International Wastewater Systems

INFORMATION**BROCHURE**

President & CEO, Lynn Mueller

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"I never thought I would witness the effects of climate change on our planet during my lifetime, regrettably this is not the case. I've committed over twenty-five years in the sustainable energy business to make a change for the better.

International Wastewater Systems was founded in 2011 to help reshape the renewable energy landscape by focusing on a unique opportunity, wastewater heat recovery. Working with a team of conscientious and like minded individuals we are determined to make a real difference by decreasing greenhouse gas emissions and offering the best possible, cost effective, energy solutions for our clients."

The Ultimate Renewable Energy Source

International Wastewater Systems is a team of technical and engineering professionals with over 100 years of experience in the heating, ventilating and geo-exchange industries. We are committed to our environment and are committed to manufacturing quality products that positively impact our environment, saving resources and unnecessary expense for heating and cooling.

Using our innovative proprietary product, The Sewage SHARC, we can heat domestic hot water as well as heat & cool medium to large multi unit residential developments and commercial buildings. The SHARC can handle a wide spectrum of applications including condominiums, hospitals and office buildings with our scope extending to energy districts and supplemental use on large geothermal installations.

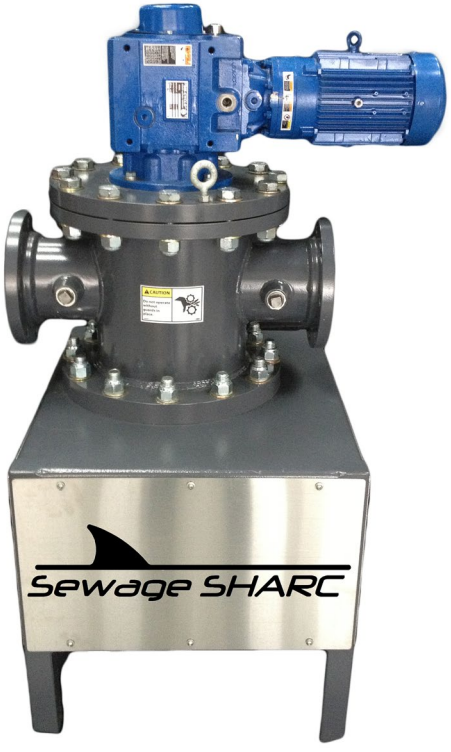
SHARC systems are 100% designed and manufactured in North America. They are custom tailored to your building specifications and work with new and retrofit applications. Each system includes detailed trending software to monitor all aspects of the system and its performance while ensuring optimal efficiency.

The thermo-mechanical methods used in our system are efficient, cost effective, scalable and reliable. Additionally, the system is an excellent solution for achieving green building points to meet sustainable design targets. We provide engineering assistance, feasibility studies, cost estimates as well as efficiency calculations proving our cost effectiveness. We also offer third party energy analysis studies to evaluate the capability of incorporating sewage heat recovery into your project.

Sewage SHARC

100% North American designed and manufactured

Scalable capacity flow: 4 inch (200 GPM) to 8 inch (1000 GPM) and multiples of those sizes to fit your requirements



Clog proof design

High quality material for long life cycle and reliable operation

Powder coated finish with stainless steel cover panels

Designed with reverse flow back flushing

Factory prewired DDC control system

Custom tailored to building specifications

Proprietary software and touch screen control

Shipped on heavy duty modular skids

Email alert system for warnings and alarms

Corrosion resistant coating and non-slip grating

Remote monitoring and data trending

The SHARC can be integrated into a variety of different applications

Multi-Unit Residential
SAIL - Vancouver, BC

SAIL is a 172 unit condominium completed in Oct 2013.

SAIL achieved Residential Environmental Assessment Program (REAP) platinum build standards. Sewage heat recovery is used to pre-heat domestic hot water all year round. The SHARC system uses the sewage from the building itself before it leaves the property.

SHARC model	440
Sewage source	The building
Sewage quantity	25 GPM
SHARC HP* capacity	220,000 BTU/hr
Wet well capacity	3900 gallons

*SHARC HP - Model includes heat pump

Multi-Unit Residential
Seven35 - North Vancouver, BC

Seven35 is a 60 unit urban townhouse development completed in May 2012.

Seven35 received both LEED® Platinum and Built Green Gold certification, with the SHARC heat recovery system being the key sustainable feature. The SHARC system is used to heat domestic hot water.

