Redevelopment Project Area Master Plans (RPAMPs)

Stormwater management has evolved in recent years, with closer ties to land use planning and a growing emphasis on "green" approaches. So far the shift from "grey" to "green" has focused on site level practices such as Low Impact Development (LID). More recently, planning practices focusing on a larger scale, including urban infill, redevelopment, and compact community form - hallmarks of smart growth - have been recognized as stormwater best practices. This recognition follows on studies showing that the water impacts for a given amount of growth depend largely on the pattern of development used to accommodate that growth. This understanding is changing the way we look at the problem of stormwater runoff. It calls for even closer coordination between water quality and land use planning efforts. The merger of smart growth and LID represents the next progression in stormwater management. This will address impacts at the site, while attending to the larger issue of development patterns.

The Los Angeles Regional Water Quality Control Board (LA Regional Board) included an innovative program in the draft tentative permit that reflects this progression. The Redevelopment Project Area Master Plan (RPAMP), part of the alternative compliance program, provides a framework for recognizing the stormwater benefits of infill, redevelopment and compact community form. The basic idea is to designate certain area(s) within which some level of on-site requirements could be reduced for certain kinds of development that are shown to have stormwater benefits. The planning area, and the rules that apply inside it, would constitute the RPAMP.

The RPAMP is an important and new concept

that raises many questions. How will RPAMP areas be designated? What are the performance criteria? What are the performance metrics? What is the approval process? How will they be administered? What are the costs? What is the timeframe? Can one be amended once established? Some are concerned that the RPAMP could pose an "administrative nightmare." Others fear it may present a loophole.

This paper is not intended to resolve the questions or concerns about the RPAMP, but to discuss the potential utility of an RPAMP-type program, to begin refining the concept, and to provide steps for moving forward.

Background – Connecting Watershed and Land Use Planning

Having an RPAMP or another program with similar objectives in the permit is important to linking water and land use at a watershed level. The reasoning lies in basic watershed concepts such as scale and integration, as well as newer themes at the water and land use nexus. Several of these are discussed below to provide context.

The Importance of Scale – Watershedbased strategies, and coordinated water and land planning in general, rely on recognition of scale. Stormwater is most deftly managed when the building, site, neighborhood, district or community (subwatershed) and region (watershed) are simultaneously considered for opportunities and impacts. The emphasis on site level practices is important, but the impacts of development on water quality also depend on its location, form and overall pattern. Successful watershed approaches need to address the overall footprint and pattern of development while minimizing site level impacts.

The Importance of Development Context -

Different development contexts offer different opportunities and constraints for implementing LID and other environmental planning practices. Joint water/land use planning is most effective when it recognizes that rural, edge, suburban and urban areas present different sets of constraints and opportunities when it comes to managing the built and natural environments. Appreciation of these differences is fundamental to any watershedbased approach.

Ecological Services and Natural

Infrastructure – A watershed approach recognizes that natural systems and processes provide benefits, often called "ecosystem services," such as flood attenuation, water purification, and groundwater recharge. From a stormwater management perspective, these benefits create an essential "natural infrastructure." Low Impact Development (LID) aims to mimic watershed functions using site design and engineering practices. At a larger scale, infill, redevelopment and compact community form are needed to protect remaining open space and ecologically valuable areas as a larger network of natural infrastructure.



The most effective types of stormwater solutions will vary depending on development context.

The Importance of Land Use Patterns-

Recent planning efforts have focused on curbing dispersed, low-density, auto-dependent land use patterns known as sprawl. From a watershed planning perspective, sprawling land use patterns generate more impervious cover and consume more undeveloped land than compact, mixed-use, pedestrianoriented development patterns. Improving site design without attending to the underlying development pattern may make sprawl greener, but the problems of excess land conversion, auto-related impacts, and higher per-capita imperviousness will remain.

