

Making our Waters Great Again!

This is the first in a series of “White Papers” that point to opportunities and solutions to make our waters great again.

Volume 1, Suntree Filters: A Winner or a Waste?

YOU DECIDE IF THIS GRANT MONEY AND TAX DOLLARS ARE WELL SPENT

Table of Contents:

1. History of Suntree Organic Material Filters
2. Layout of Suntree Filters
3. Random Sample Filter Locations and Use
4. Financial Cost vs Benefits of Suntree Filter Baskets
5. Recommendations for Future

The City Perceived the Need to Reduce Organic Plant Material From Getting Into Our Canals. The Material Was Created From Landscape Trimming and Growth.

The Decision was Made to Install Filters at Most Swale and Curb Drains. No council vote to approve this type of exppediture.

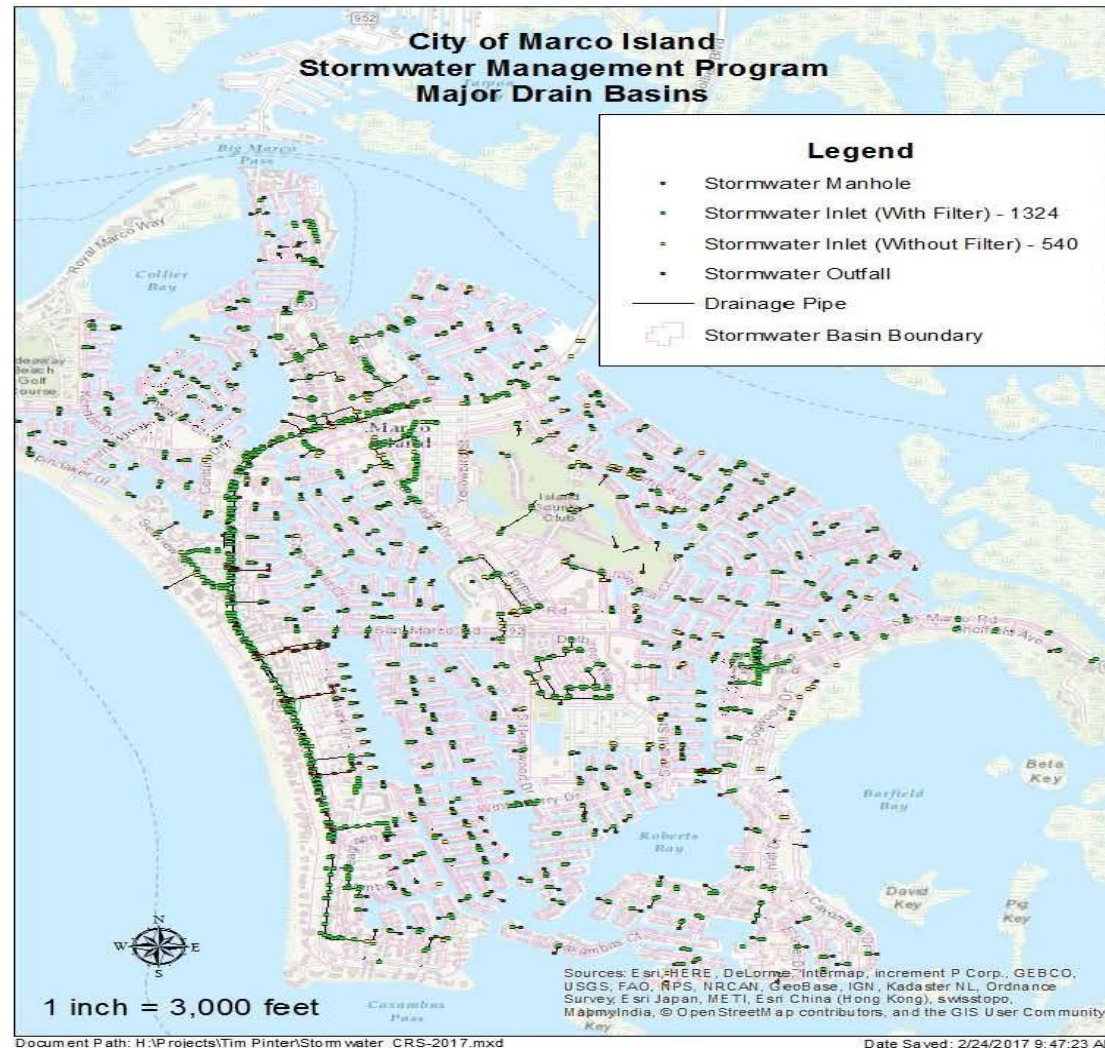
After Reviewing Filter Options, the Suntree
Filter Basket was Selected by City.

(Not sure how the City determined the use of
Filters vs. other options such as use of swales
for retention then conveyance, etc.)

