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STORMWATER SOLUTIONS INC.

October 15, 2007

Dr. Xavier Swamikannu
320 W. 4th Street, Suite 200
Los Angeles, CA 90013
RE: SECOND DRAFT VENTURA COUNTY MS4 PERMIT (NPDES PERMIT No. CASOO4002)

Dear Dr. Swamikannu,
Thank you for the opportunity to comment on the second draft of the Ventura County permit. It is clear that some of the comments on the first draft were taken into consideration in preparation of this draft, and that good progress has been made. My comments will be directed mainly at outstanding issues in the Planning and Land Development Program section that affect the selection, design, operation and maintenance of post construction BMPs. In addition to the discussion below, I have attached a summary of suggested changes to this letter.

BMP Selection Hierarchy
I am sure that most stakeholders in this permit development process share the goal of limiting the impact of development to the maximum extent practicable. Finding 2 in the draft permit succinctly captures this goal by stating:

"The objective of this Order is to protect the beneficial uses of receiving waters in Ventura County. To meet this objective, the Order requires that Best Management Practices (BMPs) will be implemented to reduce the discharge of pollutants in storm water to the maximum extent practicable (MEP), and achieve water quality objectives and standards."

Unfortunately there are provisions in this permit that potentially conflict with that objective. Specifically, in the Planning and Land Development Program, Part 5, Section E.I.1.e, a hierarchy is introduced which seems to supplant the goal of creating low impact developments with a goal of implementing "low impact development strategies" on all sites.

(1) Low Impact Development Strategies (see the following section E.III.2).
(2) Integrated Water Resources Management Strategies.
(3) Multi-benefit Landscape Feature BMPs.
(4) Modular/ Proprietary Treatment Control BMPs.

This hierarchy is at best confusing, and at worst is counter to the stated objective of the permit. It is confusing because none of the terms are defined and many BMPs or BMP suites could fit into several categories. For example proprietary BMPs, like porous pavement, infiltrating chambers and modular bioretention cells fit equally well under preferences 1 and 4. A large swale that treats runoff before it leaves the site could be considered to be satisfying preference 1, 3 or 4. Water harvesting approaches using cisterns and water distribution systems may contain modular treatment elements and could fit under all of the preferences. To illustrate this point I have attached an "LID line card" which describes several proprietary, modular BMPs offered by CONTECH Stormwater Solutions which satisfy the goals of low impact development.

Depending on how this hierarchy is interpreted, it may lead to policies that contradict the permit objective. For example, swales and filter strips probably qualify as LID BMPs, yet according to the International BMP Database summary report, they are among the worst performing conventional BMPs for most common stormwater pollutants, and are actually more likely to increase bacteria and nutrient concentrations than reduce them. They are also likely to be irrigated, fertilized and treated with pesticides and herbicides. Sand Filters and some proprietary media filters are significantly more effective for most pollutants, but would be considered to be a last resort since they are modular and/or proprietary. In

another example, underground, proprietary BMPs can be designed to provide superior treatment control and volume control on commercial sites were spill containment, pollutant sequestration, and trash storage is required. They may be more protective of wildlife, public health, aesthetics or other uses of the overlying land since pollutants are stored out of contact with humans and the natural environment. Such solutions would be discouraged by this permit when they may in fact be more suitable than landscape based BMPs

This hierarchy should be removed because it does not distinguish between mitigation approaches on the basis of performance. For example, the fact that a BMP is modular or proprietary has no bearing on its performance. Also, LID may not necessarily be the best strategy where heavy pollutant loading is expected or where infiltration is not feasible. Most disappointing is the effect such a hierarchy has on entrepreneurship. There is little incentive to develop novel BMPs if the very fact that they are proprietary or modular makes them last on the list of preferred options.

Low Impact Development

To be clear, CONTECH is a strong proponent of low impact development as a holistic design approach to reducing stormwater runoff that starts at the project planning stage. Initially, the term was descriptive of a design approach which emphasizes planning and site development practices that protect natural features and reduce imperviousness so that the predevelopment hydrologic cycle is maintained. Unfortunately, implementation of LID tends to be reduced to the same kind of BMP menu based design approach that is often associated with manufactured BMPs. This shortcutting of the design process must be avoided regardless of the type of stormwater management system being pursued. Unfortunately, this permit does not take necessary steps to reorient designers to producing sites with the lowest practicable impact on the downstream environment.

