SUMP PUMPS WORKSHOP

An Information Presentation by the Pipetrades Department of

THE NORTHERN ALBERTA INSTITUTE OF TECHNOLOGY

Sponsored by : THE CITY OF Edmonton

Drainage Services Branch

OUTLINE:

- Purpose of a Sump Pump
- Location/ Installation of a Sump Pump
- Applications
- Types/Models
- Maintenance
- Activation Switches
- Shopping Tips
- Potential Cost
- Questions

PURPOSE OF A SUMP PUMP:

- Provides protection of your home against flooding– last line of defense
- Works in conjunction with your weeping tile to protect your home from flooding
- Removes water to a safer location away from your home's foundation
- Homes built since 1988 must have a sump pump and comply with City of Edmonton Bylaw # 11501 which states:

PART 6.5.2.1.1.1.1.1.1 - RESTRICTIONS AFFECTING SURFACE DRAINAGE

ROOF DRAINAGE AND PUMPED SUBSURFACE DRAINAGE

1 No owner shall permit roof drainage or pumped subsurface drainage from a building to be discharged:

1.1.1 directly onto a pervious ground surface within one metre of the building for all buildings that have a basement or a level below the finished ground surface;

1.1.2 within 150mm of an adjacent lot or to within 300mm of a City right-of-way;

1.1.3 to a location where soil erosion would occur;

1.1.4 to a location where the flow of water or accumulation of water would adversely affect or have potential to adversely affect the stability of a slope or top of bank;

1.1.5 to a location where the flow of water or accumulation of water would have a detrimental effect on a ravine or an environmentally sensitive area; or

1.1.6 to a location or in such a way as to cause or have potential to cause a nuisance, hazard or damage.

EDMONTON ALBERTA'S CAPITAL CITY

Sump Pumps

The sump pump is part of the home's foundation drainage system, and has been a building requirement since 1988. It is usually located at the side of the house. Sump pump discharge spills onto a splash pad, concrete sidewalk or through a flexible hose to the common drainage swale. In newer areas the sump pump discharges onto the ground, with the exception of areas that have a very high ground water table, or those adjacent to a lake, ravine or river. In those areas, sump pumps must connect to a storm service in order to minimize soil erosion. A geotechnical engineer determines if this is necessary before the area is developed.

The weeping tile (a perforated hose adjacent to the foundation wall) intercepts ground water and drains it to the sump well. When the water level rises the sump pump starts and pumps the ground water over the foundation wall to the surface grade or to the foundation drainage service.

It's important to provide a splash pad and/or flexible hose below the discharge point. This helps minimize soil erosion at the foundation wall and prevents the re-circulation of the ground water back to the weeping tile. The flexible hose and/or splash pad should be directed to the drainage swales but not onto an adjacent property or discharged less that 30 cm from City property. To prevent the sump pump discharge hose from freezing, it should be disconnected during the winter months.