Filter Basket Status

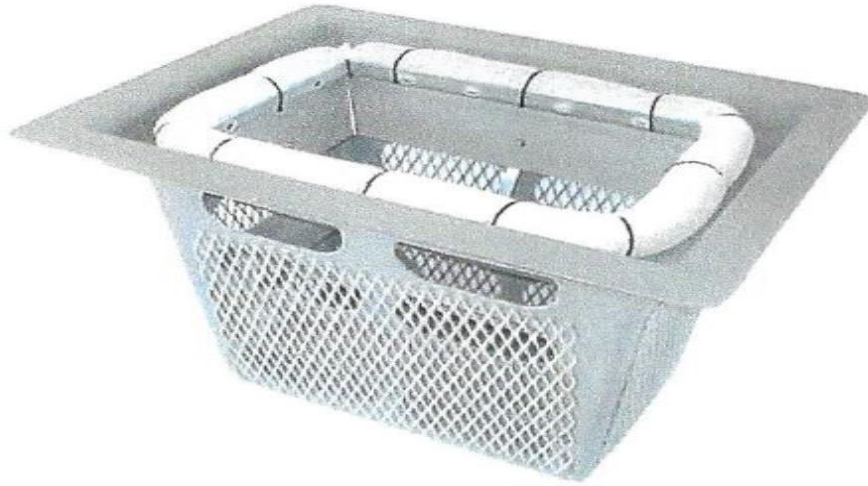
- **2006 The City begins purchase of Suntree Filter Inlet Baskets**
 - As of 2018, the City has purchased and installed 834 Suntree Filter Inlets at a cost of \$731,557.
 - 490 filter inlets have been installed by various private and public contractors citywide at no direct cost from the City. (Free?)
 - Total Grants received from SFWMD from 2006 to 2018 equals \$730,000
- 1324 Baskets Installed So Far.
- The City continues to budget for more Suntree Filters with tax dollars.

Total Drains on Island. 2/3 Have Suntree Filters



What does a Suntree Filter Grate System Really Look Like?

The Suntree Filter System (City Slide)



Current Stormwater Equipment

Suntree Grate Inlet Skimmer Boxes

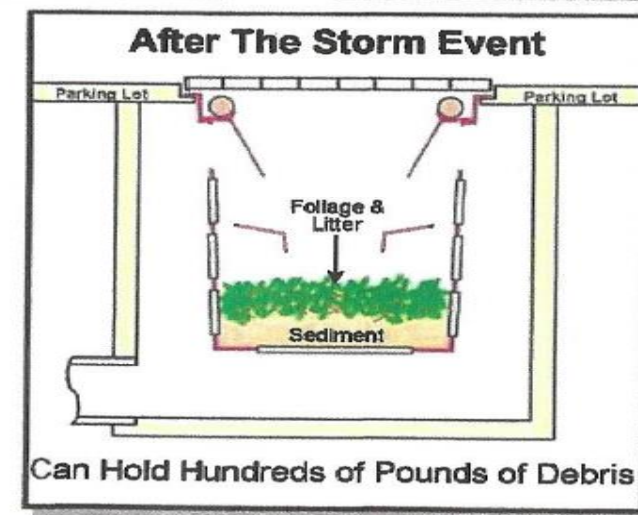
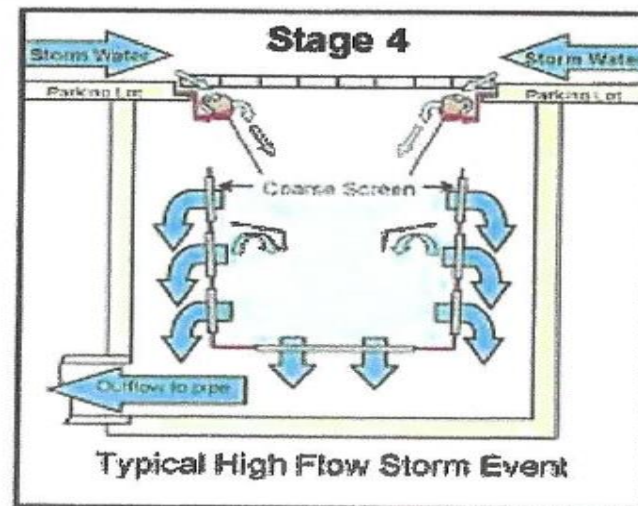
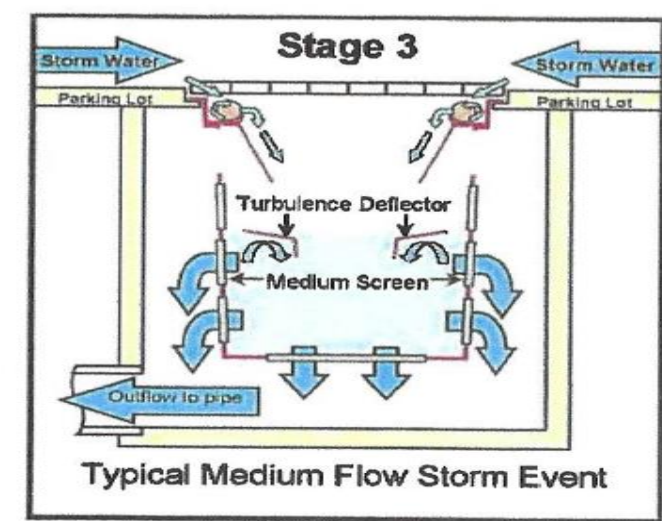
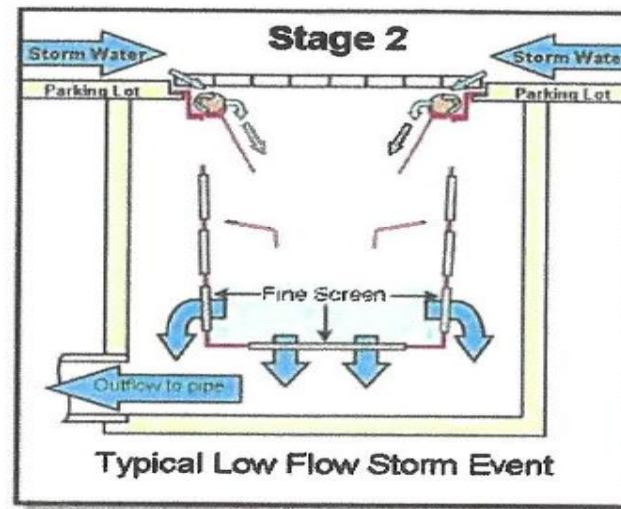
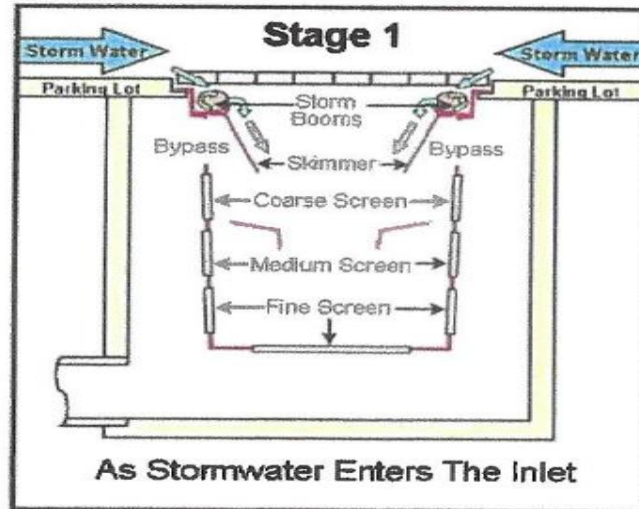
1324 Boxes installed