SHARC model	440
Sewage source	The building
Sewage quantity	11 GPM
SHARC HP capacity	120,000 BTU/hr
Wet well capacity	2000 gallons

The SHARC can be integrated into a variety of different applications

Multi-Unit Residential Canyon Springs - North Vancouver, BC

Set in the heart of Lynn Valley Village on the North Shore of Vancouver, BC. Canyon Springs is a 108 unit residential building completed in fall 2014. Sewage heat recovery is used to heat domestic hot water all year round.

SHARC model	440
Sewage source	The building
Sewage quantity	15 GPM
SHARC HP capacity	120,000 BTU/hr
Wet well capacity	2570 gallons

Wastewater Treatment Plant Sechelt, BC

Completed in August 2014 this SHARC system is used for building space heating and cooling as well as domestic hot water pre-heating.

The system consists of a primary loop that delivers heat to a few secondary circuits. Sewage is used as a heat source to boost the primary loop temperature. The SHARC contributed to LEED® Gold standards.

SHARC model	660
Sewage source	Wastewater tank
Sewage pumped through SHARC	350 GPM
SHARC HX* capacity	1,500,000 BTU/hr
Wet well capacity	Pre existing collection tank

*SHARC HX - Model includes heat exchanger only

The SHARC can be integrated into a variety of different applications

Multi-Unit Residential
Empire - Vancouver, BC

The Empire development comprises three buildings and a total of 160 units. Completion spring 2015.

The SHARC heat recovery system is the first stage heating source for building heating and domestic hot water preparation.

SHARC model	440
Sewage source	The building
Sewage quantity	20 GPM
SHARC HP capacity	300,000 BTU/hr
Wet well capacity	3500 gallons

Public Facilities
Gateway Theatre - Richmond, BC

50,000 sqft municipal building. Retrofit completed April 2013. The Gateway theatre was built over an existing sewage lift station, which made the application of the SHARC sewage heat recovery system unique.

The HVAC system in the facility comprises water to air heat pumps connected in a water loop. The temperature of the water loop is kept within the working range by a boiler and a cooling tower.

SHARC model	660
Sewage source	City main, lift station
Sewage pumped through SHARC	200 GPM
SHARC HX capacity	750,000 BTU/hr
Wet well capacity	Pre existing

SHARC System Benefits:

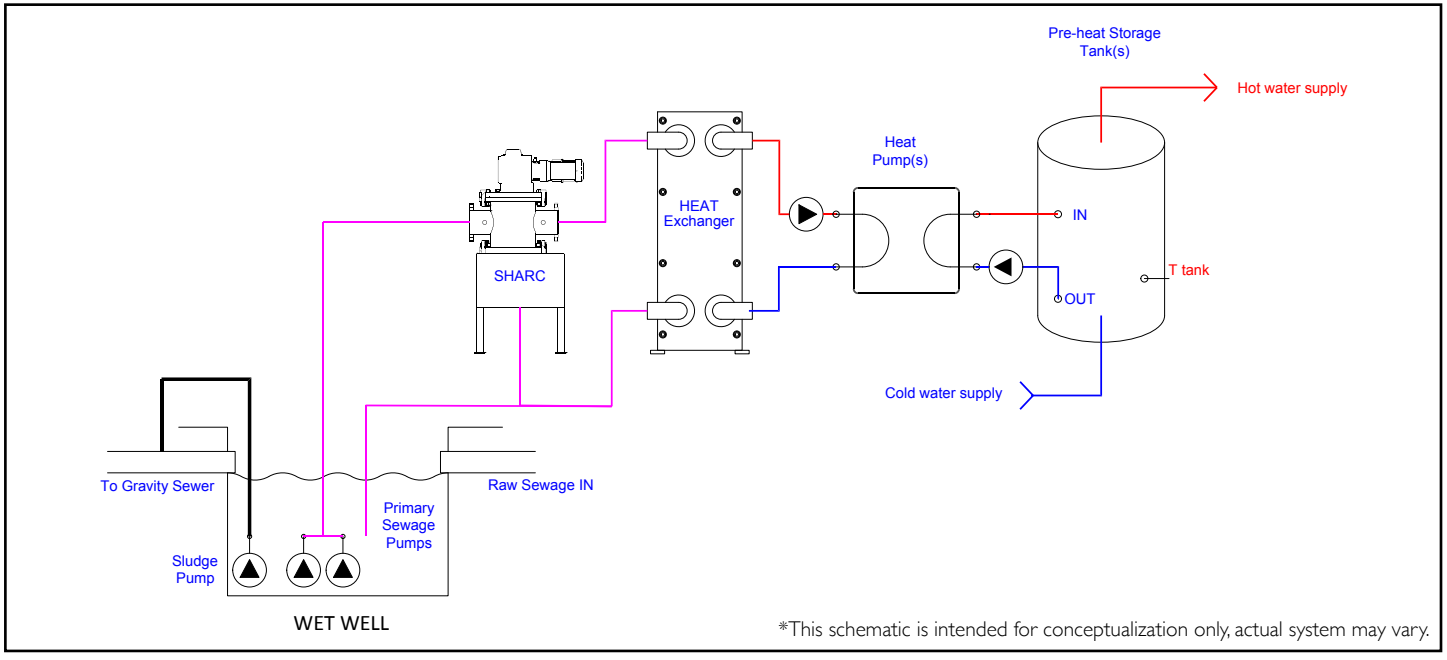
√ Reduced CO_2 and GHG emissions
√ Can be applied to new or existing infrastructure
√ No need for unsightly rooftop equipment
√ Easy to install
√ Qualify for additional LEED® points

