

Storm Management Alternatives

Hardey Group, LLC.

Civil Engineering

Hardey Group, LLC.

- Founded in 1981 in Oregon
- Family run business now in the 2nd generation.
- John Hardey has 40 years of alternative stormwater management experience.
- We provide site planning and Civil Engineering for Commercial, Residential, Municipal and School developments.

Why Use Alternative Methods?

- It can save you valuable real estate.
 - Alternative detention methods use an area of your property for storm detention *and* other uses, such as playgrounds, parking, landscaping, or sports fields.
- It is safer than traditional detention ponds.
 - You don't need to fence off these detention areas, as there is little danger of children falling in and drowning.
- It looks better and draws buyers to your site.
 - Whether it's retail, residential, or offices, alternative methods are easier to maintain and present a better 'curb appeal.'

Case Study: Westheimer Pkwy Retail Center

- 1.3 Acre Site
- 9 Units @ 1,200 sq ft. each.
- 54 Parking Spaces (6 per unit.)
- Not in Municipal Utility District
 - No community detention.
- Ft. Bend County Jurisdiction

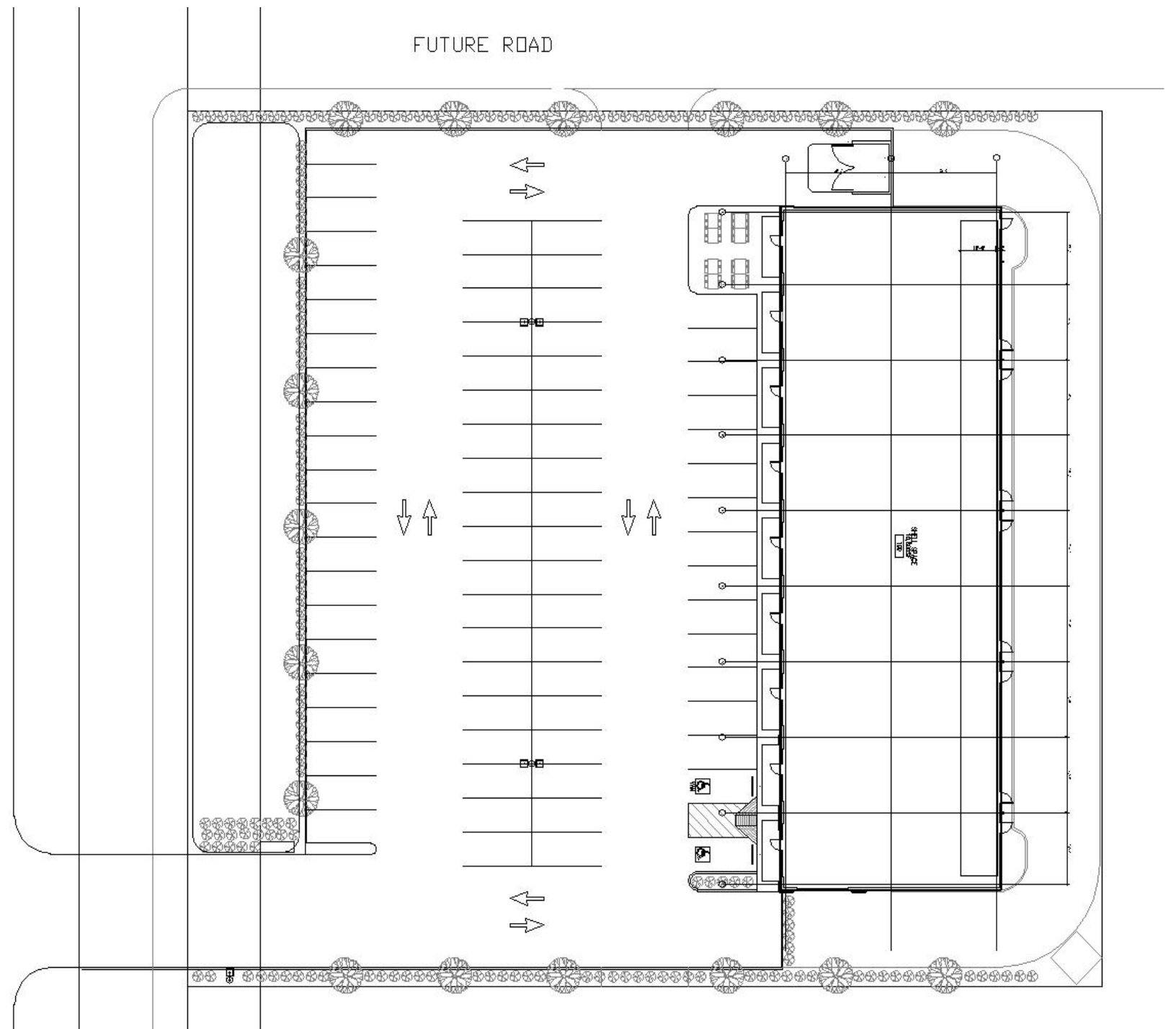
This site is 82%
“Impervious”