The Boom Filter Media is supposed to absorb oil and contaminants in storm water. Manufacturer recommends replacement every 3 months.

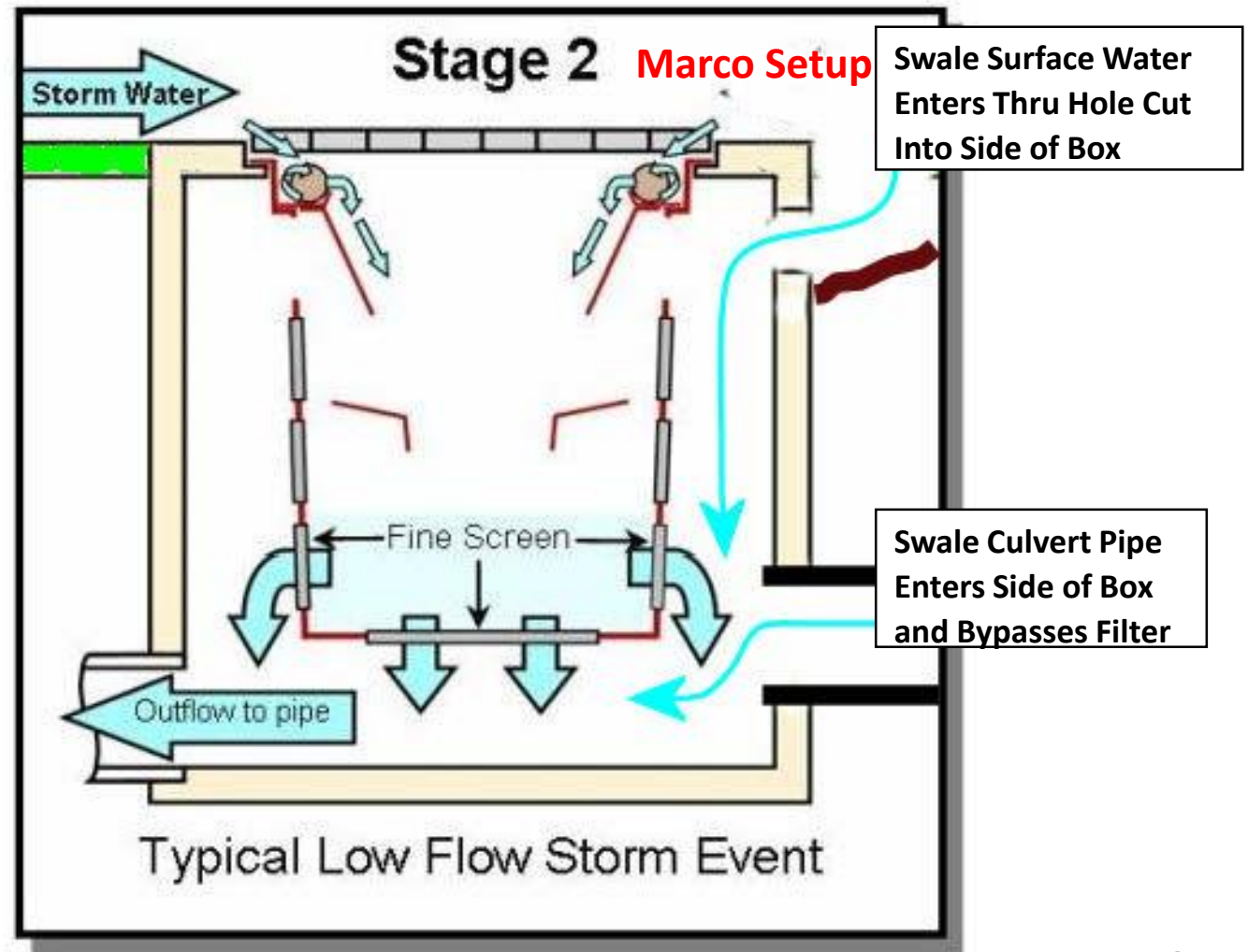
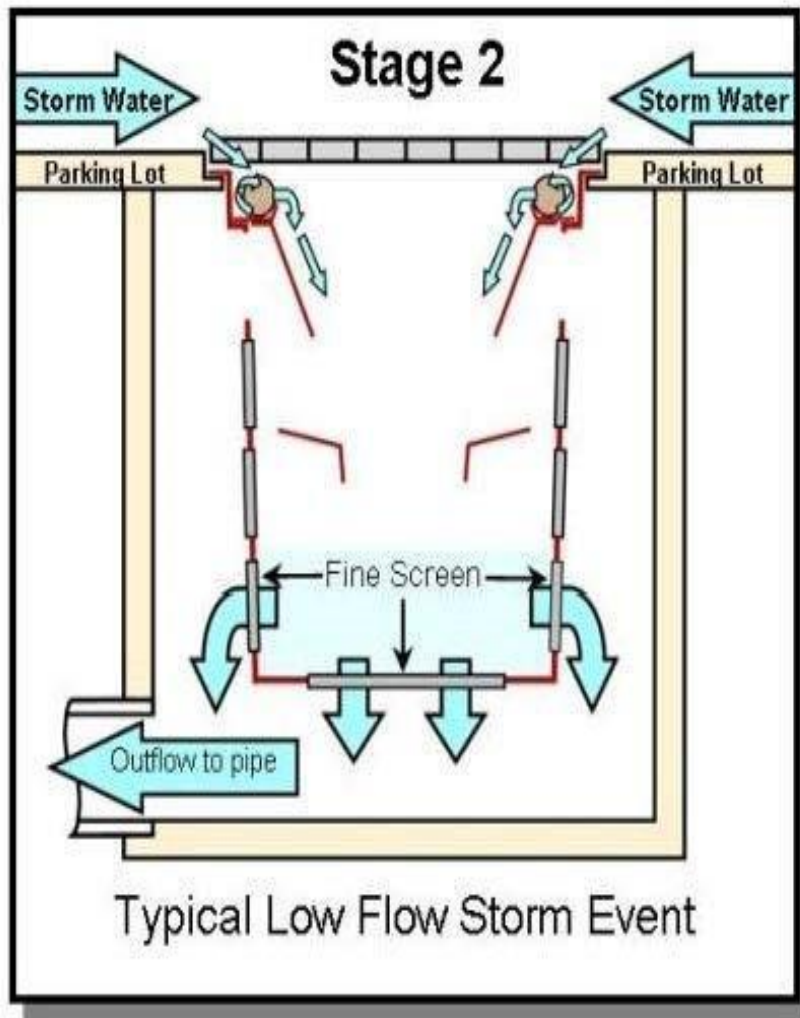
How Suntree Grate Inlet Boxes Work