√ Infinite energy supply
√ Energy savings and primary energy cost reduction (30-85%)
√ Trouble free operation and maintenance
√ Long life-cycle
√ Reliable technology

SHARC System Applications:

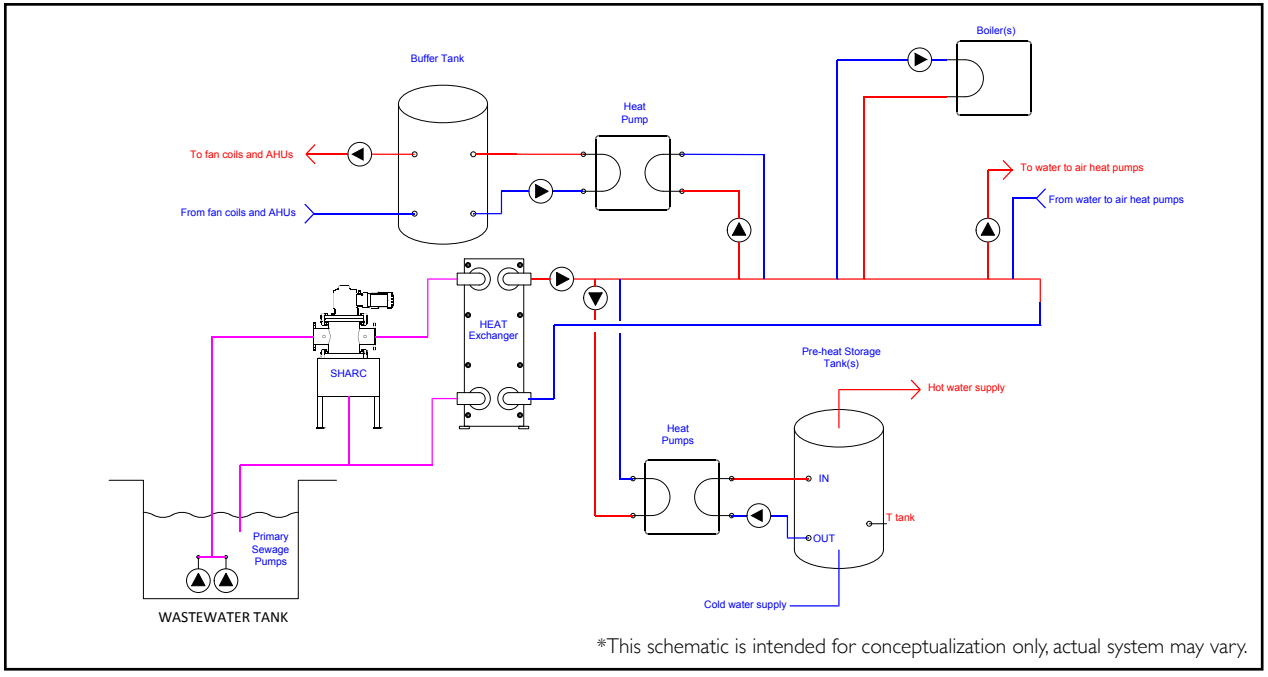
√ Apartments & Condominiums
√ Sports Facilities & Swimming pools
√ Educational Facilities
√ Hospitals & Long Term Care
√ Correctional Institutions
√ Industrial Wastewater
√ Wastewater Treatment Facilities
√ District Energy Systems