That includes all the
paved surfaces,
rooftops, and anywhere
the water will run off
quickly.

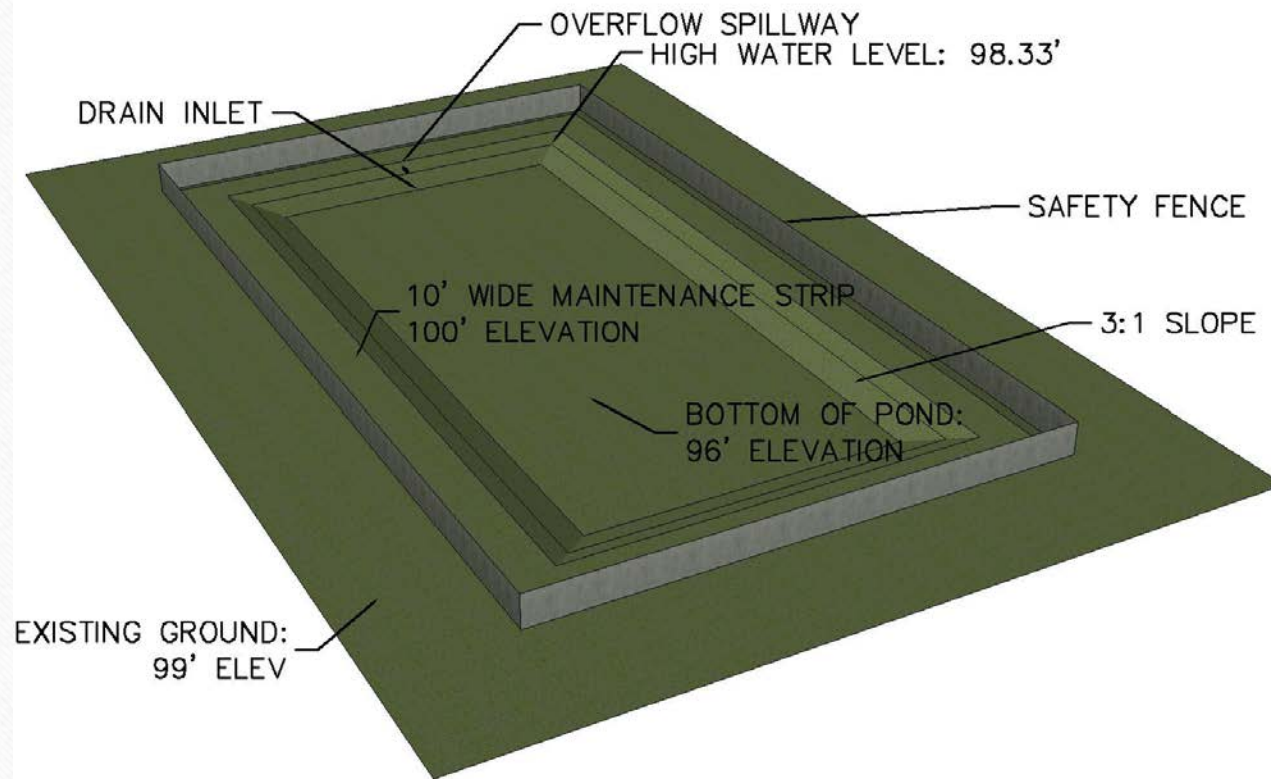
For this site, Ft. Bend
requires .92 Acre/ft of
detention – one of the
highest in the country!

That calculates to about
50,000 cubic feet of
detention required for
this site.

