and a maximum temperature of 220° F. Materials shall consist of a cast iron, bronze, or steel with screwed or flanged connections. The valve shall be equal percentage type with a spring-loaded Teflon V-ring packing. Motorized control valve for heat exchangers shall have a minimum rangeability of 100:1.

Control equipment should be electronic. Electric control valve actuators shall be fail safe and configured as Normally Closed (signal to open) / Fail Closed so that there is full shutoff with a loss of actuator power and reposition automatically without intervention. The actuator shall be equipped with a manual override in the event of a loss of control signal. The operation mode should be proportional-integrating (PI), i.e., dictated by temperature accuracy and response time. Close temperature control is desirable for low energy consumption.

Design pressure losses for the control valves can be determined by subtracting pressure losses through the heat exchanger, energy meter, strainer, and pipes from the value of the minimum pressure difference between the supply and return lines at the design outdoor temperature. Control valves are installed in the return line for two primary reasons: return water has a lower temperature, which increases the life of the valve glands and actuators, and improved control by reduced valve cycling.

Note: the supply line temperature sensor in the secondary system must be located as close as possible to the point where supply pipes emerge from the heat exchangers.

4.7 Heat Exchangers

Although heat exchangers are very reliable, at least two units (each designed for approximately 60% load capacity) are recommended for space heating. One heat exchanger can carry the full load for 80-85% of the heating season, but if both exchangers are operating continually, the return temperature can be lowered. Heat exchangers should be connected in parallel for uniform load.

Heat exchangers selections must be brazed plate or plate and frame and compatible with the requirements of the district heating system and the needs of the building.

4.8 Strainers

Install strainer(s) as shown on piping diagrams. The strainer is required to protect the heat exchanger, control valve, meter and the DES's primary system. The strainer requires upstream and downstream pressure taps for strainer service inspection as well as the ability to read supply and return pressure through use of one pressure gauge. Blowdown of the strainer is the responsibility of the building owner. Maximum allowable pressure drop across strainer is 2 PSIG. The stainless steel screen shall be sized according to requirements for the HX and/or control valve, whichever requirement is finer.

4.9 Safety Valves

Safety relief valves shall be designed according to ASME codes. Each valve should be piped on the secondary side with proper floor drain routing installed. Safety valves shall be sized to relieve 100% of the heating capacity. Pressure and temperature safety relief valves are required for all heat exchangers and pressure vessels including domestic hot water heat exchangers and are to be located on the secondary side of the heat exchanger.

5.0 PROCEDURE FOR CONNECTING HOT WATER SERVICE

5.1 Engineering Standards and Regulations

Engineering standards for the safety of unfired pressure vessels shall follow the current edition and current published revisions and interpretations of the construction codes of the American Society of Mechanical Engineers (ASME). Heat exchangers are pressure vessels that must conform in every detail to the boiler pressure vessel requirements of the latest Minnesota Construction Code. Each heat exchanger is required to be stamped with the ASME code symbol.

Any pressure piping to the heat exchanger or pressure vessel appurtenances - such as valves, meters, and gauges - shall be hydrostatically tested to ensure that it can withstand the peak temperature and pressure of the primary distribution system.

5.2 Drawings and Specifications Requirement

A complete set of specifications and scaled drawings must be provided electronically in a PDF format to the DES for review and approval at least thirty (30) days prior to schedule installation of service connection facilities. Drawings and specifications must contain information regarding intended design and component and material selections. Such information must be specific, and the rules stated herein cannot be cited in whole or in part as a substitute for specific information.

The owner is responsible for the documents that have been prepared and for the installation work that has been performed.

5.3 Mechanical Room

It is essential that engineers and contractors coordinate their design work with the DES for design and installation parameters and building's service entrance. The location of the mechanical room will determine how the district heating piping will be supplied to the building and serviced. The mechanical room space must be sufficient to allow for easy serviceability for routine maintenance and future heat exchanger removal. The room shall be locked to keep out unauthorized people. Personnel from the DES must be able to enter the room unassisted.

5.4 Construction Process

Examination of the plans and specifications by the DES does not relieve the owner of responsibility. The owner must arrange access for observation of the installation by the DES. If, in the opinion of the observer, there is an improper installation or installed materials do not meet the minimum standards, remedial action must be taken to satisfy the minimum requirements presented in this section.

5.5 New Service Start Up

Before the heat exchangers are put into operation, the building piping must be cleaned and flushed prior to pressure testing.