(City Slide as to how they are supposed to work)



Hundreds
of
pounds?
Not likely.

Left View is Design. Right View is Typical Marco Swale Use.
Most or All Runoff Bypasses Filter During Rain. \$\$ Wasted



Suntree's Installation Instruction Video



Based on these numbers, Marco has the most Suntree Filters per capita in the State!

MUNICIPALITIES WITHIN THE STATE OF FLORIDA THAT CURRENTLY USE SUNTREE FILTERS

Orange County, Florida	1600 Suntree Inlet Filters
City of Orlando, Florida	300 Suntree Inlet Filters
City of Key West, Florida	250 Suntree Inlet Filters

The City of Key West compares favorably with Marco Island based on drainage area and number of Filtered Inlets.

The Existing Filter Boxes Are Not Effective in Capturing Organic Material

CONTRIBUTIONS TO THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) FOR A MS4 PHASE II PERMIT FOR THE CITY OF MARCO ISLAND

- City of Marco Island must submit an annual report documenting the use of control measures to enforce the PHASE II MS4 PERMIT
- Permit Control Measure No. 6a, Task 02 and 03 Storm System Maintenance

□ 2016 City cleaned all 1324 filter inlets and recorded 13,599 pounds of debris removal **Note: this equals 10.27 lbs per junction box, not the Filter Box.**

□ 2017 City cleaned all 1324 filter inlets and recorded 8,000 pounds of debris removal. **Note: post Irma this equals 6 lbs per junction box, not the Filter Box**