WESTHEIMER
PARKWAY



Option 1: Offsite Detention Pond



To detain 50,000 cubic feet of water would require a half an acre of land.

Fortunately, the neighbor immediately behind the site was willing to sell for \$12/sqft.

The design and construction costs for a traditional pond like this one run about \$3/sqft.

Land: (0.5 Acres @ \$12/sqft) = \$260,000

Design and Construction = \$65,000

Total Cost: \$325,000

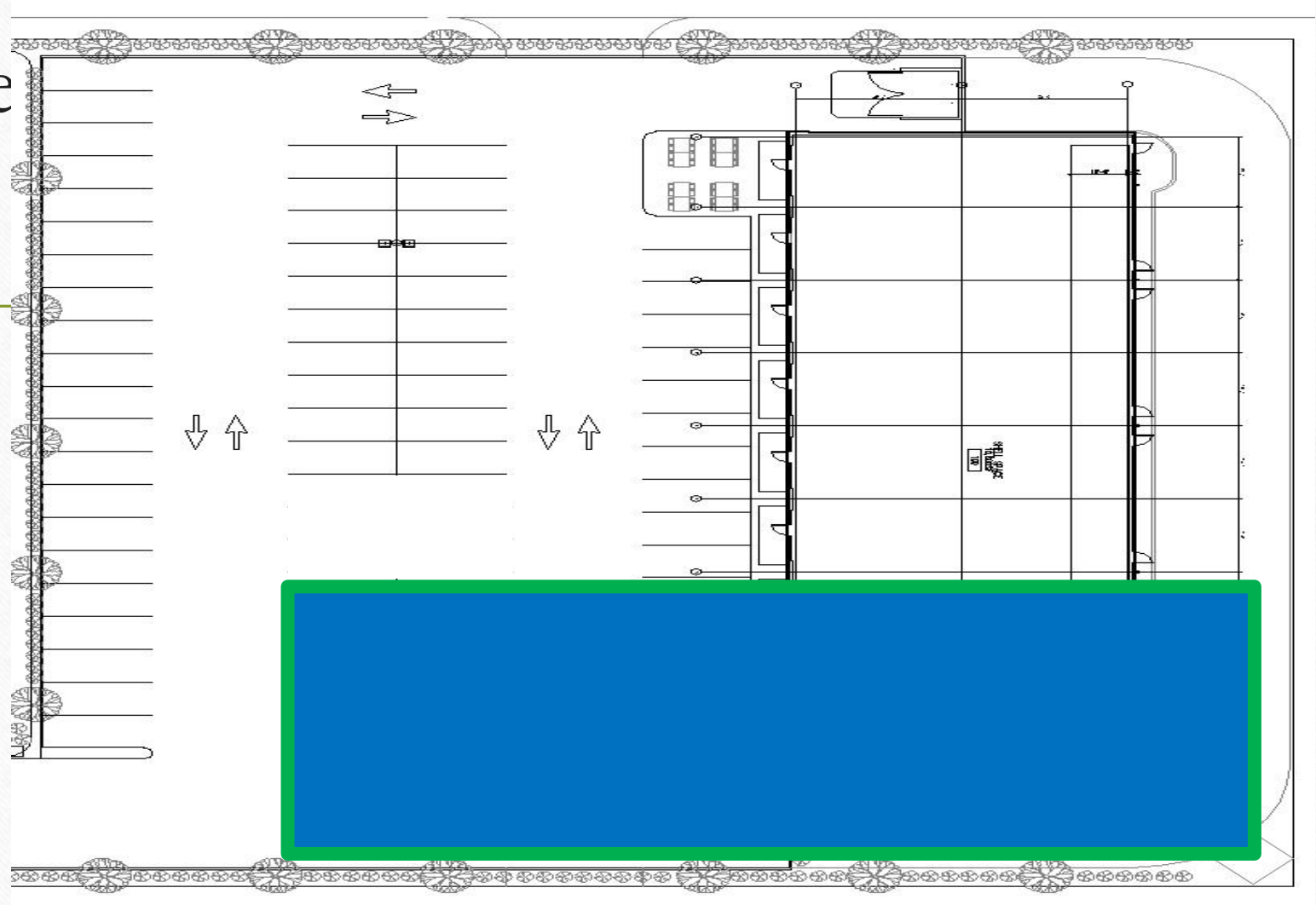
Option 2: Onsite Detention Pond

You can detain on site – on average you lose about 1/3 of your property to do this.