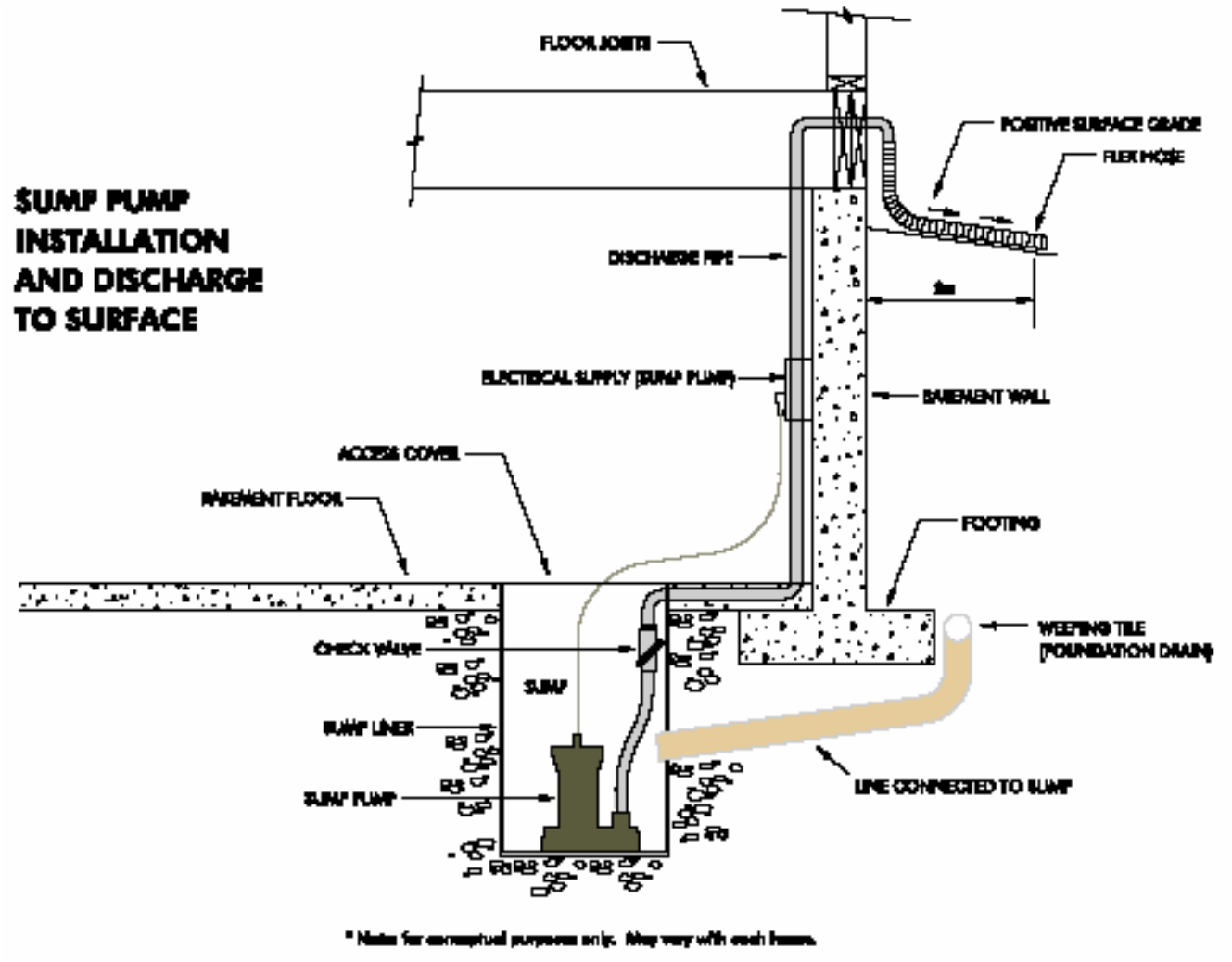
Note: Drainage Services receives a number of inquiries about excessive sump pump discharging. In the fall and winter, excessive flows result in inconvenient or dangerous icing conditions. To effectively address these concerns, Drainage Services will consider an alternative to discharging sump pump flows onto surface grade. Please refer to our Sump Pump Information pamphlet for more information.

