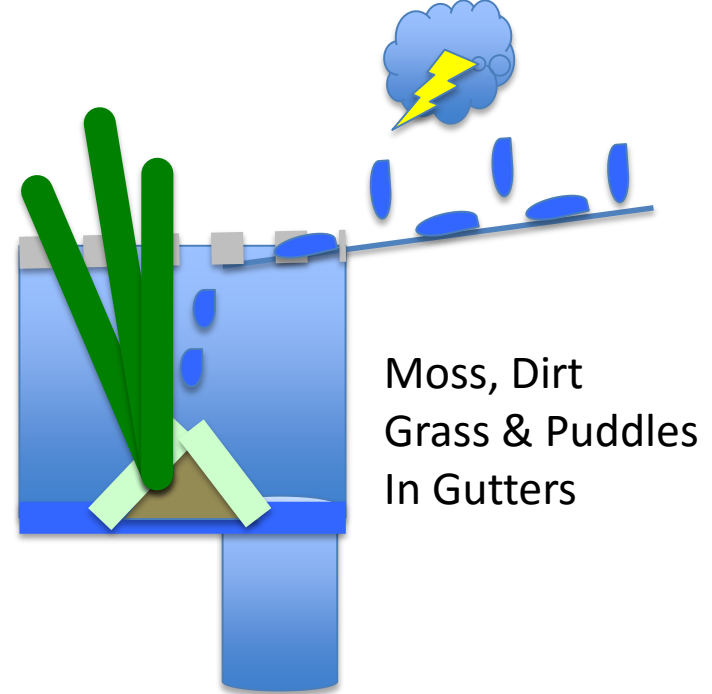


Upgrading Our Understanding Of School Water Tanks - Heavy Metal HACCP

CALLUM MORRISON - PUBLIC HEALTH COORDINATOR

Two Objectives

1. Sharing a retrofit idea to extend quality rainwater collection system while improving the storm event discharge system



2. Seeing opportunity to improve the guidelines for new and existing school private water supply systems.

This issue has application not just in remote country areas but where ever there are school water tanks. It maybe even more important in cities even though they have a town water supply.

If heavy metals are being trapped and concentrated by water collection systems used for watering school vegetable, herb and fruit gardens then this could potentially be just as important as drinking water problems.

Many schools collect rainwater for various purposes from the roof of class rooms for gardening and flushing toilets. In areas where there is no town water supply – this water is also used for drinking, hand washing and food preparation. In storm events, enormous amounts of water have to be discharged safely from the roof to prevent building flooding and damage.

The modified NSW guidelines and diagrams for schools based on domestic rainwater collection systems could be improved on further to better fit the building circumstances and priorities of schools.

It appears non-contaminating building materials have been used on the modern buildings however it would be hard to see how to get a worse water quality and environmental health outcome than with the current configuration.

Simple improvements can be made to the rainwater collection systems on many modern school buildings. Minor plumbing works could vastly improve water quality collected, reduce maintenance and aid the priority of storm event functionality.

The single system needs better delineation to benefit both :-

1. Stormwater Damage Prevention
2. Rainwater Collection for Drinking

System 1. The primary need for a storm water system on a class room is to keep children and electronic equipment dry and safe in even extreme rain, hail and snow events.

System 2. The current discharging of all stormwater into a water tank threatens water quality and also requires the gutters and pipes to be larger.