Domestic Hot Water Preparation



The sewage SHARC unit processes incoming raw sewage delivered by the primary sewage pump from a collection tank (wet well) piped to the SHARC system. The processed sewage is pumped through a heat exchanger where heat is extracted from the sewage water to process fluid in a heat pump loop. A heat pump in turn processes this fluid to heat domestic hot water in storage tanks. Processed sewage and separated solids rejoin with each other and can be sent back to the collection tank or out to the gravity sewer.

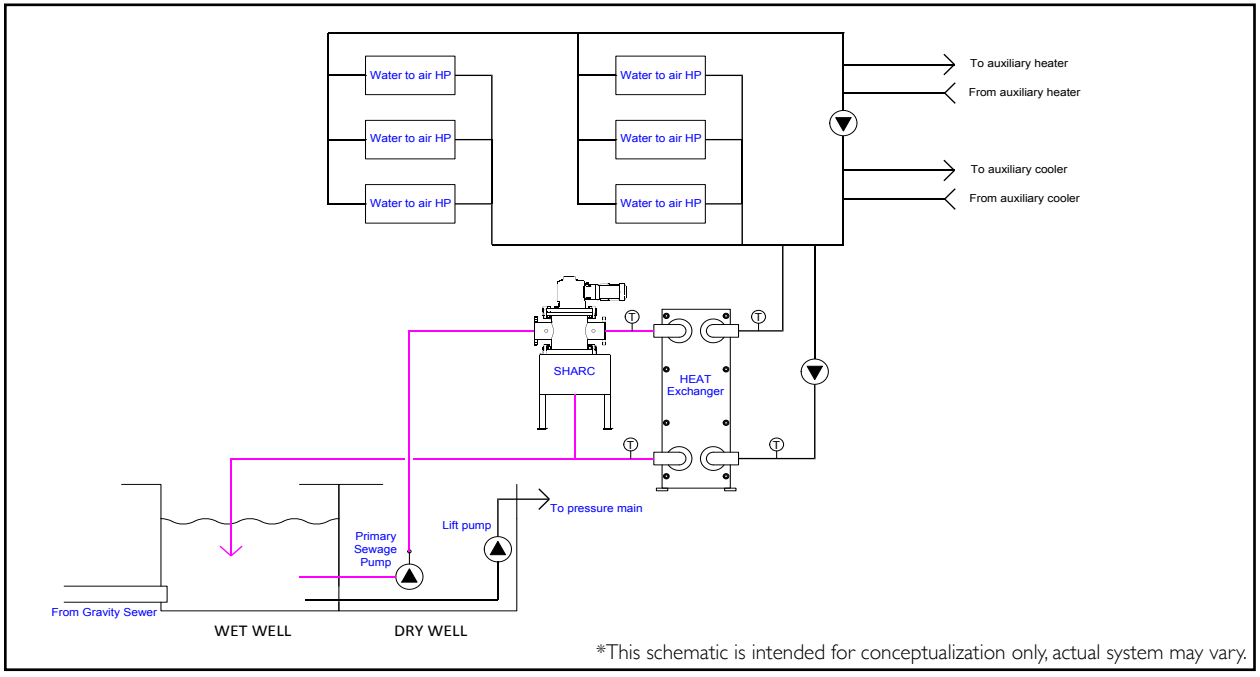
Domestic Hot Water Preheating, Space Heating and Cooling



The system consists of a primary loop that delivers heat to secondary circuits. The SHARC sewage heat recovery system and a boiler are used as a heat source to boost the primary loop temperature.

Different loads can be connected to the primary circuit. The schematic depicts water to air heat pump units for space heating and cooling as well as water to water heat pumps for domestic hot water production, and a water to water heat pump used as a heating and cooling source for fan coils and air handling units.