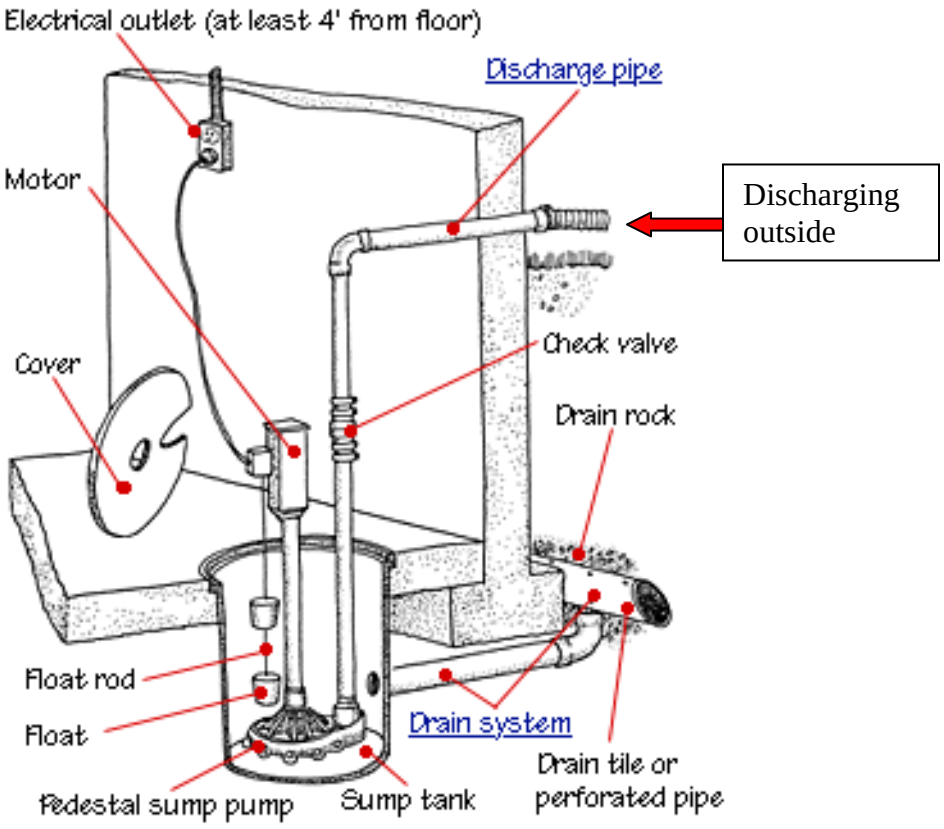
For more information contact

Drainage Services
Main Floor, Century Place
9803-102A Ave.
Edmonton, AB
T5J 3A3
Phone: (780) 496-5541
Fax: (780) 496-2865
e-mail: lot.grading@edmonton.ca

LOCATION / INSTALLATION OF A SUMP PUMP:

- Situated in a shallow pit, or sump at the lowest point in your basement
- Connected to the weeping tile which collects groundwater from around the perimeter of your basement

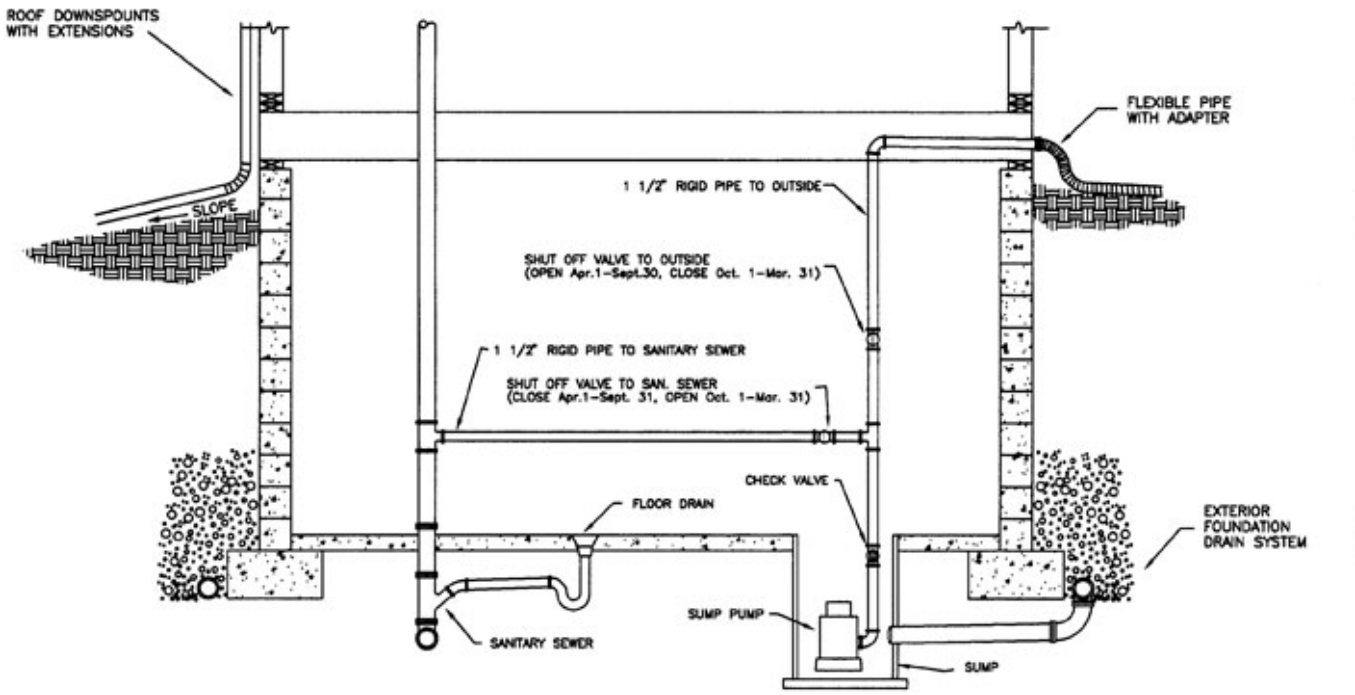




APPLICATIONS

***NOTE –** The following application is for exceptional circumstances only and can only be installed with the expressed written permission of the City of Edmonton. This application is approved on a case-by-case basis only and is not the preferred means of installing a sump pump.