Many site designers tend to pick BMPs that are most likely to be approved from a manual or list without proper regard for the suitability of those BMPs. Conventionally that list includes a handful of public domain, land based BMPs that are best applied as end of pipe solutions. In some cases proprietary BMPs are also allowed. It is crucial that we reform the process of BMP selection and design rather than simply shifting the list of "approvable" BMPs to a list of LID measures.

For example, at CONTECH, we often hear from engineers in the Los Angeles region who say, "We are trying to do LID on this site, so we don't want to use manufactured BMPs." Their experience is that swales and detention basins are considered LID because they are "natural" and that they are more likely to get approved. In many cases they are using these BMPs in the same locations, and treating the same flow rates that manufactured systems would previously have been considered for. Their "natural" BMPs are not particularly small scale or distributed, don't infiltrate substantially, and the engineer may have done very little to reduce the amount of runoff that drains to the BMPs. This is menu-based LID implementation and it entirely misses the point of the LID approach. Sadly, it is common due to a lack of clear performance requirements, inadequate review staff training, and a lack of consensus as to what constitutes LID.

One step toward resolving the confusion would be to define terms used in the permit like "LID measures", "LID strategies", LID principles" and "LID objectives" in Section 8 – Definitions. Since there is a distinction between tracking, inspection and enforcement requirements for treatment control BMPs and LID BMPs, it would also be very helpful to be able to distinguish between the two. Otherwise, an accountability loophole is created. With no definition of what constitutes an LID BMP, and LID BMPs not requiring the same ongoing maintenance and reporting, it would be tempting for a Permittee to call all their vegetated BMPs LID. That way they could avoid all responsibility for them after the initial post construction inspection. A preferable approach would be to extend all the requirements in Part 5, Section IV.1 to LID measures.

A Design Process Focus
Last year the Blue Ribbon Panel report on the feasibility of numeric effluent limits articulated some of the most glaring deficiencies in post construction municipal stormwater management programs. Prominent themes are the lack of long term accountability for performance of BMPs, improper BMP design, improper BMP selection and a tendency to maintain BMPs only for aesthetic purposes. They recommend designing BMPs "more rigorously with respect to the physical, chemical and biological processes (e.g. unit processes) that are active in the BMP." A program for the selection, design and implementation of BMPs should be developed with these observations in mind.

The following criteria are important for any structural BMP or BMP suite, regardless of whether they are LID BMPs or treatments controls, or are natural or manufactured solutions:

- The fundamental unit processes that the BMP employs must address the pollutants of concern in the forms and hydraulic and hydrologic nature that they are likely to arrive at the BMP in.
- The BMPs must be properly sited considering maintenance access, hydraulic and hydrologic conditions and physical site constraints
- The BMPs must be designed to facilitate maintenance and must have a clear long-term plan for maintenance in place with an agreed upon responsible party.
- BMPs must be adequately designed to have medium or high effectiveness for the pollutants of concern during the design storm
- BMPs must be designed to resist erosion during peak events
- Control over construction, operation and maintenance must be demonstrated so that BMPs are installed as designed, and continue to perform at acceptable levels in perpetuity.

The way to ensure that these criteria are met is to require that these factors be considered in the BMP selection and design process. For example, it would be much more effective to replace the existing prioritization hierarchy, which is based on BMP characteristics, with an outline for a design process that BMPs are selected based on providing the highest level of performance with assured operational feasibility.

Municipal Action Levels as design targets
The adjustment of municipal action levels in this draft of the permit is appreciated. However in the absence of clear performance standards for BMPs, Finding F-12 seems to set the MAL as BMP design targets. The last sentence states:

"Permittees shall implement a timely, comprehensive, cost-effective storm water pollution control program to reduce the discharge of pollutants in storm water from the permitted areas so as not to exceed the MALs."

This is clearly not their intended use. BMPs should be designed to produce effluent concentrations far below the MAL, so that the MAL are exceeded very rarely.

