

# KEYNOTE



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SITE CIVIL IMPROVEMENT ↔ EROSION CONTROL ↔ SURFACE WATER QUALITY

GeoPro® Learning Tool

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## *Nutrient Separating Baffle Box* Storm Drain Treatment Systems

### **AFFORDABLE, FULL-FLOW STORM DRAIN SYSTEM WATER QUALITY IMPROVEMENT**

Storm drain systems remain a consistent contributor of contaminated discharges into down-gradient water bodies and other sensitive ecosystems. Likely, they will remain a contributor for some time. But, significant improvement in the quality of discharged water is available, economically, via a change in how we approach water treatment within drain systems.

#### **Prevention of Contaminant Development**

Nearly all drain systems use some form of a sump to collect soil particulate, organic, vegetal and litter contaminants. To date, including the newer pre-treatment devices, all 'sumps' trap the contaminants below a static water level at the point of entrapment. In doing so, the organic materials decompose within the water pools forming a septic brew rich in COD, BOD and bacteriological contaminants. And with the decomposition comes an undesirable change in the physical characteristics of the contaminants, i.e., they become more readily suspended or have become solubilized. In turn, this physical alteration leads to significant flushing of the 'brew' during successive runoff events. The end result is a highly contaminated downstream discharge, perhaps worse than if no treatment had been attempted.

The effectiveness of all such systems is directly proportional to the amount of energy and time devoted to maintenance. Improvements have been made to reduce hydrocarbon and other liquid organic compounds via the use of adsorbing and absorbing booms as well as traditional hydrocarbon-water separators. Again, these require vigilant maintenance to remain effective. Unfortunately, economics do not always fall in line with

environmental health and particularly so with the decomposition of organic matter within water bodies. Significant increases in BOD, COD & bacteriological contaminants occur within the first few weeks of entrapment ... and budgets do not allow for sump clean outs at such tight intervals. Hence, conventional sump-based storm drain systems contribute to poor water quality discharges.



Vegetation & litter trapped in NSBB screen system

Significant, affordable discharge water quality improvement is possible given the separation of organic, vegetal and litter contaminants from static water levels inherent within drain systems - sump areas and base flows. That is, if the nutrient rich organic mass can be kept 'dry', the decomposition process is thwarted. Septic 'brews' and their odors, high bacterial counts, dissolved nutrients, particulates



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# KEY NOTE

and BOD/COD loadings are eliminated. Successive runoff event flushes do not transport heavy contaminant loadings to system outfalls ... receiving waters and ecosystems are impacted far less.

*Suntree Technologies, Inc.* storm drain treatment devices separate the vegetal and litter contaminants from permanent water levels using a unique system of screens/baskets. Storm flows deposit vegetal and litter contaminants onto screens or within baskets which are positioned above the static levels, allowing these materials and attached particulate contaminants to dry out. In turn, septic conditions are eliminated, i.e., large bacterial count increases, increased nutrient solubilization and ensuing releases as well as higher COD and BOD contaminants are all minimized.

Separation of vegetal and litter materials from static water levels within storm drain systems is CRITICAL to down-gradient ecosystem quality - and the health and safety of humans interacting with these ecosystems.

flows. The logic in developing and using partial-flow treatment stems from the belief that 'first-flushes' carry most of the contaminants into storm drains. Perhaps this logic is correct for liquid organics [parking lot car 'drips'] and very fine soil particles, but it falls far short of environmental protection when consideration is given to vegetal matter, litter, particulate nutrients and all of the pesticides, herbicides and other 'attached' contaminants that enter storm drains during moderate to severe runoff events.

Rationalization for using partial-treatment systems has developed, also, as a result of economics. Because currently marketed partial treatment systems use a 'sump' [see previous section] for contaminant capture and holding functions, the cost of full-flow treatment has not been economically possible.

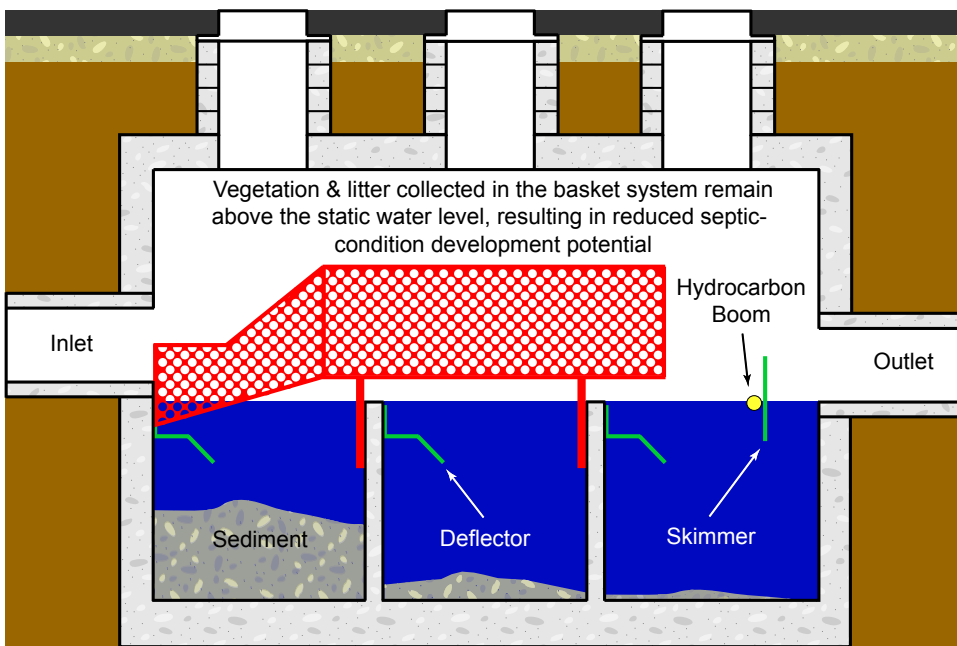
**Nutrient Separating Baffle Boxes** treat an entire storm drain system or a major zone of a large system.