In this example you have lost 3 Units, and a corresponding loss of parking.

Comparable Lease rates for 3 units @ \$2,600/mo. (NNN)

Total Cost: \$93,000/year



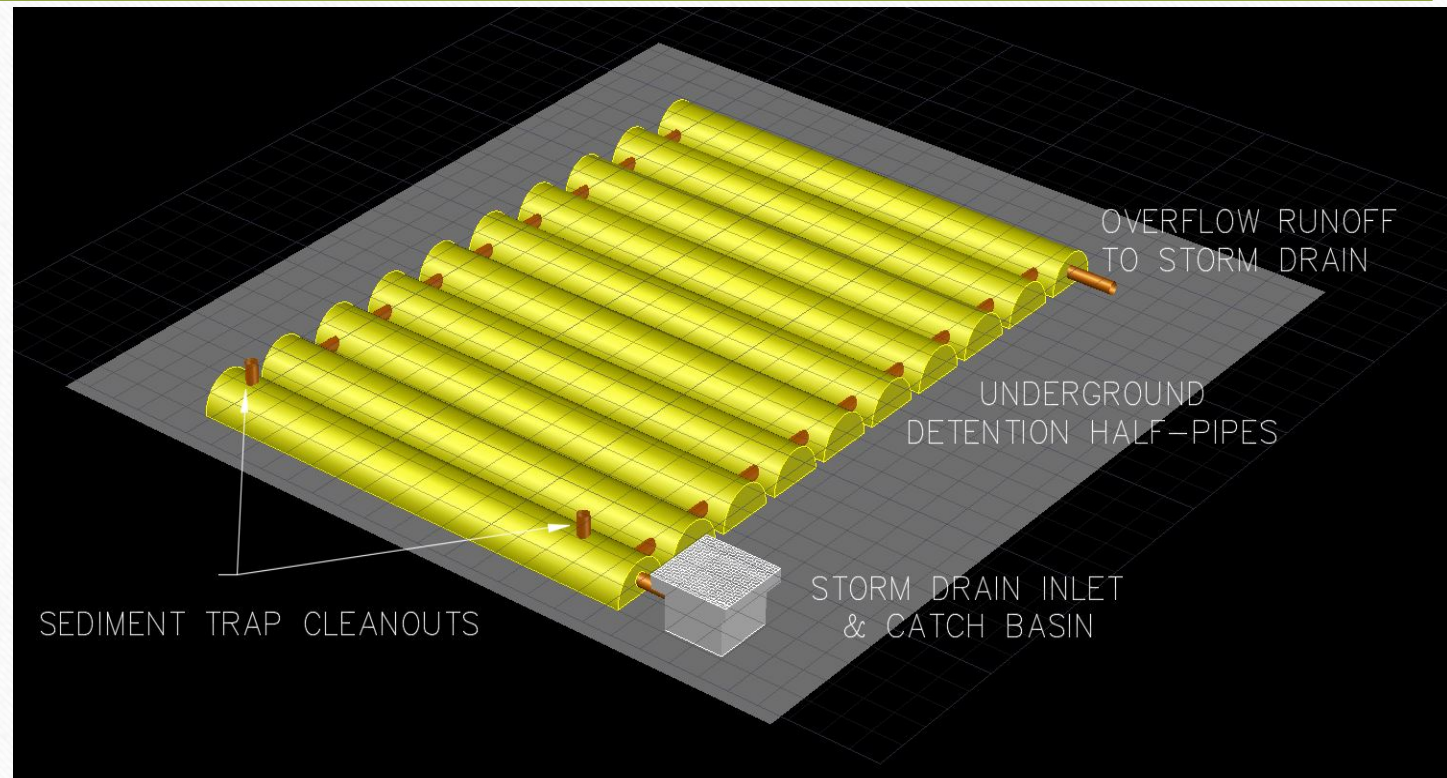
Option 3: Underground Detention

This is a Storm Chamber system.

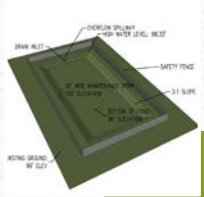
They are hollow, corrugated plastic half-pipes strong enough to support standard AC or concrete parking.

