NRDC
THE EARTH'S BEST DEFENSE

NATURAL RESOURCES DEFENSE COUNCIL

February 13, 2009

Via U.S. Mail and electronic mail

Ms. Carole H. Beswick and Members of the Board
Santa Ana Regional Water Quality Control Board
3737 Main Street, Suite 500
Riverside, CA 92501-3348

Re: Draft NPDES Stormwater Permit for the County of Orange, Tentative Order No. R8-2008-0030

Dear Chair Beswick and Members of the Board:

We write on behalf of the Natural Resources Defense Council ("NRDC") and Orange County Coastkeeper ("Coastkeeper"). NRDC is a national environmental advocacy organization with over 120,000 members in California and has been involved in MS4 permit matters across the state, with a focus on the implementation of low-impact development ("LID") practices. Coastkeeper is a grassroots environmental organization with 17,000 members in the region, a decade's worth of successful projects that have improved water quality, and a record of collaboration in developing solutions to the impacts of water pollution. As a general matter, we strongly support LID because it is the most effective means of addressing the water quality and quantity problems associated with urban runoff. LID practices seek to replicate pre-development hydrology through the deployment of measures that infiltrate or capture water onsite, thereby significantly reducing the amount of water and water-borne pollutants that drain from developed areas. Since urban runoff is the single greatest contributor to water pollution in California, widespread implementation of LID is vital to the health of our state's renowned ecosystems.

We believe that LID techniques are required by the Clean Water Act's "maximum extent practicable" ("MEP") standard for pollution reduction because of their practicability, low cost, and superior performance relative to conventional BMPs. Additionally, LID practices generate significant ancillary benefits—such as cost savings, reduced need for imported water, and improved aesthetics—for developers, building owners, and city residents. For all of these reasons, we support the Santa Ana Regional Water Quality Control Board's inclusion of LID practices in the Draft MS4 Permit ("Permit") for the County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County within the Santa Ana Region (Order No. R8-2008-0030; NPDES No. CAS618030).

NRDC has investigated the practicability of including specific, numeric metrics to guide LID implementation in MS4 permits in California. Working with national

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storm water expert, Dr. Richard Horner, we have verified the feasibility of using the type of clear and transparent metrics that are appropriate for permits—and supported by EPA Region IX—to guide LID implementation. We have also quantified the range of pollution and water supply benefits that would accompany the use of these metrics in permits. The results of this California-focused technical work show that LID is a robust, pollution-reducing, water-supply enhancer. It is extremely cost-effective, as well, according to recent EPA evaluations.[1]

We have divided our comments into three sections that discuss:

(1) The necessity for LID implementation through a numeric performance standard that is transparent and enforceable and represents the level of compliance required to meet the MEP standard;

(2) Areas in which the Permit needs revision to clarify its requirements; and

(3) Recent expert analyses of the feasibility of implementing LID features through the type of numeric performance standard established in the Permit.

I. LID Implementation and Numeric Performance Standards

There is an emergent consensus nationwide that LID practices are the most effective stormwater management techniques, besides providing many other benefits, such as reducing the need for imported water, increasing property values, mitigating the urban heat island effect, and creating aesthetically pleasing landscapes. In California, the Ocean Protection Council, for instance, strongly endorsed LID last year by "resolv[ing] to promote the policy that new developments and redevelopments should be designed consistent with LID principles" because "LID is a practicable and superior approach … to minimize and mitigate increases in runoff and runoff pollutants and the resulting impacts on downstream uses, coastal resources and communities."[2] EPA has also called upon Regional Boards across California to prioritize the implementation of LID, even "recommend[ing] that the [South Orange County draft] permit be revised to put more emphasis on LID [and to] require[] that LID be woven into the design of specified new development and redevelopment projects."[3] In other MS4 permit contexts, EPA has also specifically endorsed the use of metrics, particularly the EIA approach in the Permit.

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[1] Environmental Protection Agency, *Reducing Stormwater Costs Through Low Impact Development (LID) Strategies and Practices* (Dec. 2007) (hereinafter "EPA LID Study").

[2] California Ocean Protection Council, *Resolution of the California Ocean Protection Council Regarding Low Impact Development* (May 15, 2008). We have enclosed a CD that includes all of the documents referenced in our letter, as well as additional information regarding the benefits and implementation of LID.

[3] Environmental Protection Agency, Comments re Draft MS4 Permit for Southern Orange County (email from Eugene Bromley) (Jan. 24, 2008) (hereinafter "EPA South OC Comments").