A. System Cleaning/Flushing Primary Service Pipe:

- For primary system side cleaning, the building owner's contractor will connect the primary supply and return piping for the DES system into a loop. Next, with the contractor's pump, a solution of tri-sodium phosphate (TSP) shall be circulated through the piping for 24 hours (or less if it is a small amount of piping). Contractor is to use the product manufacturer's recommend solution rate. Phosphorus in the tri-sodium phosphate passivates the steel pipe, providing corrosion protection until the treated hot water begins circulation.
- Following the cleaning, drain the entire system, refill and flush the piping with city water for sufficient period of time (usually 24 hours) to remove all TSP, weld slag, oils, bacteria, etc.
- When sufficient flushing has been performed (about 24 hours of clear city water flush), fill with city water and contact the DES. The DES representative will check the primary side water conductivity reading for the appropriate range (within 10 µS/cm of potable water). This ensures that the excess TSP and other contaminates are sufficiently removed from the water. If necessary, additional flushing may be required by the contractor until an acceptable limit is achieved.

B. Pressure Testing (Hydrotest) for Primary Service Pipe:

- Hydrotest the primary piping system to 130 psig (1-1/2 times the system's design operating pressure) for 4 hours. To protect the heat exchanger, the building side piping shall be filled and isolated to provide counteracting pressure within the exchanger.
- Only the DES representatives are permitted to operate mainline service valves for start-up operation.

5.6 Energy Metering Start Up

After the building contractor installs the flow meter, the DES will inspect the installation. If the installation meets the requirements of this Connection Standard the DES will commission the energy metering equipment.

5.7 As Built Drawings

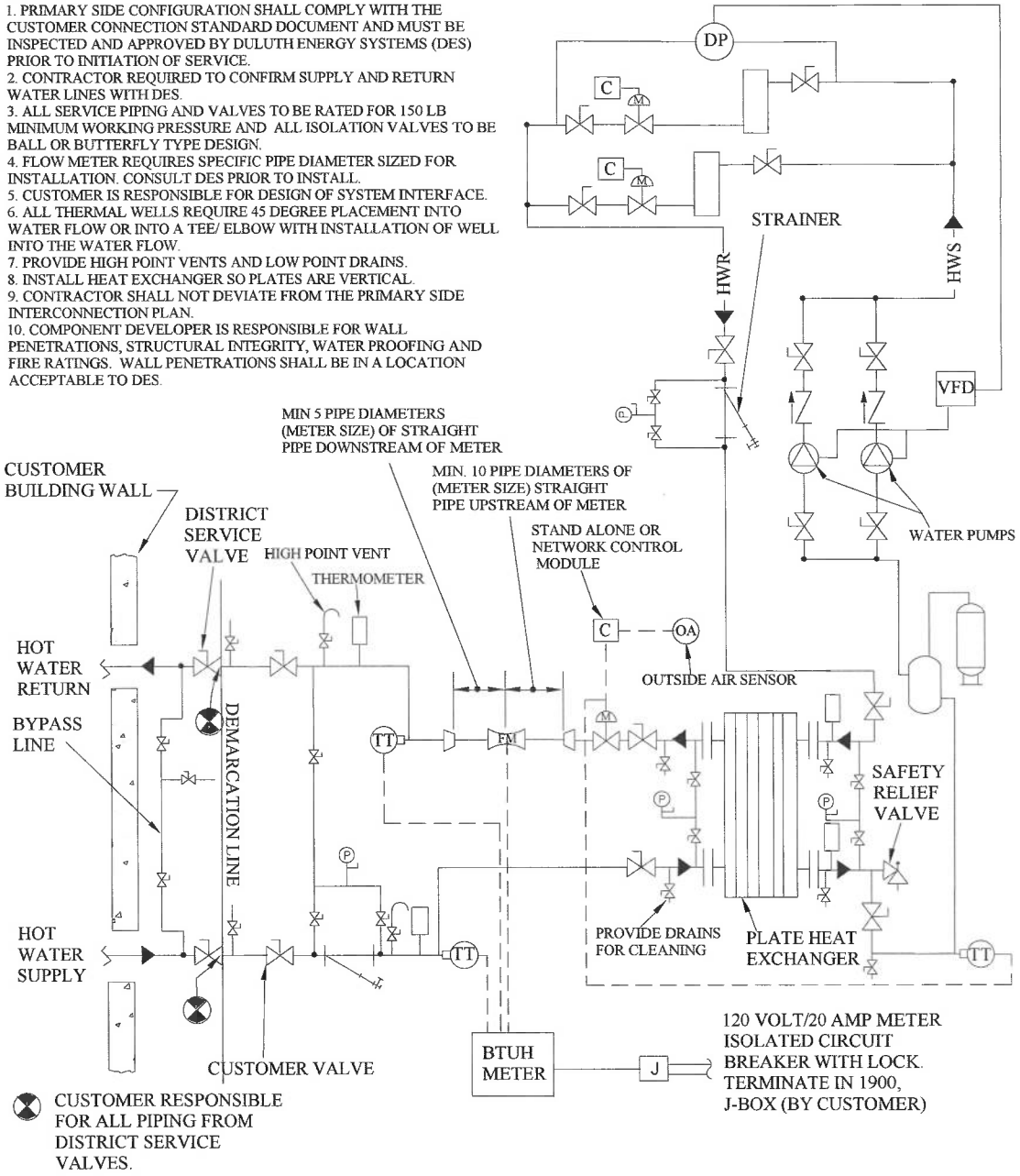
Upon completion of the interconnection work, a set of mechanical as built drawings, in PDF format, shall be sent to the DES to be kept on file.