Redevelopment as a Stormwater Strategy-

Redevelopment is one of the most effective forms of stormwater management and watershed protection. Recycling existing impervious cover through redevelopment satisfies development demand without adding new pavement to the watershed. This equates essentially to "zero impact development." Additionally, redevelopment offers opportunities to retrofit paved sites with water quality improvements, which equates to "net positive development."

Land Use Patterns: The sprawling development on the left generates more impervious cover than the one on the right.



Redevelopment accommodates development demand on existing pavement preventing new imperviousness in the watershed and allowing opportunities to retrofit developed areas.



Before Photo credit: Steve Price, Urban Advantage



After

Specific Plans and Area Plans - Cities and the County of Ventura have been using specific plans and other types of area plans to coordinate development and redevelopment in targeted areas for decades. Specific area plans provide the process for orchestrating multiple planning and design considerations. They may emerge as one of the more valuable tools for integrating stormwater into public space, buildings, infrastructure and other aspects of community design. For the permit, specific and area plans provide a basis, either conceptually or literally, for developing Redevelopment Project Area Master Plans (RPAMPs).

Why is the **RPAMP** program needed?

Approaches to stormwater management are adapting to new information and awareness about the causes and consequences of impervious cover associated with loss of natural land cover. Closer linkage between water and land use has been important to the development of newer approaches, particularly at the site level. However, a broader realization of the potential and possibilities for using land use planning to prevent and manage stormwater are emerging. In addition to site design, the great and largely untapped potential is to reform land use policies that are driving the creation of excess impervious cover. Recent studies and modeling underscore the importance of this approach, which looks at the larger development pattern to address stormwater problems.

In 2002, the USEPA modeled three development scenarios to compare the stormwater impacts of accommodating the same amount of growth (number of dwelling units) at different densities (1 unit per acre, 4 units per acre, and 8 units per acre). The study revealed that higher density development patterns generate less total runoff, less total impervious cover, and consume less undeveloped land than lower density development patterns. The figures below show the results at several different scales of development.

Figure 1 demonstrates that the amount of runoff – per housing unit – is higher at lower densities, and lessens as more units are accommodated per acre. In Figure 2,overall impervious cover for the watershed decreases as site density increases. The lowest-density scenario (Scenario A) covers the entire watershed and generates 187 million cubic feet per year of stormwater runoff. At four houses per acre, Scenario B consumes less



Figure 1

Scenario A	Scenario B	Scenario C
10,000 houses built on 10,000 acres produce: 10,000 acres x 1 house x 18,700 ft ³ /yr of runoff = 187 million ft ⁵ /yr of stormwater runoff Site: 20% impervious cover Watershed: 20% impervious cover	10,000 houses built on 2,500 acres produce: 2,500 acres x 4 houses x 6,200 ft ³ /yr of runoff = 62 million ft ³ /yr of stormwater runoff Site: 38% impervious cover Watershed: 9.5% impervious cover	10,000 houses built on 1,250 acres produce: 1,250 acres x 8 houses x 4,950 ft ³ /yr of runoff = 49.5 million ft ³ /yr of stormwater runoff Site: 65% impervious cover Watershed: 8.1% impervious cover

Figure 2

land and generates less than half as much stormwater runoff as Scenario A. At the highest density, Scenario C consumes the least land and produces just 49.5 million cubic feet per year of stormwater runoff. Scenario A generates approximately three times the runoff of Scenario B and four times as much as in Scenario C.

The lower density scenarios consumed more land than higher density alternatives to accommodate the same amount of growth. The study also shows that concentrating a given amount of growth at higher densities results in less overall impervious cover and runoff than dispersing growth at lower densities.

The EPA study corroborates research from Purdue University showing that placing lowdensity development on the urban fringe would produce 10 times more runoff than a higherdensity development in the urban core.¹

¹ Harbor, J.B., Engle, et. Al (2000) "A Comparison of Long-term Hydrological Impacts of Urban Renewal Versus Urban Sprawl." Purdue University.

Similar results from a comparison of two development projects in the Sacramento region using "Index" software are shown in the table below.