This system could detain and treat the required amount of water underneath the parking lot.

Installation and Materials =
\$211,000

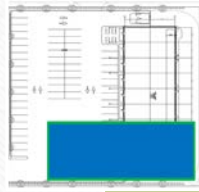


Which Makes More Sense?



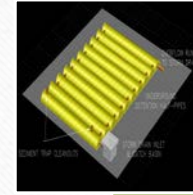
Option 1

- Offsite Pond
- \$325,000



Option 2

- Onsite Pond
- \$93,000/year



Option 3

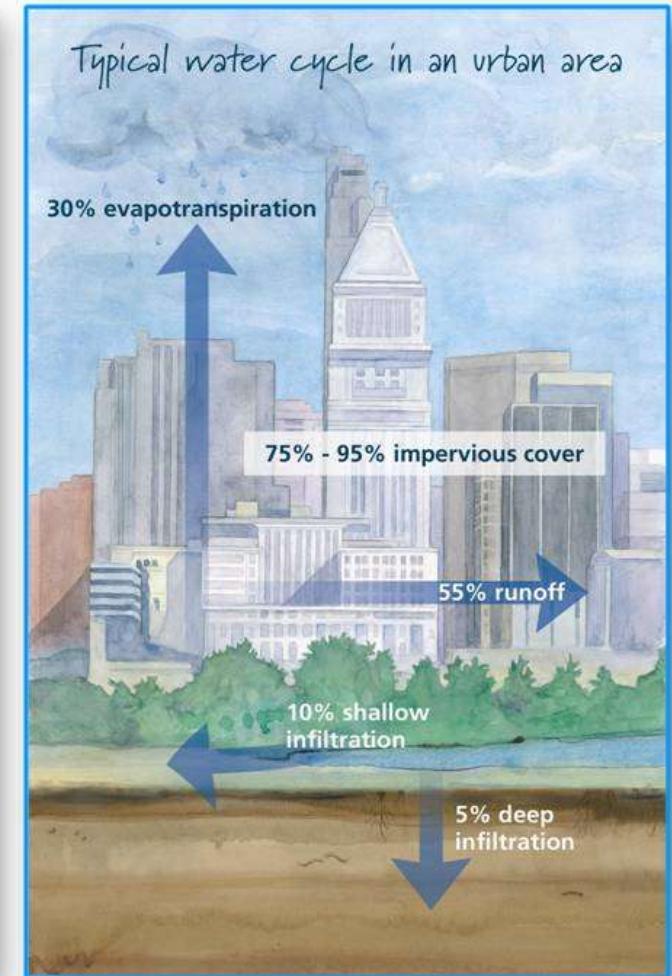
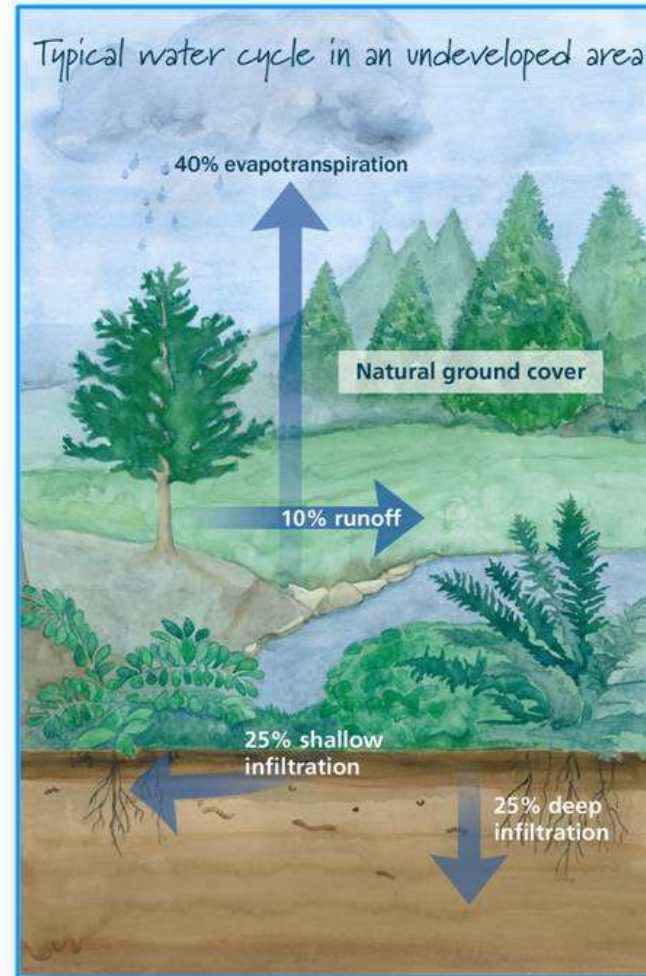
- Underground Detention
- \$211,000