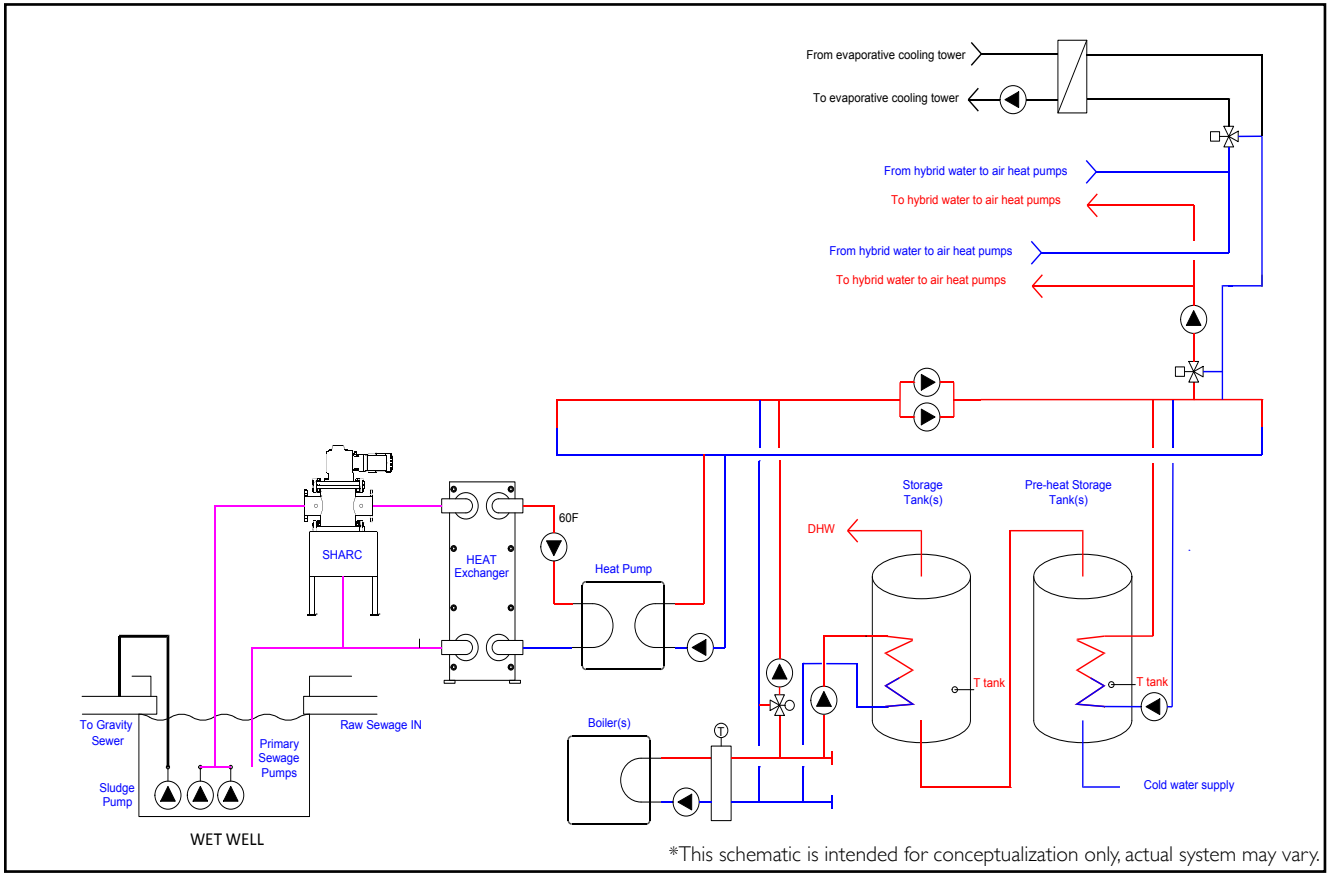
Space Heating and Cooling in a Water Loop Heat Pump System



The SHARC sewage heat recovery system can be easily integrated into a closed-loop water source heat pump system.