It is becoming clear that without requiring the implementation of LID practices designed to satisfy feasible and clear metrics, stormwater permits cannot meet the Clean Water Act's "maximum extent practicable" ("MEP") standard for pollution reduction. Critically, the prioritization of LID practices is insufficient by itself to meet the MEP standard and must be paired with a measurable requirement for the implementation of LID. Since its inception, the MS4 permitting program has been seriously hampered by a pervasive absence of numeric performance standards for the implementation of best management practices ("BMPs") such as LID. For this reason, in December 2007, the State Water Resources Control Board commissioned a report which found that "[t]he important concept across all of [the] approaches [described in the report] is that the regulations established a performance requirement to limit the volume of stormwater discharges."[4] The report also noted that "[m]unicipal permits have the standard of Maximum Extent Practicable (MEP) which lends itself more naturally to specifying and enforcing a level of compliance for low impact development."[5] EPA has highlighted similar but more specific concerns, remarking that subjective and imprecise language (such as requiring "a portion" of a site to address LID) is "vague" and that EPA recommends "more precise requirements."[6]

Various jurisdictions nationwide have begun adopting numeric performance standards for stormwater management, frequently pairing these with requirements to implement LID practices:

- **Pennsylvania:** Capture at least the first two inches of rainfall from all impervious surfaces and retain onsite (through reuse, evaporation, transpiration, and/or infiltration) at least the first one inch of runoff;[7]

- **Anacostia, Washington, D.C.:** Retain onsite the first one inch of rainfall and provide water quality treatment for rainfall up to the two-year storm volume;[8]

- **West Virginia:** Retain onsite the first one inch of rainfall from a 24-hour storm preceded by 48 hours of no measurable precipitation;[9]

- **Georgia:** Treat the runoff from 85% of the storms that occur in an average year (*i.e.*, provide treatment for the runoff that results from a rainfall depth of 1.2 inches);[10]

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[4] State Water Resources Control Board, *A Review of Low Impact Development Policies: Removing Institutional Barriers to Adoption* at 23 (Dec. 2007) (emphasis added) (hereinafter "SWRCB LID Report").
[5] *Id.* at 4.
[6] EPA South OC Comments.
[7] Pennsylvania Stormwater Best Management Practices Manual, Chapter 3 at 7 (Dec. 30, 2006).
[8] *See* SWRCB LID Report at 20-21.
[9] State of West Virginia, NPDES Permit No. WV0116025 at 13-14.

- **Central Coast, California (RWQCB, Phase II):** Limit effective impervious area ("EIA") at development projects to no more than 5% of total project area (interim criteria); establish an EIA limitation between 3% and 10% in local stormwater management plans (permanent criteria);[11]

- **All Federal Buildings over 5,000 square feet** (under EPA's draft guidance for implementation of the Energy Independence and Security Act of 2007): Manage onsite (*i.e.*, prevent the offsite discharge of) the 95th percentile storm through infiltration, harvesting, and/or evapotranspiration.

For these reasons, it is imperative that the Orange County Permit require new development and redevelopment projects to implement LID practices designed in accordance with a clear performance requirement. As detailed below, we support the Permit's use of an EIA limitation as this overall performance measure, teamed with a requirement to fulfill this obligation through appropriately sized LID features. These are critical elements of the Permit as a whole and assure that it is consistent with MEP and related requirements, as well as the mainstream of stormwater control across the country. However, as discussed below, some elements of the New Development section need revision. We also support the Permit's emphasis on LID and specifically agree with the findings on pages 19-20 of the Permit, which underscore the superiority of LID practices and the usefulness of establishing an EIA limitation.

II. Suggested Revisions to the Permit's New Development Requirements

A. EIA Should Be Defined to Require Full Onsite Retention of the Design Storm, and the Volumetric Requirement to Implement the EIA Limitation Should Be Defined as the Entirety of the Design Storm Volume.

As the overarching numeric performance standard for BMP implementation, the Permit imposes a mandatory 5% EIA limitation, based on the difference between the pre-development and post-development runoff ("delta volume") for the two-year design storm. Field-based studies have demonstrated that at 3 to 5% impervious area, watersheds begin to experience deleterious impacts from development, as noted in the attached reports by national stormwater expert Dr. Richard Horner.[12] For this reason, in other permitting contexts, we have

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[10] Georgia Stormwater Management Manual, Unified Stormwater Sizing Criteria at 1.3-1.
[11] Central Coast Regional Water Quality Control Board, Letter from Roger Briggs re Notification to Traditional, Small MS4s on Process for Enrolling under the State's General NPDES Permit for Storm Water Discharges (Feb. 15, 2008) (hereinafter "Central Coast Phase II Letter").
[12] Richard Horner, *Investigation of the Feasibility and Benefits of Low-Impact Site Design Practices ("LID") for Ventura County*; Richard Horner, *Investigation of the Feasibility and Benefits of Low-Impact Site Design Practices ("LID") for the San Diego Region*; Richard Horner, *Investigation of the Feasibility and Benefits of Low-Impact Site Design Practices ("LID") for the San Francisco Bay Area*; Richard Horner, *Supplementary Investigation of the*

recommended the establishment of a 3% EIA requirement for new development and redevelopment projects, and we recommend the same for Orange County. Dr. Horner's studies have shown the attainment of this standard onsite to be feasible in southern California.