Metro Square, the "*urban infill*" site, is higher density. North Natomas, the "*suburban* greenfield" site, is lower density single family residential. An area-based comparison of imperviousness suggests that at 26% impervious, the *suburban greenfield* site outperforms the *urban infill site*, which is 97% impervious. But on a per-unit basis, the *urban infill* site prevails. For each unit of development, the *suburban greenfield* project creates 400 square feet more impervious cover than the *urban infill* site. At a watershed, the lower density *suburban* greenfield project creates 18,400 square feet more impervious cover than the higher density *urban infill* project, to accommodate the same number of units.

The two maps on the following page show impervious cover in a larger region based on overall area (left) and per capita (right).

Both maps show measures of imperviousness in the greater Seattle metropolitan region. On the left, a traditional area-based measure is used. The more urbanized areas have a greatest intensity of impervious cover. The map on the right shows imperviousness on a per capita basis showing that more urbanized areas have relatively lower amounts of impervious cover.

The map on the left makes it clear that highly urbanized areas are already heavily impacted and need to be fixed using a full range of green design and infrastructure strategies, which will largely be accomplished through redevelopment, retrofits and restoration projects (e.g., daylighting urban creeks).

The map on the right makes it clear that as an area grows, significant reductions in the area and reach of impervious cover can be made by growing more compactly and by directing new growth to those areas that are already impacted so that:

- 1. Impacts to outlying areas are avoided and remaining open space is preserved; and
- 2. Redevelopment is encouraged in strategic areas with zero or minimal net increase in watershed impervious cover.

This second point is critical to stormwater rules in Ventura County. At a watershed scale, redevelopment satisfies development demand while adding nominal or no new impervious cover. The existing pavement in the watershed is "recycled." Additionally, redevelopment Metropolitan Seattle Imperviousness: To ways looking at imperviousness cover in a region based on per capita (right) and area (left).



provides opportunities to retrofit older development patterns by incorporating density, use mix, and economic vitality into older commercial strips and commercial centers.

In relation to the stormwater permit, using the same performance criteria for new development and redevelopment could add another barrier that prevents or delays redevelopment, or leads to building rehabilitation that avoids site improvements to improve stormwater performance. Both site and watershed level benefits are then lost as the site remains unchanged and the development demand goes elsewhere. There is a balance that the RPAMP may help achieve: encourage redevelopment, even if it means lessening some on-site requirements, while still getting as many on-site and/or sub-regional water quality improvements as possible.



Which site is better for the watershed, meadow or existing pavement? Stormwater standards *treat both these sites the same.*

What is it? - Components of an RPAMP

The text below includes all language in the permit that refers to the RPAMP program:

(d) Alternatively, where a permittee or a coalition of permittees have a Redevelopment Project Area Master Plan (RPAMP) approved in accordance with subpart 5.E.IV that balances multiple considerations, the provisions of the RPAMP will substitute for the EIA requirements identified above. (page 53)

Alternative Post Construction Storm Water Mitigation Programs

(c) A permittee or a coalition of permittees may apply to the Regional Water Board for approval of a Redevelopment Project Area Master Plan (RPAMP) for redevelopment projects within Redevelopment Project Areas, in consideration of balancing water quality protection with the needs for adequate housing, population growth, public transportation and management, land recycling, and urban revitalization. (page 60)

(d) For the RPAMP to be considered, a technical panel of the Local Government Commission or an equivalent state or regional planning agency must have reviewed and approved the proposed RPAMP, prior to its submittal to the Regional Water Board, for conformity with the balancing of interests identified in (b), including water quality. The Regional Water Board Executive Officer may then consider the RPAMP for approval, or elect to submit it to the Regional Water Board for consideration. (page 60)

(e) The RPAMP, on approval, may substitute in part or wholly for on-site postconstruction and hydromodification requirements.

