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San Diego Chapter
Serving the Environment in San Diego and Imperial Counties
8304 Clairemont Mesa Boulevard, #101
San Diego, California 92111

May 6, 2010

California Regional Water Quality Control Board
San Diego Region
9174 Sky Park Court, Suite 100
San Diego, California 92123-4353
Attention: Ms Christina Arias

Subject: Final Hydromodification Plan, Dated December 29, 2009

Dear Chairman and Members of the Board,

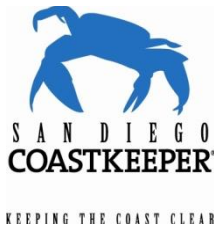
The Sierra Club respectfully submits these comments regarding the Resolution for Approval of the Hydromodification Plan for the County of San Diego. Our review raises two points regarding implementation of the HMP.

1. In Stream Management is only recommended under certain conditions, in addition to or instead of mitigation Best Management Practices (BMP), such as detention basins and swales (p.28, section 4.1.4.1 and p.77, section 6.3). Considering that restoring streams and wetlands to their natural condition is beneficial in many respects, including preventing channel bed erosion and improving water quality, we believe that restoration should be a standard part of Low Impact Development measures. Part of the development and maintenance money should be used for stream and wetland restoration, even if BMPs are adequate to manage the hydrograph. Streams and wetlands restored as closely as possible to their natural state, provide a safety net for all existing and future developments.
2. An exemption is proposed whereby developments near large rivers could be exempted from flow duration requirements (p.197, Memorandum). The analysis shows that post development changes in flow rates for the San Diego River would not have an appreciable impact on erosion within the channel. However, overland flow, due to impervious surface created by development, could cause erosion as it travels to the main channel. Depending on the land cover, this type of boundary erosion could eventually affect the main river channel. Therefore, we recommend that this exemption only be granted where it can be shown that the buffer zone between the development and the main river channel will not be adversely affected.

Thank You,

Sincerely,

Jennifer Olim
PhD, University of Minnesota, Hydrogeology
Sierra Club Volunteer



February 16, 2010

Ms. Christina Arias
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, California 92123

RE: Final Hydromodification Management Plan (CIWQS Place ID No 710562)

Dear Ms. Arias:

On behalf of the San Diego Coastkeeper (“Coastkeeper”) and the Natural Resources Defense Council (“NRDC”), we are writing with regard to the Final Hydromodification Management Plan (“HMP”), dated December 29, 2009, prepared pursuant to Provision D.1.g. of San Diego Regional Water Resources Control Board Order R9-2007-0001, the San Diego MS4 Permit (“Permit”). Coastkeeper is San Diego’s largest environmental nonprofit organization dedicated to coastal water quality protection. NRDC, on behalf of its over 100,000 California members, many of whom live in San Diego County, is dedicated to protecting public health and the environment, including the well being of San Diego’s coastal and inland surface waters. Together, San Diego Coastkeeper and NRDC have consistently advocated for the best possible remedies for protecting our local aquatic resources.

We firmly believe that a progressive and environmentally sound strategy for improving water quality and protecting beneficial uses lies in a holistic Low Impact Development (“LID”) based approach. Coastkeeper and NRDC participated extensively in the 2006-2007 San Diego MS4 permitting process and in subsequent proceedings concerning revision of the Countywide Model SUSMP, approved on March 25, 2009. Since its inception in February 2008, Coastkeeper staff has actively participated in the HMP Technical Advisory Committee (“TAC”). As a member of the TAC, and throughout the 2007 reissuance of the MS4 Permit, we have supported the development of an HMP in order to “...manage increases in runoff discharge rates and durations from all Priority Development Projects, where such increased rates and durations are likely to cause increased erosion of channel beds and banks, sediment pollutant generation, or other impacts to beneficial uses and stream habitat due to increased erosive force.”¹

On September 29, 2009, Coastkeeper submitted a detailed letter outlining our concerns with the Draft HMP (Appendix A). In addition, the NRDC submitted a comment letter to the TAC on

¹ Permit at Provision D.1.g



November 4, 2009 (Appendix B), demonstrating that the HMP has the potential to significantly and negatively impact the operation of those provisions of the Permit and Model SUSMP that do incorporate the use of LID stormwater management practices, and may serve as a basis for declaring the use of LID practices to be infeasible under both. In addition to these letters and as part of our commitment to ensuring the efficacy of the TAC, Coastkeeper also submitted an external review of the HMP by a noted national stormwater expert, Dr Richard Horner (Appendix C; submitted to Sara Agahi via email on December 15th 2009²). We are greatly disappointed that the Final HMP has not taken into consideration the comments that we previously submitted.

Dr Horner's extensive review of the HMP revealed several weaknesses and flaws with the technical underpinnings and approaches taken in this HMP. In brief, he highlighted four broad areas of concern:

1. *The HMP defines Low Impact Development too narrowly.* The HMP describes a weak framework for implementing infiltration techniques (limited incorporation of soil amendments and a soil classification scheme that is not representative of site specific soils and their infiltration potential). Additionally, the potential role of other LID based approaches (evapotranspiration, green roofs, stormwater capture, etc) is almost totally ignored by the HMP. If the full suite of LID approaches were brought together in holistic design approach in this HMP, it would maximize the ability to meet the goals of the HMP.
2. *Vague and unnecessarily complex definition of critical flows.* The HMP would provide a more transparent and easier to implement approach to critical flows if it relied on a critical flow of 10 percent of pre-development two-year flow rate.
3. *Ill conceived and unnecessary exemptions:* The exemptions outlined in the HMP do not appropriately define the term pre-development and generally exclude too much land area from HMP control and rest on the assumption that we will never restore many of the waterways in the region.
4. *Stream rehabilitation is not a replacement for hydromodification control:* For stream rehabilitation to be effective, it must be done in concert with hydromodification control, not as a replacement for it.

In addition, NRDC's November 4, 2009 letter outlined serious concerns that the HMP's erroneous assessment of infiltration potential in the San Diego Region and improper failure to adequately include the use of either evaporation or rainfall harvesting practices may provide a

² This technical review, dated November 30th, 2009, is a final, in-depth follow up to the previous brief review (submitted by Coastkeeper on April 14th 2009) of an earlier version of the draft HMP provided by Dr Horner.



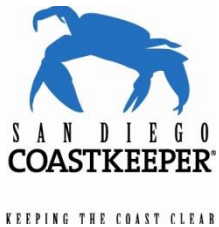
blanket and meritless justification for sites to declare the use of LID practices to be “infeasible” and exclude their use under the Permit and SUSMP.

Based on Dr. Horner’s technical input throughout this process and Coastkeeper and NRDC’s knowledge of the issues in the local area, the details of the MS4 permit, and the HMP process, Coastkeeper identified seven recommendations for improving the efficacy of this HMP in the September 29th, 2009 letter. In summary, the specific recommendations for the HMP include:

1. A standard of 3 percent maximum allowable Effective Impervious Area in all Regulated Projects, with a narrowly crafted alternative compliance provision for developments³;
2. A hydromodification standard that requires post-development peak flow rates and volumes not exceed the modeled peak flow rates and volumes of *pre-European-settlement* native land cover for all storms from the channel-forming event to the 100-year frequency stream flow. This requirement shall be satisfied to the maximum extent practicable by retention of runoff on the development site through the implementation of all potential LID BMPs (including extensive use of evapotranspiration, green roofs, rainwater harvesting, and an approach to infiltration that is not narrowly defined).
3. Monitoring of HMP compliance conducted before development, not after completion and occurring at one or more sites per watershed.
4. A requirement that individual Priority Development Projects must monitor effectiveness and maintain HMP BMPs and compliance measures.
5. Assurances that the HMP will comply with the current Permit and that it will remain consistent with other MS4 Permits in southern California to achieve the MEP standard.
6. Future development, implementation, and monitoring of the HMP should be more transparent, including more availability for public input.
7. The High, Medium, and Low susceptibility ratings should be removed. All watersheds should be treated as susceptible to erosion.

In addition to the aforementioned technical issues and recommendations, Coastkeeper’s previous letter also addressed in detail the serious issues with the TAC process. These issues included the misrepresentation to the Regional Board of TAC consensus and a lack of transparency and unavailability of key documents. Given that our input during the TAC process was not adequately considered, we feel all issues raised in our organizations’ letters, and the technical review provided by Dr Horner still stand. We therefore incorporate those documents by reference and urge the Regional Board staff to fully consider the issues we have raised.

³ The recently adopted Ventura County Permit requires new development and redevelopment projects to reduce the EIA to 5 percent of the total project area. Order No. R4-2009-0057, p.65.



This HMP is the framework that will guide the implementation of the goals articulated in the MS4 permit – the HMP can and should guide the co-permittees towards achieving the most effective and progressive approaches for restoring and protecting receiving waters from the impacts of development. This vision should not be limited to just the erosive impacts of runoff, but also the water quality and other impacts to habitat and beneficial uses.

If the HMP is adopted as is, the co-permittees, Regional Board staff, and other interested parties will have engaged in an exercise of limited value, as the HMP will not meet the goals articulated in the current MS4 Permit, will potentially negatively impact the operation of other areas of the Permit incorporating LID practices, and will surely fail to meet more rigorous standards in future permits. The HMP as currently written will therefore be of limited usefulness – its narrow and short-sighted interpretation of the current Permit is not beneficial to any of the parties involved. More importantly, such an HMP is not protective of water quality, nor does it meet the MEP standard. As we noted in our previous letter, unless our concerns are addressed, we will oppose the adoption by the Regional Board of this HMP, and we therefore ask that the Regional Board not adopt the HMP as currently drafted.

Sincerely,

Gabriel Solmer
Legal Director
San Diego Coastkeeper

Noah Garrison
Project Attorney
Natural Resources Defense Council

Appendix A

September 29, 2009



Chair Sara Agahi and Members of the Hydromodification TAC

Watershed Protection Program, County of San Diego

5201 Ruffin Road, Suite P, MS#0326

San Diego, CA 92123-2665

Via email to: Sara.Agahi@sdcounty.ca.gov

RE: San Diego Coastkeeper's comments on the technical aspects and the current process of drafting the Hydromodification Management Plan

Dear Ms. Agahi and Members of the TAC:

As San Diego's largest environmental nonprofit organization dedicated to coastal water quality protection, San Diego Coastkeeper holds a unique and critical position on the Hydromodification Management Plan Technical Advisory Committee (TAC). Coastkeeper staff has actively participated in the TAC since its inception in February 2008. Even before the formation of a TAC, and throughout the development of the 2007 reissuance of the MS4 Permit, we have supported the development of an HMP in order to "...manage increases in runoff discharge rates and durations from all Priority Development Projects, where such increased rates and durations are likely to cause increased erosion of channel beds and banks, sediment pollutant generation, or other impacts to beneficial uses and stream habitat due to increased erosive force."⁴

Over the course of our involvement, and especially in the last few months, we have seen the TAC veer dangerously off course from its stated goals and the requirements of the MS4 permit. These changes have been accompanied by a similar disregard for an open and transparent

⁴ Provision D.1.g of Regional Water Board Order R9-2007-0001

process that allows all TAC members access to information and decision-making. We are increasingly concerned assertions of consensus have been made on behalf of all TAC members that are simply not true. Given the looming deadlines for the submittal of a completed HMP, an about face on these issues is necessary to develop an HMP that we can support, and a TAC process that supports all members. Our specific comments on TAC process and current draft HMP concerns are outlined below.