The critical factor in determining whether an EIA limitation will be effective at reducing stormwater pollution is how the Permit defines the concept of "disconnecting" impervious surfaces such that they are rendered "ineffective" and thus do not count toward the 5% EIA requirement. This involves two different elements: (1) the volume of water that must be accommodated through stormwater BMPs and (2) the processes through which impervious surfaces can be considered "disconnected" from the storm sewer system.

On the first issue, in the Permit, as mentioned above, the volume of water for which developers must design stormwater BMPs to meet the EIA limitation is the delta volume for the two-year design storm. (Permit at p.52, fn.49.) For several reasons—most notably, the potential for calculations of pre-development volume that inflate the quantity of runoff which exists under natural conditions—NRDC does not support the use of the "delta volume" calculation and instead supports the use of the entire design storm as the volumetric requirement. (Our reasons are detailed in the attached critique by Dr. Horner,[13] which analyzes the study by Geosyntec et al., discussed below.) Thus, we suggest that the volumetric requirement for meeting the EIA limitation be revised to the full volume of the two-year design storm and that, for the sake of clarity, this crucial volumetric requirement be moved out of the footnote section and into the main text of the Permit.[14]

On the second issue, the Permit requires that BMPs have the capacity to "percolate" the design volume in order for impervious surfaces to be considered "disconnected" and effectively pervious. (Permit at p.52-53.) "Percolate," however, is not defined in the permit, and its meaning is not readily apparent. For this reason, we recommend revising the Permit such that BMPs are required to have the capacity to "infiltrate, harvest for reuse, or evapotranspire" the design storm volume. This onsite retention requirement will eliminate any ambiguity and allow for greater flexibility, as well as clarity, in meeting the EIA limitation. This change will also bring the Permit into line with other stormwater regulations around the country, which require onsite retention and thereby eliminate the potential for <u>any</u> polluted runoff from the design storm since there is no discharge.[15]

Feasibility and Benefits of Low-Impact Site Design Practices ("LID") for the San Francisco Bay Area.

[13] Richard Horner, *Critique of Certain Elements of "Low Impact Development Metrics in Stormwater Permitting"* (Feb. 2009).

[14] We also recommend that footnote 43 on page 48 include a cross-reference to the relevant full definition of EIA later in the Permit so that footnote 43 is not misinterpreted as the controlling definition of EIA.

[15] *See, e.g.*, requirements listed in section I, above, for Anacostia, the Energy Independence and Security Act of 2007, Pennsylvania, and West Virginia.

We would not support a definition of EIA that allows for onsite treatment and discharge to the storm sewer system, as this does not guarantee that pollutants will be removed from Orange County's receiving waters. Indeed, as further discussed below, the value of retention and reuse or infiltration is substantial, when measured both in terms of the ability to meet water quality standards and when measured in terms of other water resources imperatives, such as addressing drought and long-term reduction in water supply. Our analyses, presented as part of our submittal with this letter, document the extraordinary ability of LID to "create" new water supply, but this feature is operative only when water is retained and not discharged to surface waters.[16]

B. The Permit's Waiver Provision Must Require Offsite Compliance for Any Project that Cannot Meet the EIA Limitation Onsite and Must Set a Floor that All Developments Are Required to Meet.

The Permit, as currently written, would allow unfettered waivers for projects that can make an amorphous demonstration of disproportionate costs relative to the water quality benefits achieved. (Permit at p.55.) This loophole threatens to undermine the value of the EIA limitation and the entire New Development section. NRDC can support including flexibility in the permit's LID provisions to address true instances of technical infeasibility (and we detail below an appropriate scheme based on approaches taken in other jurisdictions). But the existing provision is overbroad, not supported by the facts, and is rife with the potential for abuse.

First, at a general level, this waiver provision is irreconcilable with the general findings of EPA and others that LID in most circumstances is *less* costly—often considerably so—than alternative building or stormwater management approaches. The provision, therefore, appears to be arbitrary and fundamentally counter-factual.

More specifically, the provision has a number of other fatal flaws as drafted. First, the LID requirements in the permit are based on addressing a *practicable* design storm, as discussed further in Dr. Horner's analysis, and this storm is well within the range of sizing requirements in place across the nation. Hence, the basic permit requirement already addresses and answers the question loosely posed by the waiver provision: the benefits and feasibility of the LID requirements are well-established generally and in reference to water quality improvements specifically. LID implemented across a watershed is far more capable of ensuring the attainment of water quality standards than traditional BMPs, and since ensuring compliance with standards is a fundamental requirement of the permit, LID is similarly a necessary element in new development and redevelopment.

Second, even if a waiver provision in general were appropriate, this one is not: the Permit does not define how these costs and benefits would be weighed against each other, and

[16] *See, e.g.*, Letter from David Beckman and Noah Garrison, NRDC, to Mary Nichols, Chair, California Air Resources Board, re AB 32 Draft Scoping Plan and Appendices (Aug. 11, 2008).

while the installation of BMPs can be easily priced, the human and ecosystem benefits of reduced water pollution are much more difficult to monetize and likely to receive short shrift in any such comparison. Even using a cost-benefit approach where (as is the case in much of the Permit area) waters are impaired may have the effect of allowing new sources of pollution to contribute to existing impairments, which is not allowable legally.