Other advantages:

- In Ft. Bend County – the above ground detention pond itself counts against you as an impermeable surface – just like the parking lot!
 - By detaining underground, you are decreasing your impervious “footprint” which means your detention requirement will be much less!
- In Harris County, you get credits for using alternative methods that fall under the category of “Low Impact Development.”
 - Using standard detention, you must detain 0.55 Acre/ft. of water.
 - Using L.I.D. (like the Stormchamber system) your detention requirements drop to 0.35 Acre/ft. – a **40% reduction** of the amount of water to detain!

Low Impact Development

- Low Impact Development offers a responsible and efficient way to control erosion, flooding, and stormwater runoff.
- Urban development often leads to impervious surfaces (parking lots, roads, etc.) which don't allow the soil to absorb rainfall, causing water to divert into culverts, ditches, and streams. Untreated, this runoff can cause damage to the streams and in extreme cases, flooding.
- Different methods can be used to implement LID designs, allowing for flexibility based on the size of your project and the use of the site, from a single house to a big box store.



The L.I.D. Toolbox



- A Bioswale detains and treats stormwater using the roots of native plants and grasses.
- The roots of plants produce an enzyme that breaks down oil pollutants and traps heavy metals in the root system of the plants. These plants then use that “poison” as fertilizer!

The L.I.D. Toolbox

Permeable Paving

5th Street/Commons Park Construction Medford, Oregon
Hardey Engineering & Assoc. 2012



Mostly used in the form of porous pavers similar to cobblestones, these pavers slow the flow of water and allow it to soak directly into the ground as it would in a natural environment.

In the case of heavy rainfall or a clay subgrade, an underground drainage pipe can be used to collect excess rain and divert it to an area where it can be treated without flooding the parking lot.

Permeable pavers reduce the area required for detention, and the “voids” in the gravel base (40% of the gravel volume!) can be counted towards detention.