In the scenario shown below the discharge piping arrangement allows the sump pump to move water outside or into the building sewer. The option to discharge into the building sewer is a good idea during the winter when water discharged outside can create dangerous ice patches. During the winter there is generally less groundwater generated also.

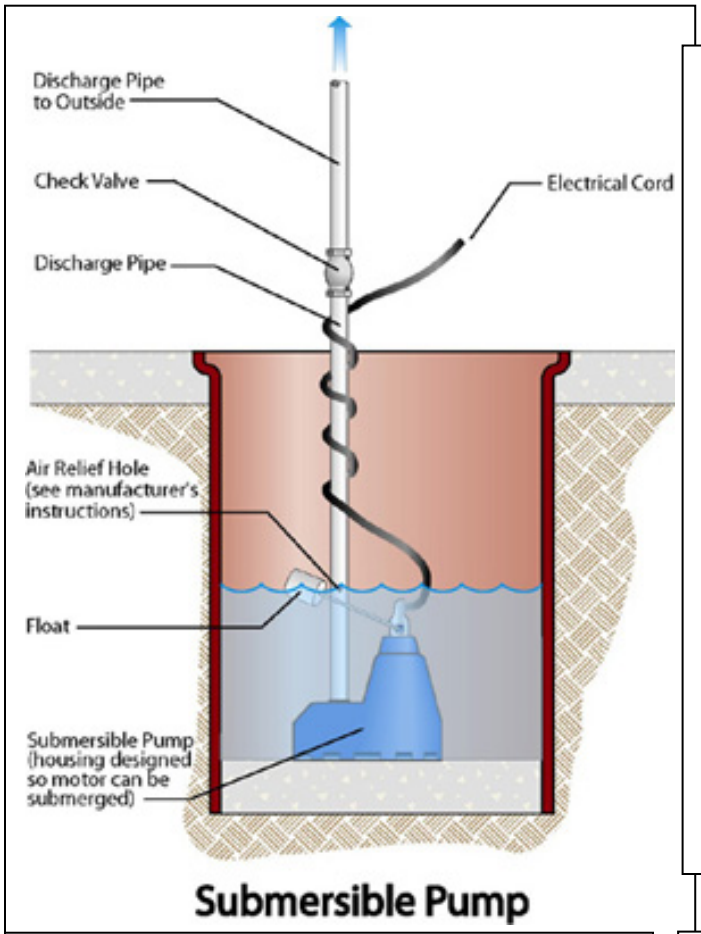


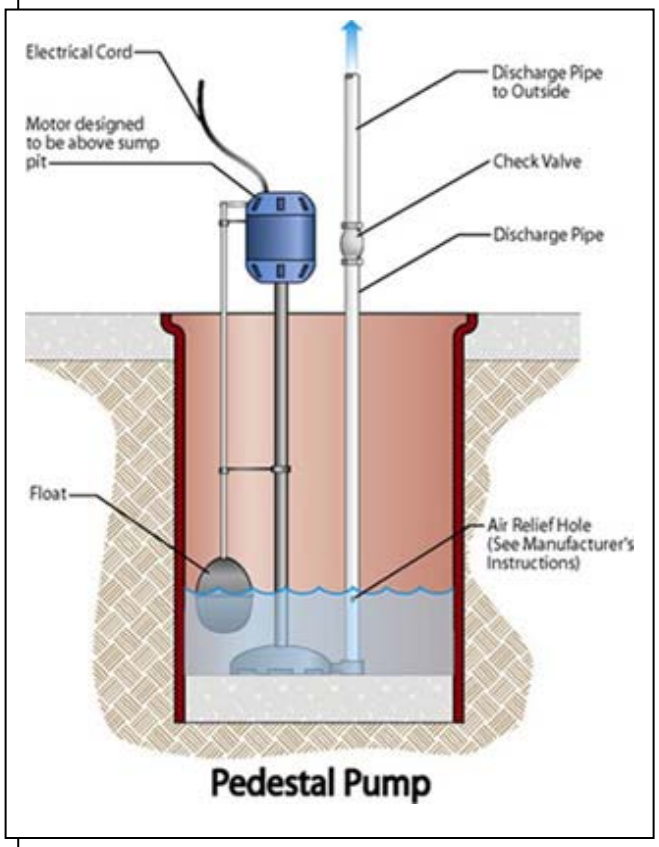
2-WAY SUMP PUMP DETAIL
WITH SEASONAL WAIVER

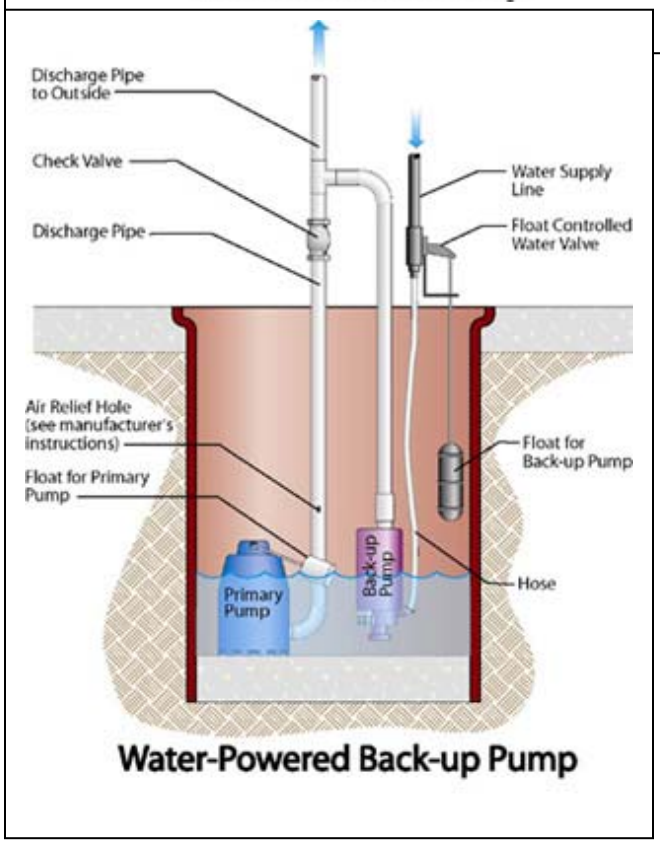
TYPES OF SUMP PUMPS

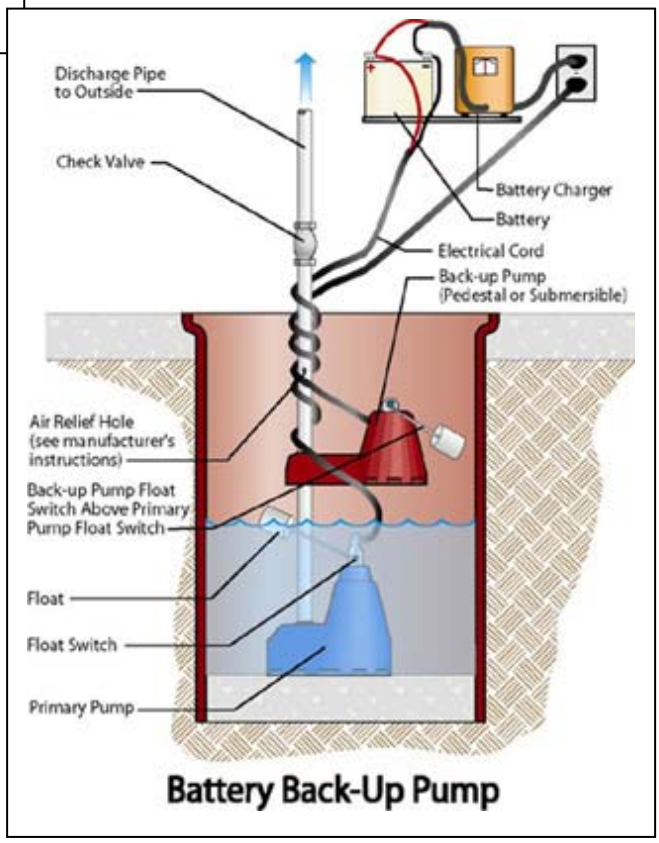
Depending on your groundwater volume, sump arrangement, or personal choice, there are many types of sump pumps available. Some common styles include: submersible, pedestal, water powered, and battery back-up. The back-up sump pump types are used in conjunction with a main pump. The water type and battery back-up are usually secondary pumps. In some cases, in lieu of a second pump, the system is fitted with an alarm to indicate a dangerously high water level to notify the home owner that the sump pump has either failed or cannot keep up with the influx of water.