HMP is disconnected from the purpose and requirements of the MS4 permit

Following the first few meetings, we submitted an e-mail that asked the TAC to take the opportunity to think more holistically and to stem the growing disconnect between the direction of the development of the HMP and the intent of the NPDES permit⁵. We received assurances that the TAC and the consulting team were looking to take this opportunity to create “the most holistic HMP carried out to date in California”.⁶

Unfortunately this promise has not been kept. We understand the HMP must address erosion, but it must also address water quality issues. The Copermittee Working Group and TAC’s silo approach may have devastating consequences down the line. When one regulatory effort moves forward without consideration of other ongoing efforts, implementation becomes impossible. This is especially true in light of significant movements by various Regional Boards (including our Regional Board) to move toward a more holistic approach to MS4 Permit implementation.

The HMP Inappropriately Includes Policy and Compliance Provisions

It appears the Copermittees misunderstand of the role of the TAC itself. Throughout the HMP development process, decisions have been made based not on science, but on “policy” grounds. For example, at the June HMP TAC Meeting, a discussion centered on minimum orifice size for BMPs to meet HMP and flow-rate requirements. The TAC recognized the conflict between the model and minimum orifice requirements predicted for fine-grain sand systems. In the end, the decision was labeled a “policy” choice to be made by the Copermittees. HMP TAC Meeting Minutes, June 17, 2009, p.4-5. However, such decisions must be based on sound science to meet the goals of the Permit.⁷

The HMP contains other policy choices made by the TAC and Copermittee working group that are inappropriate for the technical document, and circumvent the Permit. For example, with

⁵ E-mail communication from Karen Franz to Sara Agahi, 22 Feb 2008

⁶ E-mail communication from Andy Collison, 3 March 2008 in response to Coastkeeper comments

⁷ See also Meeting Minute of HMP TAC Meeting February 12, 2009, p.6. (Policy decision to be made by Copermittees about low flow threshold and LID distribution technique used for Hydromodification).

regard to implementation of the HMP, restoration activities are listed as an alternative to compliance with flow control criteria.

In situations where the benefits of a proposed stream restoration project would substantially outweigh the potential impacts of additional runoff from a proposed project, the project proponent (pending TAC approval) may consider implementation of planning measures such as buffers and restoration activities, revegetation and use of less-impacting facilities at the point of discharge in lieu of implementation of storm water flow controls.

Draft HMP, May 1, 2009, p. E-2. The Permit allows for implementation of such activities without adverse impacts to channel beneficial uses. Permit, D.1.g (2), p.27. However, the HMP proposes a cost-benefit analysis for implementation of the HMP design requirement. The Permit does not contain such “in lieu of” language, nor can it be inferred from the Permit.⁸ Moreover, injecting such cost-benefit analysis into the Permit creates a loophole in implementation of HMP. Such subjective analysis should not be part of the HMP in light of the mandate to “manage increases in runoff discharge rates and durations”. *Id.*

Additionally, implementation of buffers, revegetation, etc does not meet the twin roles of the HMP: addressing the “changes in a watershed’s runoff characteristics resulting from development, together with associated morphological changes to channels receiving runoff.” Fact Sheet/Technical Report for Order No. R9-2007-0001, p.60. The in lieu of planning measures do not address the change in watershed runoff characteristics.

The HMP exemption for the lower third of a watershed is also an unsubstantiated policy decision. HMP TAC Meeting Minutes, June 17, 2009, p.8. Impacts to all areas of a watershed need to be addressed. No support has been given for such an exemption, nor is it considered in the Permit. Runoff from impervious surfaces not only causes erosion, but also carries pollutants to receiving waters.

⁸ In fact, the proposed South Orange County permit makes clear that such management measures are not in lieu of required control measures. “In addition to the hydrologic control measures that must be implemented per section F.1.h.(1)(c), the HMP must include a suite of management measures to be used on Priority Development Projects to protect and restore downstream beneficial uses and prevent or further prevent adverse physical changes to downstream channels.” Revised Tentative Order No. R9-2009-0002, August 12, 2009, p. 46.

The increased volume, velocity, frequency and discharge duration of storm water runoff from developed areas has the potential to greatly accelerate downstream erosion, impair stream habitat in natural drainages, and negatively impact beneficial uses. Development and urbanization increase pollutant loads in storm water runoff and the volume of storm water runoff. Impervious surfaces can neither absorb water nor remove pollutants and thus lose the purification and infiltration provided by natural vegetated soil.

Revised Tentative Order No. R9-2009-0002, August 12, 2009, p. 9 (emphasis added). As the Permit requires HMP implementation to prevent “significant adverse impacts to beneficial uses, attributable to changes in the discharge rates and durations” Wholesale exemptions for portions of a watershed are inappropriate. Permit, D.1.g., p. 26.

TAC Consensus Has Been Misrepresented to Regional Board

Recently we have become aware of the Copermittees misrepresentation of TAC consensus regarding decisions made in developing the HMP. Our continuing disagreements with the current conclusions of the draft HMP are evident from: our emailed comments submitted by Karen Franz on February 2, 2008; our comment letter from our expert Dr. Horner, submitted on April 14, 2009; and our requests for underlying technical data to support the HMP. Following the receipt of the response to comments from Dr. Horner, we requested the supporting references and technical papers that were the basis for the development of the design storm formulation for the Santa Clara and Contra Costa HMPs. The request was made at the June 17th meeting, and no communication of the references or technical papers followed the request.

Further, the draft HMP was not given to TAC members until after it was first presented to the Regional Board. A TAC meeting was held in October 2008, and another meeting was not held until February 2009. In the interim, the consultants met with the Copermittee Working Group, obtained approval of the draft HMP, and submitted it to the Regional Board. It was not until February 4, 2009 that TAC members were sent an electronic copy of the HMP. We obtained a physical copy of the draft HMP at the Copermittee meeting in January shortly after it was submitted to the Regional Board and before it was sent to the TAC.

TAC consensus and approval are also misrepresented on key issues, such as HMP compliance through “no increase to pre-project impervious area and no increase to pre-project flows.” HMP Outstanding Items, 9-15-09, p. 4. Contrary to the document assertion, this has not been “discussed and approved by the TAC.” Coastkeeper has and will continue to insist upon natural, pre-project flows and reduction in overall impervious area.

Coastkeeper's Effectiveness Has been Stymied by Lack of Transparency and Unavailability of Key Documents

Coastkeeper concurs in the Regional Board's comments made on June 29, 2009. The lack of detail and transparency highlighted in the letter has been a particular concern for Coastkeeper as well.

For instance the BMP sizing tools and their reporting should be a transparent process. Although the tools go beyond the scope of the HMP development, they are a necessary piece of the process, and as such, the HMP should provide more oversight on their use.

Additionally, Coastkeeper's specific comments from our technical expert Dr. Horner remain largely ignored or dismissed out of hand. Even to get an electronic copy of the draft HMP for our expert to review proved challenging. Several attempts were made to request the document by e-mail, without success. We were ultimately forced to scan a paper copy we obtained from a Stormwater Copermittee meeting where the draft HMP was distributed.

At a TAC meeting following submission of the comment letter, several TAC meeting attendees and members opined about the radical nature of our comments and marginalized Coastkeeper.

This type of discussion is indicative of the limited role Coastkeeper was able to play in participating on the TAC. This process of excluding the TAC from critical decision-making, and information exchange has also hindered the usefulness of the TAC.

Lack of Data Inhibits Progress

In addition to the lack of transparency in information exchange by consultants and Copermittees to TAC members, the delay in production of key aspects of the HMP prohibits meaningful input from the TAC. For example, the San Diego region has three distinct geomorphic and hence geologic regions. The geologic conditions of a watershed/catchment area are factors affecting the low flow threshold values.

Other critical components that may never be reviewed by the TAC include development of maintenance and long-term monitoring protocols and the required approval process for Priority Development Projects.

The incorporation of these tools into the decision matrix and preparation of consultant technical memos are critical steps in the HMP which have yet to be conducted, and may largely take place outside of the TAC.

Exemptions Remain Ill-conceived and Overused⁹

The Draft HMP makes exemptions for hardened channels as arguably allowed by the current Permit, but these exceptions are neither required nor prudent. Draft HMP Decision Matrix. First, the Permit language gives some discretion to the Copermittees, not requiring exceptions and qualifying such decisions with the requirement not to impact beneficial uses. Permit, D.1.g.(3), p.27. Moreover, the proposed South Orange County stormwater permit specifically requires hydromodification considerations for restoration of such hardened channels.

Hydromodification measures for discharges to hardened channels are needed for the future restoration of the hardened channels to their natural state, thereby restoring the chemical, physical, and biological integrity and Beneficial Uses of local receiving waters.

Revised Tentative Order No. R9-2009-0002, August 12, 2009, p. 9; Draft HMP Decision Matrix. The current San Diego County Permit cautions that future restoration of hardened channels should be considered in developing the HMP. Permit, D.1.g.(3), p.27.

Also, the Copermittees attempt to create an exemption for projects with “no net increase” in impervious area is also not in line with the Regional Board’s interpretation of “pre-project” as highlighted in the proposed South Orange County Permit. TAC Meeting Minutes, June 17, 2009, p.8.

Where the proposed project is located on an already developed site, the pre-project discharge rate and duration shall be that of the pre-developed, naturally occurring condition.

Revised Tentative Order No. R9-2009-0002, August 12, 2009, p. 44. Therefore, pre-project conditions in the current Permit should not make exceptions for “no net increase” unless such projects mimic naturally occurring conditions. *Id.*

Further, the “adoption and implementation of this NPDES permit relieves the Copermittee from developing a non-point source plan, for the urban category, under CZARA [Coastal Zone Act Reauthorization Amendments of 1990].” Permit, p. 10. CZARA requires implementation of management measures to prevent non-point source pollution from impacting or threatening coastal water quality. *Id.* Therefore, exemptions for the lower portions of watersheds or large

⁹ Coastkeeper generally shares the Regional Board’s concerns regarding HMP exemptions outlined in its June 29, 2009 letter to the Ms. Waller regarding the HMP. Regional Board Comment Letter, June 29, 2009, p.3-4.

receiving waters (i.e. bays, lagoons, areas with tidal influence, or the ocean) are not allowed. Draft HMP Decision Matrix.

Selection and Implementation of BMPs Are Vague or Missing

The Draft HMP does not provide a list of possible or preferred BMPs, and the explanation of BMPs thus far at TAC meetings has been equally vague. Draft HMP, p. 7-1; HMP TAC Meeting Minutes, June 17, 2009, p.6-8. At the outset we find that BMP specific design criteria will be much more useful and transparent. It is unclear why the TAC has not chosen this route. Additionally, although the age of a BMP system has a great influence on the efficacy of that BMP, no provisions or requirements exist to address this issue.

We have also asked to include infiltration and rainwater harvesting in the list of BMPs, but apparently only dry wells have been added thus far. *Id.* San Diego's reliance on imported water and its precipitation patterns create a tremendous regional opportunity for the development of rainwater harvesting systems to not only capture and reuse this resource, but also to reduce flows (and sediment) from Priority Development Projects (PDPs).

The Ventura County Permit requires all features constructed to render impervious surfaces "ineffective": to "infiltrate, store for reuse, or evapotranspire, without any runoff at least the volume of water that results from" the 85th percentile 24-hour runoff event, annual runoff based on unit basin storage to achieve 80 percent or more volume treatment, or a .75 inch storm event. Order No. R4-2009-0057, p.65-66. The San Diego HMP should contain greater emphasis on infiltration, reuse and evapotranspiration as well.

