Note: Presentation material is for informational purposes only. All content is in draft form contingent on approval from the Regional Water Quality Control Board.

WATER QUALITY EQUIVALENCY PUBLIC WORKSHOP

July 28th, 2015

Water Quality Equivalency Workshop

Welcome

Sign-in, handouts, refreshments, housekeeping

Introductions

Project Team

Agenda Review

Agenda on next slide

WQE Overview

Water Quality Equivalency Overview
Overview, Key Concepts, Organizational Principles, TAC Process, Document Structure, Schedule, Questions

Stormwater Pollutant Control
Background, Metric, Formula, Factors, Devices, Example, Questions

Hydromodification Management
Intro to Hydromod, Devices, Methodology, General Steps, Questions

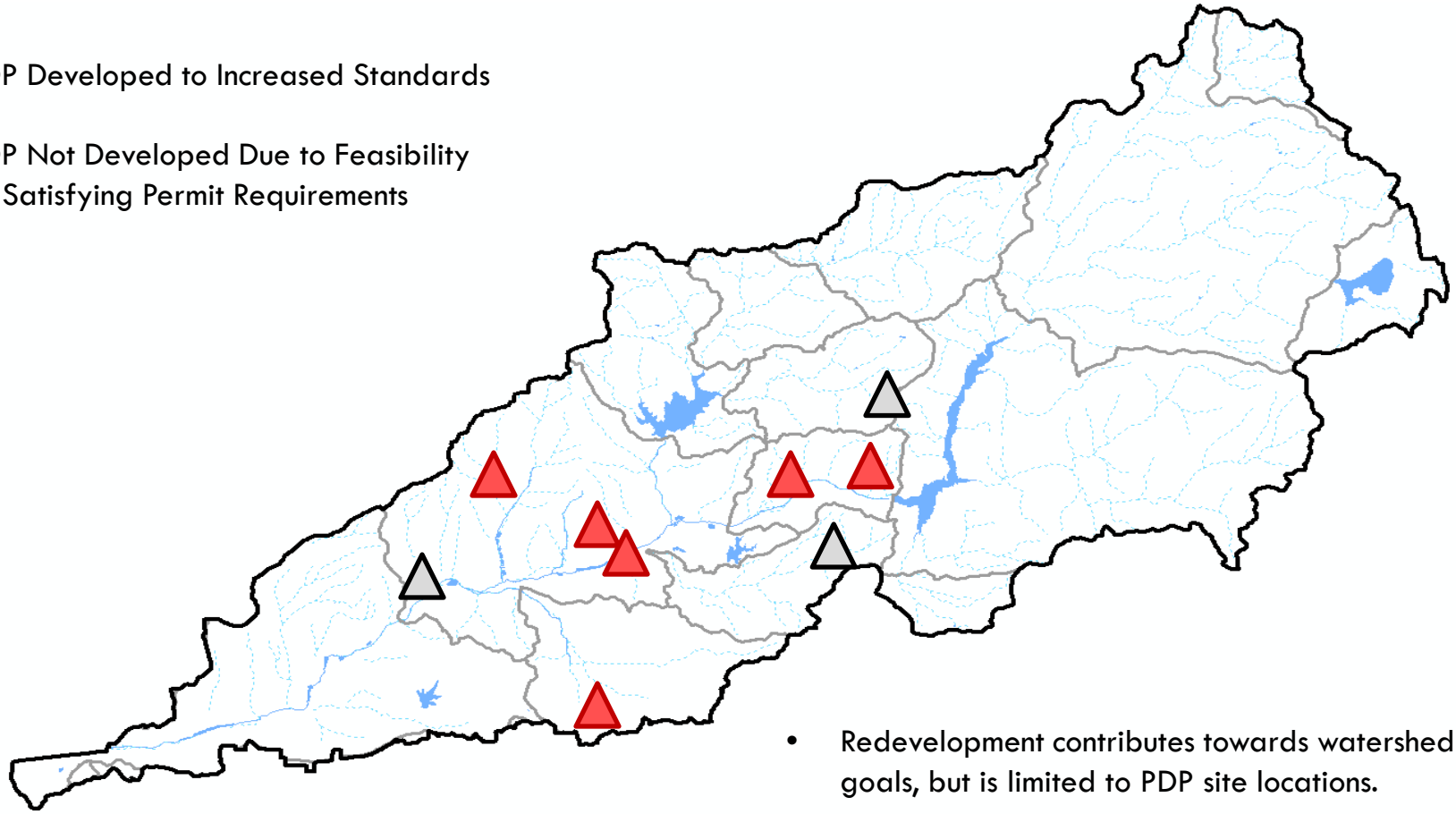
Stream Rehabilitation Options
Hydromodification Flow Control, Potential Future Pathways, Questions

Closing Items
Available Options, Opportunities for Input, Questions

Overview
Watershed without Alternative Compliance

PDP Developed to Increased Standards

PDP Not Developed Due to Feasibility of Satisfying Permit Requirements

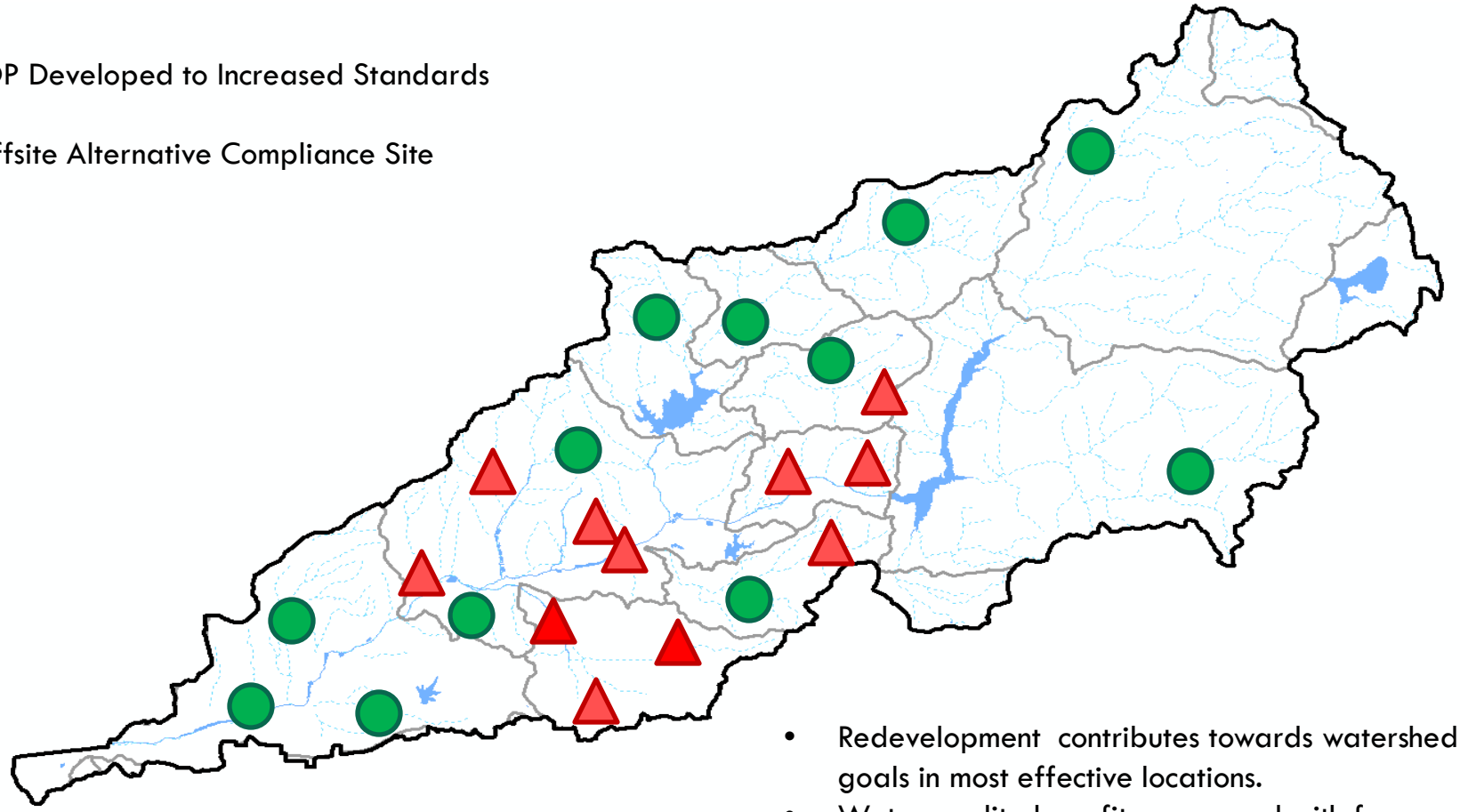


- Redevelopment contributes towards watershed goals, but is limited to PDP site locations.

Overview
Watershed with Alternative Compliance

PDP Developed to Increased Standards

Offsite Alternative Compliance Site



- Redevelopment contributes towards watershed goals in most effective locations.
- Water quality benefits preserved with fewer restrictions on PDPs.
- Water Quality Equivalency needed to relate all projects.

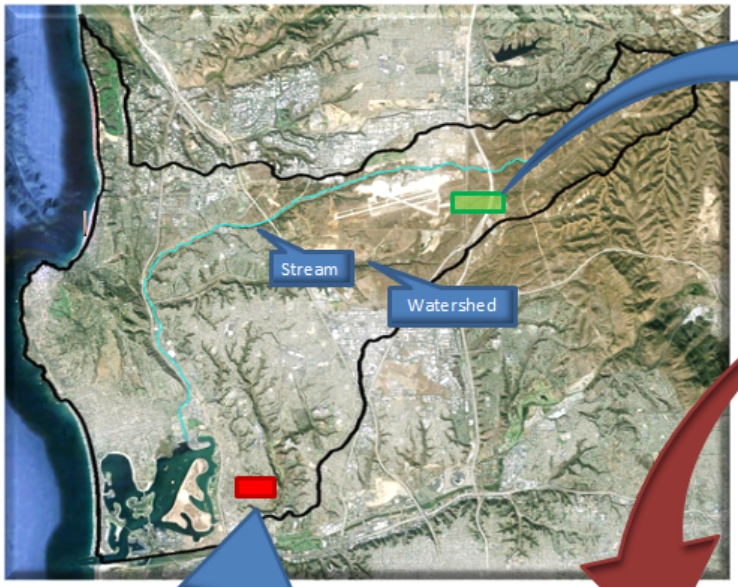
Note: Animation assumes credit system is in place.

Overview of MS4 Permit Requirements

- Section II.E.3.b Priority Development Projects
- Section II.E.3.c.(1) Stormwater Pollutant Control BMP Requirements
  - Retention ➔ Biofiltration ➔ Flow-thru BMPs
- II.E.3.c.(2) Hydromodification Management BMP Requirements
- Section II.E.3.c.(3) Alternative Compliance Program to Onsite Structural BMP Implementation

  (a) Water Quality Equivalency
  (b) WMMA Candidate Projects
  (c) Project Applicant Proposed Alternative Compliance Projects
  (d) Alternative Compliance In-lieu Fee Structure
  (e) Alternative Compliance Water Quality Credit System

Overview of Offsite Alternative Compliance Program (ACP)



Offsite Alternative Compliance
ACP constructed or purchased

Water Quality Equivalency (WQE)
"Credits" calculated based on benefits to water quality and hydromodification

Independently Implemented ACP
Owned and constructed by party other than PDP

*Framework to be established

Credit System
- Credits retained for future use (limit credit amount and duration)
- Maybe saved or traded

*Framework to be established

Credits Applied
"Credits" used to offset portion of onsite water quality and/or hydromodification requirements

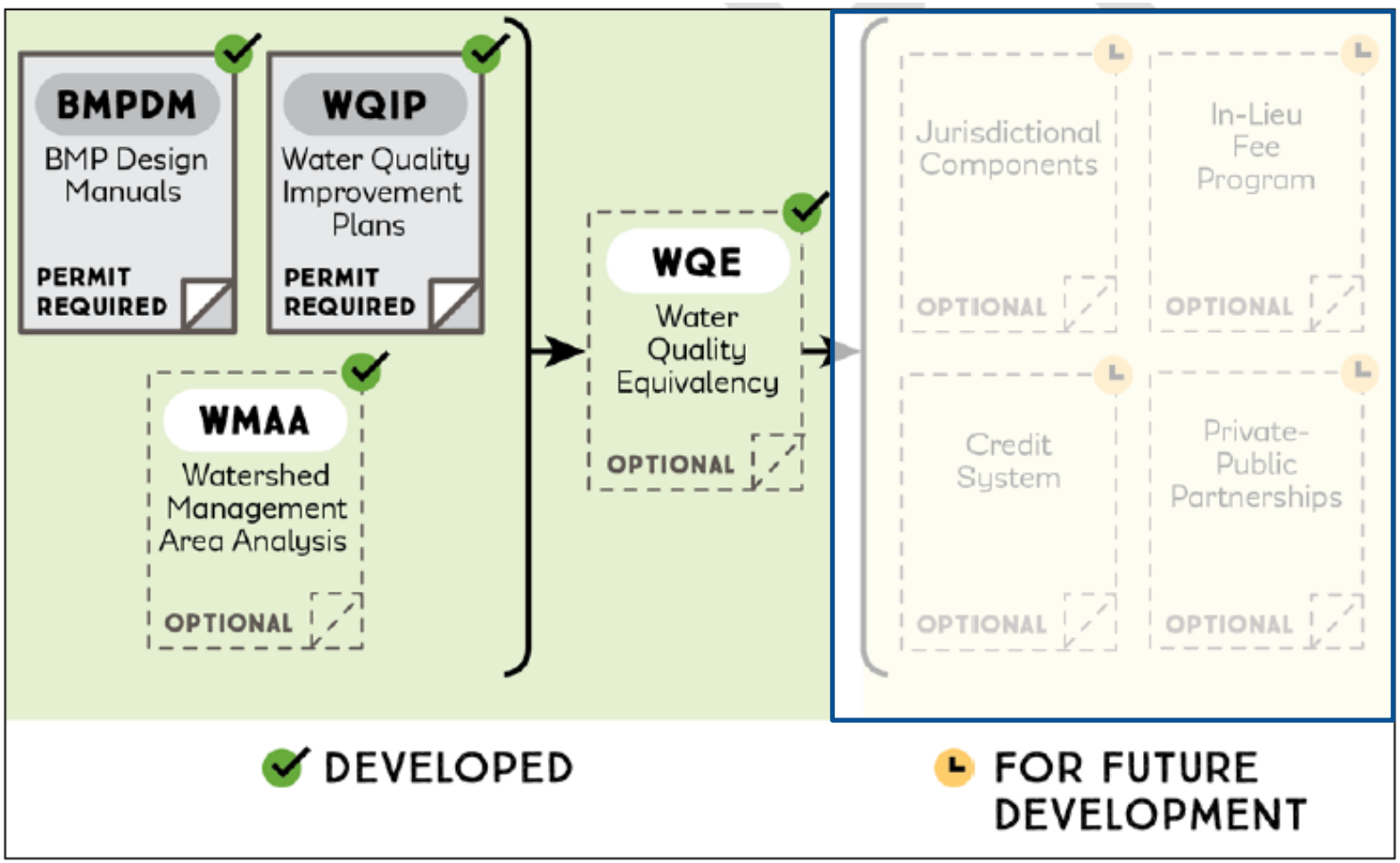
PDP Construction
- PDP "debits" compared to PDP "credits"
- Credits must be = or > than debits

Applicant Implemented ACP
Owned and constructed by same party as PDP

Benefits of Offsite Alternative Compliance

- Provides a compliance pathway for PDPs
- Addresses discharges from existing development
- Promotes regional solutions (not just site-specific)
- Allows cost-effective and market-driven solutions
- Encourages innovation
- Requires greater overall water quality benefits

Overall Program Implementation Process



WQE Key Concepts

- Establishes regional and technical basis for calculating water quality benefits
- Ensures mitigation of impacts caused by not implementing structural BMPs fully onsite
- Ensures a greater overall water quality benefit is realized

What it doesn't do….