Typically, **NSBBs** are designed and installed to treat maximum system design flows, not just first flush quantities. As a result, large organic and debris loadings introduced by moderate and severe runoff events are separated from the static water just like the loading from lower flow rate events. This performance range capability is unique to **NSBBs**.

Because NSBBs use a flow-through mechanism for capturing most particulates, the system size can remain relatively small, create little head loss between or during events [allowing retrofits to most existing storm drain systems] and are easily maintained, they represent the system of choice when Phase 2 compliance is required and lowest cost per treated flow volume is desired.

*Suntree Technologies* **Grate Inlet**

**Skimmer Boxes** and **Curb Inlet Baskets** accomplish the same organic separation function as do **NSBBs** and similarly treat whole design flows rather than partial flows. However, their use is intended for individual flow contribution points into a drain system, e.g., such as catch basin and curb inlets.



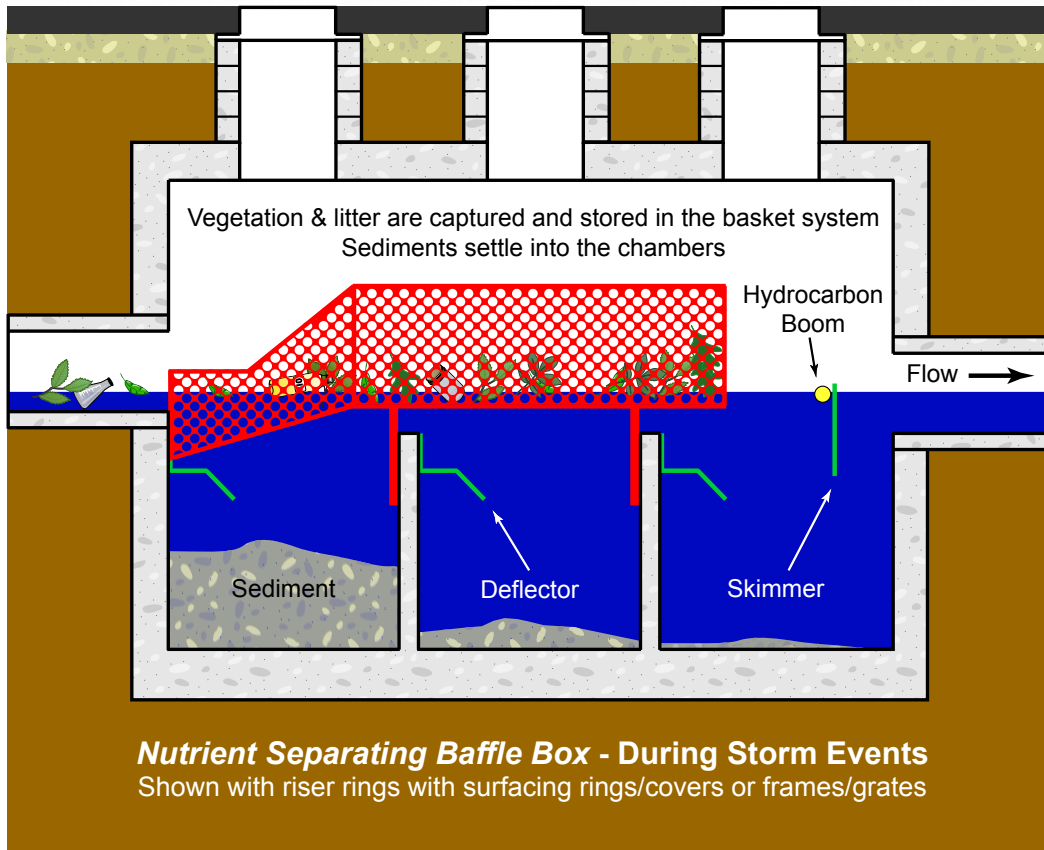
## **Nutrient Separating Baffle Box - Between Storm Events**

Shown with riser rings with surfacing rings/covers or frames/grates

### **Flow Treatment**

Traditional basin sumps 'treat' little of the storm flow during all but the smallest of runoff events. With the exception of *Suntree Nutrient Separating Baffle Boxes* [NSBB], all 'whole-system' pre-treatment products treat only a small fraction of many storm

# KEY NOTE



enforce Phase 2 TMDL limitations, prioritizing the reduction of bacteriological, nutrient and particulate contaminants, sump and partial-treatment systems will be disallowed and replaced ... some communities are already taking such proactive steps. Regulators now have performance-enhanced alternatives to conventional systems without mandating undue economic hardship on project owners. Similarly, designers have the ability to assist their clients achieve environmental compliance at a reasonable cost - both during and post construction. Further

## Key Design and Regulatory Considerations

With the introduction of the significantly improved technologies that *Suntree Technologies* products offer, treatment of storm drain flows is not only possible, but also economically feasible. As regulatory jurisdictions

information regarding all three *Suntree Technologies* systems is available by calling your *Price & Company* **Regional Representative** or visit:

[www.suntreetech.com](http://www.suntreetech.com)



Leaves captured by NSBB screens - held above static water level



For more Key Notes and product features visit

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