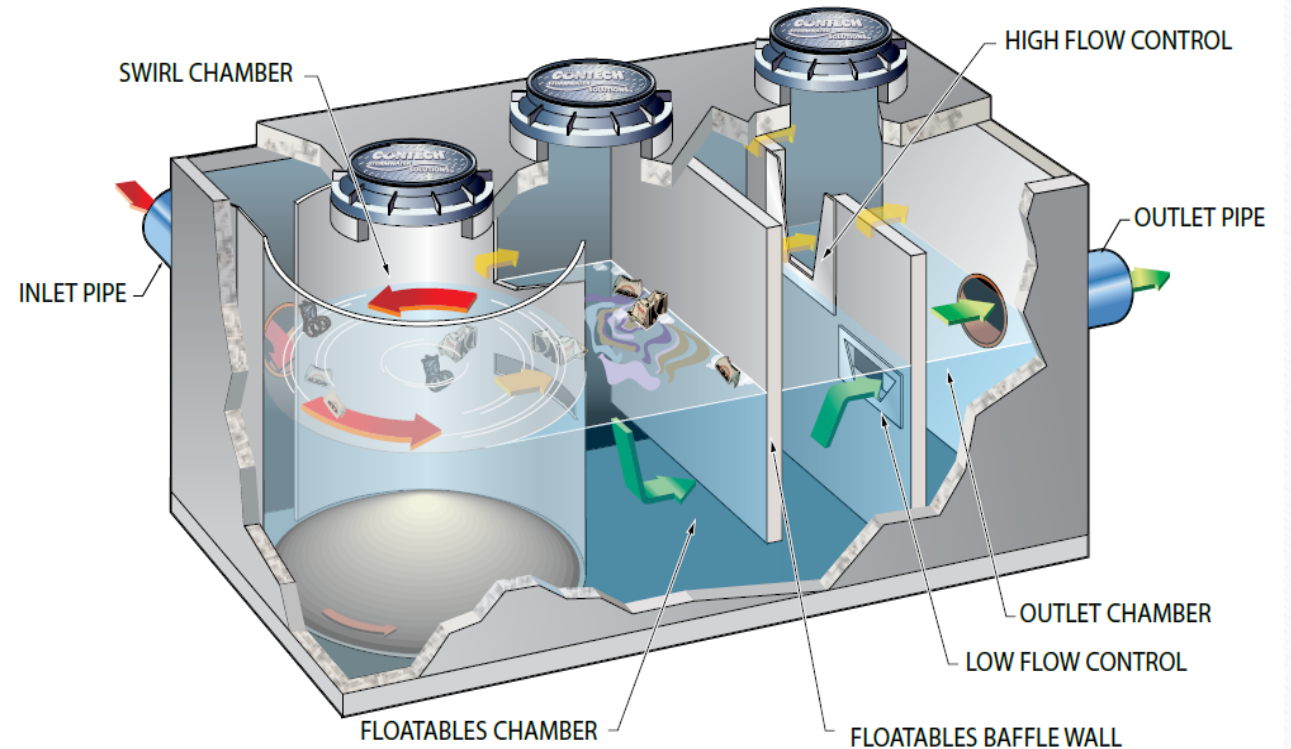
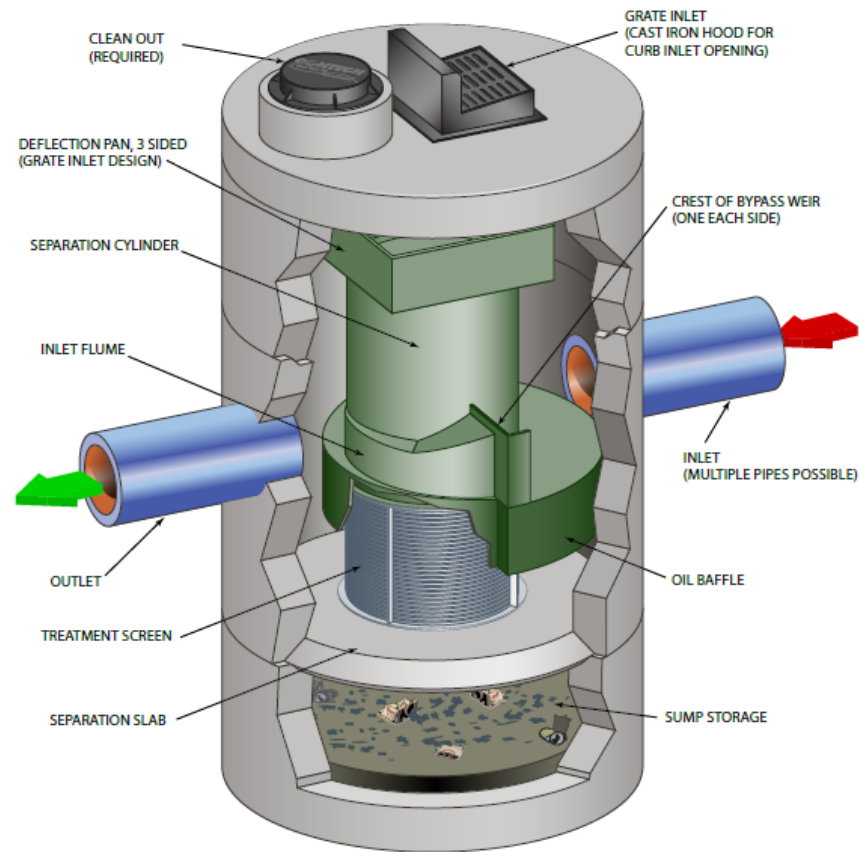
The L.I.D. Toolbox

- Tree Box Filters
 - This one is prefabricated from Filterra. (www.conteches.com)
- The underground box protects the roots of the trees, detains and treats the water, and prevents root damage to the surrounding paving.
- Most parking lots require trees as part of the landscaping – why not use that as storm treatment as well?