DEFINITIONS

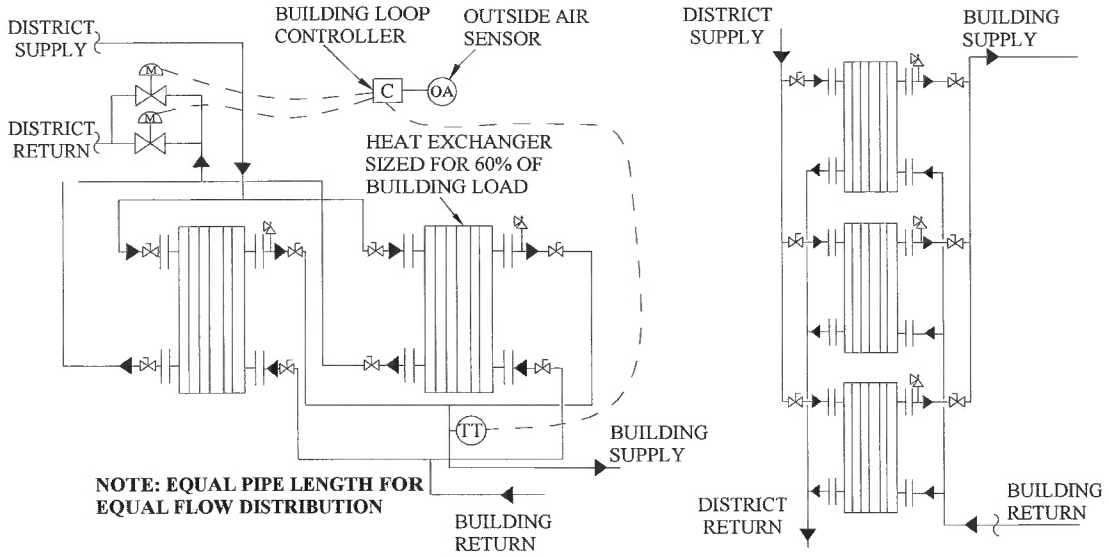
Furnish	Deliver to the site item(s) and store for installation as specified
Install	Set in position, connect (including sub-assemblies furnished), and adjust for use. Provide miscellaneous specialty items such as hangers, valves, unions, piping, and sheet metal as required for a complete and operating installation.
Main Heat Exchangers	Devices designed to transfer heat between two physically separated fluids. In district heating systems, heat exchangers transfer heat from the primary hot water supply to water on the secondary side.
Meter	An instrument for measuring rates or integrating rates over a period of time.
Modulating	Of a control, tending to adjust by increments and decrements; also one modified by variation of a second condition.
Plate Heat Exchanger	Heat exchangers with fixed plates to separate the fluids on the primary and secondary sides, typically a brazed design.
Pressure	The normal force exerted by a homogenous liquid or gas, per unit of area, on the wall of the container.
Pressure, Gauge	Pressure above atmosphere; pound per square inch. All pressure referenced in this document as gauge pressure stated in PSIG.
Pressure, Static	(1) the pressure with respect to a stationary surface tangent to the mass flow velocity vector; (2) the pressure with respect to a surface at rest in relation to the surrounding fluid.
Pressure Drop	Static pressure loss in fluid pressure, as from one end of duct to the other, due to friction, etc.
Pressure Relief Valve	A valve closed by a spring or other means and designed to automatically relieve pressure in excess of its setting; also called safety valve.
Primary Hot Water Return	The District system side return water <u>from</u> the building heat exchanger.
Primary Hot Water Supply	The District system side supply water <u>to</u> the building heat exchanger.
Secondary Side	The building side of a typical heat exchanger connected to the district heating system.
Service Point	Point at which the DES piping terminates and customer connection begins.