TYPES OF SUMP PUMPS



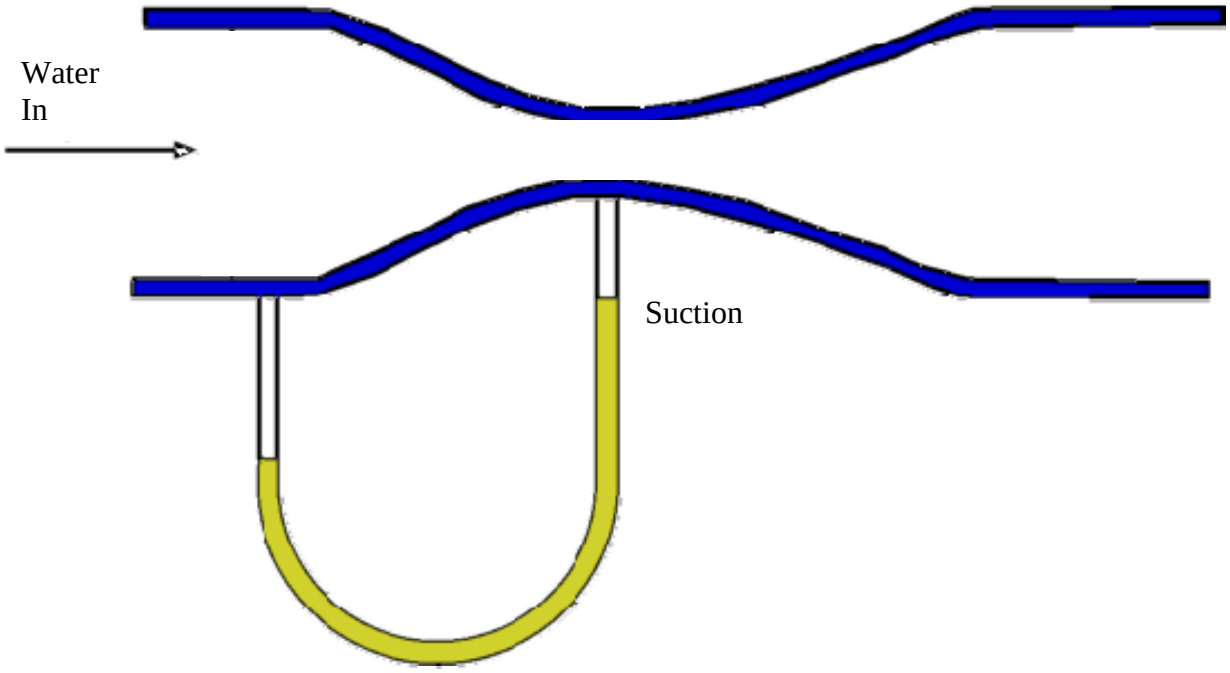






TYPES OF SUMP PUMPS

The principle of operation behind the water-powered sump pump is the venturi.



If there is ever a loss of power and the primary sump pump is inoperable, the water-powered sump pump works on city water pressure. Water flows through the venturi of the water-powered pump at point 1 shown above. The restriction or narrowing at the neck of the venturi causes an increase in the water's velocity and a decrease in water pressure at point 2. This negative pressure is enough of a vacuum to draw water up from the sump into the venturi and it is carried away with the city water. The distance "h" shown above is indicating the difference in pressure in a "U" tube manometer. Where the tube is connected to the venturi at point 2 is where the suction line from the sump would be attached. A similar arrangement is used for containers of liquid fertilizer where your garden hose is connected to a venturi at the top of the container and it draws out the fertilizer and blends it with the water in the hose.