(f) Redevelopment Project Areas include the following:

- (1) City Center areas
- (2) Historic District areas
- (3) Brownfield areas
- (4) Infill Development areas
- (5) Urban Transit Villages
- (6) Any other redevelopment area so designated by the Regional Water Board

(g) Nothing in these provisions shall be construed as to delay the implementation of post-construction control requirements, as approved in this Order. (pg 61) **Objectives** - The program has potential to meet multiple water quality objectives and other environmental and community goals. These need to be clearly defined and linked to water quality goals to provide overall direction, avoid confusion and misuse of the program, and to ensure buy-in from interested parties.

Location – Location is one of the most critical factors influencing the impact of development on water resources. RPAMPs are locationbased in the permit, with one or more defined areas constituting the RPAMP area. The permit provides direction on what areas are allowed: City Center areas; Historic District areas; Brownfield areas; Infill Development areas; Urban Transit Villages.

Delimiting RPAMP areas promises to be one of the more critical steps in developing RPAMPs. Starting with existing policies and documents, particularly area plans and specific plans that address infill and redevelopment, may help. The process of deciding what areas do and do not fall into an RPAMP is a topic for broader discussion. As noted previously, this and other details can be discussed at an RPAMP workshop in the coming months.

Performance Criteria Inside an RPAMP -

The permit says an RPAMP can substitute in part or wholly for on-site requirements, but does not clarify how this is determined. There are several options, including a tiered approach based on development context and density, a credit system that assigns value to different development practices, a trading system, or a combination of these.

Credit System - A credit system linking types of land use to water quality objectives is one method that could be used to encourage compact form as well as other water quality practices such as street trees, rain barrels, or cisterns. For example, projects that reach a level of density that serves to offset its impact could receive credits that would allow reductions in on-site requirements. The EPA has developed a similar approach. Certain projects are eligible for credits with each credit equaling a 10% reduction in on-site requirements. There is a cap on the amount of credit that can be received so all projects have to achieve a minimum of on-site requirements. In this way, a project that meets several "smart growth" objectives, such as a higher density (1 credit), mixed use (1 credit), redevelopment project (1 credit) would have a 30% reduction in on-site requirements. A similar system with additional modifications could be used for the RPAMP.

Relationship to other programs - One of the more interesting options for an RPAMP is to consider how it could link up with other programs in the permit, including:

- Regional / Sub-regional Solutions (e.g., green streets, restoration, etc.)
- Site Design Criteria (Urban LID BMPs)
- Pollution / Imperviousness Trading / Offset Program
- Mitigation Funding (could be linked to other programs)
- TMDLs
- CEQA

Building Blocks - Learning From Other Efforts

LEED for Neighborhood Design

The US Green Building Council's Leadership in Energy and Environmental Design (LEED) rating systems provide broadly accepted performance criteria for green building and design practices. The most recent rating system, LEED for Neighborhood Development, confronts the same challenge being discussed in relation to the storwmater permit – how to align green design at the building or site level, with green planning at the community or regional level. The program arose to address concerns that a green building project could not be truly green if it was located in inappropriate areas or contributed to unsustainable patterns of development.

To address the challenge, the US Green Building Council partnered with the Congress for New Urbanism and Natural Resources Defense Council (NRDC) to develop LEED for Neighborhood Development Rating System (LEED ND). LEED ND integrates the principles of smart growth, urbanism and green building into the first national system for neighborhood design. The following text from the LEED for Neighborhood Design website (www.usgbc.org) describes some of the programs goals.

In order to reduce the impacts of urban sprawl, or unplanned, uncontrolled spreading of urban development into areas outside of the metropolitan region, and create more livable communities, LEED for Neighborhood Development communities are:

- locations that are closer to existing town and city centers
- areas with good transit access
- infill sites
- previously developed sites
- sites adjacent to existing development



LEED for Neighborhood Development Rating System

Source: Criterion Planners

As RPAMPs are developed, LEED ND could provide a useful model for the following reasons:

Determining location: LEED ND includes "smart location" prerequisites, meaning that some areas and sites are simply not eligible for LEED ND certification. This is similar to the current conception of an RPAMP, which also has a location-based component. LEED ND "smart location" prerequisites provide a starting point for discussions about areas that would be eligible for inclusion in an RPAMP. At least one private planning firm, Criterion Planners, has developed a method for identifying sites that are eligible for LEED ND certification. This method could be tailored for the purposes of designating RPAMP areas. (See graph on previous page).