APPENDIX I. TYPICAL HEATING INTERCONNECTION

NOTES:
1. PRIMARY SIDE CONFIGURATION SHALL COMPLY WITH THE CUSTOMER CONNECTION STANDARD DOCUMENT AND MUST BE INSPECTED AND APPROVED BY DULUTH ENERGY SYSTEMS (DES) PRIOR TO INITIATION OF SERVICE.
2. CONTRACTOR REQUIRED TO CONFIRM SUPPLY AND RETURN WATER LINES WITH DES.
3. ALL SERVICE PIPING AND VALVES TO BE RATED FOR 150 LB MINIMUM WORKING PRESSURE AND ALL ISOLATION VALVES TO BE BALL OR BUTTERFLY TYPE DESIGN.
4. FLOW METER REQUIRES SPECIFIC PIPE DIAMETER SIZED FOR INSTALLATION. CONSULT DES PRIOR TO INSTALL.
5. CUSTOMER IS RESPONSIBLE FOR DESIGN OF SYSTEM INTERFACE.
6. ALL THERMAL WELLS REQUIRE 45 DEGREE PLACEMENT INTO WATER FLOW OR INTO A TEE/ ELBOW WITH INSTALLATION OF WELL INTO THE WATER FLOW.
7. PROVIDE HIGH POINT VENTS AND LOW POINT DRAINS.
8. INSTALL HEAT EXCHANGER SO PLATES ARE VERTICAL.
9. CONTRACTOR SHALL NOT DEVIATE FROM THE PRIMARY SIDE INTERCONNECTION PLAN.
10. COMPONENT DEVELOPER IS RESPONSIBLE FOR WALL PENETRATIONS, STRUCTURAL INTEGRITY, WATER PROOFING AND FIRE RATINGS. WALL PENETRATIONS SHALL BE IN A LOCATION ACCEPTABLE TO DES.