It would be helpful to clarify that BMPs must be selected that have a reasonable likelihood of producing effluent concentrations that are some fraction of the MAL introduced in this permit. Or, it would be helpful to require that BMPs be implemented that have at least medium effectiveness for the pollutants and hydrologic conditions of concern on the site. Of course where TMDLs are in place BMPs must be designed to meet waste load allocations. Leaving performance standards or objectives unaddressed other than by MAL or the standard MEP language is a recipe for the status quo.

Effective impervious area vs. percent imperviousness
Finding B.13 accurately points out that stream impairment is correlated with "percentage impervious cover". This seems to be the justification for a requirement to reduce effective impervious area to less than 5% of the total project area which appears in Part 5, Section E.III.1. The requirement is not an

appropriate extension of the findings since percentage of impervious cover is not the same as "effective impervious area". Also, no evidence is given that limiting effective impervious area by the method described will reduce water pollution. In fact it is as likely to have the opposite effect since it encourages site designers to overload their vegetated areas with high runoff volumes and rates so that they can stay beneath the threshold.

Obviously, to the extent that the vegetated areas are properly sited, constructed, maintained and protected against high velocity flows they will provide some measure of protection and should be encouraged. Unfortunately, Requirement 1.b in the section contains no qualification of the area that runoff must be routed through other than that it must be vegetated and must have soils with native characteristics or an amended medium engineered soils. This is not adequate protection against poor designs that may accelerate erosion. It also does not contain an exception for spill containment, groundwater protection or other substitution of more suitable non-vegetated means of control for high pollutant load generating areas. This section should be removed.

Closing
Thank you again for the opportunity to comment on this draft. I would be happy to answer any questions you might have about my comments.

Sincerely,

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Suggested Changes
NPDES No. CAS004002
Second draft Ventura County MS4 Permit

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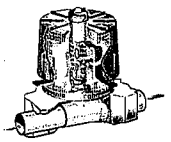
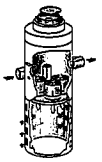
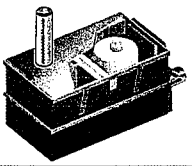
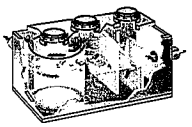
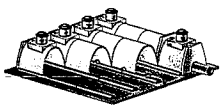
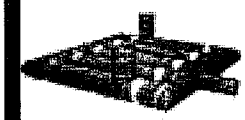
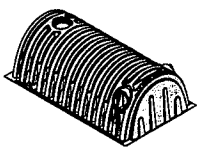
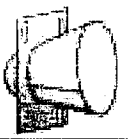
Section	Proposed Change or Comment	Justification
Findings F.2	No change is needed.	This section succinctly captures the objective of this order which is to implement BMPs to reduce the discharge of pollutants in storm water to the MEP, to achieve water quality standards. This objective is not consistently supported throughout the draft. For example the hierarchy proposed in section 5.E.I.1.e directs Permittees to make implementation decisions based on type of approach instead of anticipated impact on the discharge of pollutants.
Part 1.B.1.b.13	Remove	Pooled storm water draining from treatment BMPs within 72 hours of a storm is presumably storm water, and does not qualify as a non-storm water discharge. If the water is not stormwater, its discharge is already controlled. Water draining from treatment BMPs during storms and in the time immediately afterward will not be pollutant free since no BMP is 100% effective. Yet, taken literally this provision would seem to prohibit any stormwater flowing through a treatment BMP that is not completely free from pollutants from being discharged to the MS4 and watercourses. This provision supersedes the requirement to treat stormwater to the MEP, and is unreasonably stringent.
Table 1 - Last Row	Remove "...as specified by the manufacturer." Add "as necessary to provide ongoing hydrologic and pollutant removal performance at design values."	This entire row should be removed. See previous comment. Many BMPs have no "manufacturer". Maintenance should be based on providing the intended hydraulic and pollutant removal benefits.
Table 1 - Last Row	Insert "dry or to dry weather water levels" to second sentence which would then read: "All storm water BMPs shall be designed to drain dry or to a dry weather water level within 72 hours of the end of the rain event."	Many BMPs, especially those designed for pretreatment or spill protection, do not drain completely dry between storm events. As written this requirement would prohibit any BMP with standing water in a sump.
Part 5. Section A.2.a.2	Remove	It is possible that a Permittee will wish to implement a BMP or program that has similar fiscal burden to the original program for reasons unrelated to cost. As long as the proposed BMP or program meets the other two criteria it should be allowed.