Performance Criteria: Additionally, LEED ND establishes a point system that may be useful in determining what types of development, or development practices could receive credit in an RPAMP and provides a basis for determining how much credit different practices (e.g., vertical mixed-use development) deserve.

City of Grand Rapids - The City of Grand Rapids developed an evaluation model to compare the impervious area generated by





SW Benefits:

Compact footprint

Pavement Reduction

-mixed use

-vertical density

-structured parking

Land conservation

higher density projects to the amount generated by a typical low-density project of the same number of development units (residences, parking spaces, gross floor area). The evaluation tool was used to establish a policy to coordinate the City's "Smart Growth" initiative with its support for LID and the on-site requirements in the City's stormwater permit.

If a higher density project was shown to generate 80% less runoff (by virtue of its density) than a lower density project for the same amount of growth, then a waiver of onsite requirements could be granted.

For the purposes of the RPAMP, the Grand Rapids approach offers a model for determining "functional equivalence" for higher density infill and redevelopment projects. This tool and the methodology behind it might be particularly important for being able to quantify the water quality benefits of development in an RPAMP.

Etowah Watershed Runoff Limits Program

Municipalities and watershed stakeholders in the Etowah Watershed in the Atlanta Georgia metro-region developed tiered performance criteria depending on the ecological sensitivity of various areas. Priority 1 areas have the most stringent requirements, followed by Priority 2 areas. Additionally, local governments can designate a limited number of "development nodes" for high-intensity uses and development that have a less strict performance standard. Development nodes are selected primarily on the basis of existing zoning. An option still being discussed are "in-lieu-of" fees that would go toward retrofitting existing development or protecting valuable lands.²

Model RPAMP and Associated Performance Measures/Criteria/Credit System

With a grant through Proposition 40 funds, LGC has been working with local agency representatives responsible for stormwater management, local planners and local and regional stakeholders in Ventura County to develop strategies to better integrate stormwater management, land use planning and watershed protection. The group remains interested in the RPAMP idea and determined there is a need to explore further how RPAMPs would be created that would meet Regional Water Board approval and how they would be implemented. As a result, LGC plans to hold one or more workshops in the late summer and early fall to help develop a model RPAMP. Local and regional decision-makers and agencies involved in water quality control, stormwater management, land use planning, development review and approval, and critical stakeholder and environmental interest groups will be brought together to decide core issues and concerns associated with RPAMPs. A panel of experts will present methods that have been used to define, evaluate and credit infill, redevelopment and compact growth development projects for stormwater and water quality benefits. The group will then decide what the core components of an RPAMP should be and propose criteria for a pilot project to test and refine the RPAMP program.

Local Government Commission looks forward to continued collaboration with the Regional Board and its staff as well as stakeholders in Ventura County to help align water and land policies.

² Wenger, S.J. Carter, T.L., Vick, R.A., and Flowler .A. (2008) "Runoff Limits: An ecologically based stormwater management program." Stormwater Magazine (on-line: www.gradingandexcavating. com/sw_runoff.html)

Redevelopment Project Area Master Plan Concept

What might an RPAMP look like?

Ideas for discussion and understanding.

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RPAMP Components

Objectives - The program has potential to meet multiple water quality objectives and other environmental and community goals - these need to be defined.

Location - Determining location criteria will be up to a larger field of experts and will require modeling and data. Two related questions are important:

- 1. What locations are eligible? The permit provides direction: *City Center areas; Historic District areas; Brownfield areas; Infill Development areas; Urban Transit Villages.*
- 2. How will RPAMP boundaries be determined? Simple approach use existing plan areas and/policy designations. More robust approach use GIS to map eligible areas.