HMP Does Not Adequately Consider Climate and Land-Use Change

Effects of climate and land-use changes on low-flows and other hydrologic responses have been well documented as to the hydrological effects that will result in our region. When employed singly and in combination climate and land-use changes have significant and varying effects on flow conditions. The draft HMP contemplates only one rate of land-use change.. The HMP needs to consider the potential impacts of climate change and the effects that it will have on regional hydrologic conditions through its modeling. Hydrologic data is being generated by the Hydrologic Research Center, a San Diego-based international research center.

Conclusion

We hope the Copermitttees and TAC take our comments into consideration in moving forward with the draft HMP. Our concerns highlight some of the fundamental disagreements between TAC members that have not been accurately addressed or represented to the Regional Board.

Unless many of our concerns are addressed at this stage in the HMP development process, Coastkeeper will be unable to support the HMP before the Regional Board. Moreover, if the Regional Board chooses to accept the current path of the HMP, many of the issues highlighted above will need to be addressed in the near future as the Permit will be revised in 2012. An HMP of limited usefulness, based on strict, narrow, and short-sighted interpretation of the current Permit is not beneficial to any of the parties involved. More importantly, such an HMP is not protective of water quality, nor does it meet the MEP standard. We urge the Copermittees to think more holistically in developing the HMP, with some specific suggestions below.

Our specific recommendations for improvement are:

- A standard of 3 percent maximum allowable Effective Impervious Area (“EIA”) in all Regulated Projects, with a narrowly crafted alternative compliance provision for developments where severe site constraints, such as non-infiltrative soils, render compliance with the 3 percent EIA limitation impossible (may be written into SUSMP)¹⁰;
- As a hydromodification standard, post-development peak flow rates and volumes shall not exceed the modeled peak flow rates and volumes of pre-European-settlement native land cover for all storms from the channel-forming event to the 100-year frequency stream flow. This requirement shall be satisfied to the maximum possible extent by retention of runoff on the development site through infiltration, evapotranspiration, and/or rainwater harvesting. If the requirement cannot be fully met by on-site retention, there shall be a demonstration and convincing justification, according to specific criteria, of why it is not achievable at that site. If such a convincing demonstration and justification can be made, the differential between the required retention and the amount that can be provided on-site shall be offset by performing or contributing to an off-site project, within the same watershed, to retain an equal or greater volume of runoff from such other site.
- Monitoring of HMP compliance must be conducted at more than five sites in the entire county. At least one site per watershed should be monitored. Additionally, monitoring should begin before development, not after completion. Monitoring site selection should also be made with Regional Board staff input, not solely by Copermittees.
- Individual Priority Development Projects must be required to monitor effectiveness and maintain HMP BMPs and compliance measures. A real, tangible monitoring mechanism and compliance determination must be implemented into the HMP. Without such requirements in the HMP, no assurance of long-term effectiveness will be provided.

¹⁰ The recently adopted Ventura County Permit requires new development and redevelopment projects to reduce the EIA to 5 percent of the total project area. Order No. R4-2009-0057, p.65.

Such tools would also help Copermittees monitor specific BMP effectiveness in different watersheds.

- Urge the Regional Board staff to ensure strict compliance with the current Permit and look toward future consistency with other MS4 Permits in southern California, as setting the MEP standard.
- Future development, implementation, and monitoring of the HMP should be more transparent, including more availability for public input.
- The High, Medium, and Low susceptibility ratings should be removed. All watersheds should be treated as susceptible to erosion. Moreover, the classification of streams does not correlate to an appropriate HMP objective. For instance, for already unstable channels the standard is to “avoid acceleration of the existing erosion problems.” Draft HMP, p. ES-2. This is unacceptable, and does not meet the spirit or intent of the Permit.

Sincerely,

A handwritten signature in black ink, appearing to read 'Bruce Reznik', with a long horizontal line extending to the right.

Bruce Reznik
Executive Director
San Diego Coastkeeper

cc:

Christina Arias, Regional Water Quality Control Board

San Diego Copermittees

Attachments:

Dr. Horner Comments

Dr. Horner CV

Appendix B



NATURAL RESOURCES DEFENSE COUNCIL

November 4, 2009

Via electronic mail

Chair Sara Agahi and Members of the Hydromodification TAC
Watershed Protection Program, County of San Diego
5201 Ruffin Road, Suite P, MS#0326
San Diego, CA 92123-2665

Re: *Comments on Draft Hydromodification Management Plan*

Dear Ms. Agahi and Members of the TAC:

On behalf of the Natural Resources Defense Council ("NRDC"), I am writing with regard to the Final Draft of the Hydromodification Management Plan ("HMP"), dated October 21, 2009, prepared pursuant to Provision D.1.g. of San Diego Regional Water Resources Control Board Order R9-2007-0001, the San Diego MS4 Permit ("Permit"). The NRDC, with the San Diego Coastkeeper, participated extensively in the 2006-2007 San Diego MS4 permitting process and in subsequent proceedings concerning revision of the Countywide Model SUSMP, approved on March 25, 2009. The NRDC appreciates the opportunity now to comment on the HMP.

We have consistently raised concerns about the lack of clear standards for the implementation of post-construction low impact development ("LID") standards in both the Permit and subsequently adopted SUSMP. We are concerned now that, as currently drafted, the HMP fails to adequately require the implementation of LID practices to manage increases in runoff discharge rates and durations from Priority Development Projects, even where such practices are demonstrably feasible. At the same time we are concerned that, however unintentionally, the HMP has the potential to significantly and negatively impact the operation of those provisions of the Permit and Model SUSMP that do incorporate the use of LID stormwater management practices, and may serve as a basis for declaring the use of LID practices to be infeasible under both.

While ostensibly "the HMP advocates the use of LID design approaches," (HMP at ES-3), in practice the HMP will fail to incorporate the use of LID practices for the vast majority of sites, and in some cases, will improperly preclude the use of LID altogether. For example, in defining the infiltration potential for soils in San Diego, the

HMP fails to utilize any site specific data, or include any reference to the potential use of amended soils. (See HMP Section 4.4.) As a result, the modeled soil infiltration estimates presented under Section 4.4.1 of the HMP drastically underestimate the potential for infiltration in the San Diego Region.¹ When viewed in the context of the HMP decision matrix presented in Section 6, the result of the HMP's approach is to effectively, and erroneously, declare that infiltration is all but infeasible Countywide. Further, despite the excellent potential for evaporation practices to address increases in runoff discharges in San Diego,² the HMP fails to include any provision for use of evaporative LID practices. Rainwater capture and harvesting practices are likewise omitted from the HMP, despite their successful use and successful incorporation into MS4 permits throughout the state. There is simply no scientific or technical justification for these omissions.

Of particular concern is that the HMP's dismissal of LID practices will impact the operation of the Model SUSMP. The erroneous assessment of infiltration potential in the San Diego Region, or improper failure to include the use of either evaporation or rainfall harvesting practices, may provide a blanket and meritless justification for sites to declare the use of LID practices to be "infeasible" and exclude their use. The Model SUSMP states that interim hydromodification criteria may be achieved through use of "Low Impact Development Integrated Management Practices to manage hydrograph modification impacts." (SUSMP at 10.) Currently, this would include use of

¹See R. Horner (2007) *Investigation of the Feasibility and Benefits of Low-Impact Site Design Practices ("LID") for the San Diego Region*.

² R. Horner (2009) *Assessment of Evaporation Potential with Low-Impact Development Practices*, at 3; Figure 3.

³ Los Angeles Regional Water Quality Control Board (May 7, 2009) Waste Discharge Requirements for Storm water (Wet Weather) and Non-Storm Water (Dry Weather) discharges from the Municipal Separate Storm Sewer Systems Within the Ventura County Watershed Protection District, County of Ventura and the Incorporated Cities Therein, Order No. R4-2009-0057, NPDES Permit No. CAS004002, at 65; Santa Ana Regional Water Quality Control Board (May 22, 2009) Waste Discharge Requirements for the County of Orange, Orange County Flood Control District and the Incorporated Cities of Orange County within the Santa Ana Region Areawide Urban Storm Water Runoff Program, Order No. R8-2009-0030, NPDES Permit No. CAS618030, at 53-54; San Diego Regional Water Quality Control Board (August 12, 2009) Draft Waste Discharge Requirements for Discharges of Runoff from the Municipal Separate Storm Sewer systems (MS4s) Draining the Watershed of the County of Orange, The Incorporated Cities of Orange County, and the Orange County Flood Control District Within the San Diego Region, Order No. R9-2009-0002, NPDES Permit No. 0108740, at 35-36.

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evaporation or rainwater harvesting. However, the interim criteria will be "superseded after the HMP is accepted by the Regional Water Board," eliminating their potential use. (*Id.*) Similarly, under the SUSMP, infiltration "can be used for stormwater treatment for all land uses in all watersheds, except where site specific constraints make [it] infeasible." (SUSMP at 22.) Under the HMP's parameters, infiltration could be considered infeasible in almost all cases, regardless of whether actual site conditions would allow for infiltration or not.

We strongly urge the TAC to reconsider its methodology for determining the infiltrative capacity of soils, including the use of amended soils, in setting parameters for use of infiltration. We further urge the TAC to revise the HMP to promote the use of both evaporation and rainfall harvesting as a means of addressing, in part or in whole, the management of increased runoff discharges.

Sincerely,

Noah Garrison
Natural Resources Defense Council

Appendix C

REVIEW COMMENTS ON
FINAL DRAFT
HYDROMODIFICATION MANAGEMENT PLAN
SAN DIEGO COUNTY

Prepared for
San Diego Coastkeeper

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PREFACE

The San Diego Coastkeeper requested a technical review of the Final Draft, Hydromodification Management Plan ("the HMP" or "the plan") prepared for the County of San Diego and dated October 21, 2009. The HMP is significantly flawed in several key respects that will detract from its ability to meet its stated charge: "...to manage increases in runoff discharge rates and durations from all Priority Development Projects, where such increased rates and durations are likely to cause increased erosion of channel beds and banks, sediment pollutant generation, or other impacts to beneficial uses and stream habitat due to increased erosive force" (from Provision D.1.g of San Diego Regional Water Board Order R9-2007-0001). These shortcomings are:

- An incomplete and improper conception of low impact development (LID), the best means available to meet the HMP's charge;
- Questionable aspects of the critical flow rate development, a key factor in the HMP's methodology;
- Excessive exemptions to the HMP's requirements; and
- An incompletely developed monitoring program, missing a key element.

The inadequacies in applying LID are the HMP's most serious faults. They start with regarding LID as almost entirely a matter of infiltrating runoff, diminishing or ignoring the mechanisms of evapotranspiration and water harvesting and the practices associated with those mechanisms. Furthermore the plan recommends basing infiltration assessments on coarse U.S. Department of Agriculture concepts and data instead of site-specific analysis and almost totally ignores the great potential of organic soil amendments to improve infiltration and evapotranspiration and reduce surface runoff quantities. The HMP reveals a poor appreciation of the status, performance, and practice of LID techniques today.

Concerning the critical flow rate, the HMP presents an alternative to using a single value, a practice adopted elsewhere. The concept of multiple values is theoretically sound, but the plan falls short in specifying how the method it develops should be applied to assure proper use. Unless and until that gap can be filled, the appropriate single value, 10 percent of the 2-year flow event, should be used for the critical flow rate.

Exemptions put forward by the HMP fall into two categories: those that have been poorly thought through and, as presented in the plan, will continue to allow substantial hydromodification; and those that will forever consign degraded streams to that status. Both must be seriously reconsidered.

The subject of monitoring is only partially developed. At this stage it appears to be missing an in-stream component to determine if indeed the program is meeting its charge to manage channel erosion and impacts to beneficial uses and stream habitat.

The following sections detail these criticisms.