Section	Proposed Change or Comment	Justification
Part 5. Section E.I.1.e	Remove this section. Or, at least insert a note clarifying that this preference hierarchy is subordinate to the main goal of the permit as stated in findings section F.2, which is to implement BMPs to reduce the discharge of pollutants in storm water to the MEP, and to achieve water quality objectives and standards . In all cases the most BMP suite that most effectively meets this goal should be selected.	Adoption of this hierarchy may lead to designs that do not minimize the discharge of pollutants to the Maximum Extent Practicable. It contains undefined terms that are ambiguous and make the guidance potentially contradictory. For example proprietary BMPs like porous pavement, infiltrating chambers and modular bioretention cells fit equally well under preferences 1 and 4. LID strategies are not defined. The term LID or LID strategies is frequently misused to mean natural or vegetated BMPs which is reinforced by this hierarchy. A more appropriate definition of LID Strategies would be those design approaches and BMPs that reduce runoff volumes and rates.
Part 5. Section E.III.1	Eliminate the effective impervious area requirement.	Infiltration and treatment characteristics of pervious areas are not specified. This requirement is likely to lead to engineers overloading small vegetated areas with high flows which will accelerate erosion. No exemption is given for spill protection, groundwater protection or more suitable treatment controls in high pollutant load generating areas. This requirement will be especially difficult to meet on redevelopment projects.
Part 5. Section E.III.2	Add criteria for distinguishing between LID BMPs and Treatment Control BMPs	This is important since tracking, inspection and maintenance requirements for treatment control BMPs are much more stringent than for LID BMPs. Another option is to extend operation and maintenance requirements to LID BMPs in Part 5. Section E.IV.1.
Part 5. Section E.III.2.a	Add a requirement that the impact of development be measured at the permitted scale	Depending on where impact is measured, LID control strategies may look different. For example a site developer is required to limit impact to the receiving waters or the adjacent MS4. Therefore impact should be measured and limited at those locations. An MS4 is required to limit impact of discharges from the MS4. Therefore impact should be measured at this point. This clarification would minimize micromanagement of intra-site design by the Permittees on private developments. It would give the Permittees more flexibility to implement regional controls.
Part 5. Section E.III.2.b	Add (10) Inspection and maintenance for hydraulic functionality	This must be explicitly required. Maintenance on the basis of maintaining aesthetics is insufficient.
Part 5. Section E.III.2.b	Add (11) Provision for BMPs not in the manual to be accepted for use if they demonstrate equivalent hydrologic control	BMP selection should be based on ability to provide hydrologic control. If a solution is proposed that is equally or more effective and similarly or less costly, it constitutes management to the MEP and should be encouraged.

