



February 4, 2009

Local Water Authority  
RE: Ice Rink Water Usage

To Whom It May Concern:

Our company specializes in the design, manufacture, and installation of ice rink complexes worldwide. We have been in business since the early 80's and currently employ approximately 150 persons with over 100,000 square feet of manufacturing operations. In addition to the ice rink installation portion of our company, we are consultants to numerous engineering and legal organizations and also sponsor the operation of the Arena Training & Technology Institute, which conducts training of rink managers and other arena design firm personnel.

If one would question where or how standards are established for the skating industry, many such standards could likely be traced to the pioneering studies and work our company established over the years. Because of our position in the arena industry, we are frequently asked to comment as design professionals on how to contend with the water use consumed by an ice arena complex.

We know water utility entities are required to charge for sewer costs directly proportionate to the burden each complex puts upon the municipality. Normally a fair measurement of use is to charge sewer burdens in direct proportion to the water consumed by the individual complex. It is assumed that for each gallon of water supplied to a complex, most if not all will impact the sanitary sewer treatment system and thereby is charged on a one to one ratio based upon water consumption measurements. Additionally, when determining the sewer tap fees associated with the business enterprise, the fees are based upon the total water expected to impact the sanitary sewer system. For most businesses, the method of measuring water use for sewer charges is both fair and accurate.

However, an ice rink's water consumption is unlike most businesses since approximately 80% of the total water consumption never enters the sanitary sewer system making the typical method of measurement an inaccurate and unfair method of measurement for an ice rink.



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While each complex may vary slightly depending upon its individual operational format, the following breakdown is a reliable benchmark in which to make assumptions about an ice rinks water use.

### Water Which Enters Sanitary Sewer System

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|--|-----|
| 1) General domestic water used for toilets, showers, and general water applications. | 20% |
| 2) Water used for landscaping.   | 5%  |
| 3) Water used for ice making applications.   | 45% |
| 4) Water evaporated for refrigeration cycle.   | 30% |

Of the four (4) classifications of water use, only item # 1, General Domestic Water, actually impacts the sanitary sewer system. The balance of water consumed by an ice rink either evaporates, is consumed by landscaping, or is disposed through storm sewers which is water not requiring treatment at sewer treatment plants.

### Details Explanation Of Water Use Cycles

#### **General Domestic Water Use;**

The water used for these applications must be connected to sanitary sewer systems for proper treatment. Complexes should be accessed for the fees associated with the water consumed for this process.

#### **Water Used For Landscaping:**

This application needs little explanation. Often municipalities already make provision for sewer treatment credit for water used for landscaping purposes since this water does not increase sewer treatment capacities.



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### **Water Used For Ice Making Process:**

The ice resurfacing occurs on an as needed basis. The quantity of resurfacing applications varies with the use of the complex.

The process of resurfacing involves cutting the ice, removing the snow from the ice sheet, and applying a new layer of water, which is less than 1/64" thick. The water used for the new ice layer is heated to 130 degrees F with a boiler located in the complex and connected to the city water supply. After finishing the resurfacer operation, the ice resurfacer must dispose of the 50 to 100 cubic feet of snow gathered in the machine's snow-holding tank. This snow converts into 100 to 200 gallons of water per resurfacing when melted.

In most arena operations, the machine is simply driven outdoors and the snow is dumped outdoors onto a melting location, which is typically a section of the parking lot extended and fitted with a drain to the storm sewer system. The outdoor weather is adequate to melt this snow away. The water produced from the melted snow is extremely clean as compared to the water which runs off of a parking lot. Water from a parking lot can be contaminated with dirt, and other foreign substances typical of an outdoor lot which could house anywhere from 100 to as many as 400 parked vehicles. Because the water from the melted snow is much cleaner, melting it in a parking lot for the storm sewer has never been questioned.

Accordingly, since the water used for ice making never impacts the sanitary sewer system, sewer tap fees and the resulting sewer charges associated with ice making water should not be charged to an ice rink operation. This concept is similar to a swimming pool operation which is fitted with a secondary water meter to eliminate the sewer fees for water used to fill a swimming pool or the water to replenish pool levels lost to evaporation.