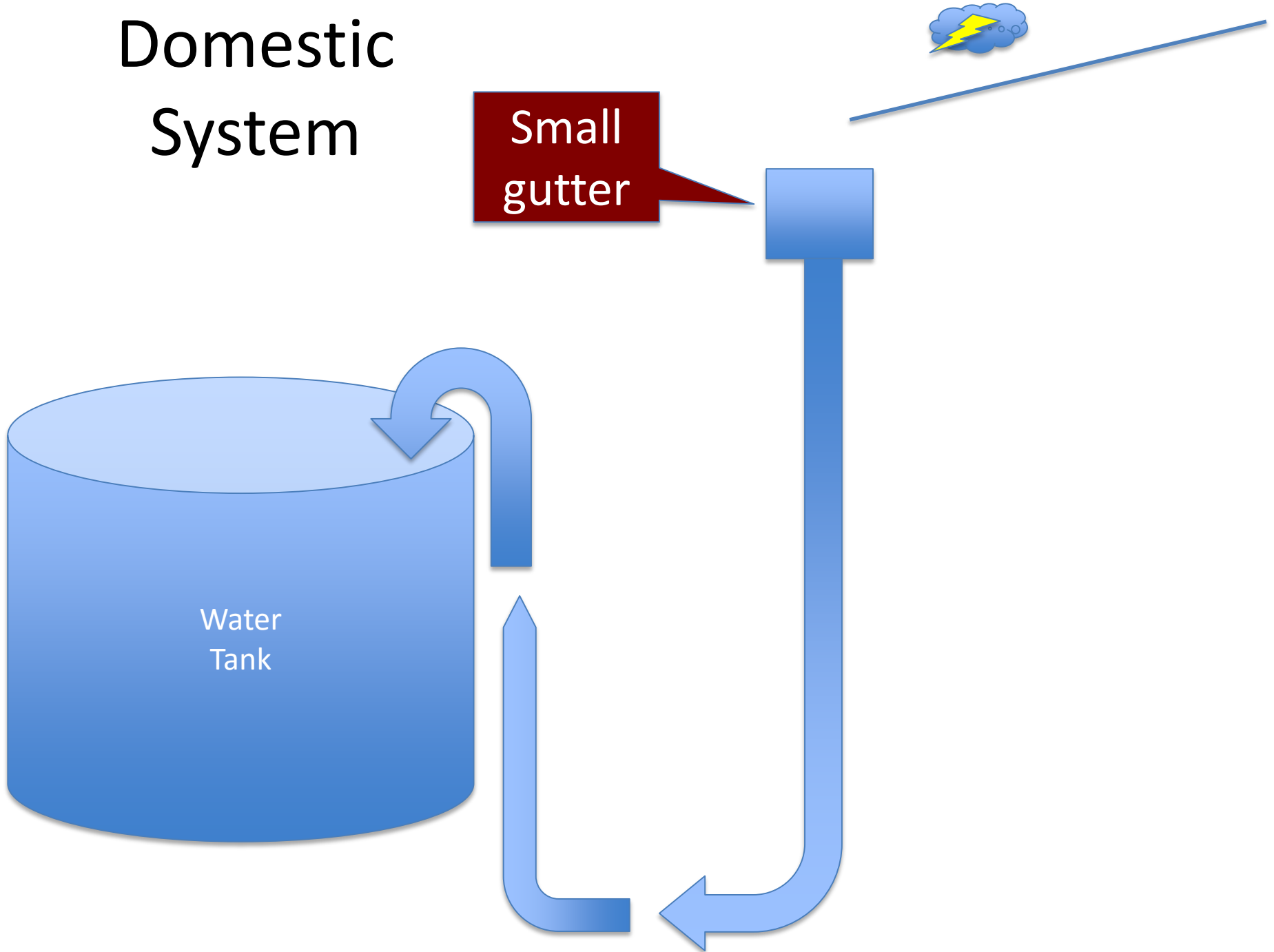
The components of the two systems are interacting at the moment jeopardising functionality of both. A simple measure like the addition of mesh to prevent leaf entry appears to have negative impacts on drinking water quality and made system maintenance more difficult. In the current configuration this causes problems but in a new configuration it might function properly.