Maintenance –

- fill the sump pit with water to make sure the pump is working properly.
- go outside to check that the pump is actually discharging water (sometimes the pump will run but it won't pump any water out).
- check that the operation of the float is not restricted.
- check for any debris blocking the suction intake, especially after a heavy rainfall.
- listen for any strange noises coming from the motor.
- if oil appears in the sump it could be an indication of a failed pump seal.
- replace the battery on the back-up sump pump every second or third year.
- Any major maintenance should be carried out by a qualified technician, i.e. anything that requires internal cleaning, adjustment.
- A visual check every few months is good preventive maintenance.

One of the most common problems with the operation of a sump pump is the activating switch. There are several types available. Some these include:

1. Diaphragm Switch.

The diaphragm switch is a popular type for professionals and is also the most expensive. The entire sump pump is immersed under water and on it is a membrane that is sensitive to water pressure. As the water level rises, the water pressure increases and the diaphragm becomes concave, thereby activating the switch to turn on the sump pump. When the water level drops, the switch turns off.

Since there is no float, there is nothing to get stuck, which is a common problem with other types of sump pumps. This type of switch is not susceptible to turbulence in the tank. So if you have water entering fast, the turbulence will not trigger the switch as it might do with the types listed below.

2) Vertical Action Float

This type of switch is recommended because it is not as expensive as the diaphragm switch and it is superior to the tethered float. The float is a ball that floats above the water. As the water level rises so does the float which, at some point, will trigger the switch to turn on the pump. This float has limited movement up and down a vertical rod thereby giving it less freedom of movement and less of a chance to get stuck as the tethered float does for example.

Vertical float switches are often of better quality than tethered floats and usually carry a longer warrantee.

3) Tethered Float

The tethered float is the most common and is used for pedestal sump pumps. The float hangs from the pump and floats on the water. As the water rises, so does the float and the switch is triggered.

Common problems related to the tethered float include the float accumulating grime and causing it to lose buoyancy and even sink. Another common problem is that the float gets stuck to the inner wall or pump and as a result, when the water rises in the sump tank, the float may stay submerged and fail to activate the pump.

Pedestal sump pumps have the added advantage of having the electrical unit above the water level. Other types are submerged and involve more risk of electrical accidents.

4) Electronic "Flood Free" switch

There is a fourth type of switch that can be used. It is electric and has no actual float. Instead, a probe wire is placed to sense the presence of water and is activated when it becomes submerged by rising water. A second probe wire can also be placed at a higher level to set off an alarm switch or another backup pump. This particular switch can be used in many types of applications.

The information above can be found on the internet at:

- *http://www.sump-pump-info.com/index.html*

Shopping Tips –

When choosing a sump pump you will need to consider the volume of groundwater you will encounter as well as the clarity of the water. Most sump pumps are essentially a centrifugal pump driven by an electric motor. The differences between the styles that have been mentioned previously are the submersible has the entire unit submersed in the water, whereas the pedestal type has the motor and all other electrical components in dry air. If the water entering the sump is dirty and gritty you must consider a pump that can accommodate a slurry-type of groundwater. This means selecting a pump with an abrasion resistant impeller. The other consideration is the horsepower of the pump. The pump should be sized to meet the worst case scenario of the maximum volume of groundwater entering your sump. If you want the pump to last – you get what you pay for. A higher quality pump is built from top quality components. You can buy a cheaper pump but don't expect it to perform as long or as well.

Potential Cost –

There is a very broad range of pumps available through hardware stores and plumbing wholesalers. If you want to go cheap you can likely pick up a sump pump for $50.00 to $60.00. If you would like to purchase a quality sump pump that will provide you with many years of reliable service, you will likely have to pay upwards of $150.00 or more. The best idea is to speak with plumbing professionals and suppliers to get a feel for what is available for what price. Remember to compare performance, quality and price before making a final decision.

City of Edmonton Drainage Services –

www.edmonton.ca/floodprevention

- **Planning & Development Department:** (780) 496-3100
- **Backwater Valve subsidy program:** (780) 496-5662
- **Customer Service Centre:** (780) 496-5541
- **Drainage and Sewer Trouble Line:** (780) 496-1717

More Information:

http://www.ag.ndsu.edu/disaster/flood/sumppumpquest.html

http://www.wisegeek.com/what-is-a-sump-pump.htm

http://www.ehow.com/how_16652_understand-sump-pump.html