- Establish Jurisdictional Program Implementation Components
- Create a Credit System
- Develop an In-Lieu Fee Program
- Establish ground rules and tools for implementation

Potential Project Categories

Structural BMPs:

- Retrofit BMP
- Regional BMP
- Groundwater Recharge & Water Supply Augmentation BMP

Natural System Management Practices:

- Land Restoration
- Land Preservation
- Stream Rehabilitation

Critical Organizational Principals of WQE

- Separation of project implementation into:
  - Applicant-implemented projects; and
  - Independent Implemented projects
- Separation of credits into:
  - Pollutant Reduction
  - Hydromodification

ACP Project Implementation Pathways

Potential Pathways for Project Approval and Construction	
Applicant Implemented ACPs	Applicant purchases or constructs Alternative Compliance Project (ACP)
Independent ACPs	A party other than the applicant owns or constructs the ACP
• Credit System	Applicant purchases ACP credits in-lieu of fully complying on-site
• In-Lieu Fee Structure	Applicant funds or partially funds ACP in-lieu of fully complying on-site (no purchase or exchange of credits)

Status of Water Quality Equivalency Guidelines

ACP Category			Stormwater Pollutant Control Credit				Hydromod Flow Control Credits
			Retention	Biofiltration	Flow-Thru	Volume Reduction	
Structural Best Management Practices	BMP	Retrofit BMP	**Available**	**Available**	Limited Availability	**Available**	**Available**
	BMP	Regional BMP	**Available**	**Available**	Limited Availability	**Available**	**Available**
	BMP	Groundwater Recharge & Water Supply Augmentation BMP	**Available**	**Available**	Limited Availability	**Available**	**Available**
Natural System Management Practices	NSMP	Land Restoration NSMP	*Not Available*	*Not Available*	*Not Available*	Limited Availability	Limited Availability
	NSMP	Land Preservation NSMP	*Not Available*	*Not Available*	*Not Available*	Limited Availability	Limited Availability
	NSMP	Stream Rehabilitation NSMP	*Not Available*	*Not Available*	*Not Available*	Limited Availability	Limited Availability

Public Participation Process

- Fifteen months of meetings
- 11 TAC and TAC/SAG meetings
- Input from:
  - RWQCB staff
  - Academics
  - Regional Copermittees
  - Building Industry, and
  - Consultant/Engineering Community

Overview of Document Structure

Section 1: Introduction

Background, Concepts, Document Use, Limitations

Section 2: WQE for Stormwater Pollutant Control

Overview, PDP Calcs, ACP Calcs (WQE Factors), Determination of Benefit

Section 3: WQE for Hydromodification Flow Control

Overview, Currency, Location Requirements, Design, Calculation of Results

Section 4: WQE Examples by Project Type

Structural BMPs: Retrofit, Regional, Groundwater Recharge and Water Supply Augmentation

Natural System Management Practices: Land Restoration, Land Preservation, Stream Rehabilitation

Appendices

A: Worksheets

B: Pollutant Control Reference Information

C: Hydromodification Flow Control Reference Information

D: Relevant WQE Mapping

E: Response to Comments

Schedule for Completion

Meeting	Date	Notes
WQE Public Draft #1	**July 15th, 2015**	
Public Workshop	July 28th, 2015	
Comments Due	August 18th, 2015	*Close of first 30 day comment period.*
RWQCB WQE Submittal 1	**~Sept 15th, 2015**	
Comments Due	~October 16th, 2015	*Close of second 30 day comment period.*

Stormwater Pollutant Control WQE

Water Quality Equivalency Overview
Overview, Key Concepts, Organizational Principles, TAC Process, Document Structure, Schedule, Questions

Stormwater Pollutant Control
Background, Metric, Formula, Factors, Devices, Example, Questions

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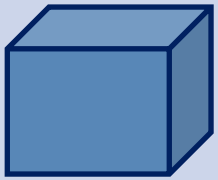
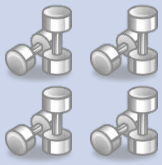
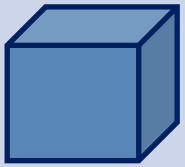
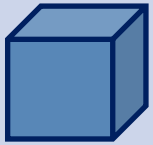
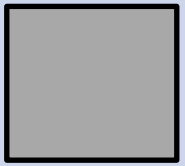
Stormwater Pollutant Control: Background

Item	Method 1	Method 2	Selected Method
Currency	 Pollutant Control + HMP Flow Control	 Pollutant Control  HMP Flow Control	 Pollutant Control  HMP Flow Control
Mitigation Factor	• Arbitrary (literature review)	• Not needed	• Pollutants: Supply, Removal, Δ Impacted Conditions • HMP: Location restrictions
Attributes	• Single currency • Simple • Not well supported	• Independent consideration of pollutant and HMP control • Multiple pollutant currencies • High reliance on uncertain pollutant concentration data	• Two currencies • Conservative assumptions to ensure environmental protection • Highly vetted by TAC
Results	• Low precision • Unknown accuracy	• Medium precision • Unknown accuracy	• Medium Precision • Weighted for improved accuracy

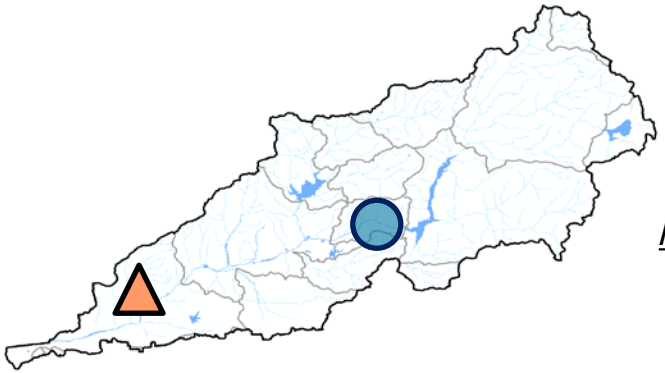
Stormwater Pollutant Control: Metric

Priority Development Project (PDP) per BMP Design Manual

Alternative Compliance Project (ACP)

Design Capture Volume

Subtract Volume Retained/Biofiltered



Design Capture Volume

Modify to account for variations in:

Pollutant Supply

Pollutant Removal

Change in Impacted Conditions

Deficit of Effectively Treated Stormwater*

Greater Overall Water Quality Benefit

Earned Stormwater Pollutant Control Volume

*Onsite flow-thru treatment of this volume must be provided prior to utilizing offsite alternative compliance.

Stormwater Pollutant Control: Formula

$$V_E = L\,(\Delta V + V_2 B_2 - V_1 B_1)$$

Variables	Consideration
V_E: Earned Stormwater Pollutant Control Volume of ACP	Calculated Water Quality Credit
L: Land Use Factor	Pollutant Supply
V_2: Mitigated Condition Design Capture Volume at ACP	Pollutant Removal
B_2: Mitigated Condition BMP Efficacy Factor	Pollutant Removal
V_1: Impacted Condition Design Capture Volume at ACP	Change in Impacted Conditions
B_1: Impacted Condition BMP Efficacy Factor	Change in Impacted Conditions
ΔV: Change in Design Capture Volume (V_1-V_2) at ACP	Change in Impacted Conditions

Stormwater Pollutant Control

$$V_E = L\,(\Delta V + V_2 B_2 - V_1 B_1)$$

OVERVIEW: Land Use Factor (L)

Intent: Identify the pollutant removal potential within a volume of stormwater

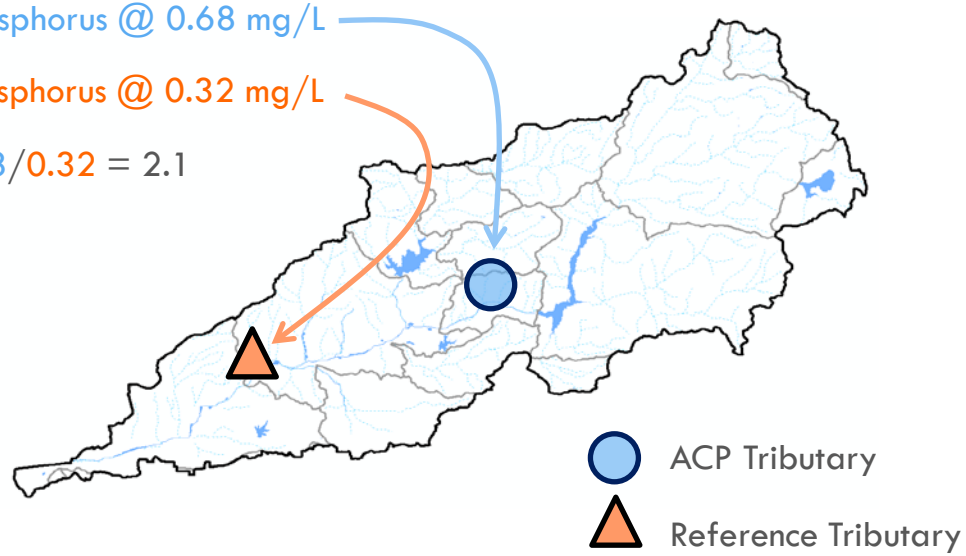
Definition: Ratio of the relative pollutant concentrations generated by an ACP tributary and a reference tributary. (Range of 0.10-10.00)

Concept: Utilize available data to correlate land uses with pollutant concentrations

Residential: Total Phosphorus @ 0.68 mg/L

Commercial: Total Phosphorus @ 0.32 mg/L

L = 0.68/0.32 = 2.1

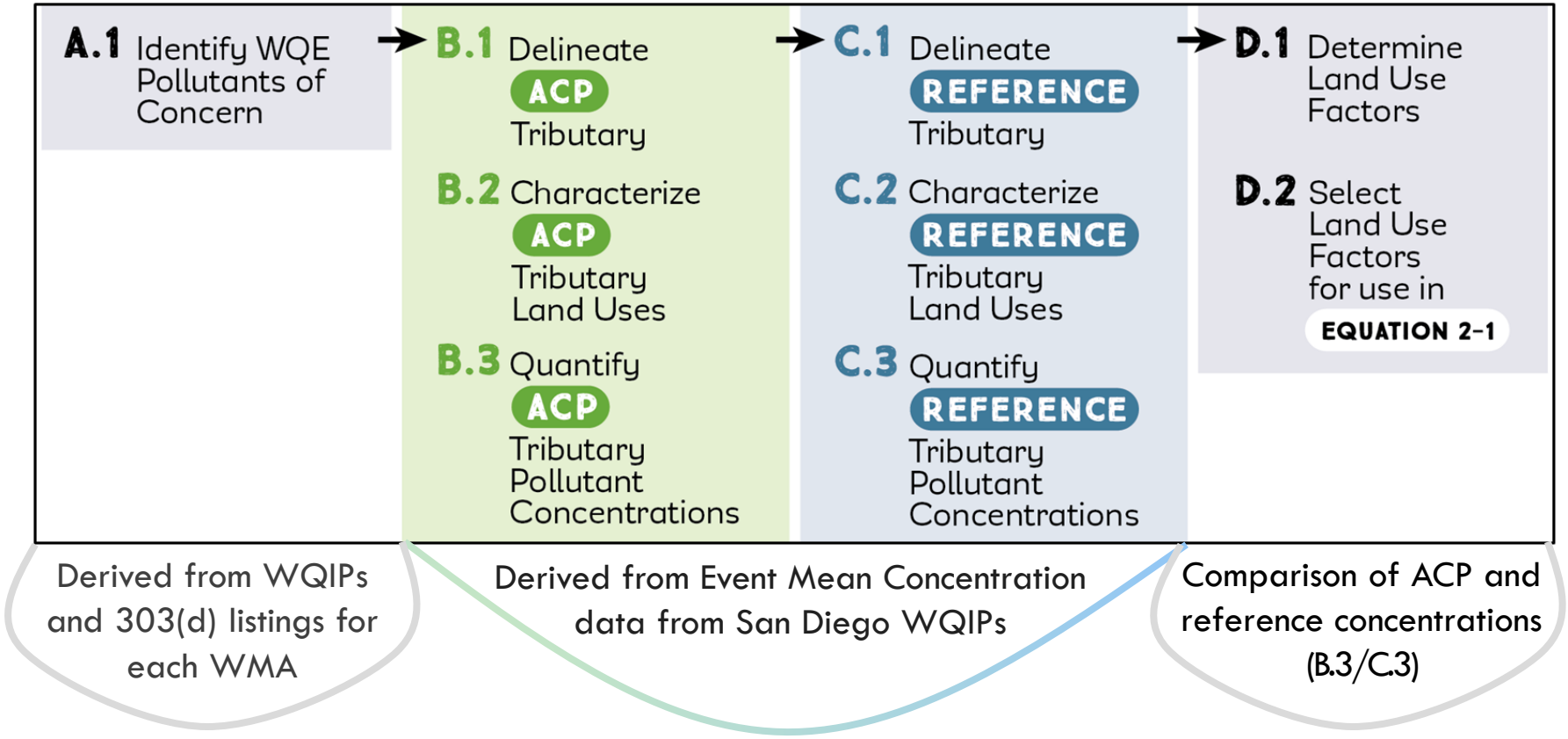


Stormwater Pollutant Control

$$V_E = L\,(\Delta V + V_2 B_2 - V_1 B_1)$$

DETERMINATION: Land Use Factor (L)

Four step process from Section 2.3.2.2 as outlined below



Stormwater Pollutant Control

$$V_E = L\,(\Delta V + V_2 B_2 - V_1 B_1)$$

OVERVIEW: BMP Efficacy Factor (B_1, B_2)

Intent: Rate how effectively a BMP addresses performance requirements for pollutant control

Definition: Ratio of an ACP's performance with respect to the performance standards set forth in the Permit/BMP Design Manual. (Range of 0.00-1.00)

Concept: BMP Efficacy Factor (**B**) is a function of the a BMP's Provided Capture (**C**) and Pollutant Removal Efficiency (**E**)

High Provided Capture

Low Removal Efficiency

vs

Low Provided Capture

High Removal Efficiency

Stormwater Pollutant Control

$$V_E = L\,(\Delta V + V_2 B_2 - V_1 B_1)$$

DETERMINATION: BMP Efficacy Factor (B_1, B_2)

BMP Efficacy Factor is a function of the a BMP's Provided Capture and Pollutant Removal Efficiency. *[Equation 2-3: **B = C x E**]*

BMP Type	**Provided Capture (C):** *Portion of the design-standard event that is Captured*	**Pollutant Removal Efficiency (E)** *Removal efficiency with respect to Permit requirements*
Retention	**1.00** (when 80% of annual storm events are captured)	**1.00**
Biofiltration	**1.50** (when 1.50 times the DCV is biofiltered)	**0.666**
Flow-Thru	**1.00** (when the 0.2 in/hr rainfall event is treated)	**n/a***

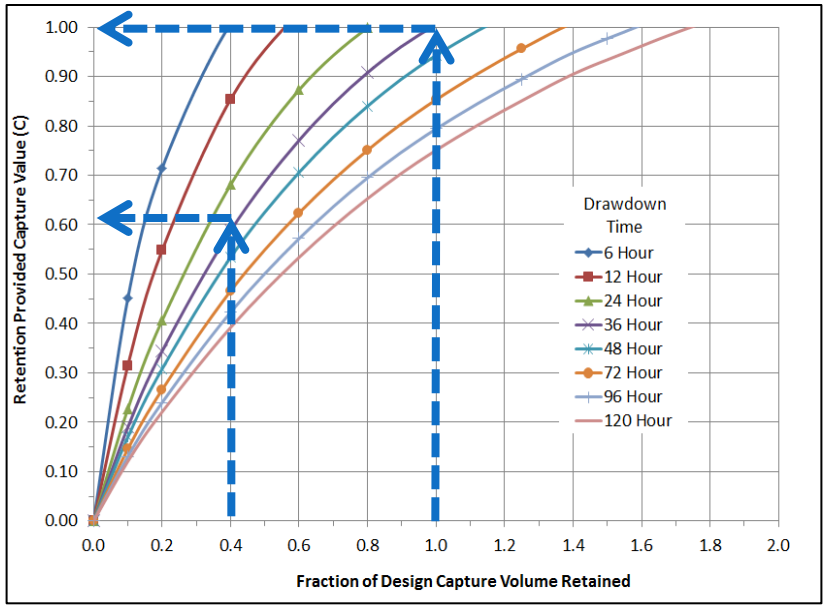
*Guidance does not establish default values, but provides pathway for determination.

Stormwater Pollutant Control

$$V_E = L\,(\Delta V + V_2 B_2 - V_1 B_1)$$

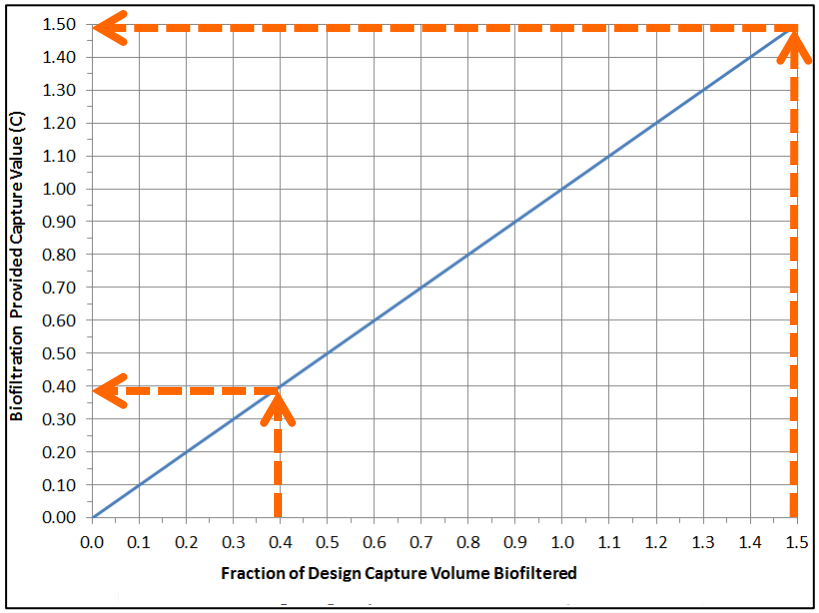
Provided Capture for Retention BMPs

- Non-Linear Relationship
- Ranges from 0.00 to 1.00



Provided Capture for Biofiltration BMPs

- Linear Relationship
- Ranges from 0.00 to 1.50



Provided Capture for Flow-Thru BMPs

- Linear Relationship
- Ranges from 0.00 to 1.00
- Fraction of 0.2 in/hr flow rate that is treated

Stormwater Pollutant Control

$$V_E = L\,(\Delta V + V_2 B_2 - V_1 B_1)$$

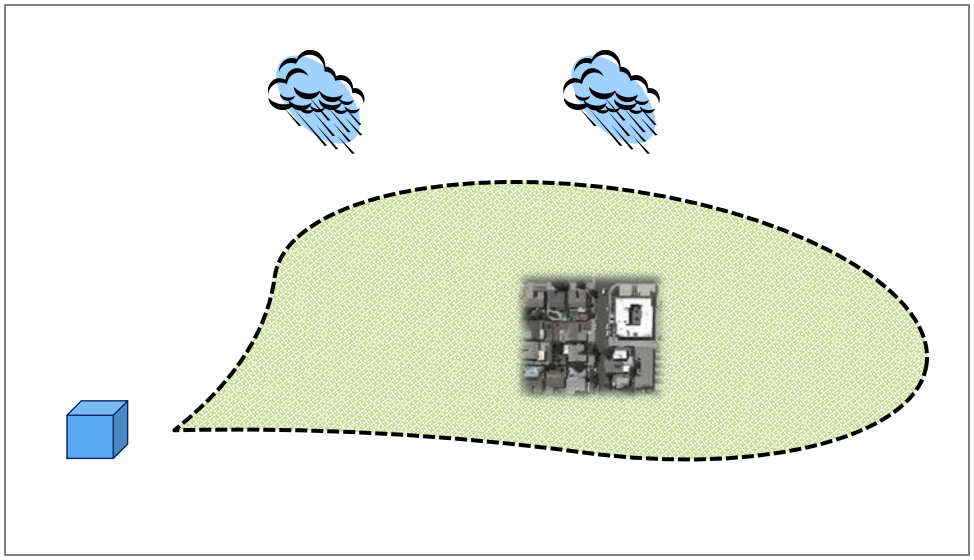
OVERVIEW: Design Capture Volumes (V_1, V_2, ΔV)

Intent: Quantify the water quality stormwater runoff volume from a project site under impacted and mitigated conditions

Definition: The volume of stormwater runoff produced from a 24-hour, 85th percentile storm

Concept: The Design Capture Volume is a function of the tributary area, surface characteristics, and rainfall depth

Determination: Determined per Guidance set forth in the BMP Design Manual



Stormwater Pollutant Control: Formula

$$V_E = L\,(\Delta V + V_2 B_2 - V_1 B_1)$$

Variables	Consideration
V_E: Earned Stormwater Pollutant Control Volume of ACP	Calculated Water Quality Credit
L: Land Use Factor	Pollutant Supply
V_2: Mitigated Condition Design Capture Volume at ACP	Pollutant Removal
B_2: Mitigated Condition BMP Efficacy Factor	Pollutant Removal
V_1: Impacted Condition Design Capture Volume at ACP	Change in Impacted Conditions
B_1: Impacted Condition BMP Efficacy Factor	Change in Impacted Conditions
ΔV: Change in Design Capture Volume (V_1-V_2) at ACP	Change in Impacted Conditions