Random Sample Inspections of Marco Island Suntree Brand Filter Installations

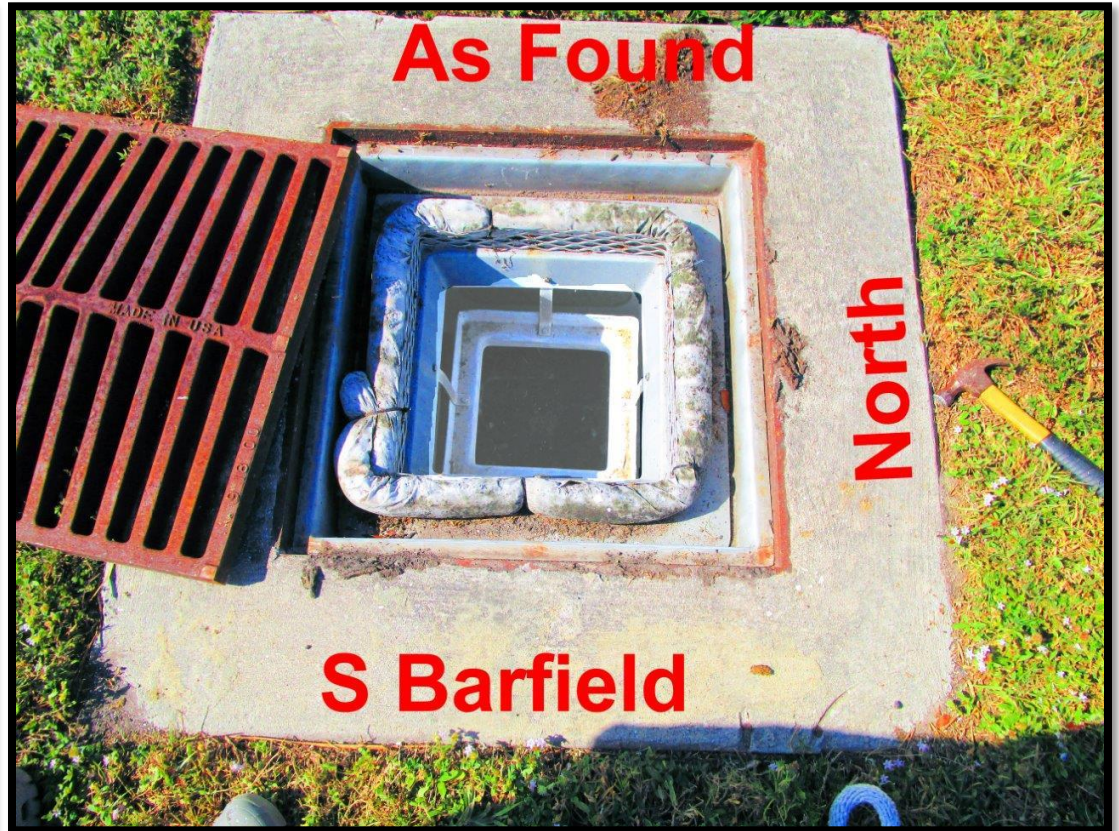
Inspections Performed December 2018

879 S. Barfield

Flush to ground level, grate easily removed by two people. City Purchased \$\$ Forklift not needed.



Top of Filter Box with Boom Filter. Only one Found During Inspection. It is old and Ineffective. Replacement Not per Manufacturer's schedule.



The Suntree Filter System!!

879 S Barfield



Boom Filter Media Long Overdue for replacement. Manufacturer says to replace quarterly. No Debris Trapped

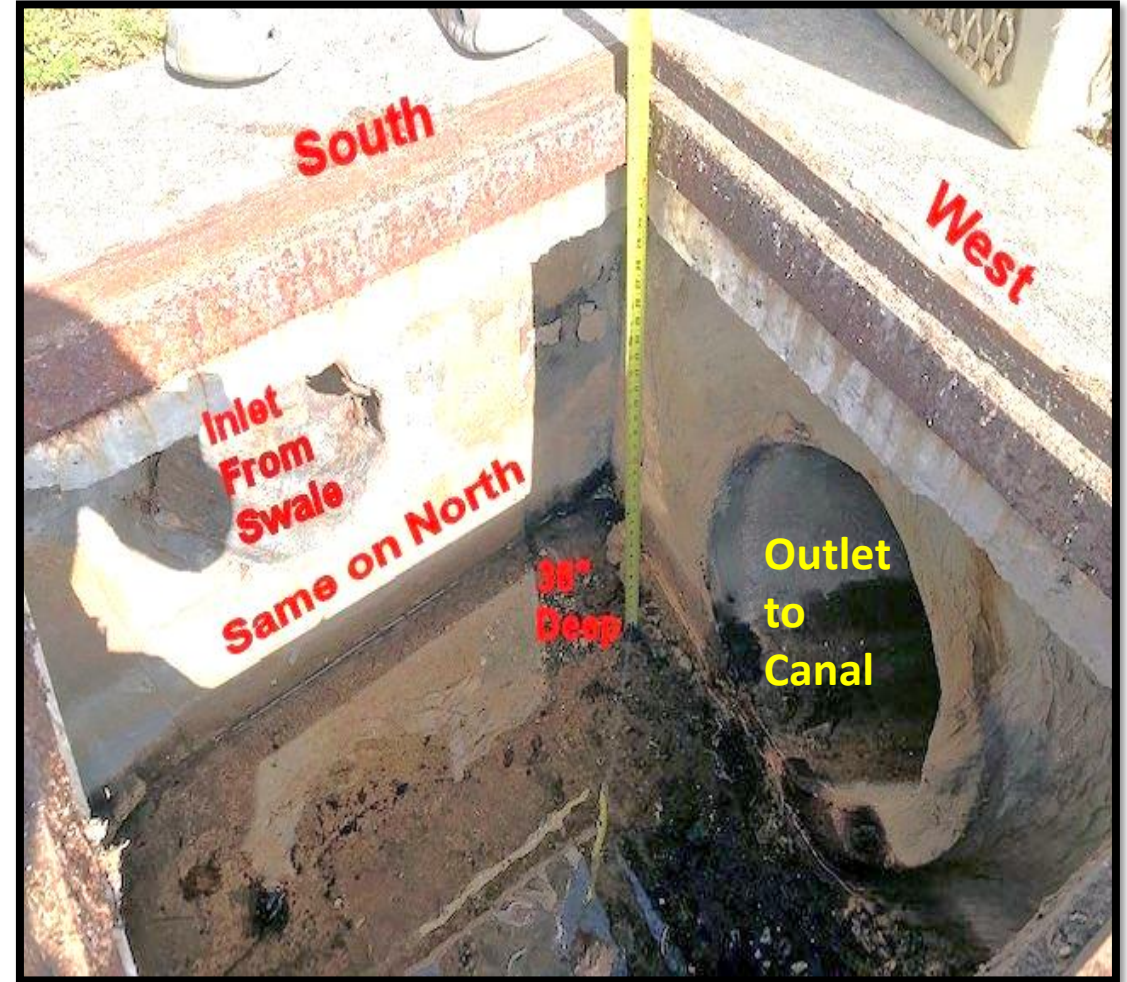


No Benefits Possible Due to Layout of Junction Box

Storm water flows Bypasses Basket!