Third, the waiver provision includes no limiting factors, such as a requirement that projects implement all feasible LID (or even conventional) BMPs. Fourth, the Permit does not mandate offsite mitigation for any stormwater volume that a project is unable to retain onsite. This is the most appropriate "waiver" provision, allowing offsite compliance when onsite compliance is truly technically infeasible.

To close the waiver provision's loopholes, we would recommend first that the cost-benefit calculation be changed to a requirement that project applicants demonstrate the technical infeasibility of complying with the EIA limitation. The Permit should then define technical infeasibility, which could include circumstances such as severe space constraints, underground pollutant plumes, and non-infiltrative soils. Additionally, the Permit should specify that the project applicant must implement all technically feasible BMPs to the maximum extent practicable—if infiltration is infeasible, then harvesting and evapotranspiration should be maximized. The Permit should also set a floor for compliance with the EIA limitation onsite (*i.e.*, X% of the design volume must be infiltrated, harvested, or evapotranspired at the project site) so that project applicants do not utilize the alternative compliance option for the entirety of the design volume. This is a typical requirement of similar regulations in other parts of the country and ensures better results because of the limitations of offsite mitigation.[17] Any onsite discharge up to the design storm volume should be treated for water quality purposes.

The project applicant should then be required to perform offsite mitigation for the difference in volume between what is achieved onsite and the otherwise applicable EIA requirement. This could be accomplished by rewriting the waiver provision such that it *requires* permittees to establish an "urban runoff fund" (or project applicants to construct their own offsite projects) within the same hydrologic unit. For the sake of water quality and overall programmatic equivalence, the monetary contributions required should be based not on the avoided cost for developers, but rather on the volume of stormwater that is not retained on a given site. This system should also be paired with an obligation to mitigate stormwater volume offsite at a higher ratio than 1:1, such as 1:1.5, given the generally weaker performance of offsite mitigation projects. Several jurisdictions, including West Virginia and Washington, D.C. (Anacostia), have instituted such ratios.

Finally, we note that the Permit imposes no time limitation on the expenditure of funds for offsite mitigation. We recommend that offsite mitigation projects, whether public or private, should be constructed within three years of final discretionary approval (of the original

[17] *See, e.g.*, the requirements for West Virginia and Pennsylvania.

project) by the permittee. Additionally, the Permit should require project applicants to provide the necessary funds within one month to the permittee (for public mitigation projects) or to an escrow account (for private mitigation projects).

C. The Permit Must Impose Limits on "Water Quality Credit Systems" to Ensure that Equivalent Results Are Achieved on a Watershed Basis.

The Permit allows permittees to establish a "water quality credit system" that would waive LID, hydromodification, and infiltration requirements. (Permit at p.56.) While we agree that certain projects generate environmental benefits by the very nature of their circumstances, we also believe that waivers from otherwise applicable criteria should not be granted unless they are necessary and some nexus with water quality can be demonstrated. The fundamental requirements of the Clean Water Act include attainment of water quality standards. Without further specification, the approach taken in the permit effectively (and unlawfully) would delegate to those responsible for meeting the standards the ability to waive attainment through unilateral reductions in basic technological treatment requirements. This is unwarranted, poor policy, and in all eventualities, inconsistent with the text of the Act. For this reason, we suggest that the Permit impose certain restrictions on the water quality credit system.

First, the Permit should require that the permittees justify—scientifically and quantitatively—the stormwater volume and pollutant load reductions that accrue from a particular type of development granted "credit" under the system. These reductions should correlate with the amount of credit available for the project in question. Second, the Permit should set a maximum allowable credit amount for which a single project would be eligible. Other jurisdictions with such credit systems cap the allowable credit at half of the volumetric requirement or less, for instance, whereas the Permit currently includes no cap at all.[18] Without these changes, the water quality credit system could undermine the EIA numeric performance standard altogether by allowing projects blanket waivers without any specific demonstration of technical infeasibility or equivalent stormwater volume and pollutant load reduction—this would not meet the MEP standard. Moreover, it would not reduce pollution so as to reduce water quality impairment and, particularly in circumstances such as those in Orange County where many projects discharge to impaired waters, it is flatly inconsistent with the basic legal requirements that apply to protection and restoration of waters listed as impaired pursuant to 33 U.S.C. Section 1313(d) (including TMDL waste load allocations and requirements that pertain to additional sources of pollution discharged to waters listed as impaired).

D. Additional Concerns and Comments.

Below, we have listed some additional concerns and comments regarding specific provisions within the New Development section of the Permit.

[18] *See, e.g.*, the requirements for West Virginia.

- **Prioritization of LID:** In the LID section of the Permit, the language does not clearly state a hierarchy of stormwater management BMPs. (Permit at p.52.) It merely states that onsite implementation of LID principles is the "preferred approach." Because proprietary BMPs and conventional stormwater management techniques have proven less effective than LID, this section of the Permit should clearly establish a hierarchy such that project applicants must prove the technical infeasibility of implementing LID BMPs before they resort to proprietary or conventional technologies.