Stormwater Pollutant Control Devices

STRUCTURAL BMPS

- **Project Types:** Retrofit, Regional, Groundwater Recharge & Water Supply Augmentation
  - **Volume-Based Treatment:** Retention, biofiltration, partial retention
  - **Flow-Based Treatment:** Swales, detention basins, subsurface wetponds, proprietary filter devices

NATURAL SYSTEM MANAGEMENT PRACTICES

- **Project Types:** Land Restoration, Land Preservation, Stream Rehabilitation
  - **Natural Approach:** Focus on restoring/preserving predevelopment watershed functions in lieu of providing direct pollutant control

Stormwater Pollutant Control: Structural BMPs

Types: Retrofits, Regional, Groundwater Recharge & Water Supply Augmentation

Existing Condition
40,000 SF
Asphalt
No BMPs

Proposed Condition
39,000 SF
Asphalt

$V_E = L\,(\Delta V + V_2 B_2 - V_1 B_1)$

Proposed Condition
40,000 SF
Asphalt

$V_E = L\,(\Delta V + V_2 B_2 - V_1 B_1)$

Proposed Condition
38,000 SF
Asphalt

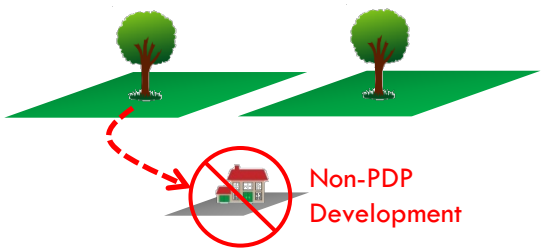
$V_E = L\,(\Delta V + V_2 B_2 - V_1 B_1)$

Stormwater Pollutant Control: Natural System Management Practices

Land Restoration

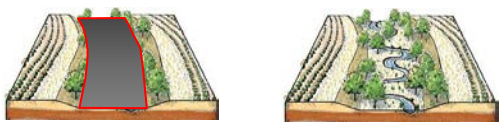
$$V_E = L\,(\Delta V + V_2 B_2 - V_1 B_1)$$

Land Preservation



$$V_E = L\,(\Delta V + V_2 B_2 - V_1 B_1)$$

Stream Rehabilitation



$$V_E = L\,(\Delta V + V_2 B_2 - V_1 B_1)$$

Stormwater Pollutant Control Regional BMP Example (*Section 4.2*)

20 Acre Tributary Area

2 Acre ACP Parcel

Consider:

- Applicant has identified a 2 acre parcel available to provide biofiltration for a 20 acre tributary
  - Commercial = 12 acres
  - Multi Family Res = 5 acres
  - Transportation = 3 acres
- Biofiltration Characteristics:
  - 19,079 ft^2 surface area
  - 10" ponding depth
  - 18" soil media
  - 18" gravel
  - Underdrain and impermeable liner
- Project is located within Carlsbad watershed management area and hydrologic unit
- Project will be an Independent ACP
- Calculate Earned Stormwater Pollutant Control Volume

Stormwater Pollutant Control Regional BMP Example *(Section 4.2)*

Step 1: PDP Stormwater Pollutant Control Calculations

Not applicable for Independent ACPs

Step 2: ACP Stormwater Pollutant Control Calculations

- **Step 2.1: Determine Design Capture Volume Tributary to the ACP (V_1, V_2, ΔV)**
  Design Capture Volume (DCV) = Runoff Coefficient x Rainfall Depth x Tributary Area
  - **Impacted Condition DCV (V_1):**
    V_1 = 0.73 x 0.80 in x 20.0 ac x (43,560/12 conversion) = 42,398 cubic feet
  - **Mitigated Condition DCV (V_2):**
    V_2 = 0.67 x 0.80 in x 20.0 ac x (43,560/12 conversion) = 38,914 cubic feet
    (due to removal of 1.6 acres impervious area)
  - **Change in DCV (ΔV):**
    ΔV = 42,398 - 38,914 = 3,484 cubic feet

Stormwater Pollutant Control Regional BMP Example (*Section 4.2*)

- **Step 2.2: Calculate Land Use Factor (L)**
  - **ACP Tributary:** Areas per visual observation, default runoff factors
  - **Reference Tributary:** Independent ACP so Carlsbad WMA compositions from Table 2-3 are used, default runoff factors
  - **Watershed Management Area:** Carlsbad
  - **Hydrologic Unit:** Carlsbad (904.00)
  - **Result:** Lowest factor of 0.61

Automated Spreadsheet Calculation for Worksheet A.5: Land Use Factor Determination

Land Use Designation	ACP Tributary Characteristics		Reference Tributary Characteristics		Relative Pollutant Concentrations by Land Use						
	Area (Acres)	Runoff Factor	Area (Acres)	Runoff Factor	TSS	TP	TN	Tcu	TPb	TZn	FC
Agriculture		0.10	5,483	0.10	0.45	1.00	1.00	1.00	1.00	0.59	1.00
Commercial	12	0.80	4,403	0.80	0.13	0.16	0.16	0.56	0.48	1.00	0.87
Education		0.50	4,222	0.50	0.13	0.20	0.11	0.14	0.25	0.39	0.13
Industrial		0.90	4,887	0.90	0.13	0.19	0.15	0.54	0.68	0.89	0.49
Multi Family Residential	5	0.60	5,615	0.60	0.10	0.13	0.13	0.14	0.15	0.29	0.27
Orchard		0.10	2,831	0.10	0.18	0.17	0.67	1.00	1.00	0.59	0.11
Rural Residential		0.30	10,923	0.30	1.00	0.51	0.14	0.10	0.71	0.13	0.19
Single Family Residential		0.40	30,211	0.40	0.13	0.20	0.15	0.27	0.43	0.35	0.63
Transportation	3	0.90	15,156	0.90	0.11	0.26	0.12	0.53	0.31	0.62	0.12
Vacant / Open Space		0.10	0	0.10	0.16	0.10	0.10	0.12	0.10	0.10	0.10
Water		0.00	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	20	-	83,731	-	-	-	-	-	-	-	-
Relative Pollutant Concentration for ACP Tributary					0.12	0.17	0.15	0.47	0.39	0.80	0.62
Relative Pollutant Concentration for Reference Tributary					0.20	0.25	0.16	0.39	0.43	0.55	0.40
Watershed Management Area					Carlsbad						
Hydrologic Unit					Carlsbad (904.00)						
Land Use Factor					**0.61**	**0.67**	**0.96**	**-**	**-**	**-**	**1.57**

Stormwater Pollutant Control Regional BMP Example (*Section 4.2*)

- **Step 2.3: Calculate BMP Efficacy Factors (B_1, B_2)**
  - **Impacted Condition BMP Efficacy Factor (B_1):** No existing BMPs, $B_1 = 0.00$
  - **Mitigated Condition BMP Efficacy Factor (B_2):** Per Worksheet A.2, $B_2 = 1.00$

Automated Spreadsheet Calculation for Worksheet A.2: Biofiltration BMP Efficacy Factor Determination for Water Quality Equivalency

Category	#	Description	Value	Units	Notes
BMP Inputs	1	Design Capture Volume Tributary to BMP	38,914	cubic-feet	User Input from BMPDM Worksheet B.2-1
	2	Provided BMP Surface Area	19,079	sq-ft	User Input
	3	Provided Surface Ponding Depth	10	inches	Default 0-12 inches. If other, demonstrate <24hr surface drawdown.
	4	Provided Soil Media Thickness	18	inches	18 inches minimum
	5	Provided Gravel Storage Thickness	18	inches	Default = 12 inches, 0 if agg. not over the entire bottom BMP area
Biofiltration Calculations	6	Soil Media Filtration Rate to be used for Sizing	5.00	in/hr	Default = 5.00
	7	Depth Biofiltered Over 6 Hour Storm	30.00	inches	[Line 6 x 6 Hours]
	8	Soil Media Pore Space	0.30	-	Default = 0.30 for Biofiltration-Only BMPs
	9	Gravel Pore Space	0.40	-	Default = 0.40
	10	Effective Depth of Biofiltration Storage	22.6	inches	[Line 3 + (Line 4 x Line 8) + (Line 5 x Line 9)]
	11	Total Depth Biofiltered	52.60	inches	[Line 7 + Line 10]
	12	Option 1 - Biofilter 1.50 DCV: Target Volume	58,371	cubic-feet	[1.50 x Line 1]
	13	Option 1 - Provided Biofiltration Volume	58,371	cubic-feet	[Minimum of Line 12 or [(Line 11/12) x Line 2]]
	14	Option 2 - Store 0.75 DCV: Target Volume	29,186	cubic-feet	[0.75 x Line 1]
	15	Option 2 - Provided Storage Volume	29,186	cubic-feet	[Minimum of Line 14 or [(Line 10/12) x Line 2]]
	16	Provided Capture for Biofiltration BMP	1.50	ratio	[Maximum of (1.50 x Line 13/Line 12) or (1.50 x Line 15/Line 14)]
	17	**Biofiltration BMP Factor for Use in WQE Formula**	1.00	ratio	[Line 16 x 0.666]

Stormwater Pollutant Control Regional BMP Example *(Section 4.2)*

- **Step 2.4: Calculate Earned Stormwater Pollutant Control Volume (V_E)**
  - $V_E = L\ (\Delta V + V_2 B_2 - V_1 B_1)$

    V_E = **0.61** x [**3,484** + (**38,914 x 1.00**) - (**42,398 x 0.00**)] = **25,863 cubic feet**

    (Pollutant Supply, Pollutant Removal, Change in Impacted Conditions)

Step 3: Determination of Overall Water Quality Benefit

This is an Independent ACP, so there is not a specific PDP impact to offset. If a credit system is in place at the completion of this project, 25,863 stormwater pollutant control credits would be banked for potential purchase by a PDP applicant with an effectively treated stormwater pollutant control volume deficit of 25,863 cubic feet or less.

Stormwater Pollutant Control Summary

$$V_E = L\,(\Delta V + V_2 B_2 - V_1 B_1)$$

Variable	Structural BMP Report Section	Natural System Management Practices Report Section	Calculation
V_E	2.3	2.3	Equation 2-1
L	2.3.1.2	2.3.2.2	Worksheet A.5
ΔV	2.3.1.1	2.3.2.1	Per BMPDM
V_1	2.3.1.1	2.3.2.1	Per BMPDM
V_2	2.3.1.1	2.3.2.1	Per BMPDM
B_1	2.3.1.3	2.3.2.3	Worksheets A.1 – A.4
B_2	2.3.1.3	2.3.2.3	Worksheets A.1 – A.4

Questions?

Let's take a quick 10 minute break.

Hydromodification Management
Flow Control Equivalency

Water Quality Equivalency Overview
Overview, Key Concepts, Organizational Principles, TAC Process, Document Structure, Schedule, Questions

Stormwater Pollutant Control
Background, Metric, Formula, Factors, Devices, Example, Questions

Hydromodification Management
Intro to Hydromod, Devices, Methodology, General Steps, Questions

Stream Rehabilitation Options
Hydromodification Flow Control, Potential Future Pathways, Questions

Closing Items
Available Options, Opportunities for Input, Questions

Hydromodification Management Introduction

- What is hydromodification?
  - Changes in a watershed's runoff characteristics resulting from development, together with associated morphological changes to the channels receiving the runoff
  - Changes in sediment transport characteristics and the hydraulic geometry (width, depth, slope) of channels.
  - The changes result in streambank erosion and sedimentation, leading to habitat degradation due to loss of overhead cover and loss of instream habitat structures

Hydromodification Management Introduction

- Development Effects
  - Greater runoff volume
  - Higher peak flow
  - Longer duration
  - Increased erosion

- Physical processes
- Results in habitat degradation

Hydromodification Management Introduction

- What can we do to control hydromodification?
  - Preserve streams and use natural conveyance systems
  - Find a way to not discharge the excess runoff volume from new impervious areas
    - Retain excess and infiltrate or use onsite

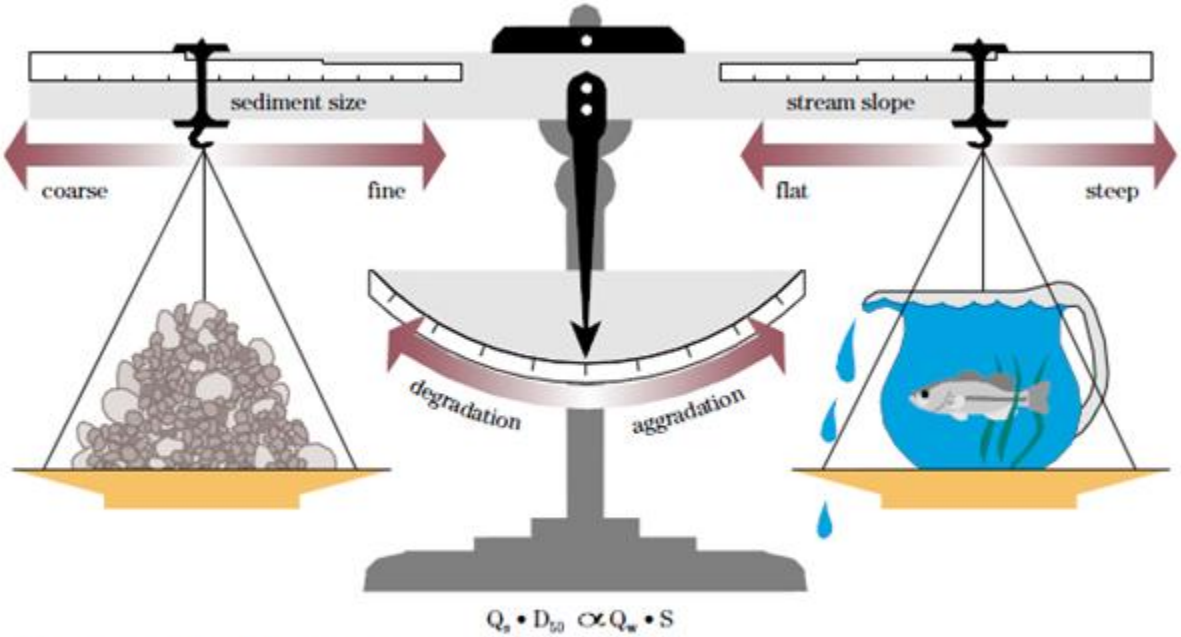
Hydromodification Management Introduction

- If we cannot retain excess runoff:
  - Discharge excess runoff volume at a flow rate less than the critical channel flow rate (Qc)
- Critical channel flow (Qc) means:
  - The channel flow that produces the critical shear stress that initiates bed movement or that erodes the toe of channel banks
  - For San Diego County Qc has been determined to be a fraction of Q_2 based on continuous simulation modeling

Hydromodification Management Introduction

- MS4 Permit Requirements for PDPs to address hydromodification
  - Flow control for post-project runoff
    - Structural BMPs
  - Protection of critical coarse sediment yield areas
    - Land planning practices

Hydromodification Management Introduction



From Rosgen (1996), from Lane, Proceedings, 1955.
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Lane's Diagram

Source: www.fgmorph.com/fg_2_9.php

Hydromodification Management Introduction

- Alternative compliance for hydromodification management
  - Offsite flow control facilities
    - Regional BMPs
    - Retrofit BMPs
    - Groundwater recharge and water supply augmentation
  - Stream rehabilitation

Hydromodification Management Introduction

- HMP Flow Control Facilities
  - Retention, biofiltration, and/or detention
    - Runoff storage
    - Flow control for runoff that is discharged
  - Designed based on continuous simulation modeling
  - Controls a range of flows starting from Qc (lower flow threshold) up to Q10
  - Discharges excess volume at flow rate < Qc

Hydromodification Management Flow Control Equivalency

- Reference documents
  - Final HMP
    - "Final Hydromodification Management Plan Prepared for County of San Diego, California," March 2011
  - Model BMP Design Manual
    - Model BMP Design Manual San Diego Region June 2015

Hydromodification Management Flow Control Equivalency

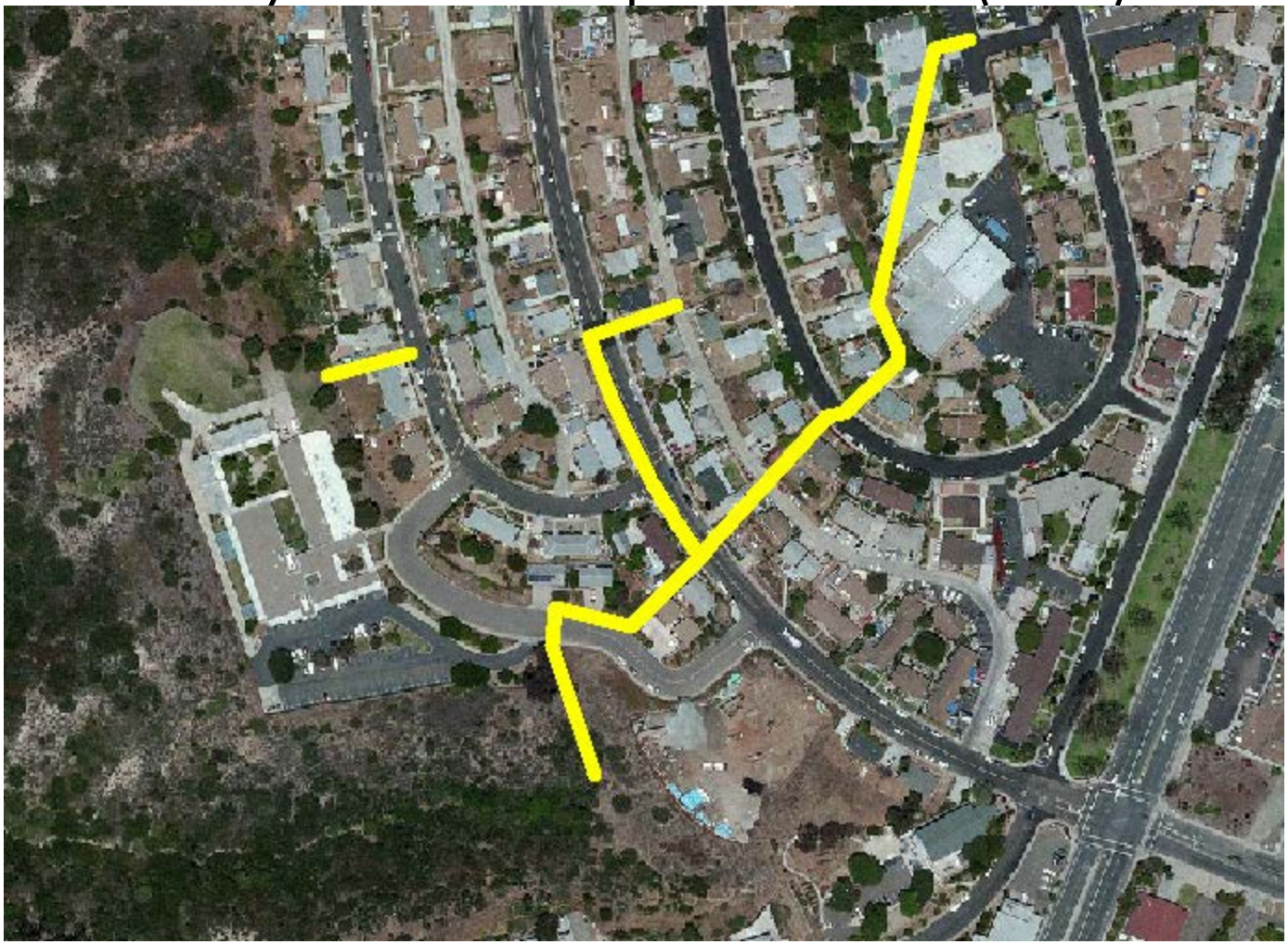
- WQE Document Provides:
  - Metric (currency)
  - Rules to apply the currency