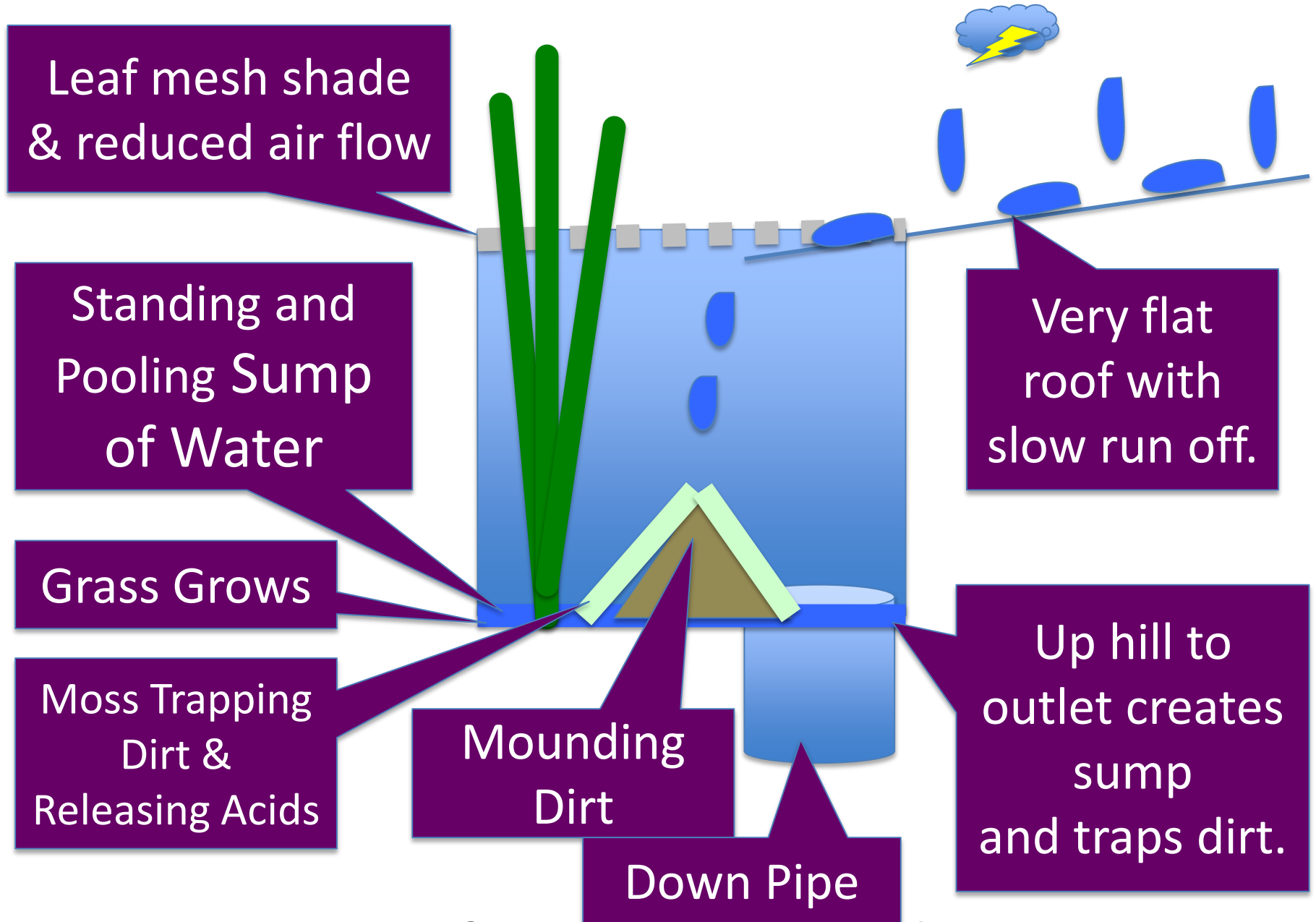
The large capacity gutters of the storm water collection system for storms and mass production of transportable building sections are often currently not supportive of quality rainwater harvesting. Each functional component is working against the other functions required.