- **Treatment Control BMPs:** The Permit allows project applicants to substitute "treatment control BMPs" for LID measures if certain conditions are met. (Permit at p.53.) These conditions include limiting EIA to 5% or less. However, this is antithetical to the Permit's inchoate conception of EIA as onsite retention with no discharge, as we support. By definition, treatment control BMPs that discharge treated stormwater cannot render impervious areas "ineffective" for the purposes of meeting the 5% EIA limitation. For this reason, we recommend that any projects exercising this compliance option be required to retain the volume of their discharge (multiplied by our suggested 1:1.5 offsite mitigation ratio) elsewhere in the hydrologic unit.

- **Hydrologic Conditions of Concern:** We do not support the Permit's waiver of hydromodification criteria for any project that discharges to engineered, hardened, and regularly maintained conveyance channels. (Permit at p.54.) The Clean Water Act is a restorative statute with a restorative purpose—by not subjecting a whole group of projects to hydromodification criteria, the Permit will heavily burden future restoration efforts. With stream daylighting and habitat restoration a reality nowadays, the Permit should not condemn all hardened conveyances to their present, unnatural state. Instead, it should effectuate the goal of the Clean Water Act and begin to restore natural conditions to even those streams that are most burdened by human engineering. It is also noteworthy that one outcome of hydrological controls is reduced flooding. With projections that the impacts of climate change in California will include more intense storms, it would be unwise in the extreme to allow a waiver of hydromodification requirements.

- **Applicability:** We support the applicability section's establishment of a 5,000 square foot threshold for most projects (Permit at p.46-47), but the language in XII.B.2(a) for significant redevelopment projects needs to specify in the third and fourth sentences that the relevant question is how much impervious surface was added or replaced (not increased), consistent with the first sentence.

- **Depth to Groundwater:** The Permit states that infiltration BMPs must be at least 10 vertical feet above seasonal high groundwater. (Permit at 49.) However, recent studies and state and national standards demonstrate that five feet (or even less) is a

safe threshold, and the Permit's infiltration infeasibility criteria should be changed accordingly.[19]

III. Case Studies and the Feasibility of LID Implementation

We have submitted, as attachments to this letter, several reports by Dr. Horner. These reports take into account local rainfall patterns and building typologies and demonstrate that a 3-5% EIA limitation can be feasibly implemented by various types of development projects in southern California. Dr. Horner's reports show that considerable reductions in pollutant loadings occur through the implementation of an EIA limitation with LID techniques. They also highlight that onsite retention of stormwater can result in significant water savings, as well, through infiltration and harvesting for in-building uses or landscape irrigation. Such water savings are an important ancillary benefit of LID implementation and can decrease our reliance on expensive, increasingly unreliable sources of imported water. These water savings also result in considerable greenhouse gas emission reductions because water importation machinery is the single largest user of electricity in California.[20] For these various reasons, as mentioned above, we strongly support the Permit's establishment of an EIA limitation that requires the implementation of LID practices because they are the most effective means of improving water quality while also generating other benefits.

Recently, another study (entitled "Low Impact Development Metrics in Stormwater Permitting," hereinafter "the report") of three specific existing or proposed development sites was completed by Geosyntec Consultants and Larry Walker Associates for the Counties of Orange and Ventura.[21] Despite several flaws in assumptions and methodology, as documented in the attached critique by Dr. Horner, the study in many regards bolsters the argument that implementing LID through a numerical performance standard, such as proposed in the Permit, is feasible. Regarding the 60 California project, for instance, the study remarks that "it was not exceedingly difficult to achieve less than 5% EIA." (Geosyntec et al. at p.55.) However, various supposed problems identified by the report deserve attention in this context because we feel that the EIA concept and LID practices have been mischaracterized and that the report unjustifiably condemns, or at least puts an inappropriately negative spin on, worthwhile aspects of the Orange County Draft Permit.

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[19] The Los Angeles Regional Water Quality Control Board, for instance, typically allows 5 feet of separation between onsite system leachfields and groundwater. *See, e.g.*, Draft Waste Discharge Requirements for the Malibu Lumber Facility (requiring a 5-foot separation from groundwater). The AB 885 draft regulations (California's septic tank law) would allow dispersal systems of all conventional OWTS to have only 3 feet of separation. *See* 27 CCR § 30014 (draft).

[20] *See, e.g.*, NRDC, *Energy Down the Drain* at v (Aug. 2004).

[21] Geosyntec Consultants et al., *Low Impact Development Metrics in Stormwater Permitting* (Jan. 2009).