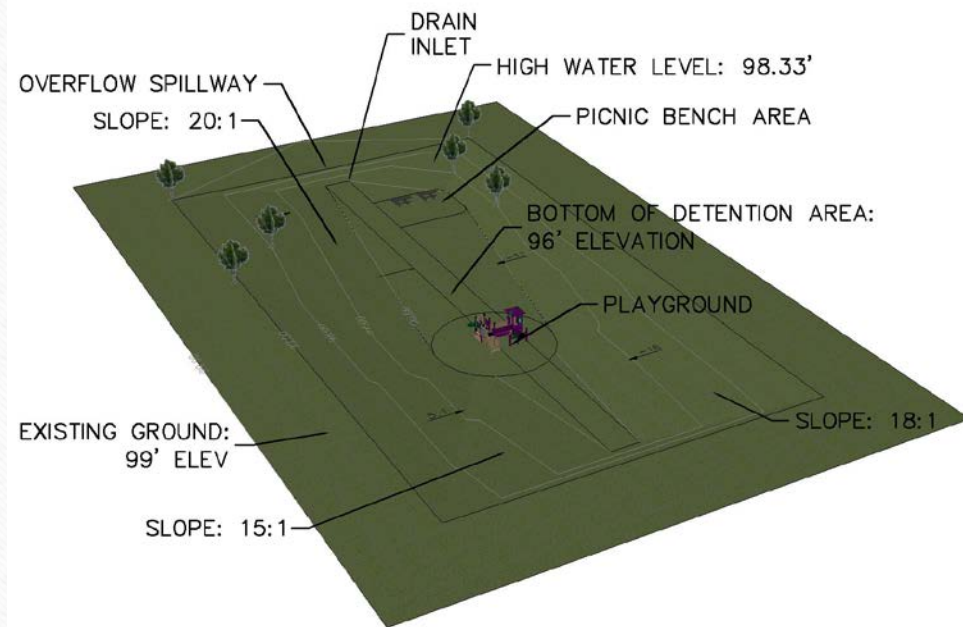


The L.I.D. Toolbox

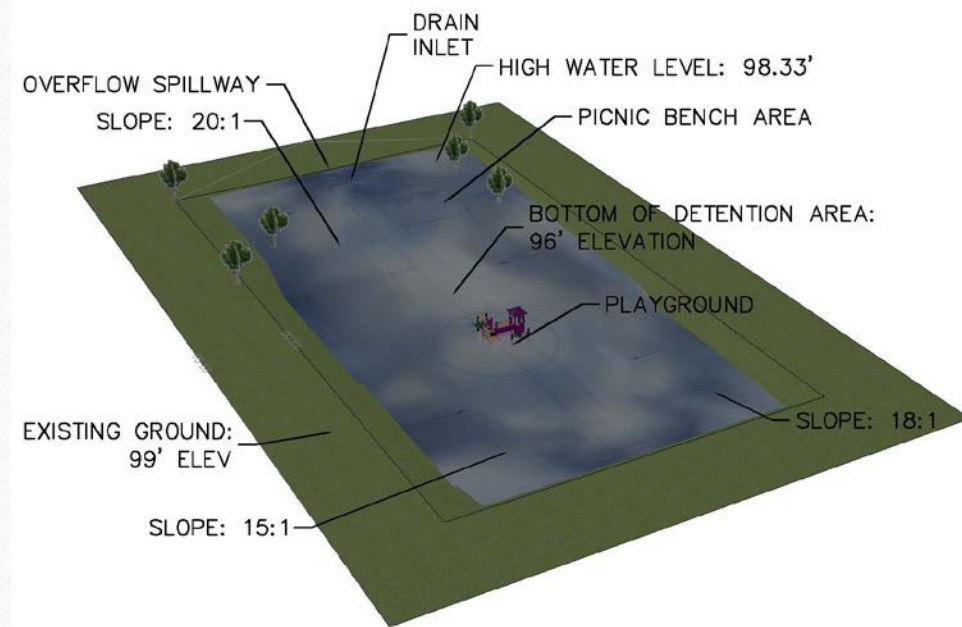
Hydrodynamic Separation and Detention



L.I.D. Doesn't have to be complicated!



TOTAL SQUARE FOOTAGE INSIDE DETENTION AREA: 2/3 ACRE
TOTAL CUBIC YARDS OF DETENTION: 1,350



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832-248-6254