INCOMPLETE AND IMPROPER CONCEPTION OF LOW IMPACT DEVELOPMENT

GENERAL CRITIQUE OF THE HMP'S COVERAGE OF LID

The HMP overall, and particularly in section 7, offers a limited, out-of-date, misleading conception of what is generally termed LID, the best means available of preventing further hydromodification and rolling back some of the damage of past stream hydrography alteration. It should be unnecessary at this point to have to write this critique, once more, relative to a document issuing from the greater San Diego stormwater program. In recent years this reviewer has made similar comments on the San Diego County's Low Impact Development Handbook and at various times verbally and in writing to the City of San Diego in relation to its Strategic Plan for Watershed Activity Implementation and Chollas Creek Metals TMDL Implementation Plan. These comments have received a fair degree of acceptance, and a number directly influenced the final draft of the Low Impact Development Handbook. However, the HMP does not even cite that handbook within the text, although it appears in the reference list. It would have been better to write a more limited section 7 and reference detailed material elsewhere than to leave out important features of LID practice and promote misconceptions.

The faults of the HMP regarding LID are:

- It almost wholly presents it as a function of infiltration, diminishing the equally key mechanisms of evapotranspiration and water harvesting.
- Partly as a consequence of the first shortcoming, the HMP omits some very useful processes and practices in the LID array.
- It gives no sense of the hierarchy and ordering of LID practices and the procedure of developing an integrated application strategy that can best address hydromodification management.
- It is predicated almost entirely on U.S. Department of Agriculture (USDA) soil survey data and the associated hydrologic soil group classifications (A, B, C, D), which are too coarse for site-specific assessments, and ignores soil testing at the site as a far better basis.
- The plan almost ignores the important LID technique of amending some soils, usually with organic compost, to improve soil storage, infiltration, and evapotranspiration.
- In part a consequence of the preceding two faults, the HMP presents a false portrait of how soil- and vegetation-based practices should be designed.

Following is an elaboration and explanation of these points.

A CONCISE, BUT COMPLETE, PORTRAIT OF LID

State-of-the-art methods in stormwater management for addressing both water quality and hydromodification concerns are what most call low impact development (LID) techniques. The

National Research Council's (NRC, 2009) report on *Urban Stormwater Management in the United States* renamed LID "aquatic resources conservation design" (ARCD), a broader term signifying that the principles and many of the methods apply not only to building on previously undeveloped sites, but also to redeveloping and retrofitting existing development. The remainder of this account employs the new term. Mechanistically, these methods operate to prevent surface runoff formation or reduce its quantity through infiltration and evapotranspiration (ET), usually both, and/or by harvesting precipitation for a use such as irrigation or gray water supply. The latter two mechanisms are virtually ignored by the HMP.

From a process standpoint ARCD includes an array of practices representing better site design to prevent surface runoff (and pollutant) generation in the first place or reduce the ultimate quantities of runoff and pollutant mass loading: (1) preservation of existing vegetation and soils; (2) numerous site design strategies intended to reduce creation of impervious surfaces, such as clustering buildings and related developed features; narrowing streets, driveways, and parking areas; and covering parking; (3) bioretention cells, channels, and filter strips (retention indicates that precipitation is prevented from being converted to surface runoff through the previously listed mechanisms); (4) stormwater planters of various designs, which essentially are small-scale bioretention cells; (5) permeable paving; (6) green roofs; (7) water-storage cisterns and tanks; and (8) roof runoff subsurface drain systems and other applications of infiltration trenches.

The best strategy for choosing among and implementing these practices is an integrated one making maximum possible use of the first two listed and then selecting among the remaining ones in relation to the localized and overall site conditions. Preservation of existing vegetation and soils obviously avoids post-development runoff quantity and pollutant increases from any portion of the site that can be so treated. Among all strategies, this one best maintains predevelopment hydrology (infiltration and ET patterns) and yield of materials flowing from the site. This preventive strategy is supplemented by the minimization one of creating as little impervious cover as possible. The remaining practices then contend with the excess runoff and pollutants over pre-development levels generated by the development. In specifying these practices equal attention should be given to all three LID mechanisms, without over-reliance on infiltration, for several reasons. First, in a natural landscape retention is somewhat balanced between infiltration and ET; maintaining a semblance of that balance best replicates predevelopment hydrology. Second, there are legitimate circumstances where infiltration potential is limited (e.g., heavy clay soils, very high water table or bedrock) or should not be induced beyond what would occur in the natural landscape (e.g., where percolating water could mobilize subsurface contaminants). Then ET and, especially, harvesting mechanisms still provide opportunities to retain water under such circumstances.

In their fullest development, soil- and vegetative-based practices in the list have such attributes as: (1) soils amended, usually with organic compost, if necessary to maximize water storage and subsequent infiltration and ET; (2) vegetation in several canopy layers (e.g., small herbaceous growth, bushes, trees) to promote diverse quantity and quality management mechanisms, such as rainfall interception, ET, infiltration (enhanced by the well developed root structures of larger plants), particle filtering, and surface-based pollutant reduction processes like biodegradation, adsorption, absorption, and ion exchange; (3) absence of an impermeable liner, for maximum infiltration opportunity; and (4) absence of an underdrain connected to a storm sewer, which creates surface runoff that might otherwise be retained on-site. The HMP's treatment of LID practices does not indicate awareness of the desirability of combining these features to retain runoff and its

associated contaminants on the site to the degree possible. In fact, as discussed further below, it misleads potential users to believe that their potential is more limited than it is in reality.

ARCD PERFORMANCE

Thorough and effective use ARCD methods can usually prevent discharge of the whole volumeth designated for design or facilities for water quality protection (e.g., the volume produced by the 85th percentile rainfall event in the San Diego case). These methods can often or even usually prevent the discharge of the required volume for channel protection. They can sometimes or even often prevent the discharge of the differential between the pre- and post-development peak flow rates as required for overbank flood protection. The capabilities have been demonstrated in field and theoretical studies to which this reviewer has contributed.

For example, a Seattle, WA, urban drainage system consisting of vegetated cells with soil amendment, installed on a nearly flat street, initially discharged only 1.9 percent as much runoff per unit rainfall as the preceding, conventional system, with the remainder kept from discharging to the receiving creek through infiltration and ET. Between December 2002, after its vegetation matured, and the conclusion of monitoring in June 2007, the natural drainage system discharged no surface runoff, despite the occurrence during that period of the largest 24-hour rainfall (in 2003) and the wettest month (November 2006) in Seattle history (Horner and Chapman 2007; Horner, Lim, and Burges 2004). Another Seattle street drainage system, in this case built in a stepped-pool arrangement on a street sloping at approximately 6 percent and also with amended soils, prevented any discharge from 79 percent of all rain events and, overall, reduced the entering runoff volume by an estimated 74 percent through infiltration and ET (Chapman and Horner in press, Horner and Chapman 2007). Even in the 21 percent of events with discharge, pollutant concentrations and mass loadings were greatly reduced from the influent quantities, as much as 92 percent in the case of the motor oil loading. Seattle uses these two natural drainage system models in concert for channel protection and control of overbank flooding and extreme storms. Vegetated cells installed on the relatively flat streets reduce the surface runoff quantity and the associated pollutants entirely or nearly so, and the stepped-pool facilities manage runoff generated on the more sloping streets to a high degree.

Horner (2006) analyzed the San Diego area to estimate the potential for reducing surface discharges of urban stormwater and the pollutants it transports. Horner (2007a, b, c) performed similar analyses for two other California metropolitan areas. These analyses demonstrated that limiting impervious area connected to the external drainage system and directing runoff from impervious to pervious areas can eliminate surface runoff from all but the most highly impervious development types and in all but the most restrictive (to infiltration) soils. The HMP does not strongly enough recognize this great potential, and hence does not promote achieving it as an overarching goal nor recommend maximum application of these now well demonstrated techniques.

DETAILED CRITIQUE OF THE HMP'S COVERAGE OF LID

Insufficient Attention to the Evapotranspiration Mechanism

The HMP cites sources of evapotranspiration data in section 4.5 but does not pay this second of the three mechanisms of ARCD practices adequate further attention. It is possible that this attention will come after these data sources are tapped, but the document should recognize the strong

potential for ET to reduce surface runoff in San Diego. It is clear from work in Maryland by Davis (2008), measuring effluent quantity from impermeably lined bioretention cells providing no opportunity for infiltration, that substantial ET occurs in these systems. As a performance measure, Davis established a target of reducing the influent volume discharging within 24 hours by at least of 33 percent and found that this target was met for 54 percent of the rain events in one of two cells tested and 61 percent in the other.

Attachment A to this report presents a report prepared by this author showing that San Diego will achieve substantially better ET losses than Maryland. The report compares evaporation data from different parts of the nation in their respective highest rainfall months. Southern California locations, led by San Diego, exhibit a substantial excess of evaporation over precipitation in the six highest months of precipitation. Only Philadelphia has any excess in the three highest rainfall months, and San Diego's excess is more than twice as large as Philadelphia's in its three highest rainfall months. San Diego also leads all other locations investigated in excess evaporation in the six highest rainfall months, with almost three times the excess of Atlanta. Therefore, even though southern California's wet season coincides with its period of lowest evaporation, its generally warm, sunny winters give it an advantage over other locations in the nation that have adopted runoff retentive LID measures.

As one illustration of the potential offered by LID, Berghage et al. (2007) performed green roof research at Pennsylvania State University, located in central Pennsylvania. They found over 50 percent of annual stormwater volume to be retained and not discharged, even with as little as 20 mm (under 1 inch) of storage capacity, and peak discharge rate attenuation to no more than the pre-development level for the 2-, 25-, and 100-year frequency events. Figure of the report in Attachment A shows that San Diego and all of the other California cities assessed are in a much more favorable position than central Pennsylvania in implementing green roofs, and hence would be expected to increase runoff retention to well over 50 percent with this LID technique. The HMP does not even mention green roofs, an omission it must remedy.

There are a number of well known ways to quantify ET or the evaporation component of it, but they have not been widely employed in specifying ARCD practices. While there are more sophisticated techniques (e.g., using remote sensing data), direct measurement such as performed by Davis (2008) is well suited as a basis for specifying these practices, because it accounts for both evaporation and transpiration. The San Diego area should conduct projects to make similar, representative measurements, as initial ARCD projects are installed, to refine the guidance for a range of regional conditions.

Insufficient Attention to the Rainfall Harvesting Mechanism

Like ET, runoff harvesting must also be incorporated to a greater degree in planning for hydromodification management. Commercial and institutional developments, especially, offer good opportunities to capture roof runoff for supplying toilet flushing and landscape watering systems. For example, in downtown Seattle the King County Government Center collects enough roof runoff to supply over 60 percent of the toilet flushing and plant irrigation water requirements, saving approximately 1.4 million gallons of potable water per year (Puget Sound Action Team 2003). A much smaller public building in Seattle, the Carkeek Environmental Learning Center, drains roof runoff into a 3500-gallon cistern to supply toilets (Accetturo 2005). While the HMP

mentions cisterns, presumably for small-scale collection of drainage from individual dwellings for household irrigation use, it must expand to larger-scale applications.

San Diego Coastkeeper staff, which commissioned this review, reported that public agency personnel associated with developing the HMP have advanced the excuse for not considering harvesting more that it will be a source of mosquito breeding. These personnel provided a report by Metzger (2009) documenting mosquito breeding in extended-detention basins and AquaShield units in June on Caltrans SR-125 in San Diego County as justification for not harvesting stormwater for water supply. The two situations are so different that giving such a justification is a virtual *non sequitur*. The highway stormwater management devices were receiving non-stormwater during the dry season, preventing their drainage as intended. The storage tanks for the King County Government Center and the Carkeek Environmental Learning Center are shielded from non-stormwater runoff and are completely sealed from mosquito entrance, true of neither of the highway devices.