Domestic System

Small
gutter

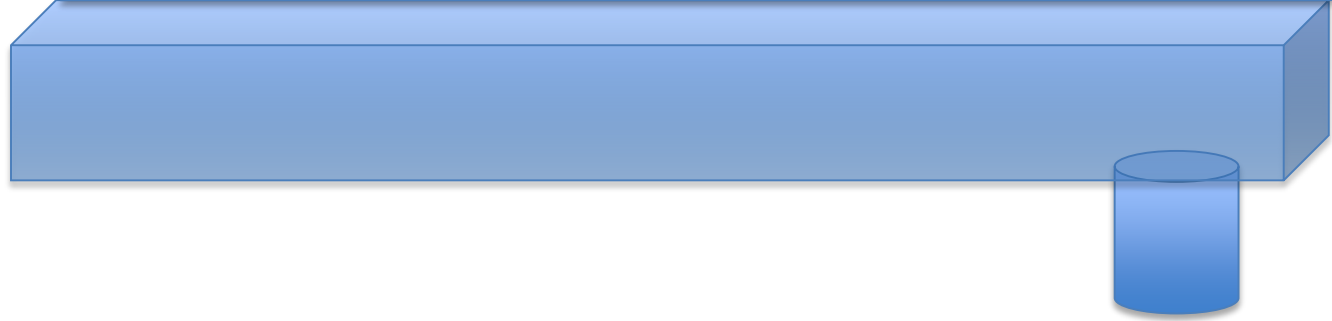
Water
Tank





Section of Large School Gutter

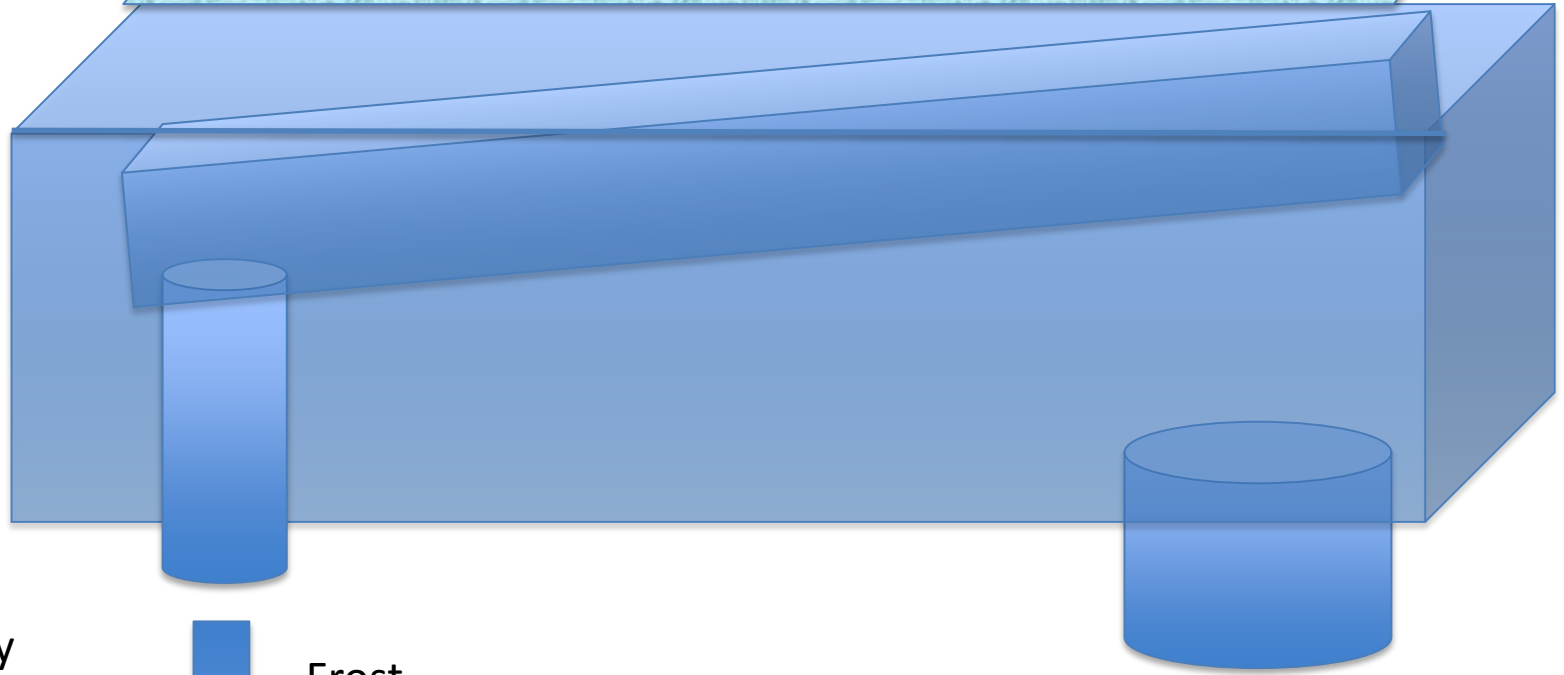
Normal house gutters should have fall but are often laid flat for aesthetic reasons.



School transportable buildings have larger gutters and may in some cases have negative gradients and pool water.



The solution would appear to be laying domestic scale guttering inside large scale guttering hidden from view with its own smaller diameter downpipe to a first flush diversion device and water tank. Any storm excess just spills into larger existing boxing that should remain dry most of the time and in storm events the existing downpipes are more efficient and run direct to street.



High quality
reasonable
water flows to
water tank.