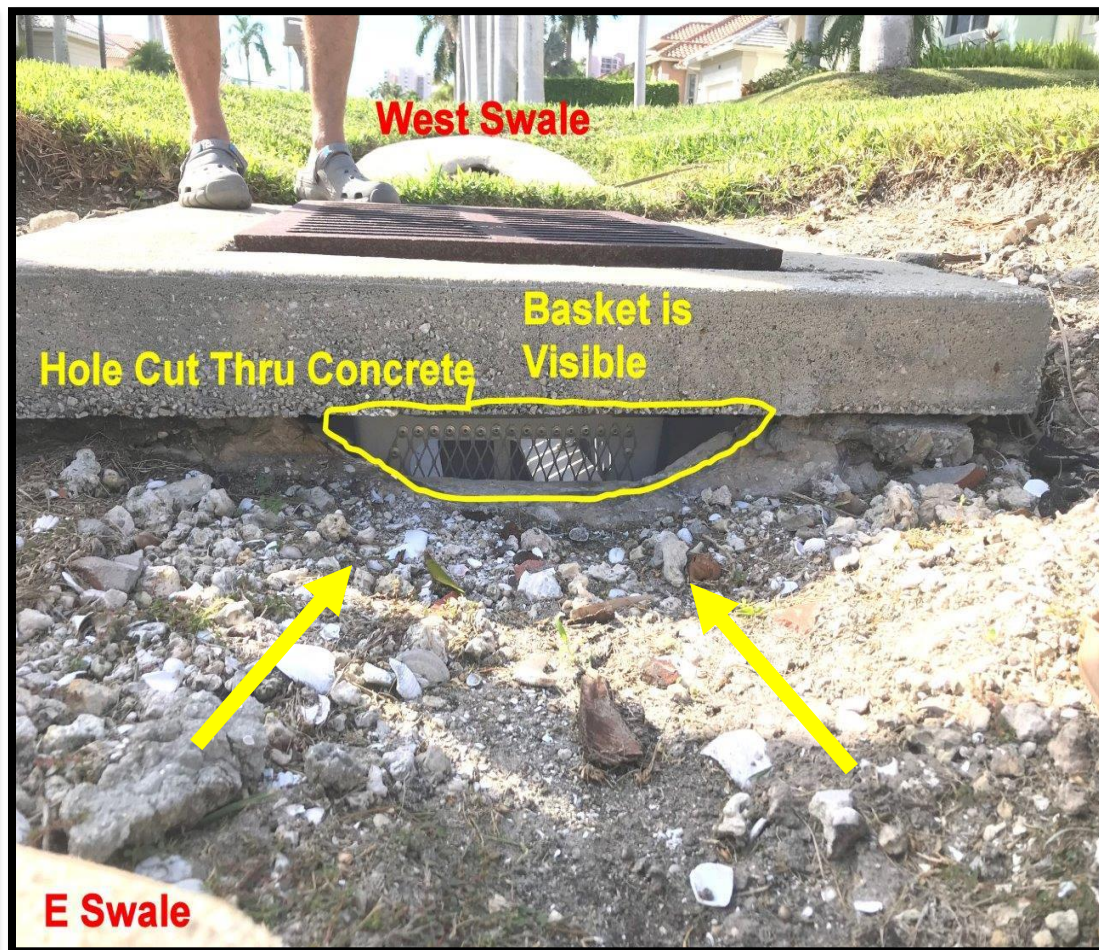
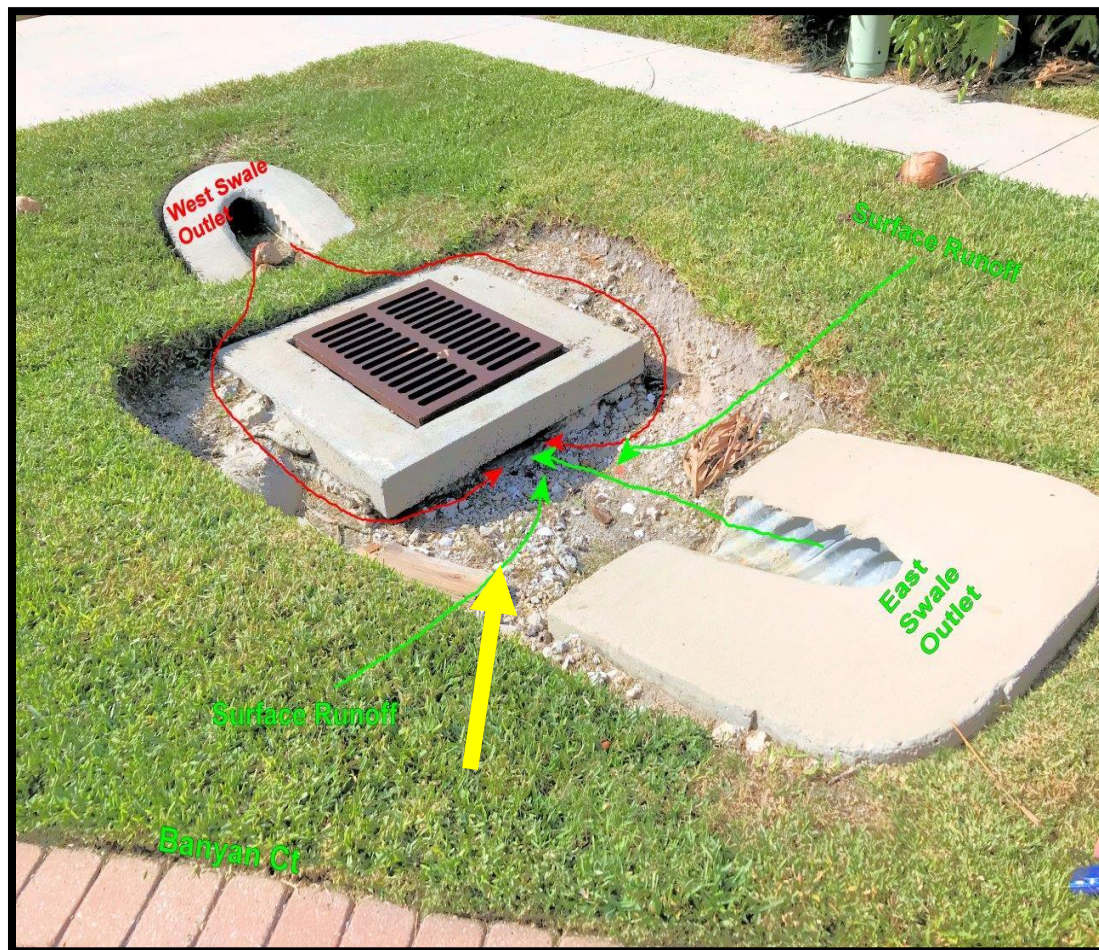