APPENDIX II. TYPICAL CONNECTION METHOD FOR UNIFORM FLOW WITH MULTIPLE HEAT EXCHANGERS



APPENDIX III. TYPICAL DHW AND SNOWMELT INTERFACE

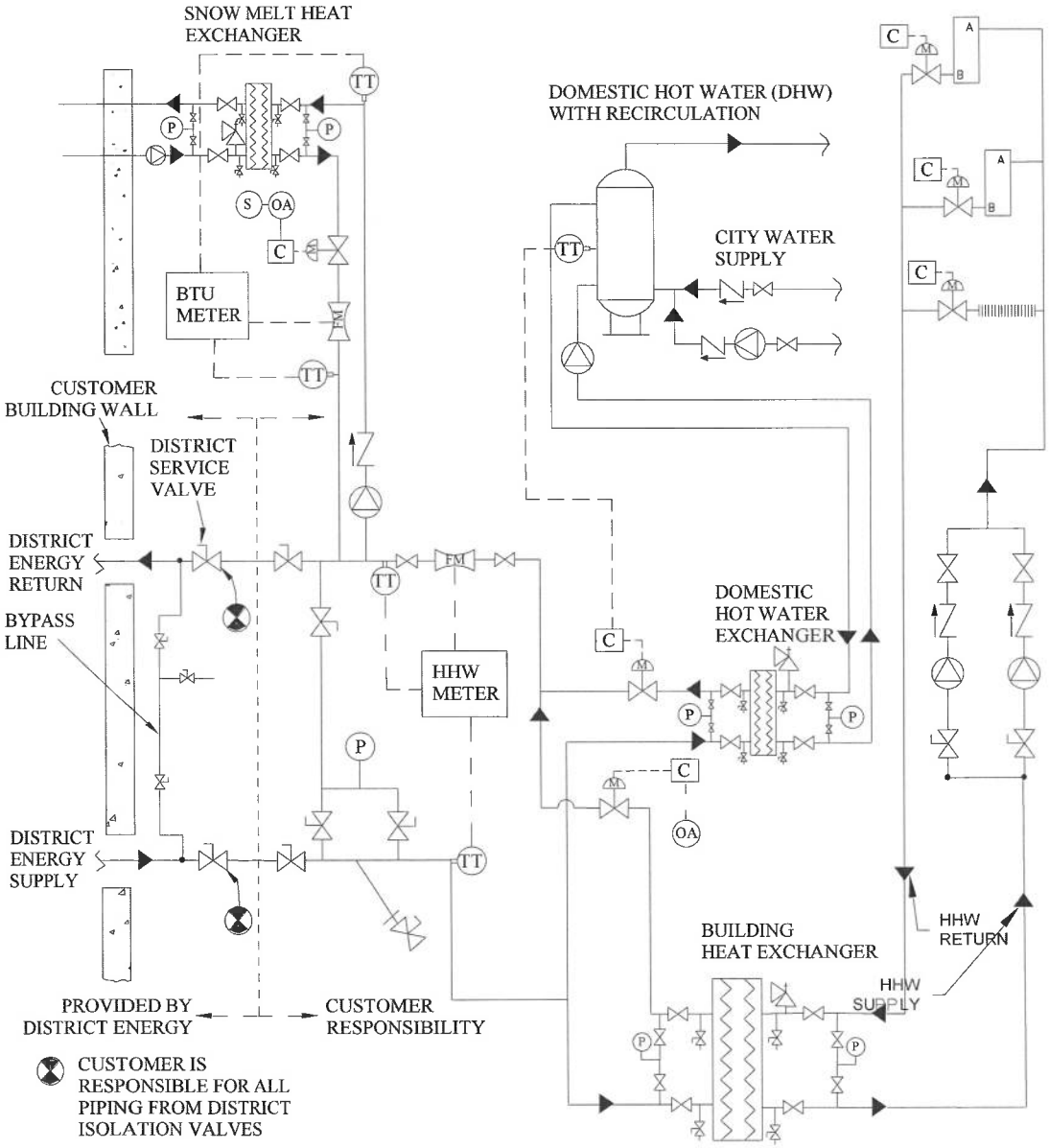
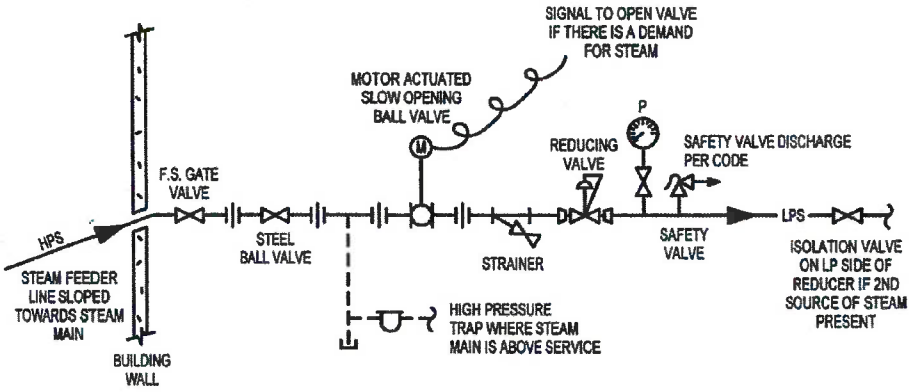
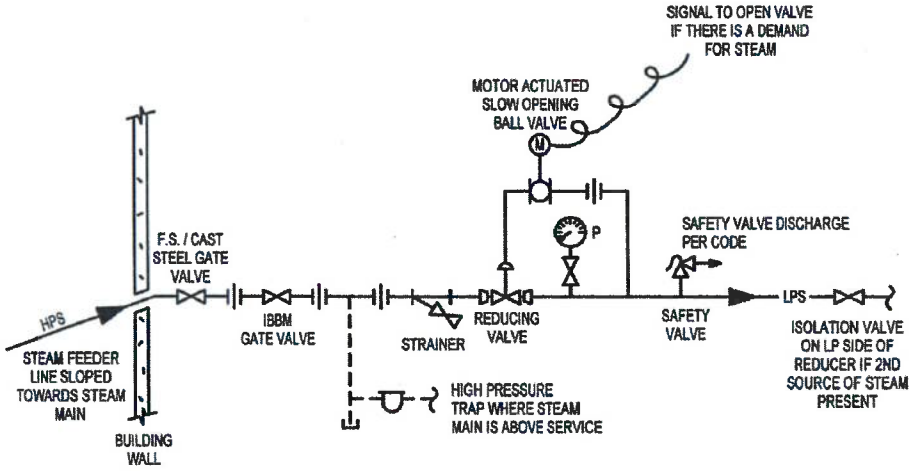


EXHIBIT G – Steam service Connection Standards



1 LESS THAN 1" SERVICE
NO SCALE



2 GREATER THAN 1" SERVICE
NO SCALE

LHB PERFORMANCE DRIVEN DESIGN.
LHBcorp.com
21 W. Superior St., Ste 500 | Duluth, MN 55802
218.727.5449