Hydromodification Management Flow Control Equivalency

- Currency = directly connected impervious area (DCIA) mitigated
- DCIA is impervious area directly connected to streams by urban drainage systems

Hydromodification Management
Flow Control Equivalency Currency

Directly Connected Impervious Area (DCIA)



Hydromodification Management Flow Control Equivalency Currency

- Directly Connected Impervious Area (DCIA)
  - Directly affects the volume of runoff delivered to a stream
  - Strong predictor of stream ecological condition
  - Measurable physical feature of a PDP and an ACP drainage area

Hydromodification Management Flow Control Equivalency Currency

- Currency for PDPs
  - Total impervious area of the PDP that would have required onsite mitigation
    - PDP impervious area assumed to be entirely DCIA
- Currency for ACPs
  - Existing DCIA mitigated within the ACP drainage area
    - Directly measured, or
    - Estimated as a subset of total impervious area

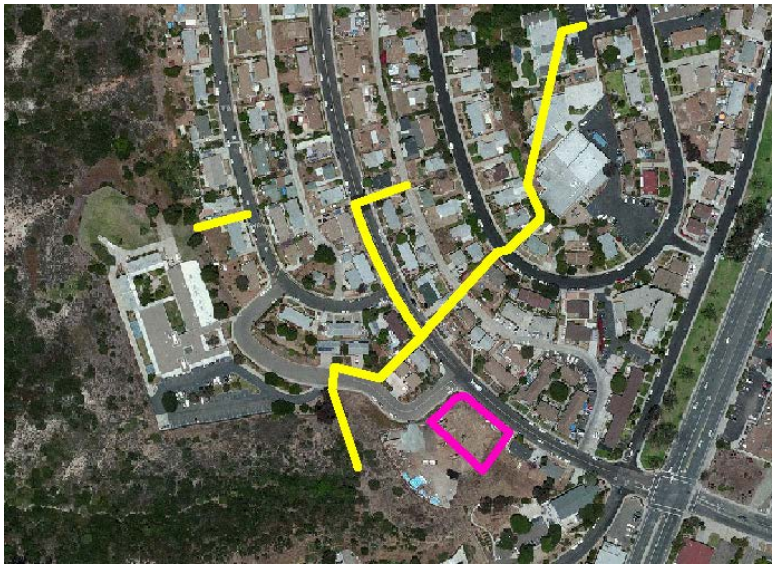
Hydromodification Management Flow Control Equivalency

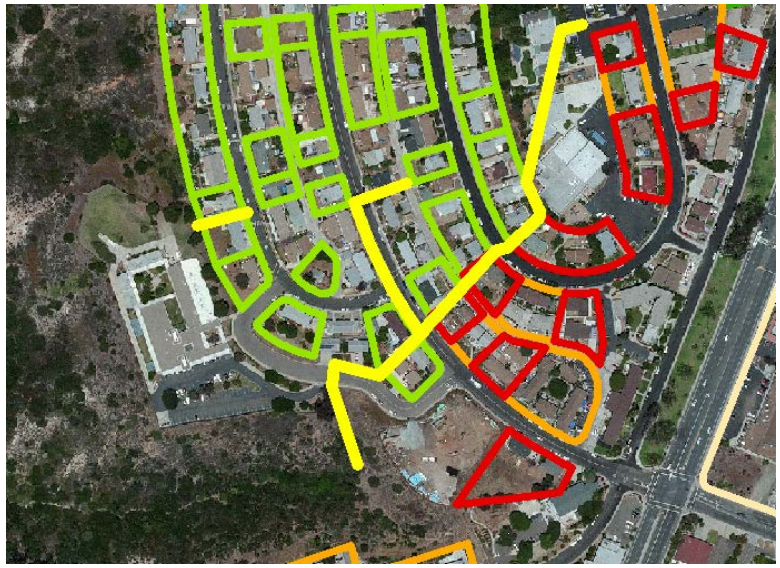
Principles for HMP flow control facilities as ACPs

- Currency = DCIA
- Adhere to strict location requirements
  - Location requirements are intended to prevent a new impact to a stream from new impervious area
  - Guidelines for ACP location relative to PDP location depend on PDP scenario type

HMP Flow Control Facilities Guidelines for ACP Location

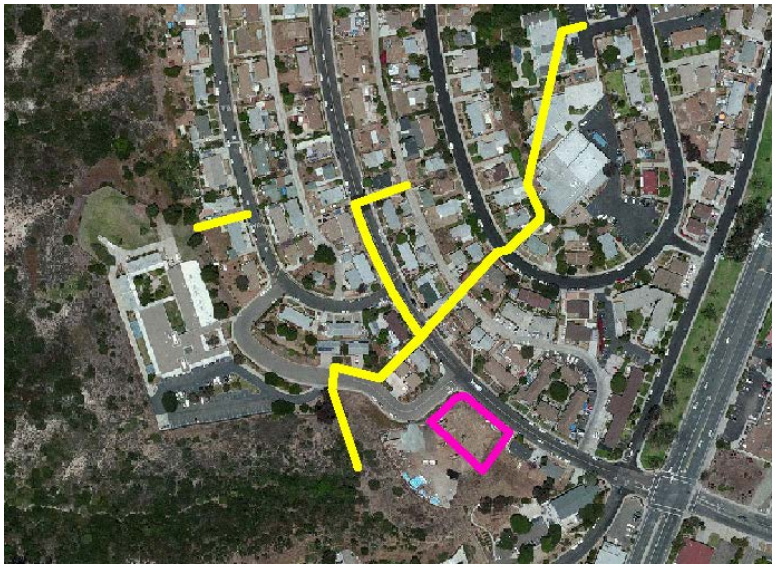
- Three project scenarios:
  - New development
  - Redevelopment Increasing Impervious Area
  - Redevelopment with NO Increase of Impervious Area





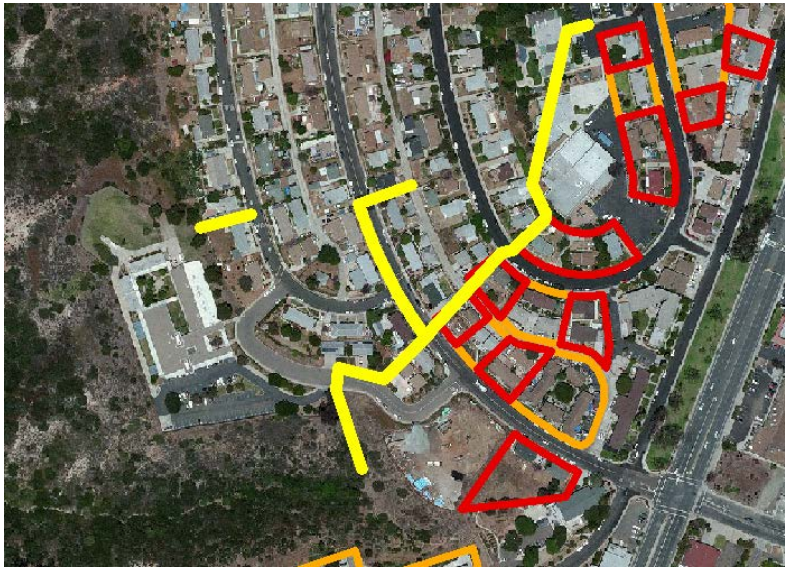
HMP Flow Control Facilities Guidelines for ACP Location

- ACP Location Requirements for New Development
  - Within the same local watershed/system
  - Mitigation provided prior to discharge to a susceptible receiving water
  - Existing DCIA draining to ACP ≥ PDP DCIA to be mitigated

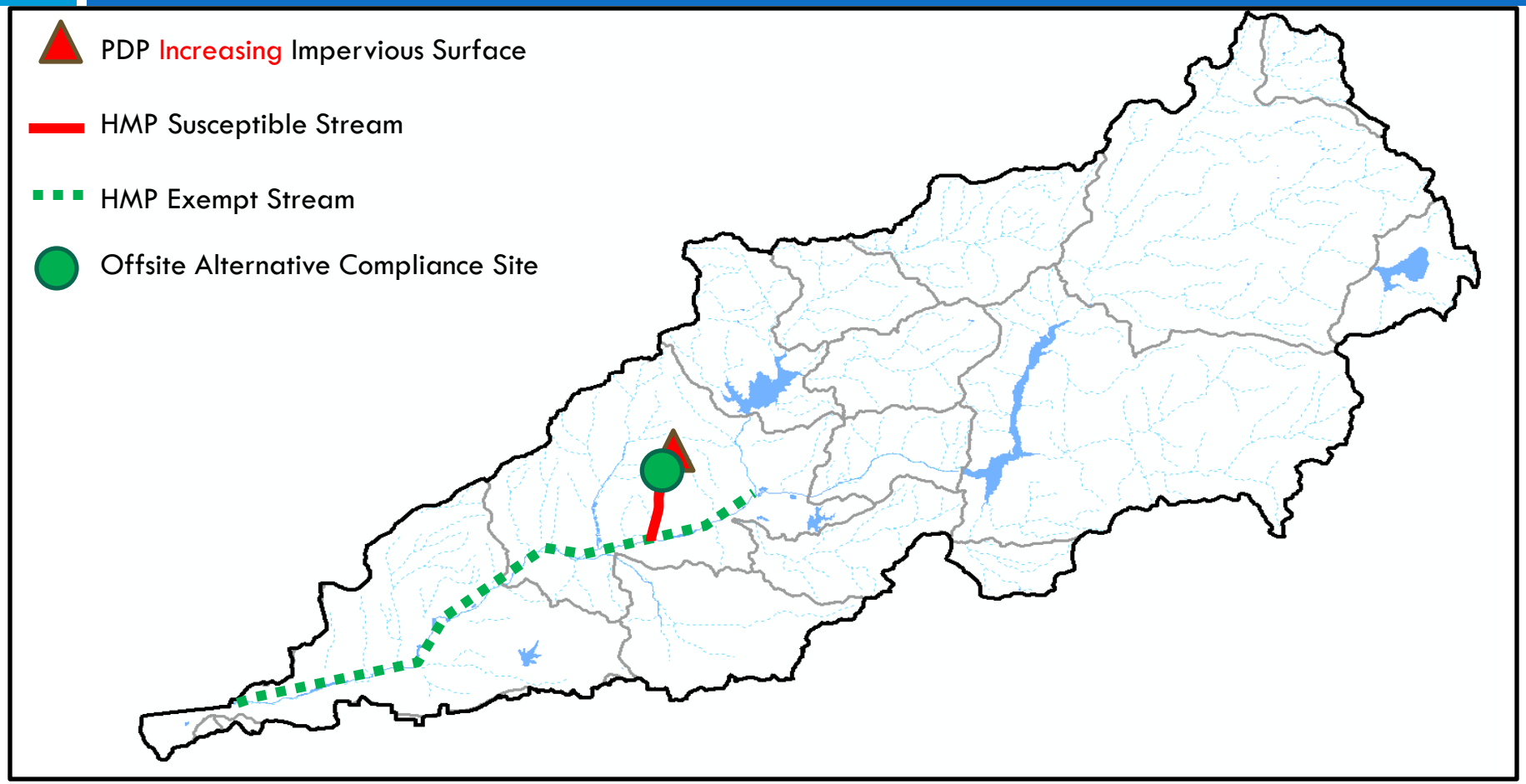


HMP Flow Control Facilities Guidelines for ACP Location

- ACP Location Requirements for Redevelopment Increasing Impervious Area
  - Same location guidelines as new development



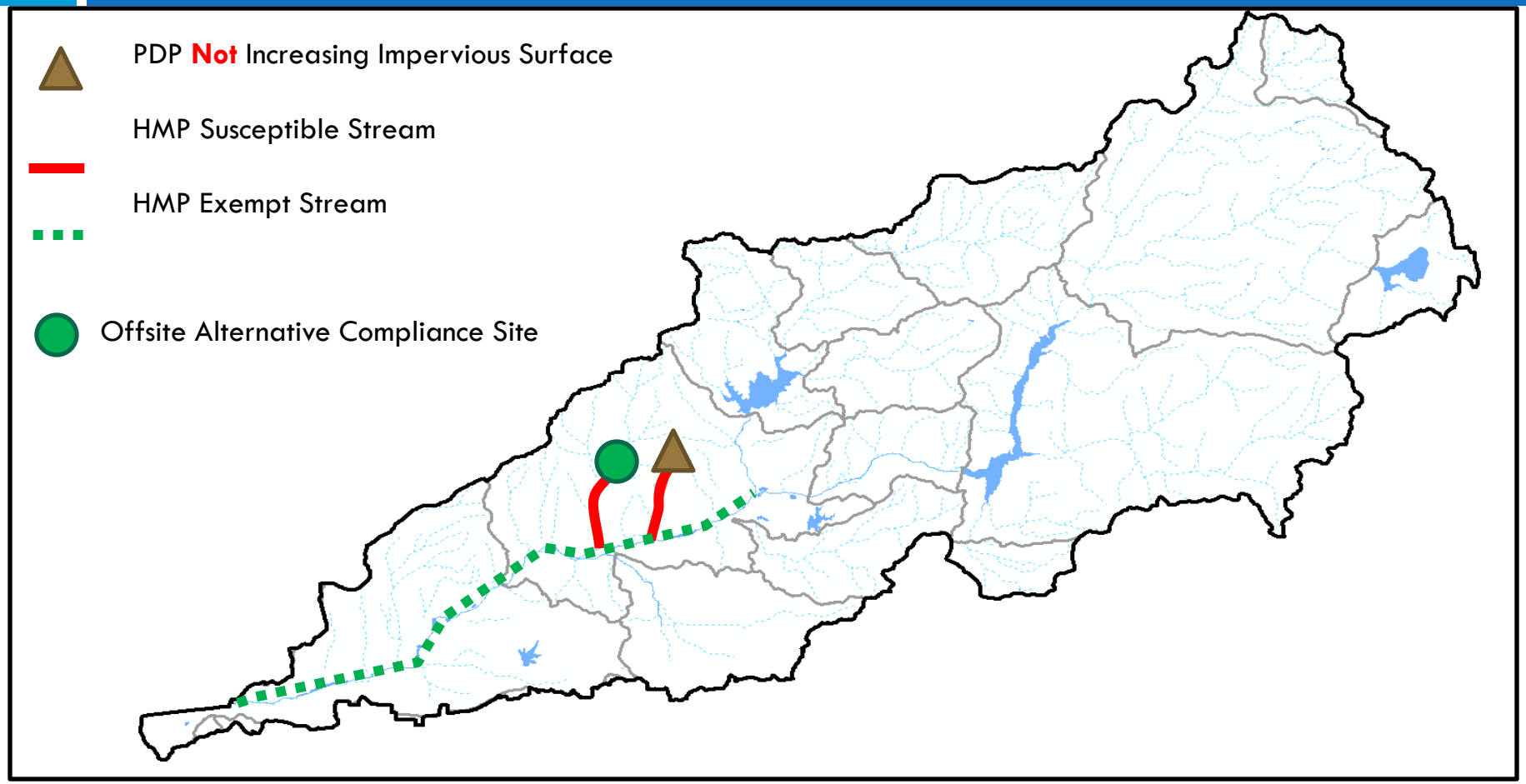
Required ACP Location for PDP Increasing Impervious Surface



HMP Flow Control Facilities Guidelines for ACP Location

- ACP Location Requirements for Redevelopment with NO Increase of Impervious Area
  - Within the same hydrologic unit
  - Not in an HMP exempt location
  - Existing DCIA draining to ACP ≥ PDP DCIA to be mitigated

Example ACP Location for PDP Not Increasing Impervious Surface



Hydromodification Management Flow Control Equivalency

Designing HMP flow control facilities as ACPs

- Applicant-Implemented ACP:
  1. Calculate PDP debit (DCIA to be mitigated)
  2. Identify PDP scenario type and location requirements
  3. Identify appropriate ACP location
  4. Control existing DCIA $\geq$ PDP DCIA

HMP Flow Control Facilities Guidelines for ACP Sizing

- Scenario 1: New Development
- Either:
  - Size based on the new development project
    - Mitigates the project only, no credits to sell

  OR

  - Size based on the ACP location
    - Mitigates the additional existing DCIA within the ACP drainage area
    - Earn and sell credit of additional DCIA mitigated on a 1 acre: 1 acre basis

HMP Flow Control Facilities Guidelines for ACP Sizing

- Scenario 2: Redevelopment Increasing Impervious Area
  - Same sizing guidelines as new development
  - Same potential credit as new development

HMP Flow Control Facilities Guidelines for ACP Sizing

- Scenario 3: Redevelopment with NO Increase of Impervious Area
- Either:
  - Size based on the redevelopment project area to be mitigated, AND based on the ACP receiving stream susceptibility
    - Mitigates the project only, no credits to sell

  OR

  - Size based on the ACP location, AND based on the ACP receiving stream susceptibility
    - Mitigates the additional existing DCIA within the ACP drainage area
    - Earn and sell credit of additional DCIA mitigated on a 1 acre: 1 acre basis