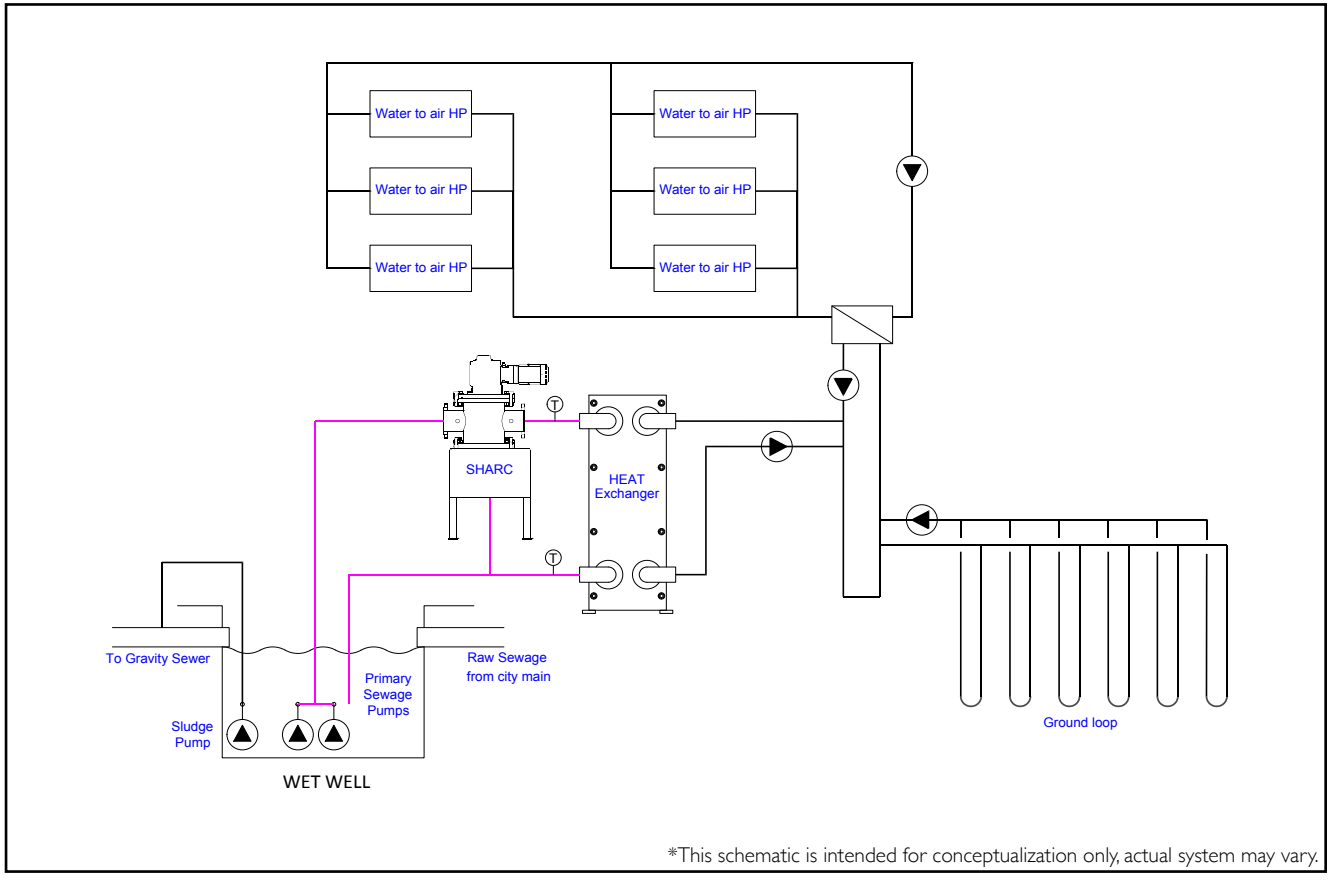
The SHARC system works in combination with the existing boiler and cooling tower to keep the temperature of the water heat pump loop within the working range. Sewage is used as a heat sink to reject extra condensation heat and as a heat source to provide extra energy to the heat pumps.

Domestic Hot Water and Space Heating



In this system the SHARC heat recovery system is the first stage heating source for building heating and domestic hot water preparation. Raw sewage is processed in the SHARC unit and then is pumped through a heat exchanger so that heat can be transferred to a water to water heat pump that maintains the minimum temperature of the primary loop.

Hybrid SHARC - Geothermal System



The SHARC system works with a geothermal loop to reject from or inject heat into the water heat pump loop. In combination with a geothermal system, sewage heat recovery can:

- Reduce drilling requirements 30-50%
- Reduce land mass requirements
- Reduce project pay back periods
- Improve loop temperatures
- Increase heating and cooling efficiency

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