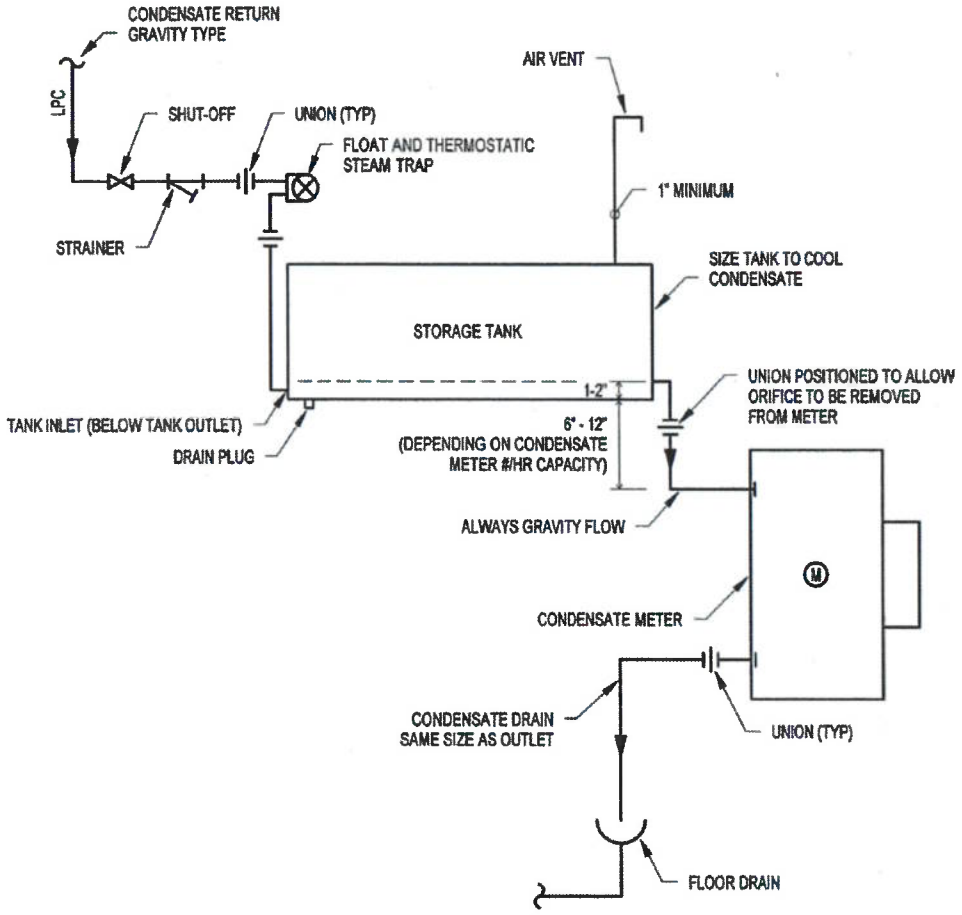
CLIENT NAME:
DULUTH STEAM
One Lake Place Drive
Duluth, MN 55802
218.723.3601

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
Signature:
Typed or Printed Name: DAVID WILLIAMS
Date: 05/05/14 Reg. No.: 18929

DWG. TITLE: STEAM SERVICE DETAILS

PROJ. NO: 140155
DRAWN BY: MPT
CHECKED BY: DTW
DRAWING NO: M1.01

EXHIBIT B – Connection Standards (continued)



1 TYPICAL CONDENSATE METER INSTALLATION
NO SCALE

LHB PERFORMANCE DRIVEN DESIGN.
LHBcorp.com
21 W. Superior St., Ste 500 | Duluth, MN 55802
218.727.8446

CLIENT NAME:
DULUTH STEAM
One Lake Place Drive
Duluth, MN 55802
218.723.3601

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
Signature:
Typed or Printed Name: DAVID WILLIAMS
Date: 05/05/14 Reg. No.: 18929

DWG. TITLE: CONDENSATE METER DETAIL

PROJ. NO: 140155
DRAWN BY: MPT
CHECKED BY: DTW
DRAWING NO: M1.00

EXHIBIT H

Rate Schedules

Customer s' Total Monthly Cost of Hot Water Service

Cost = *HW Consumption Charge* + *HW Capacity Charge* + *Infrastructure Charge* + *State and City Sales Tax*

HW Consumption Charge = (The lessor of: 70% x *Steam Consumption Rate* or the *HW Consumption Rate*) x *Customer's Metered Consumption*

For the purposes of the rate calculation, the months of January, February, March, April, May, October, November and December comprise the "Heating Season"; the remaining months of June, July, August and September comprise the "Off-Season".

At the beginning of the fiscal year, the Hot Water (HW) Heating Season Consumption Rate (**R_{HS}**) is set at 95% of the projected annual HW Consumption Rate. As the year progresses from January, actual variable costs and consumption will replace projected costs and consumption resulting in monthly changes to the **R_{HS}** calculated as follows:

$$R_{HS} = \left(\frac{(\textit{Actual Variable Costs incurred} + \textit{Remaining Projected Variable Costs})}{(\textit{Actual HW Consumed to date} + \textit{Projected Additional HW Consumption for year})} \right) \times 95\%$$

The HW Off-Season Consumption Charge Rate (**R_{OS}**) is calculated each month; June through September with actual variable costs and consumption replacing projected costs and consumption as follows:

$$R_{OS} = \left(\frac{(\textit{Actual Variable Costs Incurred} + \textit{Projected Additional Annual Costs} - \textit{Actual HW Heating Season Consumption Charges Billed} - \textit{Remaining Projected HW Heating Season Variable Costs})}{(\textit{Actual Off-Season Consumption to date} + \textit{Remaining Projected Off-Season Consumption})} \right)$$

Each customer's monthly HW Consumption Charge is equal to the customer's metered consumption multiplied by the appropriate Consumption Rate (**R_{HS} or R_{OS}**).