Hydromodification Management Flow Control Equivalency

Designing HMP flow control facilities as ACPs

- Independent ACP:
  1. Identify ACP drainage area
  2. Determine existing DCIA
  3. Determine receiving channel susceptibility
  4. Control up to 100% of existing DCIA
  5. Sell or trade credit for existing DCIA mitigated to PDPs if the ACP location meets the PDP location requirements

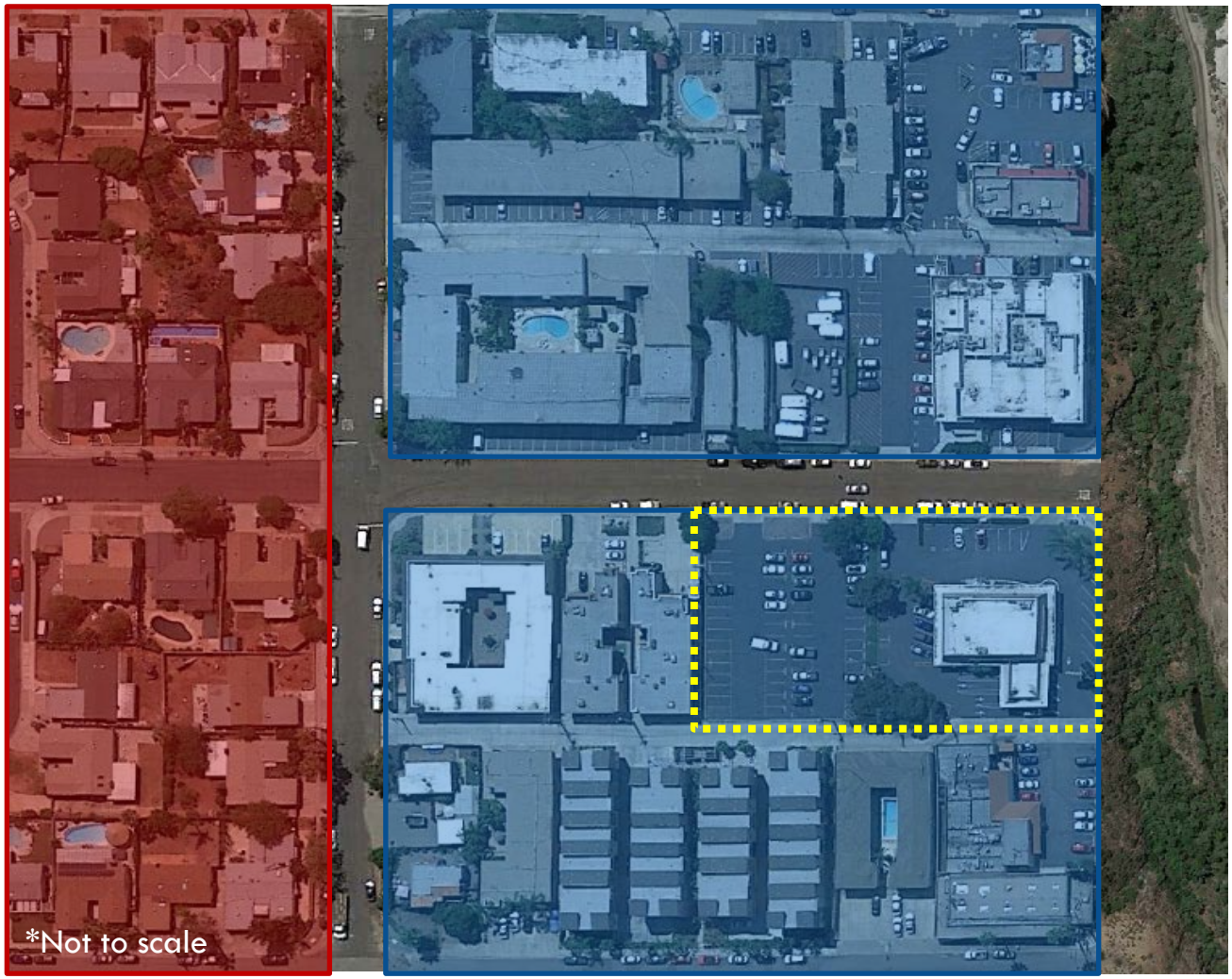
HMP Flow Control Facilities

- Flow control facilities
  - Retention (infiltration or harvest and use)
  - Biofiltration
  - Detention

Combined Pollutant Control and Flow Control Facilities

Structural BMP	Potential to Achieve both Pollutant Control and Flow Control
Retention by Infiltration	Yes
Retention by Harvest and Use	Yes
Biofiltration	Yes
Detention	No – Flow Control Only

Hydromodification Management Example Problem



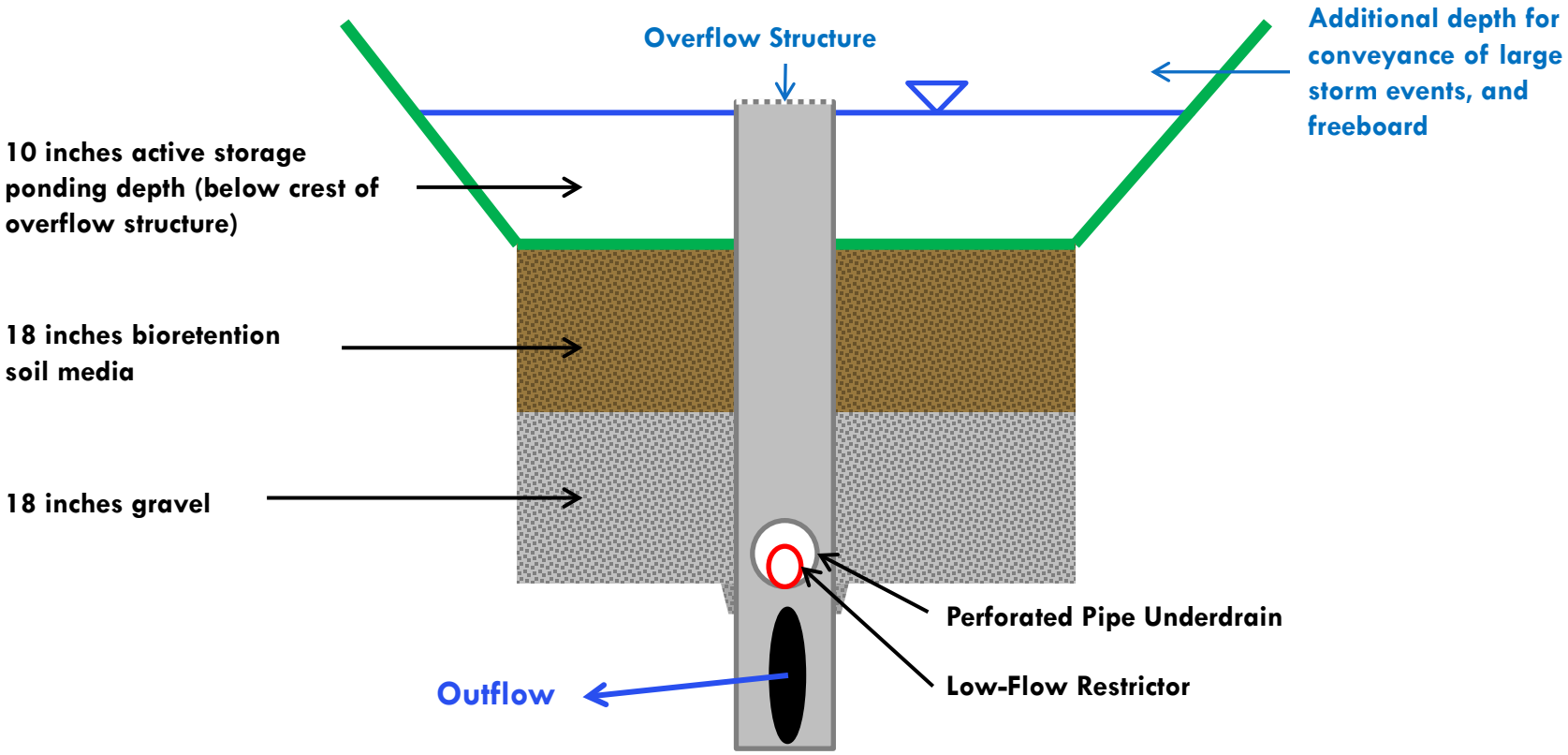
Hydromodification Management Example Problem

Goal: Biofiltration BMP to mitigate as much existing DCIA as possible

- Biofiltration BMP will include:
  - 10 inches active storage ponding depth
  - 18 inches bioretention soil media
  - 18 inches gravel
  - Underdrain at bottom of 18 inches of gravel
  - Low flow restrictor on underdrain

Hydromodification Management Example Problem

Biofiltration BMP Layers



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Hydromodification Management Example Problem

Designing Regional Flow Control Facility as Independent ACP

1. *Identify ACP drainage area*
2. *Determine existing DCIA*
3. *Determine receiving channel susceptibility*
4. *Control up to 100% of existing DCIA*
5. *Sell or trade credit for existing DCIA mitigated to PDPs if the ACP location meets the PDP location requirements*

Hydromodification Management Example Problem

Step 1: ACP Drainage Area

- 20 acre drainage area (18 acres offsite + 2 acres onsite)

Land Use	Total Area (acres)	% Impervious	Impervious Area (acres)	Pervious Area (acres)
Retail	4	80	3.2	0.8
Retail/Office	6	85	5.1	0.9
Multi-Family	5	65	3.25	1.75
Roads	3	90	2.7	0.3
Retail	2	80	1.6	0.4
Total	20		15.85	4.15

Hydromodification Management Example Problem

Step 2: Determine Existing DCIA

- Assume all impervious area has been determined to be directly connected based on site visit
- DCIA = total impervious area = 15.85 acres

Land Use	Total Area (acres)	% Impervious	Impervious Area (acres)	Pervious Area (acres)
Retail	4	80	3.2	0.8
Retail/Office	6	85	5.1	0.9
Multi-Family	5	65	3.25	1.75
Roads	3	90	2.7	0.3
Retail	2	80	1.6	0.4
Total	20		15.85	4.15

Hydromodification Management Example Problem

Step 3: Determine Receiving Channel Susceptibility

- Assume high susceptibility for this example
- Lower flow threshold for hydromodification management design = 0.1Q2

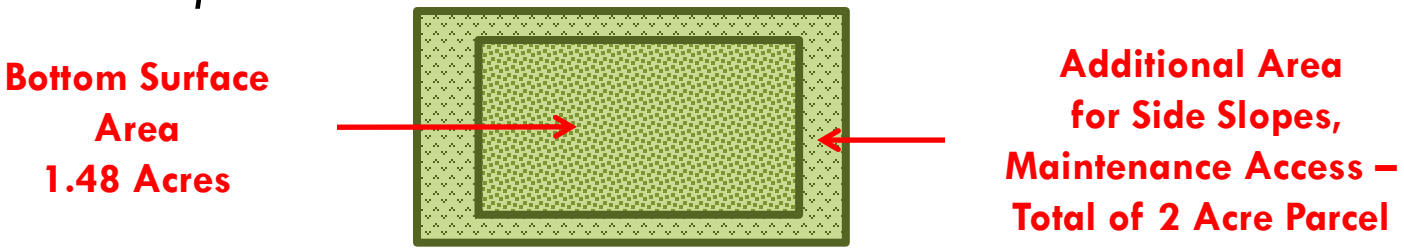
Step 4: Design ACP to mitigate up to 100% of the existing DCIA

- Use methods from BMP Design Manual
- Design to the receiving channel susceptibility

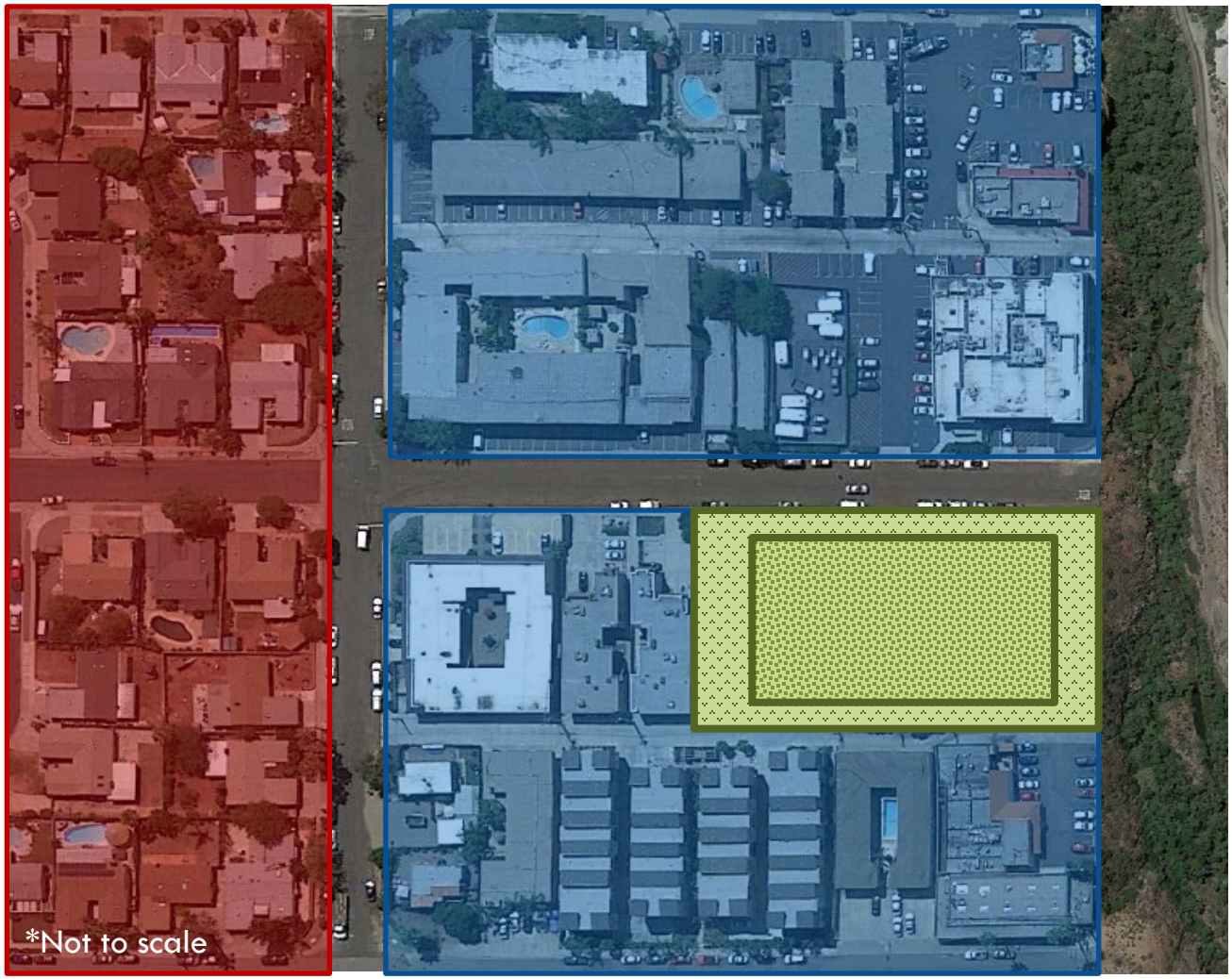
Hydromodification Management Example Problem

Step 4: ACP Design

- Biofiltration device designed using sizing factor method (See WQE document Section 4.2)
- Low flow orifice flow = 0.51 cfs
- Minimum area = 1.48 acres (64,469 ft^2)
  - *This is the bottom surface area*
  - *With side slopes and maintenance access the ACP will occupy the full 2-acre parcel*



Hydromodification Management Example Problem



Hydromodification Management Example Problem

Combined Pollutant Control and Hydromodification Control

	Pollutant Control	Hydromodification Control
Required Biofiltration Area	19,079 ft^2	64,469 ft^2
Flow Rate Through Soil	Standard design rate 5 inch/hour	Controlled by low flow orifice 0.3 inch/hour

- Hydromodification control device area is larger, but a flow restrictor changes the flow rate through the soil
- Re-check the percent capture for pollutant control

Hydromodification Management Example Problem

Combined Pollutant Control and Hydromodification Control

Automated Spreadsheet Calculation for Worksheet A.2: Biofiltration BMP Efficacy Factor Determination for Water Quality Equivalency

Category	#	Description	Value	Units	Notes
BMP Inputs	1	Design Capture Volume Tributary to BMP	38,914	cubic-feet	User Input from BMPDM Worksheet B.2-1
	2	Provided BMP Surface Area	64,469	sq-ft	User Input
	3	Provided Surface Ponding Depth	10	inches	Default 0-12 inches. If other, demonstrate <24hr surface drawdown.
	4	Provided Soil Media Thickness	18	inches	18 inches minimum
	5	Provided Gravel Storage Thickness	18	inches	Default = 12 inches, 0 if agg. not over the entire bottom BMP area
Biofiltration Calculations	6	Soil Media Filtration Rate to be used for Sizing	0.30	in/hr	Default = 5.00
	7	Depth Biofiltered Over 6 Hour Storm	1.80	inches	[Line 6 x 6 Hours]
	8	Soil Media Pore Space	0.30	-	Default = 0.30 for Biofiltration-Only BMPs
	9	Gravel Pore Space	0.40	-	Default = 0.40
	10	Effective Depth of Biofiltration Storage	22.6	inches	[Line 3 + (Line 4 x Line 8) + (Line 5 x Line 9)]
	11	Total Depth Biofiltered	24.40	inches	[Line 7 + Line 10]
	12	Option 1 - Biofilter 1.50 DCV: Target Volume	58,371	cubic-feet	[1.50 x Line 1]
	13	Option 1 - Provided Biofiltration Volume	58,371	cubic-feet	[Minimum of Line 12 or [(Line 11/12) x Line 2]]
	14	Option 2 - Store 0.75 DCV: Target Volume	29,186	cubic-feet	[0.75 x Line 1]
	15	Option 2 - Provided Storage Volume	29,186	cubic-feet	[Minimum of Line 14 or [(Line 10/12) x Line 2]]
	16	Provided Capture for Biofiltration BMP	1.50	ratio	[Maximum of (1.50 x Line 13/Line 12) or (1.50 x Line 15/Line 14)]
	17	**Biofiltration BMP Factor for Use in WQE Formula**	1.00	ratio	[Line 16 x 0.666]

Summary of WQE Guidance for Flow Control Facilities as ACPs

- Currency = DCIA
- Adhere to strict location requirements
- Applicant-implemented or independent
- Retention, biofiltration, or detention
- Regional, retrofit, groundwater recharge and water supply augmentation