A. The Report Relies on a Flawed Definition of EIA to Draw its Negative Conclusions about the EIA Concept Overall.

The authors base their definition of EIA on the flawed language of the current Ventura draft permit. (Geosyntec et al. at p.3.) NRDC and Heal the Bay have repeatedly commented on the lack of hydraulic sizing criteria that should apply to the EIA limitation in that permit, and we agree with the authors of the report that this loophole allows for manipulation of the EIA concept. (Geosyntec et al. at p.5.) However, by basing their analysis of EIA limitations, writ large, on a single flawed definition of the concept, the authors have compromised the applicability and usefulness of their study. They are, therefore, unable to address the true benefits of an EIA standard from a water quality perspective, benefits recognized by a wide range of agencies and experts, including Dr. Horner (in his California studies), Tetra-Tech (in a study for the Ocean Protection Council),[22] EPA (in its own comments on the South Orange County Permit and in other permit proceedings around the state),[23] and the Central Coast Regional Water Quality Control Board (which adopted a default 5% EIA standard for Phase I and Phase II communities).[24] In this sense, it is not an overstatement to suggest that by adopting something of a "straw man" and then knocking it over, the report does not credibly refute the effectiveness or practicability of EIA properly implemented. The Orange County Draft Permit does not contain the same loophole as the Ventura draft permit, and although we recommend certain changes to the Permit's definition of EIA, it can easily be insulated from the type of abuse envisioned by the authors of the report.

B. The Permit Does Incentivize Infill, Redevelopment, and Smart Growth.

The authors mistakenly claim that the Permit creates significant disincentives for infill, redevelopment, and smart growth. (Geosyntec et al. at p.5.) In truth, the permit accommodates these development typologies by enabling developers to comply with the Permit's EIA limitation through four different options at varying scales and by allowing the permittees to establish both alternative compliance measures (*i.e.*, in-lieu fees for offsite mitigation) and a water quality credit system that would lessen the requirements for the exact sites about which the authors are worried. (Permit at pp.51-53, 55-56.) The Permit has gone further than several other states in encouraging infill, redevelopment, and smart growth, and we stand behind the Regional Board's efforts to accommodate these concerns in a manner that is consistent with water quality protection.

The environmental community's willingness to accept permit requirements that can be satisfied in part offsite should not be taken for granted, as it constitutes an attempt to address other stakeholders' stated concerns and, in any case, fully addresses any reasonable concern about infill and redevelopment. We are willing to accept offsite mitigation notwithstanding the

[22] Oceans Protection Council of California, *State and Local Policies Encouraging or Requiring Low Impact Development in California* at 27 (Jan. 2008).
[23] EPA South OC Comments.
[24] Central Coast Phase II Letter.

lack of a clear need for this flexibility when the matter is analyzed objectively. For example, some of the most aggressive LID requirements have been imposed in ultra-urban environments, like Philadelphia, PA, and Anacostia, Washington, D.C., demonstrating that the supposed conflict between LID and infill and redevelopment appears to be largely rhetorical. Moreover, as noted in Dr. Horner's critique of the report (and further below), even those sites chosen to represent the most challenging circumstances for LID implementation can feasibly (and in some cases easily) implement LID as envisioned by the Permit. And of course, the record also contains Dr. Horner's analysis of the feasibility of LID implementation across a range of building typologies, showing that LID can be accommodated in virtually any building situation with robust numeric metrics.

C. With Our Recommended Revisions, the Permit Will Not Lead to Unnatural Levels of Infiltration.

The report states that the Permit's infiltration requirements could destabilize the water balance in certain locations. (Geosyntec et al. at p.5.) This might be true in some situations if the Permit required infiltration of the entire design volume; very large numbers of sites were affected; and the water balance in the affected area were otherwise undisturbed compared to natural conditions. However, none of these three factors is present and, in particular, those who would contend that the LID provisions regulating new development and redevelopment could significantly affect water balance have failed to recognize that, in most of urbanized Orange County, the natural rate of infiltration has been dramatically reduced by a century of development focused on impervious surface. While we believe that this issue is yet another poorly justified criticism of LID, we note that the permit in any case does not require infiltration, per se, but rather any of three techniques that retain water. To make this even clearer, we have recommended the inclusion of language to clarify that three techniques are allowed: infiltration, harvesting, and evapotranspiration. If infiltration is ill-advised and thus infeasible, then project applicants will simply use the other allowable techniques for retaining water onsite.

Moreover, the Technical Advisory Committee (mentioned on page 46 of the Permit) should develop criteria—for potential insertion into the DAMPs and/or guidance manuals—to determine when infiltration would be counter-productive. These criteria will guide developers in deciding whether to utilize infiltration, harvesting, or evapotranspiration, or some combination of the three, to meet the EIA limitation. Additionally, developers have the option under the Permit of paying in-lieu fees when it is infeasible to attain the Permit's otherwise applicable requirements, including the infiltration requirement. Thus, there is no reason to assume that the level of infiltration encouraged by the Permit will lead to hydrologic imbalances, and there is every reason to assume that this potential problem will be easily avoided.