Performance - Permit says an RPAMP can substitute in part or wholly for on-site requirements, but does not clarify how this is determined. Again, the system and criteria need to be determined with input from a broader group and using data/modeling.

Program Implementation

- \checkmark Area(s) designation and approval criteria
- ✓ Performance and evaluation *inside* the RPAMP (I.e. Credit System?, Measurability?)
- Relationship to other programs: Regional / Sub-regional Solutions (e.g. green streets, restoration, etc); Site Design Prerequisites? (cap on EIA reduction? Mandatory BMPs?); Pollution / Imperviousness Trading / Offset Program; Mitigation Funding (could be linked to other programs)

We need input. Lets look at some hypothetical possibilities to stir up questions and ideas.

The following "strawman" ideas are very simplistic and meant only to advance discussion.

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Location Component - Suppose the red area is established as an RPAMP area.



Inside an RPAMP (Performance Criteria)

Credit compact form and design/management strategies that fit the development context



Compact Form Infill & Redevelopment - Transit proximity - Mixed Use Density - Streets and Parking





Sustainable Design - Urban LID Techniques - Street trees Cisterns / rainbarrels Retrofit prioritization - Restoration / daylighting Urban Watershed

Credit System?			
Strategy	Criteria	Points	
Use Mix	TBD	TBD	
Density	TBD	TBD	
Parking Strategies	TBD	TBD	
Street Design	TBD		
Urban Forestry	TBD		
Others TBD			

A credit system linking development practices to water quality objectives is one method that could be used to encourage compact form as well as other water quality practices such as retrofits, street trees, rain barrels, or cisterns.





This is the City of Camarillo. Hypothetically, certain areas within the City would be eligible for creating an RPAMP. Those areas could be identified to establish RPAMP boundaries.



Let assume these are the areas (in blue) that were eligible for the RPAMP program in Camarillo. It is the composite of these areas that might make up an RPAMP. Lets assume the blue areas are Camarillo's RPAMP boundaries.



Focusing in on a smaller part of RPAMP, we can consider how certain types of development could be credited *within* the RPAMP. The circled area is the Camarillo Commons Strategic Plan area.

Camarillo Commons Strategic Plan

Currently, the area is covered by buildings and pavement. The Camarillo Commons Strategic plan calls for pedestrian oriented-mixed use development with interconnected open space and landscaped areas.

It is located within the RPAMP, meaning it is eligible for reduced on-site requirements, but how much, if any? For the purposes of discussion, lets consider how a credit system might work for smart growth projects inside the plan area.



Camarillo Commons

Credit System (hypothetical)

Credit could be assigned for different development practices that provide water quality benefits. Credit would enable progressive reductions in on-site requirements. The amount of credit assigned for different practices, and the amount of reduction allowed will need to be discussed more broadly and with the aid of modeling. For discussion, consider the following hypothetical project.

Project Includes

- + Mixed Use (x credits)
- + High Density (x credits)
- + Street Trees (x credits)
- = 3X credits

So, in this case the credits would result in a <u>3X% reduc</u>tion in on-site requirements.





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There is much more to determine!

The RPAMP concept is new and needs clarity. These slides provide initial ideas based on interpretation of permit language. Developing an effective RPAMP program (or something similar) will take additional dialogue between a wider audience of experts, additional resources (time and money), and the application of technology and data (modeling / measuring performance and impacts). We propose a workshop focused on the RPAMP as a critical next step.

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Next steps and Recommendations

Organize and hold an RPAMP Workshop Bring together experts to discuss details: methods, parameters, performance criteria, quantifying performance, setting RPAMP boundaries, approval criteria. Look at modeling options.

- 1) LGC develops agenda, sets date/time
- 2) Discuss at Regional Board workshop on July 10?
- 3) Hold the workshop

2) Take steps to pilot the program

- 1) Select pilot options
- 2) Look for funds to develop pilot RPAMP
- 3) Begin developing RPAMPs for cities (with more funds/time)

- 2 and 3 are likely beyond the scope of current LGC project -