Stream Rehabilitation Options

Water Quality Equivalency Overview
Overview, Key Concepts, Organizational Principles, TAC Process, Document Structure, Schedule, Questions

Stormwater Pollutant Control
Background, Metric, Formula, Factors, Devices, Example, Questions

Hydromodification Management
Intro to Hydromod, Devices, Methodology, General Steps, Questions

Stream Rehabilitation Options
Hydromodification Flow Control, Potential Future Pathways, Questions

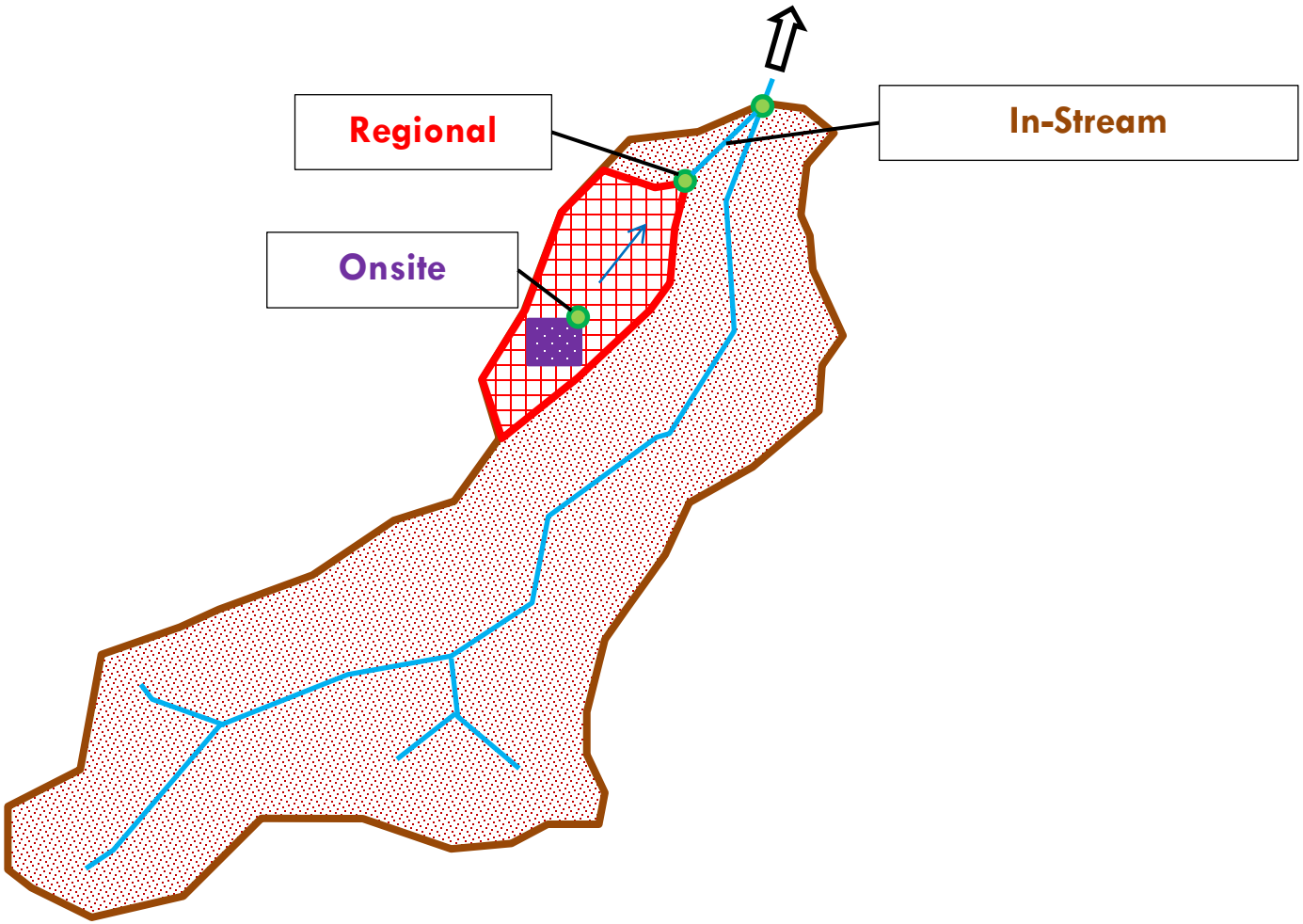
Closing Items
Available Options, Opportunities for Input, Questions

Stream Rehabilitation Options
Eric Mosolgo - City of San Diego

PRESENTATION OUTLINE

- **WQE Sections 3.6, 4.6, and Appendix C.2**
- **Overview**
- **Hydromodification Management**
- **Water Quality Improvement**
- **Questions**

Stream Rehabilitation Options Overview



Stream Rehabilitation Options Overview

IN-STREAM PROJECT BENEFITS

- **Hydromodification management**
  - Rehabilitate for future and legacy impacts
  - Rehabilitate for additional directly connected impervious area
- **Water quality improvement**
  - Restoration activities to improve water quality
  - Improvement of physical and ecological health

Forester Creek

Hydromodification Management Approach

Identify scenario

↓

Evaluate future condition based on a scenario [Estimate Geomorphic Impact]

↓

Evaluate the existing condition [Channel Assessment]

↓

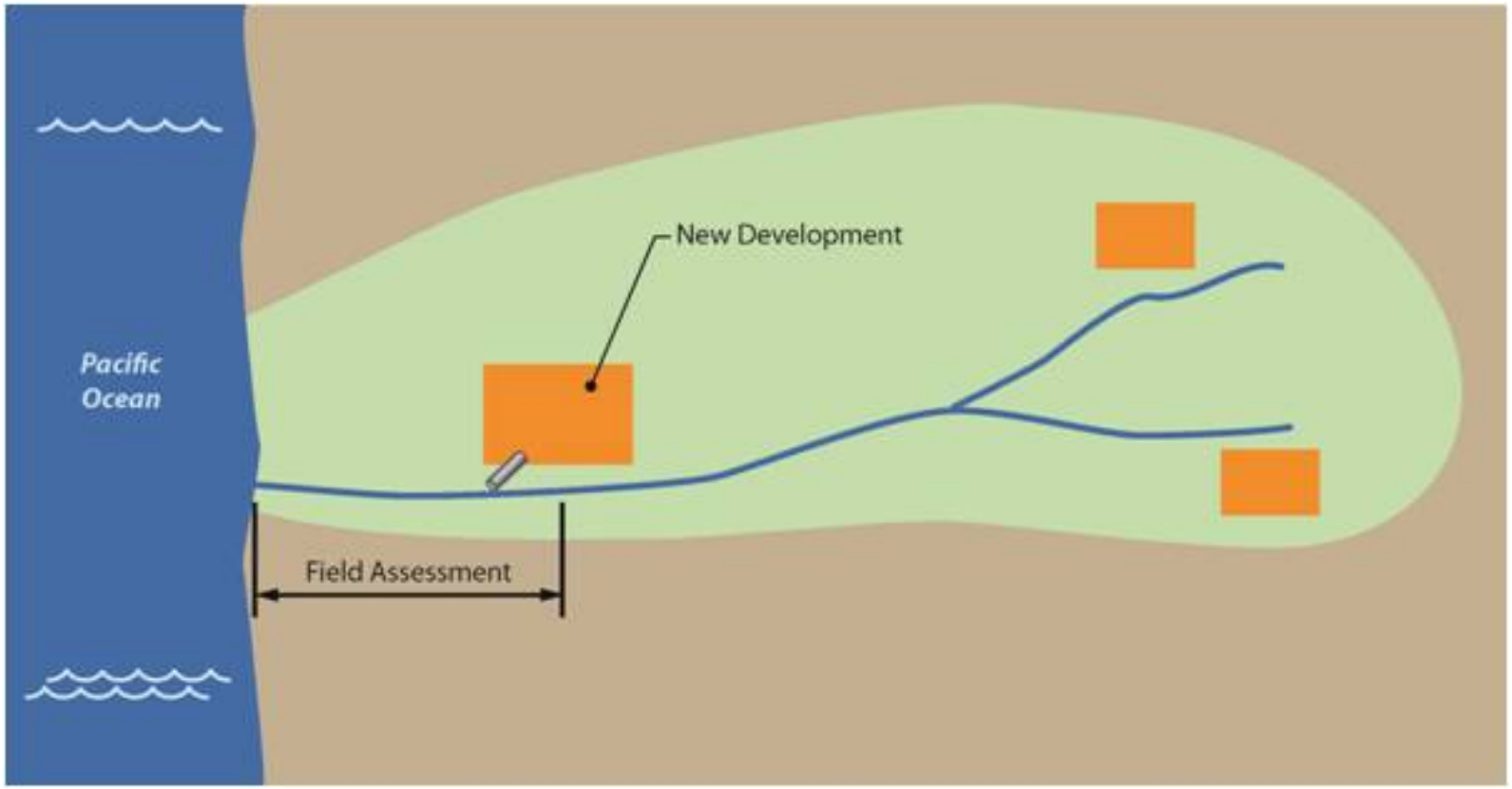
Compare outcomes and estimate credits from stream rehabilitation

Hydromodification Management Basis for Equivalency

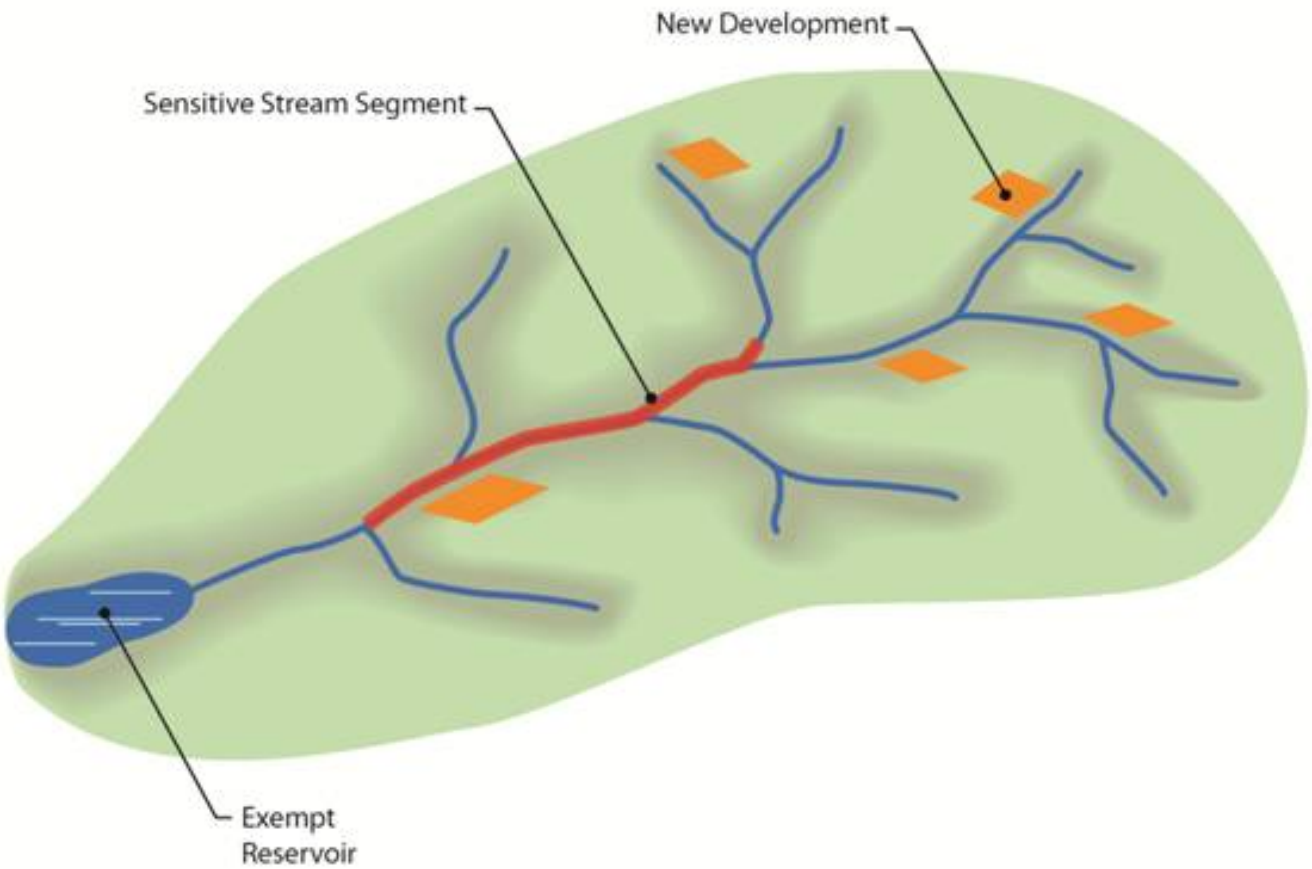
$$SR_{GCA} = GI_{FC} - GS_{RW}$$

- Where
  - SR_{GCA} = Stream Rehabilitation – geomorphic capacity added
  - GI_{FC} = Estimated Geomorphic Impact (GI) for Future Condition
  - GS_{RW} = Geomorphic Stability (GS) of the Receiving Water
- To be distributed to projects that require implementation of hydromodification management BMPs to meet MS4 permit requirements
  - i.e. new development and redevelopment projects up to 2050
  - To be based on estimated directly connected impervious area (DCIA) to be added by development projects

Hydromodification Management Scenarios



Hydromodification Management Scenarios

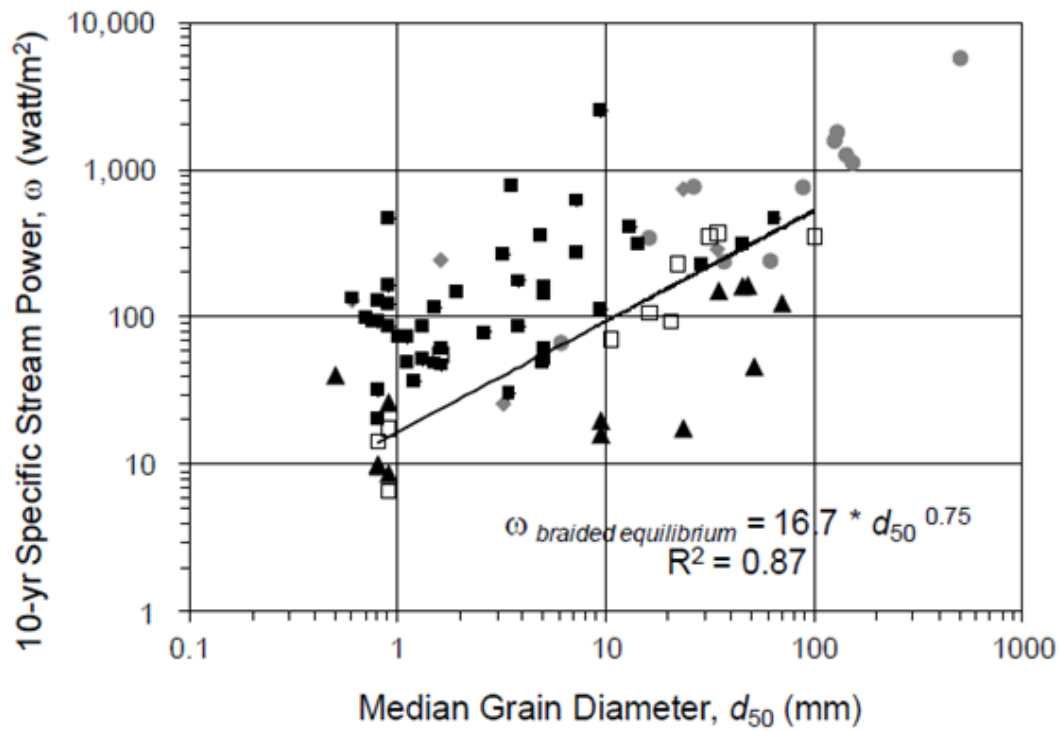


Hydromodification Management Geomorphic Impact / Stability

- **Erosion Potential**
  - Ep < 1.20 for d50 > 16 mm
  - Ep < 1.05 for d50 < 16 mm

- **Specific Stream Power**
  - Total stream power/width = $\gamma QS/w$
    - γ = specific weight of water (9810 N/m^3)
    - Q = flow rate (dominant discharge in many cases)
    - S = Slope of channel
    - W = Channel width

Hydromodification Management
Geomorphic Impact / Stability

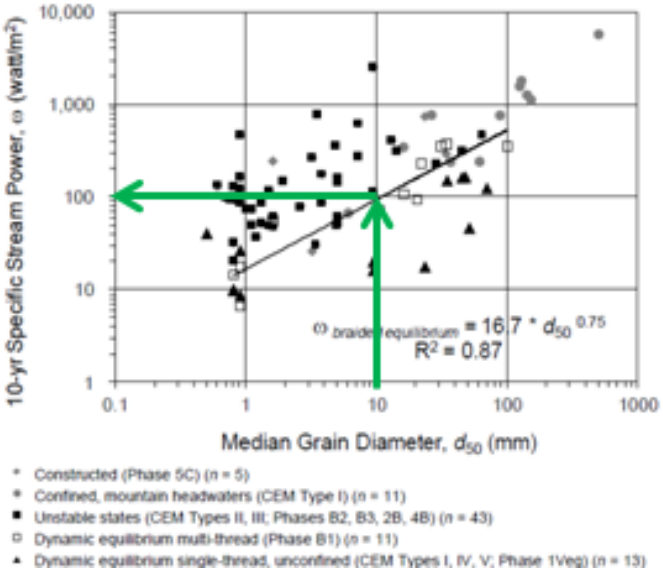


- Constructed (Phase 5C) (n = 5)
- Confined, mountain headwaters (CEM Type I) (n = 11)
- Unstable states (CEM Types II, III; Phases B2, B3, 2B, 4B) (n = 43)
- Dynamic equilibrium multi-thread (Phase B1) (n = 11)
- Dynamic equilibrium single-thread, unconfined (CEM Types I, IV, V; Phase 1Veg) (n = 13)
- Regression of braided equilibrium