The speciousness of the argument is further established by considering the amount of water supply storage already installed in the San Diego area. The website of the City of San Diego's Water Department (<http://www.sandiego.gov/water/gen-info/overview.shtml>) states that "...San Diego maintains and operates ... more than 200 million gallons of potable water storage capacity in 32 standpipes, elevated tanks, and concrete and steel reservoirs." San Diego County Water Authority's website (<http://www.sdcwa.org/manage/sources-reservoirs.phtml>) reports that 24 surface reservoirs are located within the Water Authority's service area, with a combined capacity of approximately 571,000 acre-feet of water. The website informs us further that:

Water recycling is defined as the treatment and disinfection of municipal wastewater to provide a water supply suitable for non-potable use. Water agencies in San Diego County currently use recycled water for irrigation of parks, campgrounds, golf courses, freeway medians, community greenbelts, and school athletic fields; irrigation for agricultural food crops and nursery stock; recreational and aesthetic enjoyment associated with the replenishment of lakes, ponds, and ornamental fountains; dust control at construction sites; makeup water for cooling tower use; and other industrial and commercial purposes. Our recycled water supplies have proved to be a valuable, dependable, and uninterrupted source of water, which helps to offset the need to import additional water supplies.

Water Recycling is becoming an increasingly important component of the San Diego region's efforts to expand its local water supplies. Today some 25,000 acre-feet of recycled water is in use within the San Diego area, and by 2020 that number is expected to jump to over 40,000 acre feet. One acre-foot is enough to serve two families of four for a year.

The agency personnel would have us gullibly accept that distributing reclaimed wastewater in this way, including to lakes, ponds, and ornamental fountains, is devoid of mosquito threats, while somehow introducing harvested rainwater suddenly calls in the mosquitoes. An area that takes most of its water from hundreds of miles away and is considering desalination, at great energy and environmental cost, should be the first to capture its free water supply from the sky and add it to the already established, and expanding, recycling system.

Poor Basis for Soils Characterization and, Therefore, Infiltration Assessment

Over-reliance on USDA Data:

The HMP relies too much on USDA soil survey data and the associated hydrologic soil group classifications (A, B, C, D). This methodology does not provide a reliable measure of a site's infiltration capacity and should not be used to develop LID sizing factors, as proposed by section 7.2 of the HMP. The USDA has placed soils, as a part of its long-time soil survey program, in one of four "hydrologic soil group" (HSG) categories ranging from rapid (A) to highly impeded (D) rate of infiltration; in the Natural Resource Conservation Service (NRCS) "TR-55" and "TR-20" hydrologic models, the HSG classification is used as one consideration in selecting a curve number, a limited method fortunately rejected by the HMP in favor of continuous hydrologic modeling. The underlying soil survey data are generally based on broad, often remotely sensed results instead of site-specific information. As a result, localized conditions often deviate from the supposed soil type and HSG assignment. Even in a broad matrix of one type, soils at any given site can differ markedly. Relying exclusively on the USDA soil survey data, therefore, can give either overly pessimistic or optimistic impressions of infiltration potential, resulting in lost opportunities on the one hand or failed systems on the other.

Beyond the assignment of a HSG category based on a soil that may not actually exist at a site, the HSG concept itself is flawed when applied as the principal or only basis to analyze the infiltration potential of the natural soils at a given site and design stormwater management facilities. It is overly simplistic, in that it ignores the many variables that determine how much infiltration will occur in any given soil at any given time, such as total precipitation quantity, rainfall intensity overall and in pattern during the storm, site slope gradient and length, surface roughness, and vegetative cover. Fennessey and Hawkins (2001) cogently criticized over-reliance on HSG:

The HSG was originally developed as an approximate average value used to estimate runoff potential. Four HSG types are used to represent thousands of soils underlain by different geology in different regions of the United States. HSG were developed considering rainfall events that produced large flood events. The HSG were determined by "assuming that the soil surfaces were bare, maximum swelling had taken place, and rainfall rates exceeded surface intake rates" (USDA, 1993) and after prolonged wetting using the soil B horizons. This is almost never the case for most rainfall events, especially those that BMPs are aimed at functioning during. Additionally, the HSG has nothing to do with recharge, and should not be used as an indicator of recharge, or for any other purpose that it was not originally intended for.

In light of these biases built-in to the HSG concept, sizing factors developed from it will often incorrectly estimate the infiltration potential of the natural soils at a given site. Ventura County, CA (2001) consulted multiple sources and cited ranges of infiltration rates for the various soil groups, as follows: (1) A—1.00-8.3 inches/hour, (2) B—0.5-1.00 inch/hour, (3) C—0.17-0.27 inch/hour, and (4) D—0.02-0.10 inch/hour); these ranges are a function of the numerous variables and associated variation in how much infiltration will occur in any given situation. HSGs, properly understood, can be used by developers for preliminary design purposes. However, HSGs should not be used, as proposed in the manual, to develop sizing factors to be applied to unamended soil at a given site.

Instead of the broad USDA classifications, the HMP must rely on site-specific characterization of soils and their infiltration capacities. The best, and an eminently reasonable, way to introduce better soils information in stormwater management facility analysis and design is to require all building permit applicants to determine soil characteristics and infiltration rates around their sites through direct observations and measurements. Excavating shallow pits, analyzing basic soil characteristics, and performing percolation tests are not expensive tasks. (See, for example, the detailed guidance on performing a "soil and infiltration assessment" in Chapter 3 of the City of Santa Barbara (2008) stormwater manual.)

Dismissal of Soil Amendment:

The HMP does not adequately appreciate the value of soil amendment as a means to increase infiltration and otherwise manage stormwater onsite. Over and above the faults with soil survey and HSG data for the HMP's purposes, research has shown that engineering soils, generally through the addition of organic compost, can greatly improve temporary water storage in the soil and subsequent loss from the surface flow system through infiltration and ET (Horner, Lim, and Burges 2004; Horner and Chapman 2007; Chapman and Horner in press; Davis 2008). Most soils, excepting those heavy in clays, can be amended to increase water storage sufficiently to reduce surface runoff substantially through infiltration and evapotranspiration. The Seattle urban street drainage system consisting of vegetated swales and filter strips with soil amendment and highly effective in attenuating surface runoff, described above, is in a location where the original soils were in the HSG "C". Thus, a site with some natural limitations in attenuating surface runoff can be redressed to serve much better in that respect and, in effect, be converted from one HSG to another. The success of these unlined Seattle drainage systems built without underdrains on amended soils in a general HSG "C" soil setting points out that there is no justification for the HMP's specification (on page 7-2) that LID facilities built in Group C soils will include an underdrain (and, presumably, a liner).

To provide insights for future ARCD designs in Seattle, there was a desire to quantify, at least approximately, what minimum infiltration rate to expect. Rates estimated through analysis of rain and runoff data, as well as with the aid of a simple model (Chapman 2006), demonstrated considerable variability dependent on storm characteristics and soil wetness. To get an idea of the limiting condition, the rate in relatively large, extended storms falling on comparatively wet soils, an examination was made of rainfall events producing at least 0.9 inch of rain over extended periods and having an antecedent precipitation index (API) in the "wet" range (≥ 0.6). These storms were all in the cooler months and thus represent infiltration, largely, and probably not much evapotranspiration. Infiltration rates were 0.3 or 0.5 inch/hour in all but one of these events, one having two to four times as much rainfall as any other example. Thus, it appears that a rate of 0.3-0.5 inch/hour would be a reasonable, relatively conservative design value. Comparing to the Ventura County "C" soil values cited above, this range is approximately twice as high, demonstrating the potential of soil amendment to increase infiltration for very substantial hydromodification and water quality management benefits.

¹ The antecedent precipitation index (API) is defined as $API_t = R_{t-1} + k \cdot API_{t-1}$, where API_t is the index for day t, API_{t-1} is the index for the previous day, R_{t-1} is the rainfall depth for the previous day in inches, and k is a coefficient reflecting the relative rate of soil drying (Linsley, Kohler, and Paulhus 1982). The value of k can range from approximately 0.85 (sand) to 0.98 (clay). In this study, a k of 0.85 was chosen due to the somewhat sandy nature of the weathered till present at the site.

The subject of soil amendment requires full treatment in the HMP, or at least reference to full sources. Fact Sheet 30 in Appendix 4 of San Diego County's LID Handbook covers it some detail. A number of other sources exist to draw upon as well. For example, the Puget Sound Action Team and Washington State University's (2005) LID guidance manual devotes eight pages (pp. 90-97) to the subject. The City of Santa Barbara (2008) stormwater manual has a more concise but detailed section (5.10).

QUESTIONS REGARDING THE CRITICAL FLOW RATE

Section 4.1.2.3 discusses the results of studies in several locales to establish the critical flow rate (Q_c), the rate corresponding to the critical shear stress; i.e., the shear stress that can move stream bed material and hence perform erosive work on the channel. In the San Francisco Bay Area Q_c was found to be 10 percent of the pre-development two-year flow in the Santa Clara Valley and 20 percent of the that flow in Fairfield. The differences in the values may be attributable to distinctions in watershed characteristics in the two cases, with Fairfield having a more densely vegetated riparian corridor and therefore, presumably, a higher resistance to increases in shear stresses. Western Washington State, which has more densely vegetated riparian zones than either Fairfield or Santa Clara County, has adopted a Q_c of 50 percent of the 2-year flow. It is undoubtedly true that more arid San Diego has less riparian vegetation density than any of these examples. If a single value for Q_c is appropriate, then the vegetation density argument would support no greater than using 10 percent of the pre-development two-year flow rate in San Diego.

It is reasonable to conclude, as the HMP does in section 5.1.2, that in reality there is a wide range of critical flows, based largely on channel material but also on channel dimensions, rainfall, and watershed area. The document goes on in section 5.1.3 to develop multiple critical flows based on ranges of these conditions, also a reasonable exercise. That exercise concluded with the recommendation of five critical flow conditions as multiples of the 2-year discharge for different channel materials. What is unclear about the procedure is how the HMP anticipates it being applied. If the channel material is not homogeneous, is the material to be characterized accord to the most erosive fraction found, an "average" fraction, or what? Using something other than the most erosive fraction would lead to continuing hydromodification. Also, how does the plan expect that the sampling and analysis will be performed and the data interpreted, where in relation to the project, at how many locations, and by whom? For a proper determination multiple samples will be needed, with the sample collection overseen and data interpretation performed by a registered geologist. The technique must be further developed in regard to these issues before it can be accepted. Until then, the HMP should be based on a Q_c equal to 10 percent of the pre-development two-year flow rate (see discussion of the term "pre-development" under the topic Excessive Exemptions below).

The critical flow development depends on a selection of "dominant discharge," the flow rate that performs the most "effective work" (a function of both flow frequency and sediment transport rate) on the channel. The HMP selected the 5-year runoff event as the dominant channel-forming discharge based upon a report by Coleman, MacRae, and Stein (2005). However, as the HMP admits in section 5.1.3, these authors actually found the dominant discharge in Southern California streams to average at the 3.5-year event (in a range of 2.1- to 6.7-year). This reviewer worked through the mathematics and found that the selection does not make a great deal of difference

numerically, but the HMP authors owe readers an explanation of why the 5-year event was selected when the best available data point to another choice.

In addition to these questions about its foundation, it is unclear if the mathematics was properly performed in developing the multiple critical flows. Metric (SI) and English units of measurements were mixed in the presentation. If English units pertain to the velocity equation, as they seem to, there is a constant factor missing in the equation.