Filter Basket Depth 24 inches



Box and Inlet Pipes Depth 36 inches So Basket 12" off Bottom. Not Effective. Water and Sand in Box

863 Banyan Ct.



Storm Water Flow Bypasses Filter Basket Thru Hole Cut in Side of Concrete Box!

863 Banyan Ct.



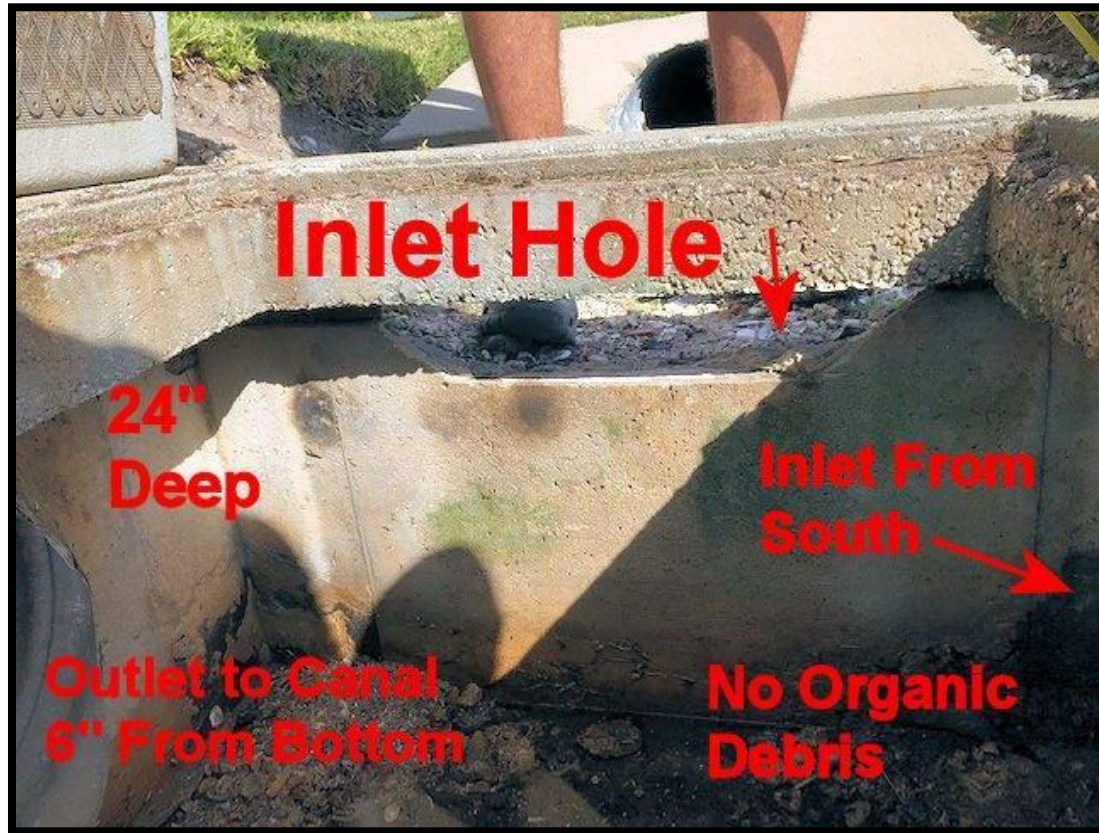
Filter Boom Missing



Filter Basket is Shorter Than Concrete Box

863 Banyan Ct.

Suntree Basket Actually Blocks Water Flow to Outlet to Canal



Box depth 24 inches. Note size of Inlet Bypass Hole



"Debris" is Sand & Gravel Blocking Pipe which accounts for most of the pounds removed as claimed by the City

863 Banyan Ct.



**Inlet and Outlet flows miss Filter Basket totally,
Basket Impedes water flow, no swale runoff
water can enter the basket**