D. The EIA Limitation in the Permit Is Not Intended to Function As a Hydromodification Standard, Nor Should It.

The authors of the report posit that the EIA metric does not reflect the current understanding of stream hydrology and geomorphology. (Geosyntec et al. at p.6.) It does not reflect these issues because it is not intended to, and any interpretation of the EIA limitation that transmutes it into a hydromodification standard is misguided. Limiting the effective impervious area of a site is a means of addressing water quality—not water quantity—concerns. The purpose of retaining water onsite and infiltrating, harvesting, or evapotranspiring it is to prevent all pollutant loads contained within the design storm volume from entering aquatic ecosystems. While such retention may aid projects in meeting hydromodification criteria, and does have the salutary effect of making new water supplies available, the EIA metric stands as a water quality-focused, technology-based performance standard required by the Clean Water Act. This is why the Permit also contains a section that establishes requirements for "hydrologic conditions of concern." (Permit at p.54.) Any arguments about hydromodification should properly be addressed to this section. It also bears mention that even the report's recommended performance standard suffers from the same exact "problem" as the EIA limitation, and the authors thus included a separate hydromodification control standard in their recommendation. The Permit is structured in exactly the same fashion.

E. The Report's Case Studies Fail to Demonstrate that It Is Technically or Economically Infeasible to Implement a 5% EIA Standard.

The authors purport to prove through three case studies that the EIA concept is both difficult to implement and less protective of water quality than a volumetric reduction requirement. (Geosyntec et al. at p.16.) The principle failure of this analysis is, again, that the authors used a flawed definition of EIA (with no sizing requirement) as the basis for their analysis. They effectively seek to compare the function of two techniques, one of which they define nonsensically and one of which they define reasonably. This yields skewed analyses that, accordingly, run the risk of appearing to be results-oriented to support a predetermined perspective on the Permit. Moreover, the authors' assertion that a volumetric reduction approach would be "more constructive than a % EIA standard" highlights the degree to which the inadequate language of the Ventura draft permit has biased various entities' understanding of how an EIA limitation should operate. Ultimately, EIA limitations should be volumetric reduction approaches, as the authors of the report advocate. When EIA is properly defined as a requirement for onsite retention of a certain percentage of the design storm volume, it is literally a volumetric reduction requirement, and thus all of the report's negative conclusions about EIA have no real bearing on the worth of a properly designed EIA standard. Indeed, if it is a volumetric reduction approach that the authors favor, they should support a properly designed EIA standard. With this in mind, we offer the following thoughts on the specific case studies.

1. Walnut Village

As noted by Dr. Horner in the attached letter, this case study suffers from several analytical flaws. Without repeating those flaws here, we will simply draw attention to the fact that the authors found it almost feasible (and had they used appropriate infiltration rates, it would have been entirely feasible) to meet even the most stringent of the standards they analyzed, characterizing options as merely "less feasible" and "more feasible" based on problematic assumptions described by Dr. Horner. (Geosyntec et al. at pp.8-11.) This most stringent standard—delta volume for the two-year design storm—is by definition only 5% different from the EIA standard in the Permit because the Permit bases its definition of EIA on the delta volume for the two-year design storm. Thus, the authors' third proposed standard—although nowhere described as EIA—is just 5% away from the EIA metric in the Permit. This case study, therefore, demonstrates in general terms the practicability of the Permit's approach even on a very challenging building site and even when technically unsupported limitations are assumed that make accomplishing Permit requirements more difficult than necessary.

2. 60 California

The same flaws apply to this case study analysis; however, here, the authors openly admit that the site could feasibly achieve any of the three standards they used. (Geosyntec et al. at pp.13-14.) Their sole bases for questioning the utility of apparently any LID requirement are that green roofs and cisterns are relatively new concepts and that green roofs (anecdotally) might not be climate-appropriate, hardly reasons for dismissing them out-of-hand.

The 60 California case study can in fact assist us in partially understanding the cost implications of the various performance standards analyzed by the report, although the authors themselves have performed no such economic analysis. The authors concluded that for the largest storm event analyzed (the two-year design storm, which is nearly four times the volume of the 85th percentile storm), a combination of green roof and cistern would meet the standard. This green roof would require 4,300 square feet of space (Geosyntec et al. at p.13) and need to retain at least two inches of water. Assuming that this would require an intensive green roof, which can typically hold 80-150 pounds per square foot and accommodate soil depths up to 24 inches, the roof itself would cost (at the high end) approximately $25 per square foot, or almost $108,000.[25] The accompanying cistern that would need to hold an additional 4,170 gallons would likely cost less than $10,000, plus any plumbing necessary to carry stormwater from the roof to the cistern.[26] In all, the total cost of stormwater infrastructure would likely be less than

[25] *See, e.g.*, Great Lakes Water Institute, Green Roof Installation, at http://www.glwi.uwm.edu/research/genomics/ecoli/greenroof/roofinstall.php; Steven Peck and Monica Kuhn, *Design Guidelines for Green Roofs*, available at http://egov.cityofchicago.org/webportal/COCWebPortal/COC_ATTACH/design_guidelines_for_green_roofs.pdf.

[26] *See, e.g.*, Low Impact Development Center, Rain Barrels and Cisterns, at http://www.lid-stormwater.net/raincist_cost.htm.