The Monthly Capacity Charge calculation includes both the Steam and Hot Water energy usage and costs in determining the Group Capacity Charge Rate. The Group Capacity Charge Rates are the same for both the Steam and Hot Water services. For Customer's switching from Steam to Hot Water service, prior steam usage will be used in the calculation unless otherwise defined in Article I. A Hot Water Customer's Capacity may be capped or otherwise limited so as to differ from the calculation above when a binding, long-term agreement has been entered into by said Customer and City of Duluth or its agent.

Monthly HW Capacity Charge = $\frac{\textit{Normalized Consumption} \times \textit{Group Capacity Charge Rate}}{12}$

Capacity Year Consumption = *a building's average consumption for a given 12 month period starting on July 1st and ending on June 30th for each of the three previous years (n, n-1, n-2)*

Weather Normalization Factor = $\frac{(\textit{the } \textbf{normal} \textit{ total number of Heating Degree days for a given 12 month July 1 to June 30 period})}{(\textit{the } \textbf{actual} \textit{ total number of Heating Degree Days for a given 12 month July 1 to June 30 period})}$

Note: Heating Degree Days (HDD) as reported by NOAA at the Duluth International Airport using a 65^0 F base temperature

Normalized Consumption = $\frac{(\textit{Capacity Year Consumption}_n \times \textit{Weather Normalization Factor}_n + \textit{Capacity Year Consumption}_{n-1} \times \textit{Weather Normalization Factor}_{n-1} + \textit{Capacity Year Consumption}_{n-2} \times \textit{Weather Normalization Factor}_{n-2})}{3}$

Consumption Group = *Customer grouping categories based on a customer's Normalized Consumption*

Normalized Group Consumption = *Total Normalized Steam Consumption for all Customers in a Consumption Group*

Group Consumption Percentage = $\frac{\textit{Normalized Group Consumption}}{\textit{(Total Normalized Group Consumption for all Consumption Groups)}}$

Group Factor = *Factor for each Consumption Group*

Group Factor Percentage = *Group Factor* x *Group Consumption Percentage*

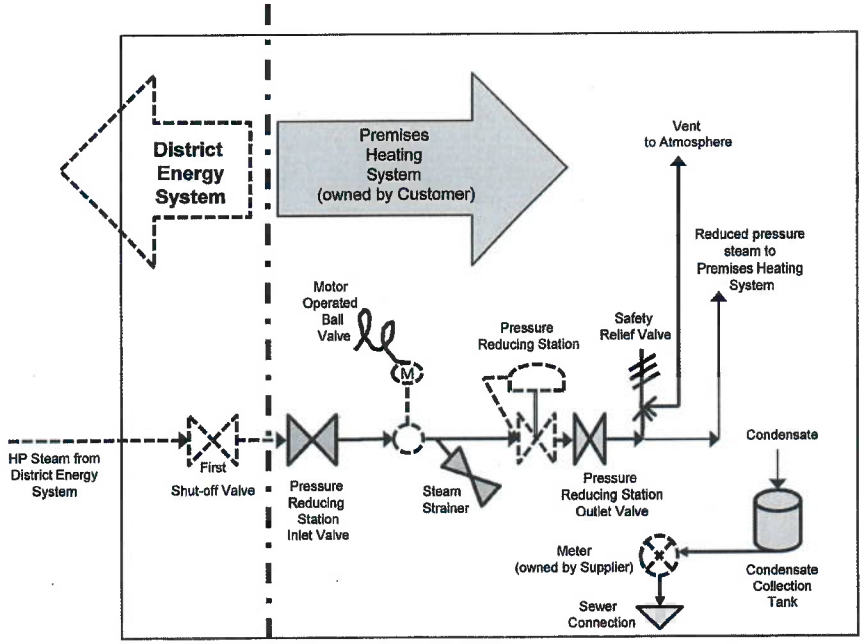
Adjusted Group Factor Percentage = $\frac{\textit{Group Factor Percentage}}{\textit{Sum of all Group Factor Percentages}}$

Group Fixed Capacity Charge Allocation = *Adjusted Group Factor Percentage* x *Total System Projected Fixed Costs*

Group Capacity Charge Rate = $\frac{\textit{Group Fixed Capacity Charge Budget Allocation}}{\textit{Normalized Group Consumption}}$

Infrastructure Charge: Customer's Infrastructure Charge is defined in Article I of the Hot Water Service Agreement.