**A Few Fresh Mowed Grass Clippings is all that
is captured vs Storm Water Debris Runoff**

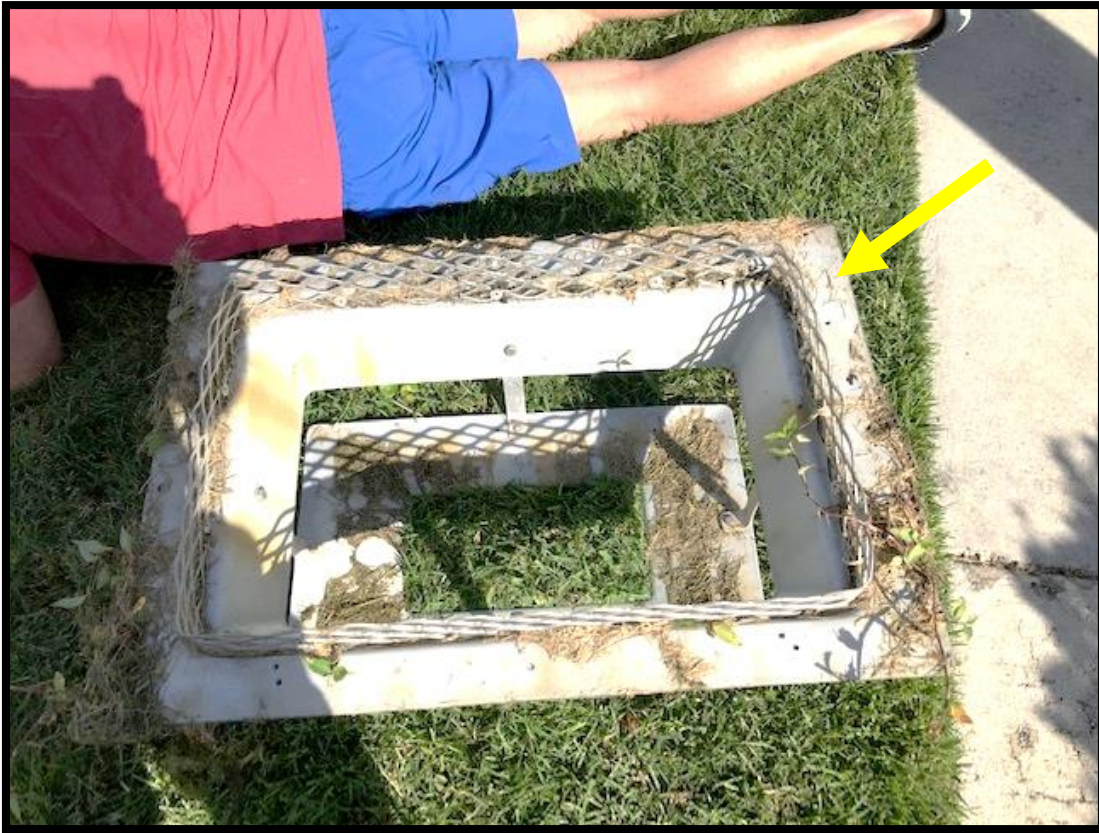
860 Banyan Ct.



Typical Swale Drain



860 Banyan Ct.



No Boom Filter Found in Basket



Filter Basket 19 inches Deep-
Found Empty

860 Banyan Ct.



Junction Box depth 26 inches deep with outlet to canal. Runoff enters box thru Hole Cut in side of box



View From Inside Box. Hole Cut In Side Lets Swale Runoff Bypass Filter Basket. Defeats Purpose Of Filter. Not Exactly Best Practice. Tiny Debris. \$\$ Wasted

Great Planter Boxes & Worst Practice SWM



Heck of Job

Cost / Benefit (City Data)

- At approximately \$1,000 per Suntree Filter system, Marco has invested approximately \$1.3M in Grant Money and Tax Dollars. Estimated Life of Filter Basket is 10 years. Amortizing the investment is \$130,000 per year. For the 1324 Baskets, cost is \$100 per Basket. Estimated annual Maintenance cost is \$300 per Filter Basket. **Total cost per Basket/year is estimated at \$400 or \$530,000 total per year.**
- Total Organic Debris cleaned from Filter Baskets was 8000# in 2017. Equates to 6# per Basket
- **Cost is \$66 per pound to capture grass clippings in 2017.**
\$530,000/8000 / Lb
- Claimed Water quality objectives are enhanced (**Totally Unquantified**)
- Claimed Environmental preservation and pollution reduction objectives are enhanced (**Totally Unquantified**)

Condensed version of Estimated Costs and Reported Benefits from 2018 City slide deck. No reported Benefits are measurable in terms of water quality improvement. Looks like most debris captured is not organic.

**But we keep adding to the problem!
City is Adding More Costly and
Ineffective Drains and Outlets to Canals.**



1090 Dana Ct.

Close the Storm Inlet Gaps on Collier Blvd Curbs



Organic material entering Collier Blvd
Storm Water Inlet December 2018



Install a suitable Grate barrier to
eliminate large Organic debris from entry

Conclusion and Comments:

Present Program is not effective in eliminating organic waste from entering waterways. Test results show water quality getting worse, officially FDEP impaired or N in 2017. Test locations are worst for N in middle of the island per Turrel Hall Report.

Present filters require changing 4X a year (Marco Does it 1X) and even at once a year, don't seem to be cost effective if it costs \$66 to capture a pound of organic material.

Suntree Filters are not cost effective. Need to abandon use and reallocate resources to where justified.



Recommendations

Recall that Council approved two Staff level positions during Mr. Niblock's short tenure that would report directly to the City Manager. One was for a Public Relations position, the other was for a **Storm Water Engineer**.

The City hired a Storm Water Engineer but not at Staff level.

Introducing:

Jason Tomassetti, P.E.

Stormwater Engineer

Public Works Department (Wrong as approved by Council)

City of Marco Island

239-300-1462

We need to more effectively use Mr. Tomassetti, our City "Staff" expert, to focus just on storm water quality issues and present Staff Report to City Council on-going.

What can be done NOW

1. Remove the non-functioning Suntime Filters which will allow vacuum truck to reduce debris removal time; maintenance savings.
2. Eliminate bypass holes on junction boxes and swale drains.
3. Raise the Swale Drains 6-8 inches using a concrete Stormwater Collar to allow retention first, conveyance second.
4. Start Monthly water testing NOW to monitor our progress. Use the budgeted money from cancelled and removed Suntime Filters, to fund it.

What can be done NOW

5. Regrade Swales to restore depressions with City's newly purchased Gradall Excavator.
6. Add swales to homes that were CO'd by the City with no front swale.
7. Add Curb Drain Screens to prevent foreign organic matter from entering storm drains.
8. Meet with the FDEP representative that is administering the NPDES program and present a plan for consideration, discussion and consensus."
9. Elevate Storm Water Engineer to Staff level position as approved by Council.