Section	Proposed Change or Comment	Justification
Part 5. Section E.III.2.c	Add (7) Design considerations for the arid urban environment and their impact on performance.	Many LID manuals contain designs developed in the Mid-Atlantic region or in the Pacific Northwest. These designs may require substantial modification to be feasible in this region. Those modifications, for example reducing the use of grass turf and dense vegetation in favor of water efficient, drought tolerant designs may have a significant impact of performance.
Part 5. Section E.III.3.a.2.A.i	Eliminate the requirement to match the predevelopment hydrograph within 1%. Replace with a requirement to not exceed the predevelopment peak flow rate and volume.	Hydrograph matching with this precision is not possible since infiltrating BMPs are typically designed with excess initial capacity. Over time this capacity is reduced as the infiltrating surface becomes occluded. Typically a factor of safety is applied to the design so that at the end of the design life, the water quantity goals are still met. As written, the requirement will encourage engineers to abandon a factor of safety and to assume that there is no reduction of infiltration capacity over time. The existing requirement also limits water harvesting and infiltration amounts, since it requires the total volume of runoff to remain unchanged. This is unnecessary unless the site drains to a natural creek or stream where base flow rates must be maintained.
Part 5. Section E.III.3.a.3.B	Add (Xiii) A provision for use of Hydromodification Management Control BMPs that are not in the manual if they can demonstrate equivalent hydrologic control.	BMP selection should be based on ability to provide hydrologic control. If a solution is proposed that is equally or more effective and similarly or less costly, it constitutes management to the MEP and should be encouraged.
Part 5. Section E.IV.1	Clarify that these requirements also apply to structural LID BMPs.	LID BMPs are not included in the definition of Structural BMPs in Part 8 - Definitions. Hydrologic Control BMPs, which could be interpreted to include structural LID BMPs are not defined in Part 8 - Definitions.
Part 5. Section E.IV.7.a	Clarify that the approval of BMPs is contingent on evidence that they will have medium to high effectiveness for the pollutants of concern.	No specific performance objective is given. Alternatively clarify that BMPs must be selected that have a reasonable likelihood of producing effluent concentrations that are some fraction of the MAL introduced in this permit. If no performance standard is given, the MAL become the default design standard. This is not their intended use. They are upset levels. BMPs should be implemented that are likely to produce effluent concentrations far below the MAL so that the MAL are exceeded very rarely.
Part 5. Section G.5.e	Clarify that "Full Capture Devices" installed to capture trash prior to entry to the MS4 also meet this requirement.	As written, the requirement strongly favors excluders which keep trash at the street level. It may be more feasible, aesthetically desirable and safer to capture and store trash in a full capture structure where it is out of contact with the public. It is not clear that this is allowed although it would meet the same objective of keeping trash out of the MS4.

CONTECH STORMWATER SOLUTIONS INC.

Low Impact Development Product Line Guide

		Product	LID Application	LID Benefit	Configuration	Target Pollutant/ Specifications
	FILTRATION	CatchBasin StormFilter™ MFS- Media Filtration System	Decentralized filtration	Decentralized treatment at bottom of LID micro-depression or at catch basin inlet (connect to infiltration)	Catch basin, curb inlet	Fine Silt (15 µm) Metals (+ soluble)
	FILTRATION	DryWell StormFilter	Decentralized filtration and infiltration	Decentralized treatment/infiltration - minimizes conveyance and off site discharge	Manhole	Fine Silt (15 µm) Metals (+ soluble)
	FILTRATION	DownSpout StormFilter™	Decentralized filtration	Decentralized treatment of roof runoff (connect to infiltration)	LDPE plastic catch basin	Fine Silt (15 µm) Metals (+ soluble)
	HYDRODYNAMIC SEPARATION	Vortechs® VortSentry® CDS®	Pretreatment (e.g. before infiltration)	Extends life of infiltration/bioretention systems	Vault, manhole	Coarse Silt/Fine Sand (50 to 75 microns)
	DETENTION - RETENTION - INFILTRATION	CON/SPAN® Concrete Detention System	Rainwater harvesting or infiltration	Provides storage in rainwater harvesting system as infiltration product recharges groundwater and minimizes potential scouring with controlled outlet	3 sided reinforced concrete arch	Down to 12' spans with 6'+ vertical storage
	DETENTION - RETENTION - INFILTRATION	CON/STORM™ Concrete Detention System	Rainwater harvesting or infiltration		3 sided reinforced concrete arch	Down to 7'4" spans with 4' to 6' vertical storage
	DETENTION - RETENTION - INFILTRATION	CMP Detention	Rainwater harvesting or infiltration		Corrugated steel (solid or perforated)	Down to 6" diameter and vertical storage
	DETENTION - RETENTION - INFILTRATION	StormChamber™	Infiltration	Lightweight, shallow site infiltration system	3 sided HDPE arch	5' span with 34" of vertical storage
	DETENTION - RETENTION - INFILTRATION	A2000™ System	Infiltration	Strong, perforated or slotted pipe for both shallow (<1') and deep (>10') sites	PVC pipe	4" to 36" diameter and vertical storage
	FLOW CONTROL	HydroBrake	Flow Control	Non-blocking vortex valve replaces problematic outlet control orifices	Stainless steel	Manages flows up to 4.2 CFS
	FLOW CONTROL	Slotted Drain Pipe	Level spreader and downstream infiltration	Disconnects impervious surfaces - converts concentrated flows back to sheet flow	Metal slotted drain	Restores hydrologic and water quality functions to buffer zone