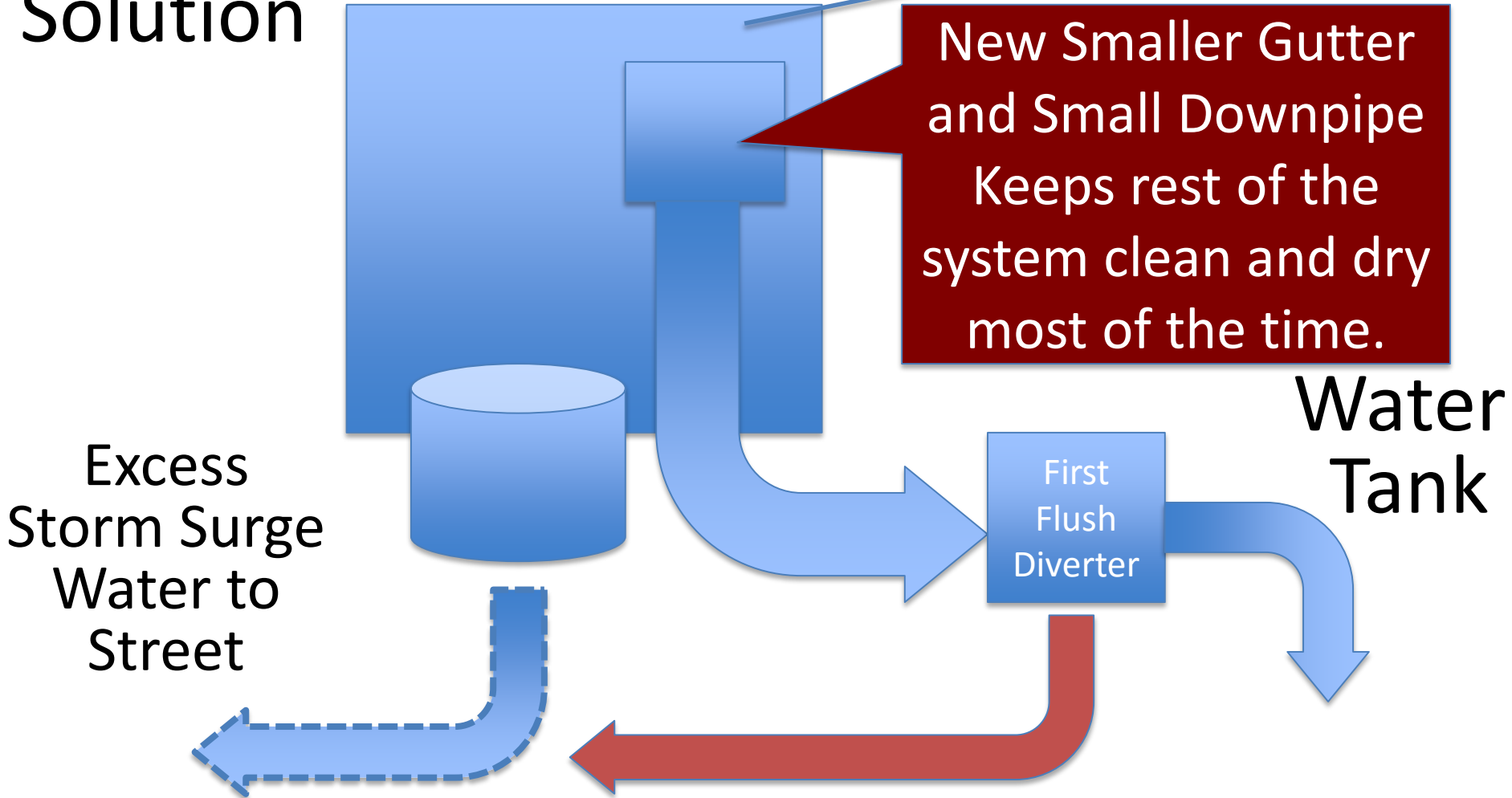
Frost,
condensation
and other
trickle flows
drained away
from moss and
grass.

Excessive storm flow
direct to street. No
standing water in pipes
and improved head of
pressure direct to
street.



Solid pipe
through
septic
trenches.

Possible Solution



Retrofit of rain collection gutter inside the existing large storm gutters

Summary of Problems and a Solution

Existing Stormwater System

- A very flat roof with slow discharge velocity and little washing effect. Large diameter gutters are for storm surges. Unfortunately they are positioned on flat or negative grades. These pool water and solids and then these grow moss and grass that in turn traps even more solids and release leached out byproducts. All contaminants end up in the charged downpipe to the tank where they stagnate and putrefy. These create taint, water quality and maintenance issues. Running these solid pipes through septic trenches is risky as well. Problems with more extremes of climate and mosquitoes etc.

Retrofit Rainwater Collection

- A very flat roof is not really a problem but it needs to discharge into a smaller diameter gutter on steeper gradient so sediments do not pool in the gutter. The larger gutter can remain around the smaller one to hide it and capture any spilling storm excess. The larger gutter will spend more time dry and collect less solids and grow less moss and grass.
- A first flush diverter improves the water quality going to the water tank and sends dirty water to the street. No back up in the downpipes to the street increases the peak storm surge flow capacity.