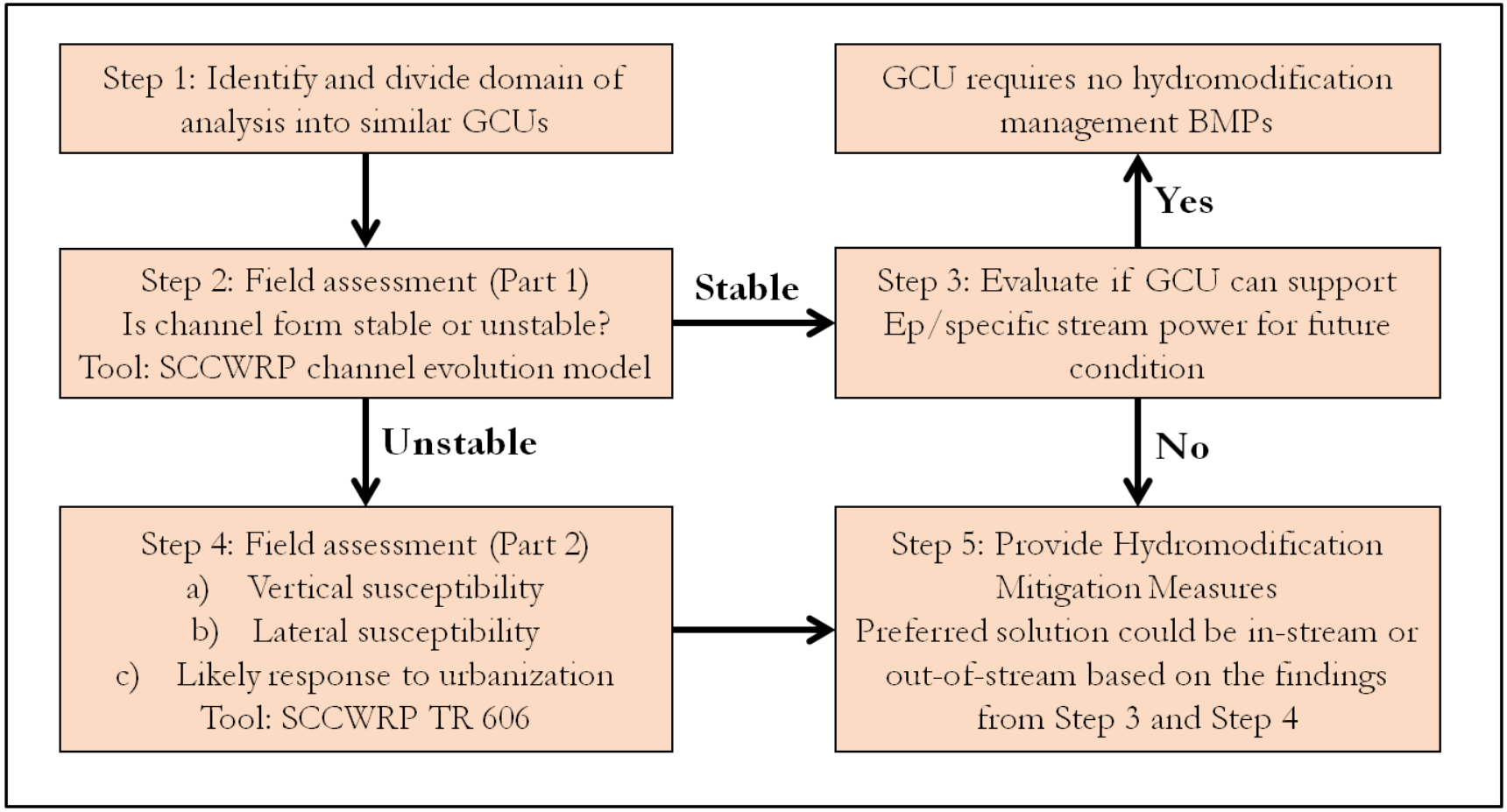
Hydromodification Management Geomorphic Impact / Stability

$$SR_{GCA} = GI_{FC} - GS_{RW}$$

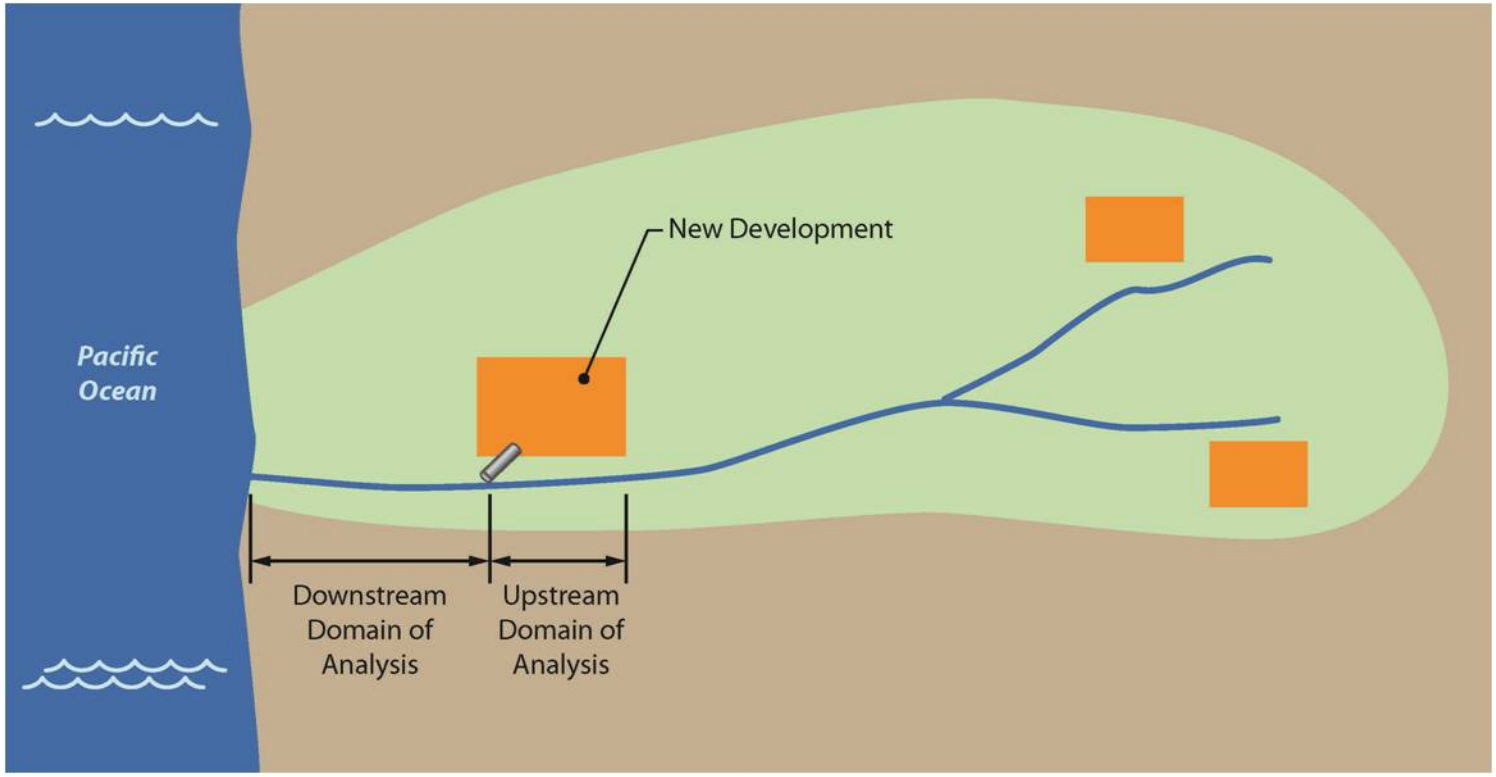
- Step A: Scenario 2 i.e. PDP and all planned development downstream of PDP
- Step B: GI_{FC} = 120 w/m^2; Includes existing DCIA and new DCIA added
- Step 3: 1 GCU; d_{50} = 10mm; GS_{RW} = 100 w/m^2; Need to rehabilitate for an increased geomorphic capacity of 20 w/m^2



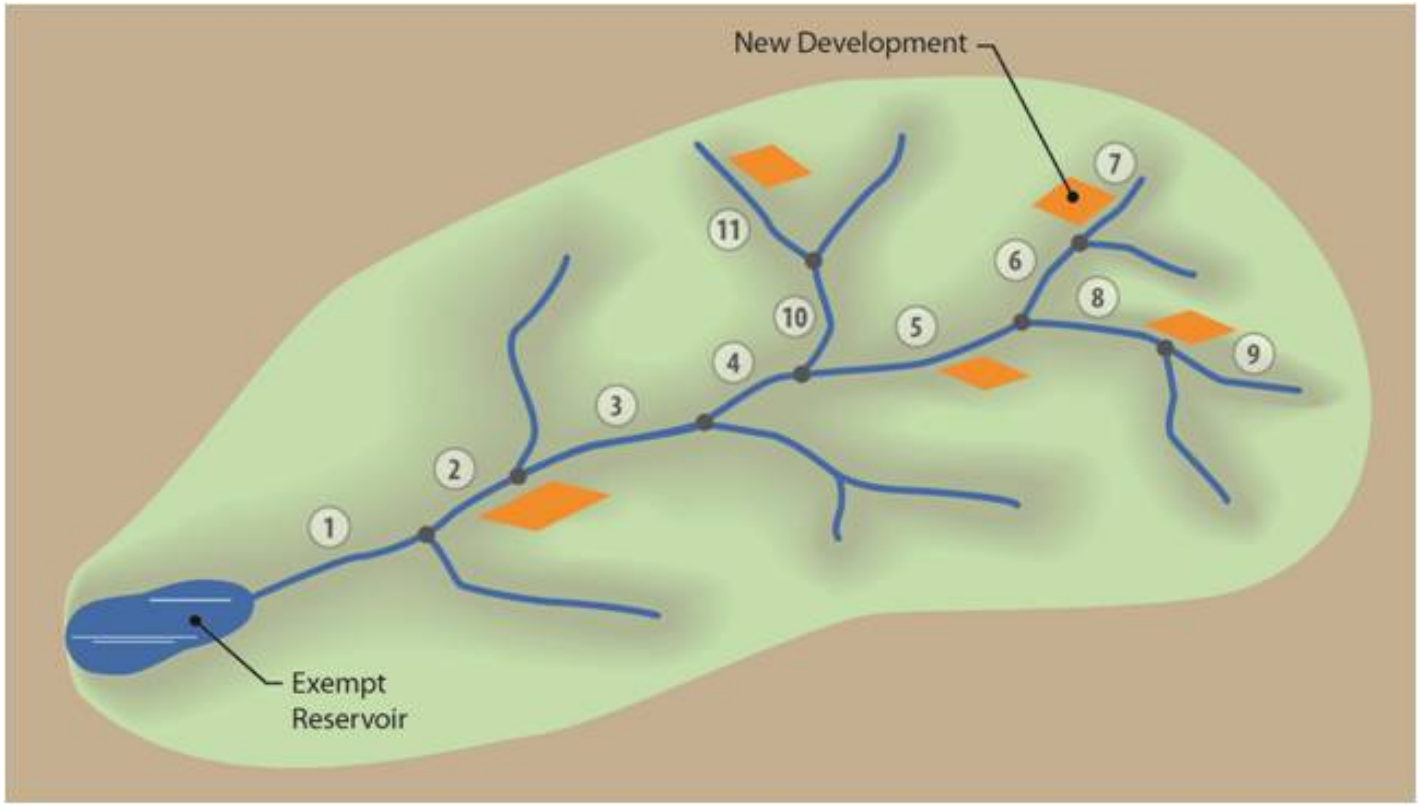
Hydromodification Management Channel Assessment



Hydromodification Management Domain of Analysis



Hydromodification Management Geomorphic Channel Units

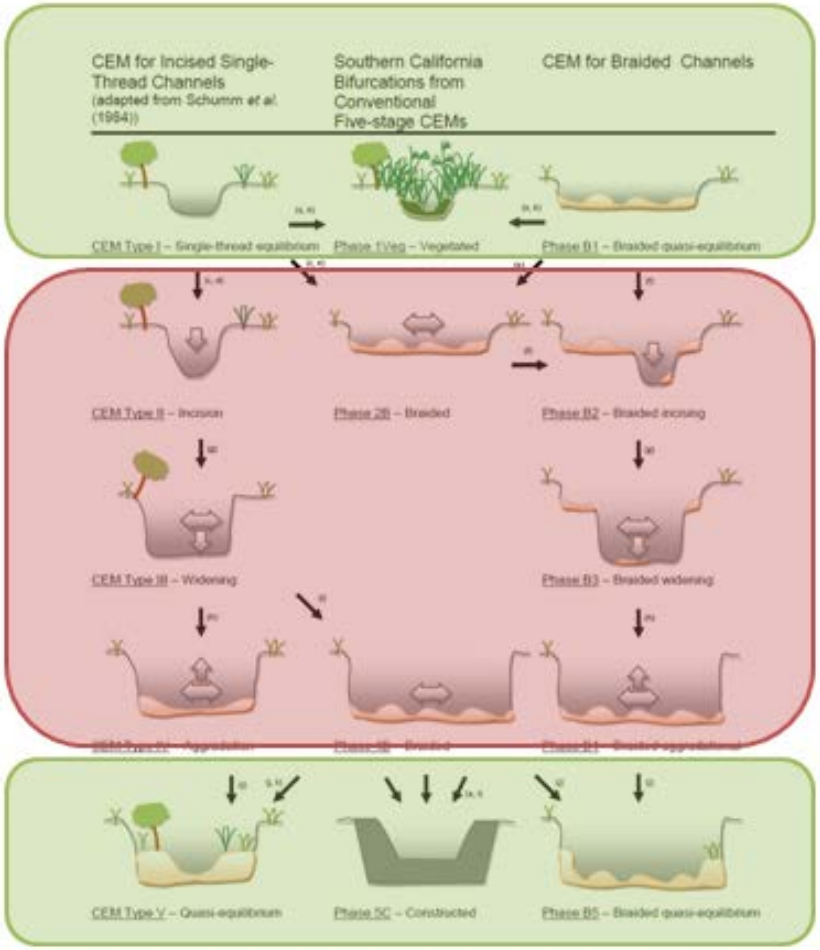


Hydromodification Management Channel Form

Stable forms

Unstable forms

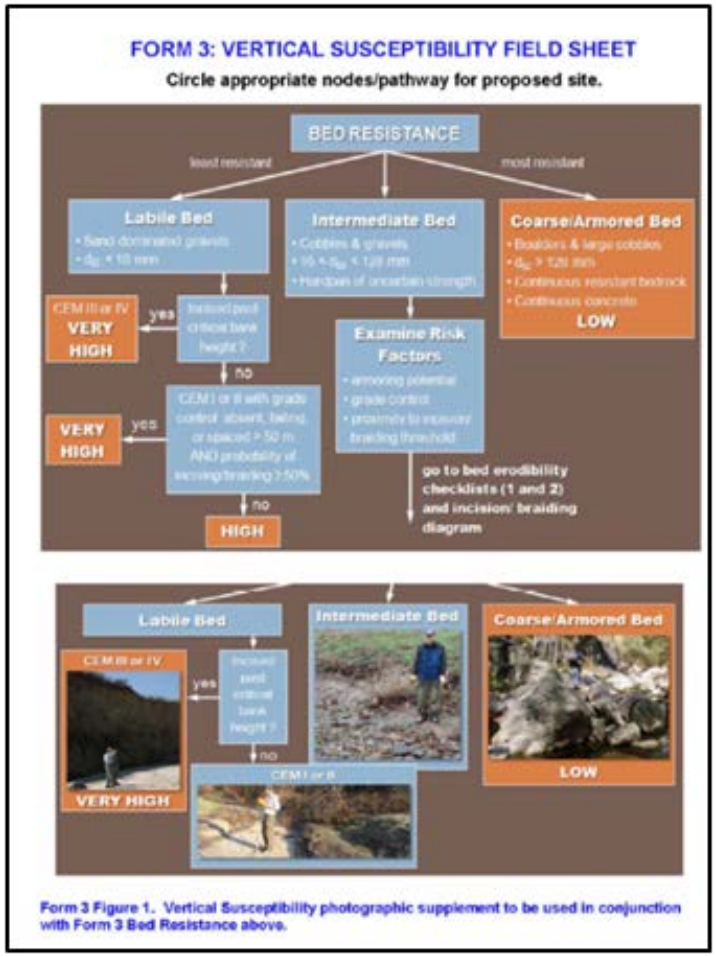
Stable forms



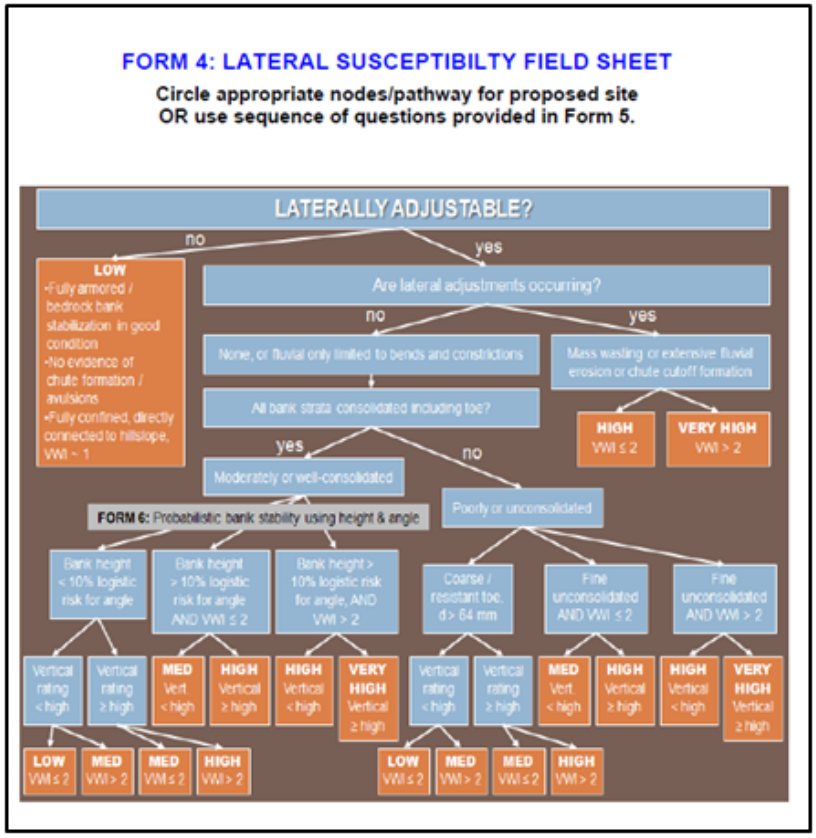
Hydromodification Management Channel Form Evaluation

Erosion Potential	Specific Stream Power
Relative metric; pre-project condition to be defined as existing condition	Absolute metric
Continuous simulation based metric	Single event based metric
Metric considers both flow rates and duration	Metric only considers flow rate
Can potentially account for onsite flow controls	Cannot account for onsite flow controls
For currently **stable** systems: • Ep < 1.05 when d50 < 16 mm • Ep < 1.20 when d50 > 16 mm	SCCWRP stability curve that correlates d_{50} to a stable specific stream power for Southern California streams
Time and effort intensive	Easy to use

Hydromodification Management Field Channel Assessment



Form 3 Figure 1. Vertical Susceptibility photographic supplement to be used in conjunction with Form 3 Bed Resistance above.