$125,000. Of course, this does not take into account the costs of avoided conventional stormwater infrastructure, which would reduce the added cost of the LID infrastructure by some unknown but potentially substantial amount. Indeed, EPA found that at 11 out of 12 case study sites, LID infrastructure actually cost less than conventional stormwater management practices.[27]

The total development cost for this project was around $4 million. Hence, even if conventional stormwater infrastructure cost nothing and the green roof fell in the upper range of expected costs, the ~$125,000 stormwater compliance price-tag would be only 3% of total project cost. And this is supposedly one of the most constrained sites the authors could find where compliance would be the most technically and financially difficult. Hence, the best interpretation of the authors' analysis is that the upper limit of the cost to comply with the LID requirement—even assuming the most unfavorable conditions and without any credit for offsetting infrastructure cost savings that are clearly present—is only 3%. This is well within the accepted cost for compliance with existing MS4 requirements, such as the SUSMP provisions; the State Water Resources Control Board (in the *Bellflower* decision) already has determined in precedential orders that such provisions are reasonable and appropriate.

3. Kmart

The Kmart case study analysis is the most flawed of all from a methodological standpoint. Regardless of the LID techniques proposed, the report misconstrues the requirements of the Permit such that the conclusions vis-à-vis percentage of total project cost are entirely indefensible.

As a threshold matter, the authors misunderstood that an interior remodel that does not replace or add impervious surface would not trigger the Permit's requirements. Thus, the basis for their low-end estimate of redevelopment cost is a number far below any true redevelopment cost that would be associated with actually adding or replacing roof or other impervious surfaces. The applicability section of the Permit on page 46 specifies that redevelopments must comply with the Permit *only* when they result in the addition or replacement of impervious surface. An interior "remodel" would not add or replace impervious surface; only a demolition and reconstruction would do so. Consequently, the $50 per square foot low-end estimate should be revised to a more reasonable reconstruction—not remodel—cost figure, so as to allow an accurate calculation of the relative cost of the LID features compared to total construction cost.

Typical commercial construction costs range from $160 per square foot to $350 or more per square foot.[28] The authors' high-end estimate of $250 per square foot is, hence, an average cost figure for redevelopment. Using this more appropriate range, the total project cost (for the

[27] EPA LID Study at 12.
[28] *See, e.g.*, Saylor Publications, Inc., Square Foot Building Costs, at http://www.saylor.com/lacosts.

130,000 square foot building) is $21 million to $46 million. Just with this initial change in cost estimates, the "% of total redevelopment cost" figures given in the study changes from 4-22% to 3-6% for the "high volume interpretation" and from 1-3% to 0.5-1% for the "low volume interpretation."

Digging further into the report's assumptions, the authors once again misconstrued the applicability section of the permit. If the building alone were being redeveloped and the parking lot were left in its existing condition, the project would not obligated to comply across the entire site because it would result in an alteration of less than 50% of the impervious surface, thus requiring that only the altered portion comply with the permit. As the building footprint is slightly less than 25% of the site (approximately three out of 12.4 acres), the stormwater infrastructure costs would thus drop to about $300,000 or $50,000, depending on the high vs. low volume interpretation; the "% of total redevelopment cost" figures given in the study, consequently, would drop to 0.7-1.5% or 0.1-0.2%, respectively.

If the project altered more than three acres of the parking lot, as well as the entire building footprint, then the entire site would be required to comply with the Permit. However, in this situation, to find a meaningful value for the percentage of total redevelopment cost, one would have to calculate the costs of the stormwater infrastructure and landscaping that would otherwise be required by law or desired by the developer (for instance, the developer would surely include landscaping in the parking lot for aesthetic reasons, regardless of its stormwater functionality), and those costs would have to be deducted from the 3-6% or 0.5-1% of total redevelopment cost figures calculated above. It is thus impossible to draw any real conclusions from the study because of the lack of complete cost data. Without such data, even using correct redevelopment cost assumptions, the study actually tells us nothing that we want to know in terms of the marginal costs of complying with the permit vs. complying with requirements that would exist anyway in the absence of the permit.

IV. Conclusion

We commend the Regional Board staff's efforts to prioritize LID stormwater management practices and to establish an EIA limitation as the performance standard for BMP implementation in the Permit. Studies have demonstrated that attainment of this standard is feasible, and even so, the Permit contains sufficient alternative compliance criteria that (once properly revised) should allow equivalent results while granting developers more flexibility. Nonetheless, we believe that the effectiveness of the Permit's provisions could be compromised by various defects, especially the overbroad waiver language, the delta volume sizing criterion, and the Permit's failure to specify clearly that onsite retention (and not simply capture and discharge) is required. We have recommended various ways to remedy these and other problems, and we strongly urge the Regional Board to adopt these revisions.

We look forward to working further with Regional Board staff on the Permit and encourage you to contact us with any questions regarding our suggestions or the documents we have provided.

Sincerely,

David Beckman
Bart Lounsbury
Natural Resources Defense Council

Garry Brown

Orange County Coastkeeper