Exhibit I – Steam Service Equipment Ownership
and
Maintenance Responsibility Schematic



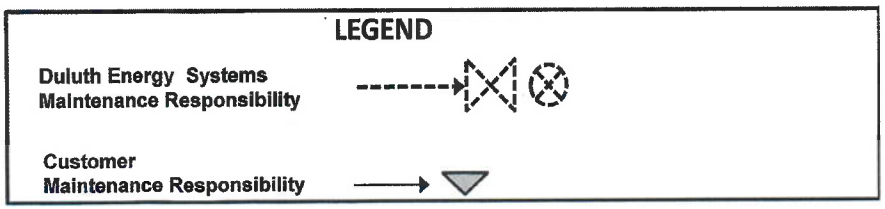
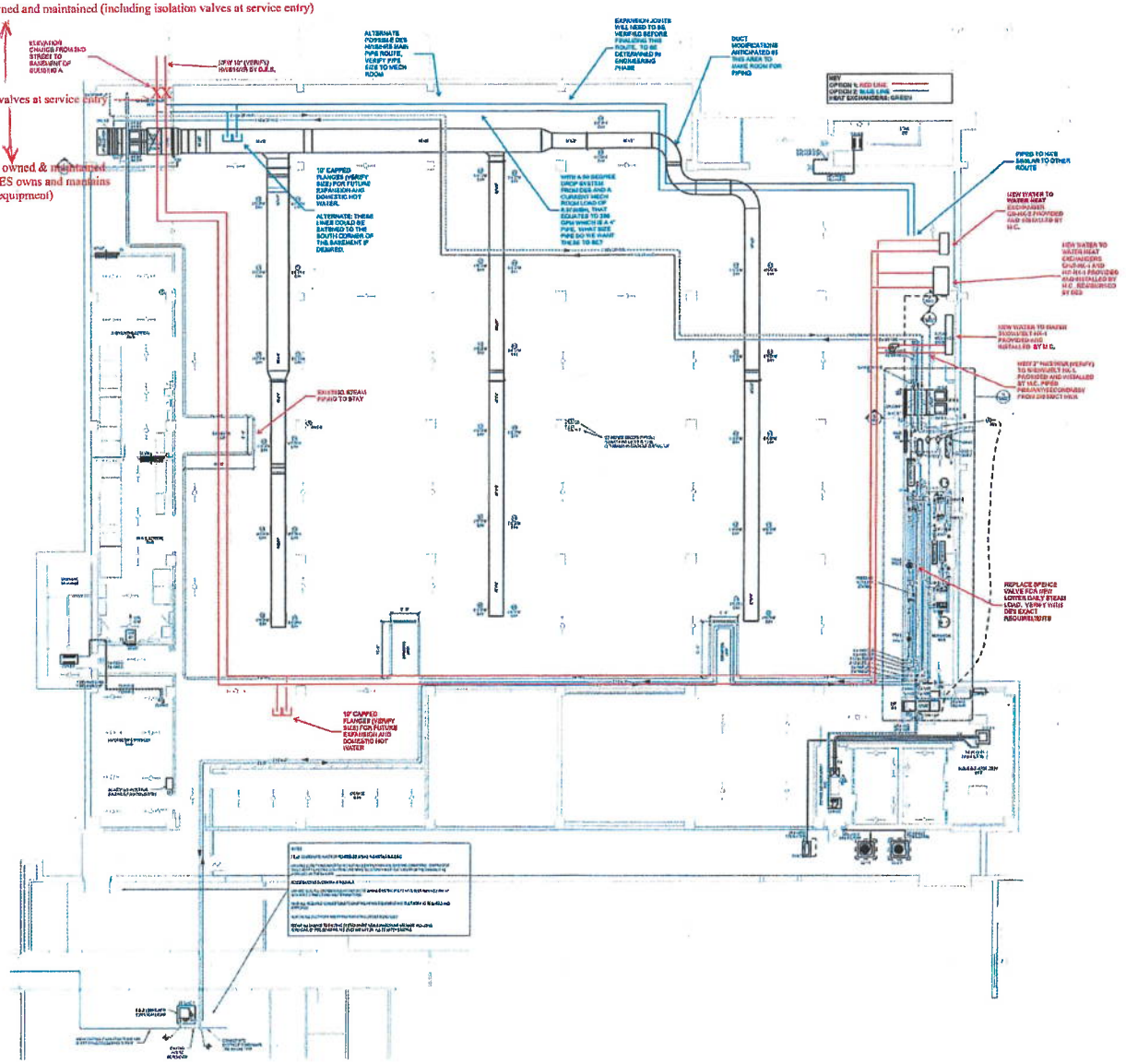


Exhibit I - Hot Water O&M Responsibility

DES Owned and maintained (including isolation valves at service entry)

Isolation valves at service entry

St. Luke's owned & maintained (except DES owns and maintains metering equipment)



ERDMAN COMPANY

St. Luke's

ST. LUKE'S

MEDICAL OFFICE BUILDING & PARKING GARAGE

1018 E. SECOND ST.
DULUTH, MN 55805

BASEMENT HVAC PLAN

M101