EXCESSIVE EXEMPTIONS

Section 6.1 of the HMP lists exemptions from HMP management requirements when:

- The project is not a Priority Development Project;
- The project does not increase the impervious area or peak flows to any discharge location;
- The project discharges to a hardened conveyance system that extends to the Pacific Ocean, San Diego Bay, a tidally-influenced lagoon system or an exempt river reach; and/or
- The contributing watershed area to which the project discharges has an impervious area percentage greater than 70 percent.

The wording of the second exemption raises the question, Increase from what? The HMP uses the term "pre-development" in many places without defining it, and perhaps that is the intended baseline for this exemption. The term, without further explanation, is susceptible to several possible interpretations. In particular, for redevelopment sites, if "pre-development" is read as referring to *pre-construction* or *pre-project* runoff volumes, this will almost always represent conditions that we now want to avoid. Therefore, the HMP must clearly state that "pre-development" refers not to the condition of a site prior to construction of the particular development project under review, but rather the condition of a site in its *undeveloped* state.

If the second exemption is interpreted literally, it constitutes a misunderstanding of how urban development alters hydrology and how it must be managed. Not only is installation of impervious surface at issue, but the entire modification of the natural landscape and drainage system is involved. Loss of vegetation reduces rainfall interception, tissue storage of water, transpiration, and the assistance to infiltration provided by root structures. Construction activity removes topsoil and compacts the remaining soil, diminishing its water storage capacity and ability to infiltrate and percolate water. Lawns are thus almost impervious in nature. Curb-and-gutter urban drainage systems replace dispersed sheet flow and transport water away before it has a chance to infiltrate or evapotranspire. Hydromodification management must account and compensate for all of these alterations. As the HMP properly notes elsewhere, it is not just peak flows rises at issue but also increases in total discharge volumes and durations of elevated flows. Specifically, box 4 of Figure 6-1 must be corrected to state, "Does the proposed project increase peak flow rates and durations at any outlet compared to the undeveloped state for the flow range from the lower flow control limit to Q_{10} ?"

The third and fourth exemptions essentially consign these channels perpetually to their artificial, highly degraded status with almost no ecological function. These exemptions should be removed, at least until a broad assessment of restoration potential can be completed and the most opportune cases prioritized for implementation.

Section 6.3 provides for "stream rehabilitation" options in lieu of project flow controls if the channel screening tools indicate the existing channel condition has a high susceptibility to erosion. The implications of this option are extensive, and it is very poorly developed in just a half page in the HMP. All it says about what rehabilitation might consist of is buffers and restoration activities, revegetation, and use of less-impacting facilities at the point of discharge. If in-stream restoration is undertaken without attending to elevated flow rates, volumes, and durations in the watershed, what is to keep the restoration structures or the replanted riparian vegetation in place? Stream restoration pursued in this thoughtless way has often failed very quickly, sometimes in the first sizeable storm. This entire idea on its face is ill-considered. For any proper evaluation, it must be developed to a much greater extent and all of its implications examined.

INCOMPLETELY DEVELOPED MONITORING PROGRAM

As with other aspects of the HMP, the monitoring program in section 8 is not well developed, given only three pages of text. While overall better definition is needed, one major shortcoming stands out at this level of development. The proposed program seems to be limited to discharge monitoring, but in-stream monitoring is also needed to assess overall progress in meeting hydromodification objectives as the program goes forward. The implicit goal of the program is, or at least should be, to prevent further degradation of beneficial uses and act to recover at least some lost beneficial uses over time. Assessing such a goal requires direct monitoring of beneficial uses, for example fish production, along with hydrologic and hydraulic variables. Monitoring the effectiveness of the hydromodification management program will be most meaningful where there are baseline data, taken before the institution of controls. Obtaining baseline data should be an immediate priority, and its existence should be a criterion in selecting streams on which to conduct monitoring.

REFERENCES

- Acceturro, A. 2005. *Seattle Highlights Rainwater Harvesting at ARCISA 2005*. HarvestH2O.com. (Available online at: <http://www.harvesth2o.com/seattle.shtml>)
- Chapman, C. 2006. Performance Monitoring of an Urban Stormwater Treatment System. M.S.C.E. thesis, Department of Civil and Environmental Engineering, University of Washington, Seattle, WA.
- Chapman, C. and R.R. Horner. In press. Performance Assessment of a Street-Drainage Bioretention System. *Water Environment Research*.
- City of Santa Barbara. 2008. *Storm Water BMP Guidance Manual*. City of Santa Barbara, CA. (Available online at: http://www.santabarbaraca.gov/Resident/Major_Planning_Efforts/Storm_Water_Management_Program)
- Coleman, D., C. MacRae, and E.D. Stein. 2005. Effect of Increases in Peak Flows and Imperviousness on the Morphology of Southern California Streams. Research Project Technical Report #450. Stormwater Monitoring Coalition, Southern California Coastal Water Research Program, Westminster, CA.
- Davis, A.P. 2008. Field Performance of Bioretention: Hydrology Impacts. *Journal of Hydrologic Engineering* 13(2):90-95.
- Fennessey, L.A.J., and R.H. Hawkins. 2001. The NRCS Curve Number, a New Look at an Old Tool. Proceedings of the 2001 Pennsylvania Stormwater Management Symposium, October 17-18, 2001, Villanova University, Villanova, PA. (Available online at: http://www3.villanova.edu/VUSP/bmp_research/Outreach/pasym01/index.html)
- Horner, R.R. 2006. Investigation of the Feasibility and Benefits of Low-Impact Site Design Practices ("LID") for the San Diego Region. Report to Natural Resources Defense Council, Los Angeles, CA.
- Horner, R.R. 2007a. Initial Investigation of the Feasibility and Benefits of Low-Impact Site Design Practices ("LID") for the San Francisco Bay Area. Report to Natural Resources Defense Council, Los Angeles, CA.
- Horner, R.R. 2007b. Investigation of the Feasibility and Benefits of Low-Impact Site Design Practices ("LID") for Ventura County. Report to Natural Resources Defense Council, Los Angeles, CA.
- Horner, R.R. 2007c. Supplementary Investigation of the Feasibility and Benefits of Low-Impact Site Design Practices ("LID") for the San Francisco Bay Area. Report to Natural Resources Defense Council, Los Angeles, CA.
- Horner, R.R. and C. Chapman. 2007. NW 110TH Street Natural Drainage System Performance Monitoring, With Summary of Viewlands and 2nd Avenue NW SEA Streets Monitoring. Report

- Horner, R.R., H. Lim, and S.J. Burges. 2004. Hydrologic Monitoring of the Seattle Ultra-Urban Stormwater Management Projects: Summary of the 2000-2003 Water Years, Water Resources Series Technical Report Number 181. Department of Civil and Environmental Engineering, University of Washington, Seattle, WA. (Available online at: http://www.seattle.gov/util/stellent/groups/public/@spu/@esb/documents/webcontent/spu01_002597.pdf)
- Linsley, R.K., Jr., M.A. Kohler, and J.L.H. Paulhus. 1982. *Hydrology for Engineers*. McGraw-Hill Book Company, New York, NY.
- Metzger, M. 2009. BMP Site Inspection Report, SR-125, San Diego County. Vector-Borne Disease Section, California Department of Public Health.
- National Research Council. 2009. *Urban Stormwater Management in the United States*. The National Academies Press, Washington, D.C. (Available online at: http://www.nap.edu/catalog.php?record_id=12465)
- Puget Sound Action Team (PSAT) and Washington State University. 2005. *Low Impact Development, Technical Guidance Manual for Puget Sound*. Puget Sound Action Team, Olympia, WA. (Available online at: www.psp.wa.gov/downloads/LID/LID_manual2005.pdf)
- Puget Sound Action Team (PSAT). 2003. *Natural Approaches to Stormwater Management: Low Impact Development in Puget Sound*. Puget Sound Action Team, Olympia, WA. (Available online at: http://www.psparchives.com/publications/our_work/stormwater/lid/LID_studies/lid_natural_approaches.pdf)
- State of Massachusetts. Undated (last visited 11/3/09). *Smart Growth/Smart Energy Toolkit*. (Available online at: http://www.mass.gov/envir/smart_growth_toolkit/pages/mod-lid.html)
- United States Department of Agriculture. 1993. National Engineering Handbook, Section 4, Hydrology. Soil Conservation Service, Washington, DC.
- Ventura County. 2001. Ventura Countywide Stormwater Quality Management Program, Land Development Guidelines, Appendix C, Hydrologic Soil Groups. Ventura County, Ventura, CA. (Available online at: <http://www.vcstormwater.org/documents/workproducts/landuseguidelines/appC.pdf>)



County of San Diego

DEPARTMENT OF PUBLIC WORKS

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RICHARD E. CROMPTON
ASSISTANT DIRECTOR

May 10, 2010

Christina M. Arias
Water Resources Control Engineer
California Regional Water Quality Control Board
San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

Dear Ms. Arias:

COMMENTS REGARDING TENTATIVE RESOLUTION R9-2010-0066

Please find below County comments in response to the San Diego Regional Water Quality Control Board's (RWQCB) Tentative Resolution R9-2010-0066 regarding approval of the San Diego Region Copermittee Hydromodification Management Plan (HMP).

1. URBAN INFILL EXEMPTION

1.1 Regional Board Findings - Tentative Resolution Item 6a

Section 6 of the Final HMP describes cases where exemptions from hydromodification mitigation requirements may be granted for PDPs. One such exemption is for urban infill projects discharging runoff to an existing hardened or rehabilitated conveyance system. According to the Final HMP, exemptions may be granted where the existing impervious area percentage in the watershed exceeds 40 percent, and if the potential future development in the watershed would increase the watershed's impervious area percentage by less than 3 percent (as compared to existing conditions). The potential for future development in each watershed is speculative and highly variable and there is no guarantee that such impacts would result in an increase in impervious surface limited to less than 3 percent. Therefore, this exemption is not appropriate.

RWQCB Recommended Revision

Section 6, Figure 6-1 –HMP Applicability Determination

Remove nodes 10-13 regarding program exemptions for urban infill projects, and all accompanying discussion.

1.2 County Response

The Copermittees do not believe the HMP infill exemption criteria to be speculative. The exemptions criteria are comprehensive and organized to filter only those projects that qualify. Using various case studies against continuous simulation modeling to support our approach, these exemptions would result in only marginal increases to the basin flow and, therefore, negligible channel degradation. Below is a more detailed explanation on the exemption criteria including a case study to support the Copermittees approach.

The proposed exemption for small urban infill projects was proposed for scenarios where the all of the following five (5) conditions are met.

1. The watershed to which the proposed project discharges is significantly urbanized (existing impervious area of the watershed is greater than 40 percent). No exemption would be considered if the existing impervious area of the watershed is less than 40 percent.
2. The potential for cumulative added impervious area in the watershed (including the proposed project site) is less than 3 percent (as compared to existing conditions at the time of HMP adoption). This determination will be made by analyzing municipal Land Use General Plans and assigning anticipated impervious area percentages to specific land use designations. If there is potential for cumulative added impervious areas in excess of 3 percent for a watershed, then this exemption cannot be considered. Continuous simulation models have been prepared showing that if the existing watershed impervious area is 40 percent or greater, then additional impervious areas increases of less than 3 percent have a negligible impact on the resultant flow duration curve. These analyses are presented in Appendix F of the HMP submitted to the RWQCB on December 29, 2009.
3. The project discharges runoff directly to a hardened conveyance system or a rehabilitated drainage system which has been designed to safely convey the ultimate land development conditions. No exemption would be considered if the proposed project discharged to a natural conveyance system.
4. The hardened or rehabilitated conveyance system detailed in the item above would be required to extend beyond the project's domain of analysis, as defined in the HMP. Thus, if a hardened conveyance system extends for 200 feet downstream of a proposed site and the domain of analysis extends for 500 feet downstream of a site, then no exemption would be considered.