### **Indoor Snow Melting Operations**

In recent years many new ice arenas have chosen to conduct the snow melting process completely indoors through the use of a snow-melting pit which is incorporated into the complex design. The construction of an indoor snow melting system results in a greater first cost for the operator to help maintain a snow free appearance outdoors. Considering the process and the water are essentially the same as dumping the snow outdoors, the operators should be unfairly penalized by



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making them tie the snow melting pit water into the sanitary sewer system. With numerous other projects, when the explained, the municipalities have unanimously agreed.

The process of melting the snow indoors makes the arena more environmentally tight since it eliminates the need for the ice resurfacers to travel outdoors through an open garage door. By opening an outdoor garage door on a regular basis the complex is afflicted by added humidity/heat load

The indoor pit is fitted with a piping coil on the bottom, which is heated from the refrigeration system or accessory heating system. The ice resurfacers machine simply dumps the resurfaced snow into the specially designed pit where it melts away and drains into the storm sewer in the same manner as if it were dumped outdoors like the other thousands of ice rinks installed throughout the country.

Using the storm sewer system, as opposed to the sanitary sewer, is a regularly approved practice in our industry and is a safe practice, as this water is extremely clean and not subject to contamination by any toxic elements or substances. In fact, in locations where water supply is limited or expensive, this water can be recycled for use in landscaping operations and/or for the evaporative condenser. Nothing used in the making or maintenance of the ice system would affect its overall quality or safety. The snow dump tank is a clean area of the ice resurfacers, which is exclusively used for the process of storing the clean resurfaced snow.

Any concerns about oil contamination from the ice resurfacers machine are highly unwarranted, as the ice resurfacers is a critical piece of equipment with a high level of maintenance. Because of the negative impact to ice quality by oil, even the smallest oil drip would not be tolerated for an ice resurfacers. The machine is designed and maintained to avoid this problem from ever occurring. The possibility of any contamination entering the pit is extremely unlikely and almost non-existent as compared to a parking lot where hundreds of vehicles are stored which do not benefit by the critical level of care given to the ice water operations.

### **Water Used Refrigeration Evaporation Process:**

The refrigeration system dissipates heat through a process of water evaporation. The water, which feeds the evaporative condenser, is converted into steam which is blow into the atmosphere. Since this water is evaporated, it does not impact the sanitary sewer system and should also be omitted from sewer charges.



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### **Condensation Water From Dehumidification**

In some past conversations with municipal sewer operators, they argued that while the water evaporated by an air-conditioning/refrigeration system does not impact the sewer treatment facilities, the condensation water normally associated with an air conditioning system which is not measured does. Because of this added water load, the municipality could justify the sewer charge as a trade-off for condensation water load. This point made by municipal authorities was a good point since an ice rink has a large dehumidification load and needs to expel a great deal of water from the arena space.

Until the recent past, the process of removing the moisture through dehumidification involved fully self-contained mechanical dehumidifiers or air handlers which both produces large amounts of condensation water. However today almost all arenas are using desiccant type dehumidifiers, which do not produce any condensation water making this argument for charging sewer fees, associated with a refrigeration process mute. The desiccant process works in a manner similar to a cloths dryer where the moisture is expelled through hot regeneration air into the atmosphere.

### CONCLUSION

Ice arenas should be designed with a secondary meter which provides credit for all water which does not impact the sanitary sewer systems. The owner will provide a simple water distribution system which should provide for a single secondary meter which can accurate track the water for which the complex should receive a credit on for all sewer billings. Additionally, the ice arena should not be charge for a sewer tap fee for the quantity of water which will be entering the storm sewer system.

Should you have any questions about this matter or require additional supporting documentation, please do not hesitate to contact us.

Sincerely,

A handwritten signature in black ink, appearing to read "John Burley". The signature is written in a cursive, somewhat stylized font.

John Burley, President  
Everything Ice, Inc.