5. In addition to the criteria listed in the HMP submitted on December 29, 2009, the Copermittees would further limit the potential exemption to scenarios where the conveyance system ultimately discharges runoff to a channel reach with a LOW susceptibility to channel erosion, as determined by the Southern California Coastal Water Research Project (SCCWRP) channel susceptibility method outlined in the HMP. If the conveyance system ultimately discharges to a channel reach with MEDIUM or HIGH susceptibility to erosion, then no exemption can be considered.

Case Study

The following case study details an example project watershed which may be considered for the urban infill exemption. A 150 acre existing urbanized watershed is located in the Clairemont area of the City of San Diego. The watershed contains a mix of single-family residential and commercial development. The existing impervious area of the watershed is 55 percent. Since the existing impervious area of the watershed is greater than 40 percent, then the urban infill exemption can be considered.

Runoff from the existing watershed drains to an existing storm drain system. At the storm drain system outfall location, the storm drain system size is 72 inches. The storm drain discharges flow to a tributary of Tecolote Creek. A properly sized riprap energy dissipation system is provided at the outfall prior to discharge to the unlined tributary.

The total remaining developable area in the watershed (which drains to the storm drain system outfall location) is 3 acres. This developable area, which represents multiple projects in various areas of the watershed, has been zoned for commercial development, which has an anticipated impervious area percentage of 85 percent.

Assuming full development of the remaining developable area, the anticipated ultimate condition added impervious area of the watershed is $(3 \text{ acres}) \times (0.85) = 2.55 \text{ acres}$. This added impervious area would increase the total impervious area of the watershed from 82.5 acres to 85.05 acres, which would adjust the maximum ultimate condition impervious area in the watershed to 56.7 percent. This represents an added impervious area increase of 1.7 percent as compared to the existing condition. Since the added impervious area percentage is less than 3 percent, then the urban infill exemption can be considered.

For each individual project in the remaining developable land areas, the project proponent must show that the project discharges runoff to a hardened or stabilized conveyance system that extends beyond the project's domain of analysis. As an example, a 1-acre commercial development site is proposed in the example watershed (1 acre of the watershed's 3 acres of remaining developable land). The project will discharge runoff to an existing 24-inch storm drain system just downstream of the site and the project's domain of analysis was determined to extend 100 feet downstream of the proposed project site. The receiving storm

drain system continues downstream in increasing storm drain pipe sizes (each of which has capacity to convey at least the 10-year ultimate condition design flow) until reaching the 72-inch storm drain outfall pipe 1,000 feet downstream of the project site. Since the project discharges to a hardened conveyance system that extends to the discharge location and beyond the domain of analysis, then the urban infill exemption can be considered.

At the discharge location, calculations show that the existing riprap energy dissipation system provides adequate energy dissipation for the incrementally increased design flows at the conveyance system outfall. Furthermore, the Tecolote Creek tributary was determined to have a LOW susceptibility to erosion as determined by the SCCWRP channel susceptibility analysis. Since an adequately sized energy dissipation is provided and since the receiving channel segment has a LOW susceptibility to erosion, the urban infill exemption can be considered.

2. DRAWDOWN TIME

2.1 Regional Board Findings - Tentative Resolution Item 6b

Section 6 of the Final HMP includes a decision matrix to guide users in choosing or sizing appropriate hydromodification mitigation facilities. The decision matrix and accompanying text states that a maximum drawdown time of 72-hours is allowed, which corresponds to standards set forth by the County Department of Environmental Health (DEH) for vector control. As DEH standards are subject to change, it is more appropriate to state generic drawdown requirements in meeting this design specification.

RWQCB Recommended Revision

Section 6, Figure 6-2 –Mitigation Criteria and Implementation, and Figure 6-3 – Mitigation Criteria and Implementation

Change nodes 5 and 17 from “Verify 72 hour Drawdown Time” to “Verify Necessary Drawdown Time,” and revise all accompanying discussion as needed.

2.2 County Response

Concur.

3. QAPP

3.1 Regional Board Findings - Tentative Resolution Item 6c

The Final HMP does not include development of a Quality Assurance Project Plan (QAPP) for water quality monitoring or geomorphic assessment described in the HMP Monitoring Plan. A QAPP is necessary to ensure consistency and data reliability

RWQCB Recommended Revision

Section 8 - Monitoring and BMP Evaluation - Add the following component:

Develop a Quality Assurance Project Plan (QAPP) compatible with the Surface Water Ambient Monitoring Program (SWAMP), including details for each monitoring component included in the HMP Monitoring Plan.

3.2 County Response

Concur.

4. GEOMORPHIC DATA

4.1 Regional Board Findings - Tentative Resolution Item 6d

Various assumptions were made in calculations of critical flows (flows which initiate sediment movement and cause erosion). Assumptions included designating typical configurations to local channels since data describing such configurations is sparse. Local geomorphic data is needed to validate or refine these assumptions to improve the accuracy of calculated critical flows, and refine design standards and other HMP requirements as necessary. PDPs, if conditioned to do so, can provide such data as part of the land development permitting process. To include data for undeveloped areas, the Copermittees must supplement the local data where no PDPs are planned.

RWQCB Recommended Revision

Section 8.2 - Pre-Project Monitoring Activities: Add requirement that each PDP subject to HMP requirements shall provide pre-project monitoring. Where no PDPs are planned in open space areas, the Copermittees shall supplement this data by annually monitoring at least one location per hydrologic unit.

4.2 County Response

If a project applicant elects to determine the appropriate lower flow threshold for the project site (through use of the Critical Flow Calculator and SCCWRP Channel Susceptibility Tool), then a field investigation would be required. This investigation would include acquisition of channel survey information downstream of the proposed discharge location(s). The Copermittees will also require pre-project field channel investigations for all projects proposing in-stream mitigation options.

The Copermittees will collectively manage this assembled geomorphic data for use in future monitoring reporting efforts.

If a project applicant does not conduct a field investigation, then hydromodification mitigation facilities must be designed assuming the most restrictive lower flow threshold ($0.1Q_2$). The Copermitees can require projects, via conditions of approval, to provide pre-project channel data in certain situations. One such potential scenario could include a project discharging runoff to a highly susceptible movable channel. In this scenario, the project applicant may choose to bypass the channel susceptibility analysis and design to the more restrictive $0.1Q_2$ lower flow threshold (given the receiving channel's obvious susceptibility). However, the governing municipality can identify this as a potentially significant monitoring location. These determinations will be made on a case by case basis and coordinated with the Copermitee Land Development work group.

To assess conditions in permit coverage areas where no new development is anticipated and to provide comparison to watersheds experiencing development-related impacts, the Copermitees recommend that one channel monitoring location be identified and monitored in the permit coverage area where no future development is anticipated.

5. MONITORING LOCATIONS

5.1 Regional Board Findings - Tentative Resolution Item 6e

Section 8 of the Final HMP describes monitoring and best management practice (BMP) evaluation, including flow based sediment monitoring. Section 8 proposes a minimum of 5 monitoring points throughout San Diego County over a period of 2 rainy seasons. This proposed monitoring is inadequate for purposes of assessing effectiveness of HMP implementation, as required by provision D.1.g(1)(k) of Order No. R9-2007-0001. Substantially more data are needed to better quantify flow based sediment concentrations associated with the typical range of channel dimensions and materials, contributing watershed sizes, land uses, vegetative cover, and rainfall patterns (and subsequent flow) in receiving waters throughout San Diego County. In addition to increased spatial coverage, monitoring is needed over several rainy seasons for increased temporal coverage because Copermitees will need to distinguish erosion caused by anthropogenic activities from naturally occurring erosion in order to assess the effectiveness of the HMP.

RWQCB Recommended Revision

Section 8 - Monitoring and BMP Evaluation

Add a requirement that for each hydrologic unit, the Copermitees must monitor in-stream flow based sediment concentrations downstream of planned or completed PDPs for the purpose of assessing effectiveness of HMP implementation. Monitoring shall occur downstream of a minimum of 20 percent of PDPs subject to HMP requirements per hydrologic unit (rounded up to the next whole number). Monitoring shall take place at a minimum of two storms each rainy season until Order No. R9-2007-0001 is superseded. Monitoring shall occur during the first wet weather event of the season

which meets the U.S. EPA's criteria as described in 40 CFR 122.21(g) (7), and monitoring shall occur during a wet weather event after February 1.

5.2 County Response

This recommendation is excessive and will cause undue burden on municipalities and project applicants. Monitoring activities proposed in this section exceed monitoring requirements detailed in the Stormwater Municipal Permits of Contra Costa, Santa Clara and Sacramento Counties. The Santa Clara and Sacramento permits do not require hydromodification-related monitoring and the Contra Costa permit requires only inflow and outflow monitoring of five (5) selected LID facilities throughout the County.

The cost to complete the Copermittee recommended monitoring activities (detailed below) could be as much as \$742,000 over the next five (5) years while the cost to complete the Regional Board staff recommended monitoring plan is projected to be \$1,745,000 over the next five (5) years.

During this difficult time of budget constraints, each agency looks to recoup costs in order to perform additional work such as this. Typically, Copermittees could pass on monitoring costs to new development; however, there are challenges with the RWQCB request. First, since monitoring locations could be located upstream of a Copermittee jurisdiction (but within a hydrologic area) the Copermittee will not be able to charge developer fees for the cost. Second, if the monitoring location is located within a Copermittee's jurisdiction but includes drainage from previously developed land, pollutants and drainage runoff will not be attributable only to developing land, and therefore the Copermittee will not be able to charge a developer fee for it. Third, some of the PDP's located downstream of a monitoring location would be paying for in-stream monitoring for drainage they do not contribute to. Since these monitoring costs will not be recoverable through developer fees, they could qualify as an unfunded mandate and the Copermittees would seek reimbursement from the State.

The San Diego Copermittees recommend the hydromodification monitoring activities at (5) monitoring locations as detailed in the Hydromodification Management Plan submitted on December 29, 2009 as well two (2) additional monitoring sites. The proposed monitoring activities include the following.

1. Baseline cross section data shall be acquired downstream of five (5) proposed Priority Development Projects, as recommended in the HMP submitted on December 29, 2009. It is inherent that the monitoring locations should be selected so that development-related impacts can be independently assessed and outside watershed influences are minimized. Thus, monitoring locations will be identified at the headwaters of watersheds or watershed sub basins whenever possible. A portion of

this data acquisition effort may be supplanted by project applicants subsequent to conditions of approval. Data from at least 1 year (two monitoring events) should be acquired prior to significant additional development in the watershed upstream of the monitoring location (additional pre-project data should be collected if development in the watershed is delayed). One monitoring event should occur just before the beginning of the rainy season (September) and the other should occur just after completion of the rainy season (May).

2. Baseline cross section data shall be acquired downstream of one (1) urban infill watershed. This monitoring plan component is in addition to the recommendations provided in the HMP submitted on December 29, 2009. Data from at least 1 year (two monitoring events) should be acquired prior to significant additional development in the watershed upstream of the monitoring location (additional pre-project data should be collected if development in the watershed is delayed). One monitoring event should occur just before the beginning of the rainy season (September) and the other should occur just after completion of the rainy season (May).
3. Baseline cross section data shall be acquired at one (1) watershed location where there is no existing or planned upstream development. This monitoring plan component is in addition to the recommendations provided in the HMP submitted on December 29, 2009. One monitoring event should occur just before the beginning of the rainy season (September) and the other should occur just after completion of the rainy season (May).
4. Baseline (pre-project, existing conditions) flow-based sediment monitoring shall be conducted as detailed in the HMP submitted on December 29, 2009. This monitoring should be provided at the same monitoring locations as required for the baseline cross section monitoring detailed above. Data from at least 1 rainy season should be acquired prior to significant additional development in the watershed upstream of the monitoring location (additional pre-project data should be collected if development in the watershed is delayed). Monitoring shall take place at a minimum of two storms per rainy season until No. R9-2007-0001 is superseded. Monitoring shall occur during the first wet weather event of the rainy season which meets the U.S. EPA's criteria as described in 40 CFR 122.21(g) (7), and one monitoring event shall occur during a wet weather event after February 1.
5. As detailed in the HMP submitted on December 29, 2009, post-project cross section monitoring shall be conducted at all baseline monitoring locations. Post-development stream cross section data will be compared to baseline cross section data and determinations will be made regarding the causes of cross sections changes (natural versus development-related). This data can be used to modify flow threshold ranges and mitigation selection. Monitoring shall take place twice per year until Permit No.

R9-2007-0001 is superseded. One monitoring event should occur just before the beginning of the rainy season (September) and the other should occur just after completion of the rainy season (May).

6. As detailed in the HMP submitted on December 29, 2009, post-project flow-based sediment monitoring shall be conducted at all baseline monitoring locations. Flow-based sediment monitoring data can be used to identify flows at which sediment begins to be transported in a selected stream location. This data can be used to refine the quantification of critical flow and the lower flow threshold limit used in hydromodification mitigation design. Monitoring shall take place at a minimum of two storms per rainy season until No. R9-2007-0001 is superseded. Monitoring shall occur during the first wet weather event of the rainy season which meets the U.S. EPA's criteria as described in 40 CFR 122.21(g) (7), and one monitoring event shall occur during a wet weather event after February 1.
7. As detailed in the HMP submitted on December 29, 2009, monitoring of hydromodification mitigation facilities, such as bioretention basins, flow-through planter boxes or extended detention basins, shall be conducted at Priority Development Projects upstream of stream monitoring locations. Facility inflows and outflows will be monitored on a continuous hourly basis. Continuous simulation models will be developed for hydromodification mitigation facilities included in the monitoring program. Results from the predicted models, generated using rainfall data, will be compared to inflow and outflow results collected in the monitoring program. The models will then be calibrated and adjustments to sizing factors and pond sizing algorithms will be made if necessary. Continuous monitoring will be analyzed throughout the duration of the monitoring program. Specific rainfall event results will be analyzed for a minimum of two storms per rainy season until No. R9-2007-0001 is superseded. Detailed analysis shall occur during the first wet weather event of the rainy season which meets the U.S. EPA's criteria as described in 40 CFR 122.21(g) (7), and one event occurring after February 1.

6. FUTURE AMENDMENTS TO HMP

6.1 Regional Board Findings - Tentative Resolution Item 6f

Section 8 of the Final HMP states that the details of the HMP Monitoring Plan for San Diego County will continue to evolve and be improved over time, and that this improvement process will be based in part on the analysis of collected data. The Final HMP states that, as more data are collected and as field issues associated with the data collection are refined, the HMP Monitoring Plan can be fine-tuned to most accurately assess the effects of the hydromodification flow control facilities. However, the Final HMP does not contain a commitment with a specific timeframe to verify and/or refine the assumptions, findings, and requirements of the HMP in light of newly gathered data.

Regional Water Quality Control Board
May 10, 2010
Page 10

Neglecting to include such a commitment gives no assurance that the assumptions, findings, and requirements of the HMP will ever be revisited.

RWQCB Recommended Revision

Section 8 - Monitoring and BMP Evaluation

Add a commitment to revisit the Final HMP with data and information gathered in accordance with Section 8 within 5 years of HMP implementation, or when enough data has been collected to verify and/or refine the assumptions, findings, and requirements of the HMP (whichever is sooner).

6.2 County Response

Concur.

Thank you very much for consideration of our comments. Please contact Sara Agahi at (858) 694-2665 should you have any questions or require additional information.

Sincerely,



CID TESORO, Manager
Department of Public Works

CT:sa



May 10, 2010

California Regional Water Quality Control Board, San Diego Region
Attention: Christina Arias
9174 Sky Park Court, Suite 100
San Diego, CA. 92123-4340

**SUBJECT: COMMENTS REGARDING REGIONAL WATER QUALITY CONTROL BOARD
TENTATIVE RESOLUTION R9-2010-0066**

Dear Ms. Arias:

The City of Vista appreciates the opportunity to provide comments on RWQCB Tentative Resolution R9-2010-0066, currently scheduled for an adoption hearing on June 9, 2010.

With this letter, the City of Vista expressly supports the comments provided to the Regional Water Quality Control Board by the County of San Diego, on behalf of the San Diego County Stormwater Copermittees, in their comment letter to be submitted under separate cover.

We trust that the Regional Board will give full consideration to the technical comments and recommendations provided by the San Diego County Stormwater Copermittees, and we thank you in advance for your attention to these matters.

Sincerely,

A handwritten signature in black ink, appearing to read "Paul Hartman".

Paul Hartman
Stormwater Program Manager

cc: Lawrence D. Pierce, Director of Engineering
Rita Geldert, City Manager



Public Works Department

May 5, 2010
File # 0780-85-KY181
Via Email and Regular Mail

Ms. Christina Arias
Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123

SUBJECT: HYDROMODIFICATION MANAGEMENT PLAN
RE: CIWQS PLACE ID NO. 710562: carias

Thank you for the opportunity to provide comments on the Regional Water Quality Control Board's proposed changes to the Final Hydromodification Management Plan (HMP). The City of Chula Vista supports comments provided by the County of San Diego.

Should you have any questions or concerns please contact Khosro Aminpour, Senior Civil Engineer, at (619) 397-6111. Thank you.

MATT LITTLE
ASSISTANT DIRECTOR OF PUBLIC WORKS

C: Silvester Evetovich, Principal Civil Engineer
Khosro Aminpour, Senior Civil Engineer

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*City of
Encinitas*

May 10, 2010

Attn: Christina Arias
California Regional Water Quality Control Board
San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA. 92123-4340

SUBJECT: COMMENTS REGARDING RWQCB TENTATIVE RESOLUTION R9-2010-0066

Dear Christina,

The City of Encinitas appreciates the opportunity to provide comments on RWQCB Tentative Resolution R9-2010-0066, currently scheduled for an adoption hearing on June 9, 2010.

With this letter, the City of Encinitas expressly supports the comments provided to the Regional Water Quality Control Board by the County of San Diego, on behalf of the San Diego County Stormwater Copermittees, in their comment letter to be submitted under separate cover.

We trust that the Regional Board will give full consideration to the technical comments and recommendations provided by the San Diego County Stormwater Copermittees, and we thank you in advance for your attention to these matters.

Sincerely,

Erik Steenblock
Clean Water Program Manager, City of Encinitas

cc: Peter Cota-Robles, Director of Engineering
Phil Cotton, City Manager



CITY OF SANTEE

MAYOR
Randy Voepel

CITY COUNCIL
Jack E. Dale
Brian W. Jones
John W. Minro
Hal Ryan

CITY MANAGER
Keith Till

Attention: Christina Arias
Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123

Re: Hydromodification Management Plan; CIWQS Place 10 No. 710562

With this letter the City of Santee expressly supports the comments provided to the San Diego Regional Water Quality Control Board by the County of San Diego, on behalf of the San Diego County Stormwater Copermittees in their forthcoming comment letter to be submitted under separate cover.

We also wish to highlight the RWQCB staff recommendation to supplement the proposed monitoring plan with requirements that exceed the level of monitoring required for any other hydromodification plan within the State of California. The cost of this additional monitoring (one million dollars) will result in an undue burden on taxpayers within San Diego County.

We trust that the Regional Board will give full consideration to the comments and recommendations provided by the San Diego County Stormwater Copermittees, and we thank you in advance for your attention to these matters.

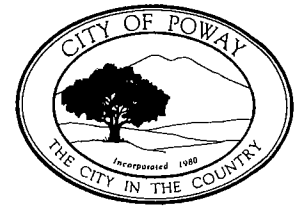
Respectfully,

Pedro Orso-Delgado

Deputy City Manager/Director of Development Services

CITY OF POWAY

DON HIGGINSON, Mayor
CARL KRUSE, Deputy Mayor
MERRILEE BOYACK, Councilmember
JIM CUNNINGHAM, Councilmember
BETTY REXFORD, Councilmember



May 10, 2010

Ms. Christina Arias
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123

Subject: Hydromodification Management Plan (HMP) –
Tentative Resolution R9-2010-0066

Dear Ms. Arias:

The City of Poway supports the comments issued by the County of San Diego regarding Tentative Resolution R9-2010-0066. We request that the Regional Board take into consideration the comments raised by the County on behalf of the Copermitees.

One area of concern in the HMP is the monitoring requirements that have been discussed in the Tentative Resolution. The monitoring requirements could create an economic burden during a time when municipal funds are scarce. We support the level of monitoring proposed by the County.

The City of Poway urges the Regional Board to accept the recommendations presented in the County of San Diego comment letter.

Sincerely,

DEVELOPMENT SERVICES DEPARTMENT

A handwritten signature in black ink, appearing to read "Steve Crosby".

Steve Crosby
Principal Civil Engineer

c: Frank Casteleneto, City Engineer
Malik Tamimi, Stormwater Program Administrator
Clay Ost, Associate Civil Engineer



May 7, 2010

Attention: Christina Arias
Re: Hydromodification Management Plan; CIWQS Place ID No. 710562
Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123

Subject: Hydromodification Management Plan; CIWQS Place ID No. 710562


Ms. Arias,

The City of La Mesa supports the comments issued by the County of San Diego regarding Tentative Resolution R9-2010-0066. The City of La Mesa urges the Regional Board to carefully consider the comments raised by the County in their submitted comment letter.

In addition, the recommendation put forth by Regional Board Staff regarding monitoring activities exceeds the monitoring requirements of Municipal Storm Water Permits of Contra Costa, Santa Clara, and Sacramento Counties. The proposed monitoring plan, which is summarized in the comment letter submitted by the County of San Diego, provides a level of monitoring which is fair and sufficient concerning the ultimate goals of a Hydromodification Management Plan. Additional requirements which were added by Regional Board Staff in the Tentative Resolution are excessive and would place an additional undue economic burden on municipalities in a time when additional revenue sources are extremely scarce.

The City of La Mesa urges the Regional board to accept the recommendations provided by the County of San Diego in their submitted comment letter.

Thank you,


Joe Kuhn
Storm Water Program Manager
City of La Mesa



City of Imperial Beach, California

OFFICE OF THE CITY MANAGER _____

Date: May 10, 2010

Christina Arias

Re: Hydromodification Management Plan; CIWQS Place 10 No. 710562

Regional Water Quality Control Board

9174 Sky Park Court, Suite 100

San Diego, CA 92123

Dear Ms Arias:

I want to express my support on behalf of the City of Imperial Beach for the response letter submitted by the County of San Diego on the comments made by the Regional Board's Tentative Resolution order R9-2010-0066 regarding the approval of the Hydromodification Plan.

We support a fair and scientifically sound HMP that does not impose an excessive burden on municipalities or project applicants. The San Diego Copermittees have reviewed the Regional Board's comments and have jointly collaborated on the response summarized in the County's letter.

We encourage the Regional Board to consider the points outlined in the letter and the comments that will be presented during the June 9th Board Meeting before making a final decision on the Final HMP.

Sincerely,

Gary R. Brown
City Manager