Stream Rehabilitation Options Guidance Document

Slope Reduction Structures

Photo Credits: Geosyntec Consultants and Salix Applied Earthcare

- Stream widening
- Stream flattening
- 100-year flow conveyance
- 401, 404, and 1602 permits

Stream Rehabilitation Options Water Quality Improvement

- **Potential future pathways for pollutant control equivalency metric**
  - Increased runoff volume reduction
  - Increased hydraulic residence time
  - Increased settling of solids
  - Increased decay coefficient for plant assimilative capacity
  - Removal of concrete
  - Focus on water quality effect at low flow conditions

Questions

- Eric Mosolgo
- City of San Diego
- 858-541-4337
- EMosolgo@sandiego.gov

Closing Items

Water Quality Equivalency Overview
Overview, Key Concepts, Organizational Principles, TAC Process, Document Structure, Schedule, Questions

Stormwater Pollutant Control
Background, Metric, Formula, Factors, Devices, Example, Questions

Hydromodification Management
Intro to Hydromod, Devices, Methodology, General Steps, Questions

Stream Rehabilitation Options
Hydromodification Flow Control, Potential Future Pathways, Questions

Closing Items
Available Options, Opportunities for Input, Questions

Closing Items:
Status of Offsite Alternative Compliance

ACP Category			Stormwater Pollutant Control Credit				Hydromod Flow Control Credits
			Retention	Biofiltration	Flow-Thru	Volume Reduction	
Structural Best Management Practices	BMP	Retrofit BMP	**Available**	**Available**	Limited Availability	**Available**	**Available**
	BMP	Regional BMP	**Available**	**Available**	Limited Availability	**Available**	**Available**
	BMP	Groundwater Recharge & Water Supply Augmentation BMP	**Available**	**Available**	Limited Availability	**Available**	**Available**
Natural System Management Practices	NSMP	Land Restoration NSMP	*Not Available*	*Not Available*	*Not Available*	Limited Availability	Limited Availability
	NSMP	Land Preservation NSMP	*Not Available*	*Not Available*	*Not Available*	Limited Availability	Limited Availability
	NSMP	Stream Rehabilitation NSMP	*Not Available*	*Not Available*	*Not Available*	Limited Availability	Limited Availability

Closing Items: Opportunities for Input

Review WQE Guidance:

Currently available on Project Clean Water in the following location:
Stormwater Copermittees > Working Bodies > Land Development > Regional Water Quality Equivalency

Provide Written Comments on Draft Document

Provide written comments to charles.mohrlock@sdcounty.ca.gov by Tuesday, August 18th, 2015.

Provide Written Comments on Regional Board Submittal

Anticipated submittal date September 15th, 2015. Review schedule to be determined.

THANK YOU

WATER QUALITY EQUIVALENCY PUBLIC WORKSHOP

July 28th, 2015

WATER QUALITY EQUIVALENCY PUBLIC WORKSHOP

July 28th, 2015 | 8:30-12:30pm | 5520 Overland Avenue, San Diego, CA 92123

Produced by the Center for Collaborative Policy, CSUS

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Workshop materials are available on the Project Clean Water website at:
http://www.projectcleanwater.org/index.php?option=com_content&view=article&id=252&Itemid=210

1. WELCOME & OPENING REMARKS

Sheri McPherson, County of San Diego, opened the meeting and welcomed participants. She noted that the purpose of the workshop was to review the Water Quality Equivalency (WQE) methodologies and components outlined in the Draft WQE Guidance Document; describe how the WQE program fits into the Alternative Compliance Project (ACP) options for offsite mitigation projects; and allow stakeholders the opportunity to ask questions and discuss with project staff about the program.

Ms. McPherson introduced the project staff, and requested members of the Technical Advisory Committee (TAC) and Science Advisory Group (SAG) present to stand for recognition of their contributions to the Guidance Document.

2. WATER QUALITY EQUIVALENCY OVERVIEW

Please refer to presentation slides #3 -18.

Ms. McPherson provided an overview of Water Quality Equivalency. The following topics were discussed:

- **What is the Offsite Alternative Compliance Program?**
  - An optional program that may be implemented by Copermittees to allow for offsite ACPs to offset stormwater pollutant control and hydromodification impacts that are not fully addressed at Priority Development Project (PDP) sites.
- **Watersheds with and without Alternative Compliance**
  - While redevelopment can contribute towards watershed goals, without Alternative Compliance, PDPs may not be developed due to feasibility of satisfying permit requirements or performance standards.
  - With Alternative Compliance options, PDPs can be developed and performance standards can be met off-site. Thus, water quality benefits for the whole watershed can be preserved with fewer restrictions on PDPs and more effective use of locations.
    - WQE is needed to relate all projects to one another.
- **Overview of Municipal Separate Storm Sewer System (MS4) Permit Requirements**
  - A proposed PDP is what triggers the performance standards for Best Management Practices (BMP) requirements.
  - New items in the MS4 Permit include changes to PDP requirements and the option of Alternative Compliance.
  - Section II.E.3.c discusses Pollutant Control.
    - Section II.E.3.c.(3) discusses Alternative Compliance Program (ACP) and onsite structural Best Management Practices (BMP) implementation.
    - WQE is one of several tools (to be approved by the RWQCB) for participating in ACP.
- **Overview of the Offsite Alternative Compliance Program**
  - WQE must be calculated to understand and determine what mitigation efforts would be required offsite to meet the standards and requirements of the permit.
  - WQE "credits" are calculated based on benefits to water quality and hydromodification.
  - Once WQE is determined, there are two pathways for implementing projects:
    - <u>Applicant Implemented ACP</u> is owned and constructed by the same party as the PDP.
    - <u>Independently Implemented ACP</u> is owned and constructed by a party other than the PDP party.
  - The WQE credit system framework is still being developed and will be the focus of the project team's efforts over the next year.
- **Benefits of Offsite Alternative Compliance**
  - Provides a compliance pathway for PDPs

    - Addresses discharges from existing development
    - Promotes regional solutions (not just site-specific)
    - Allows cost-effective and market-driven solutions
    - Encourages innovation
    - Requires greater overall water quality benefits
- **Overall Program Implementation Process**
    - To address the updated development requirements set forth in the new Permit and support the newly available offsite alternative compliance options, several regional documents or components must be developed (refer to figure Slide #9):
        - BMP Design Manual (BMPDM) – *required*
        - Water Quality Improvement Plans (WQIPs) – *required*
        - Watershed Management Area Analysis (WMAA) – *optional*
        - BMPDM, WQIP and WMAA all contribute to the WQE determination
    - Future optional programs will include In-lieu Fee Program, Credit System, Private-Public Partnerships, and other Jurisdictional Components.
- **WQE Key Concepts**
    - Establishes regional and technical basis for calculating water quality benefits
    - Ensures mitigation of impacts caused by not implementing structural BMPs fully onsite
    - Ensures a greater overall water quality benefit is realized
- **What the WQE Guidance Document Does Not Do**
    - Establish Jurisdictional Program Implementation Components
    - Create a Credit System
    - Develop an In-Lieu Fee Program
    - Establish ground rules and tools for implementation
- **Potential Project Categories**
    - The permit provided a structure for various types of potential projects:
        - <u>Structural BMPs</u>, including: Retrofit BMP, Regional BMP, Groundwater Recharge and Water Supply Augmentation BMP
        - <u>Natural System Management Practices</u>, including: Land Restoration, Land Preservation, Stream Rehabilitation
- **Critical Organizational Principals of WQE**
    - Separation of project implementation into:
        - Applicant-implemented projects
        - Independent Implemented projects
    - Separation of credits into:
        - Pollutant Reduction
        - Hydromodification
- **ACP Implementation Pathways**
    - For Applicant Implemented ACPs, the applicant purchases or constructs the ACP
    - For Independent ACPs, a party other than the applicant owns or constructs the ACP. The Applicant then either purchases ACP credits, or funds or partially funds ACP in-lieu of fully complying on-site.

        - A credit system must be in place in order to facilitate Independent ACPs. Thus, this will be an option in the future.
- **Status of WQE Guidelines**
    - In reference to the several ACP category types, guidelines for establishing stormwater pollutant control credits are available for project types where enough science is available to link projects to performance standard metrics.
    - Guidelines for structural BMP projects that involve retention, biofiltration, volume reduction, and hydromodification flow control are available.
    - There is limited availability on guidelines for flow-thru BMP projects.
    - There is limited or no availability on guidelines of Natural Systems Management Practices.
- **Public Participation Process**
    - The project team convened 11 TAC/SAG meetings over the last 15 months.
    - Input on the WQE Guidance Document has been received from the San Diego Regional Water Quality Control Board staff, Academics, Regional Copermittees, Building Industry staff, and the Consultant/Engineering Community.
- **Overview of WQE Guidance Document Structure**
    - Section 1: Introduction
        - Background, Concepts, Document Use, Limitations
    - Section 2: WQE for Stormwater Pollutant Control
        - Overview, PDP Calculations, ACP Calculations (WQE Factors), Determination of Benefit
    - Section 3: WQE for Hydromodification Flow Control
        - Overview, Currency, Location Requirements, Design, Calculation of Results
    - Section 4: WQE Examples by Project Type
        - <u>Structural BMPs:</u> Retrofit, Regional, Groundwater Recharge and Water Supply Augmentation
        - <u>Natural System Management Practices:</u> Land Restoration, Land Preservation, Stream Rehabilitation
    - Appendices
        - A: Worksheets
        - B: Pollutant Control Reference Information
        - C: Hydromodification Flow Control Reference Information
        - D: Relevant WQE Mapping
        - E: Response to Comments
- **Schedule for Completion**
    - Aim is to have the Document moving forward by the end of the calendar year, when new BMP Design Manual takes effect.
    - The WQE Guidance Document Public Draft was released on July 15, 2015.
        - Comments are due on this draft by August 18, 2015.
        - Please submit comments using the excel table and instructions found on the Project Clean Water website.

- Submission of the Document to the San Diego Regional Water Quality Control Board (San Diego Water Board) is anticipated for September 15, 2015.
    - A second 30-day comment period will follow this submission, closing approximately October 16, 2015.

Questions and Discussion

- As agencies expand their jurisdictional needs to develop the credit system program in the future, will that process also require San Diego Water Board approval? And if so, would that entail each City submitting separately to the Water Board?
    - Yes. Currently, the San Diego Copermittees are working with the San Diego Water Board to develop standards for the credit system, including rules and responsibilities. Each jurisdiction would then use these tools to create and implement their own credit program, while still allowing for a measure of consistency within the entire watershed.

3. WQE STORMWATER POLLUTANT CONTROL

Please refer to presentation slides #19-39.

Charles Mohrlock, County of San Diego, presented on WQE Stormwater Pollutant Control (Section 2 of the WQE Document). The following topics were covered:

- **Stormwater Pollutant Control: Background**
    - Several methods for establishing WQE equivalency were explored before deciding upon the current method:
        - Method 1 looked at establishing a single combined currency for pollutant control and hydromodification management plans (HMP). This resulted in low precision, unknown accuracy, and was not well supported.
        - Method 2 explored separating pollutant control and HMP flow control. A mitigation factor was not needed in this case. Results were medium precision, unknown accuracy, and multiple pollutant currencies.
        - Method 3, the current method, also separates pollutant control and HMP flow control, but applies mitigation factors to both. The method was highly vetted by the TAC. It results in two currencies, medium precision, and is weighted for improved accuracy.
- **Stormwater Pollutant Control: Metric**
    - The determined metric for stormwater pollutant control is *volume*, as this is the same metric used in the Permit for on-site pollutant control requirements.
    - It will be necessary to calculate the design capture volume (DCV) for a PDP. The retention/biofiltered volume is then subtracted from the DCV to obtain the deficit volume of effectively treated stormwater.
        - What volume is not captured requires offsite mitigation via an ACP.

- Volumes of ACPs will be modified to account for variations in location, pollutant supply, pollutant removal, changes in impacted conditions, and BMP type.
- The overarching goal is to achieve greater water quality benefits to the watershed.

- **Stormwater Pollutant Control: Formula**
- $V_E = L\ (\Delta V + V_2 B_2 - V_1 B_1)$ **Refer to slide #22 for descriptions of the formula variables.*
  - Overview: <u>Land Use Factor</u> (L)
    - **Intent:** Identify the pollutant removal *potential* within a volume of stormwater
    - **Definition:** Ratio of the relative pollutant concentrations generated by an ACP tributary and a reference tributary. (Range of 0.10-10.00)
      - Note that a reference tributary refers to the area that is analyzed to characterize land use compositions and subsequent pollutant concentrations for comparison to ACP pollutant concentrations.
    - **Concept:** Utilize available data to correlate land uses with pollutant concentrations
    - **Determination:** There is a four-step calculation for L that can be found in Section 2.3.2.2 (*also refer to slide #24)*
    - Land Use Factor is limited to a maximum value of 10.
  - Overview: <u>BMP Efficacy Factors</u> (B_1 and B_2)
    - **Intent:** Rate how effectively a BMP addresses *performance requirements* for pollutant control
    - **Definition:** Ratio of an ACP's performance with respect to the performance standards set forth in the Permit/BMP Design Manual. (Range of 0.00-1.00)
    - **Concept:** BMP Efficacy Factor (**B**) is a function of the a BMP's Provided Capture (**C**) and Pollutant Removal Efficiency (**E**)
    - **Determination:** BMP Efficacy Factor is a function of a BMP's Provided Capture and Pollutant Removal Efficiency. *[Equation 2-3: B = C x E]*
    - BMP Efficacy has a value between 0 and 1 that will rate how effectively a BMP addresses performance requirements for pollutant control.
    - Per the BMP Design Manual, performance standards for Retention BMPs and Biofiltration BMPs are different. A Biofiltration BMP requires 1.5 times the DCV of a Retention BMP.
    - The only opportunity to benefit from flow-thru BMPs is for ACPs. However, there is not yet enough consistent data to allow for determination/publication of related pollutant removal efficiency values.
    - The Provided Capture Factor (C) curve for Retention BMPs is non-linear, and ranges in value from 0 to 1. This equalizes values for larger BMPs with slow drawdown times with smaller BMPs with fast drawdown times.
    - C curve for Biofiltration BMPs is linear, and ranges in value from 0 to 1.5.
    - C for Flow-thru BMPs is also linear, however is it not based on flow rate, but volume. It ranges in value from 0 to 1.
  - Overview: <u>Design Capture Volume</u> (V_1, V_2 and ΔV)

        - **Intent:** Quantify the water quality stormwater runoff volume from a project site under impacted and mitigated conditions.
        - **Definition:** The volume of stormwater runoff produced from a 24-hour, 85th percentile storm.
        - **Concept:** The DCV is a function of the tributary area, surface characteristics, and rainfall depth.
        - **Determination:** Determined per guidance set forth in the BMP Design Manual. No additional methodology is applied.
- **Stormwater Pollutant Control Devices**
    - Structural BMPs
        - Project Types: Retrofit, Regional, Groundwater Recharge & Water Supply Augmentation
            - Volume-Based Treatment: Retention, biofiltration, partial retention
            - Flow-Based Treatment: Swales, detention basins, subsurface wetponds, proprietary filter devices
        - See Slide #31 for hypothetical applied example.
        - Even if no BMP is proposed, there is still a quantifiable water quality benefit based on location and reduction of impervious area. The BMP factor would just be zero for purposes of the equation.
        - It is also possible to add a BMP without reducing impervious area and still generate a quantifiable water quality benefit. The delta volume would just be zero for purposes of the equation.
    - Natural Systems Management Practices
        - Project Types: Land Restoration, Land Preservation, Stream Rehabilitation
            - Natural Approach: Focus on restoring/preserving predevelopment watershed functions in lieu of providing direct pollutant control.
            - Land preservation credits are only achieved if project does not trigger PDP requirements.
        - See Slide #32 for hypothetical applied example.
- **Stormwater Pollutant Control: Regional BMP Example**
    - Example provided in Section 4.2 of the Document.
    - Identify the types of land uses in the tributary.
    - Consider the biofiltration characteristics.
    - Determine in what hydrologic unit the proposed project is located.
    - Determine if the project will be an independent or applicant implemented ACP.
    - Calculate the earned stormwater pollutant control volume using the formula and excel calculation tables provided in the guidance document.
    - Determine the overall water quality benefit of the project.
        - Note: slide #38 provides listed references for the various sections of the document where variable calculation tables can be located.

Questions and Discussion

- Is the location of the ACP required to be in the same watershed as the PDP?
    - Yes. Both projects must be located in the same watershed management area. There are no restrictions on whether the ACP must be upstream or downstream of the PDP at this time.

- How does one identify the reference tributary, and are the reference tributary characteristics filled into the calculation spreadsheet automatically?
    - The reference tributary can characterize two different conditions. The Guidance Document provides typical characteristics for anticipated PDP development within each watershed based on land use mapping (default runoff factors only; all other cells are blank).
    - For an Independent ACP, one would refer to Table 2.3 to find typical land uses for PDPs in the watershed in order to populate the blank cells in the table.
    - For Applicant Implemented ACPs, the PDP is known. Thus, the land use factors will be determined based on the composition of land uses within the specific PDP tributary area.
    - In the example provided, the ACP was independently implemented, and there was no specific PDP being offset. Land use compositions within the Carlsbad watershed management area were used here as the average pollutant load from a PDP.

- Watersheds do not follow city or county limits. When an ACP is designed to have a bank of credits, how will coordination work between agencies to spend and receive credits?
    - That will be developed via the regional credit system effort. Banking, trading, tracking and monitoring of credits are all items that will need to be developed. The San Diego Water Board will ultimately approve system procedures. This document only addresses equivalency.

- Are the ACPs required to either be retention or biofiltration BMPs?
    - Currently the ACP could employ retention, biofiltration, or partial retention BMPs. The guidance document does have a framework to support flow-thru and other BMP types, but there are not yet efficiencies for them. The individual jurisdiction programs may develop such efficiencies.

- The BMP Design Manual references Washington Technology Assessment Protocol – Ecology (TAPE) for flow-thru BMPs and pollutant removal efficiencies. Is that being considered for the equivalency program, or will the local jurisdictions fund certification?
    - Please review page 29 of the Guidance Document, which discusses pathways for establishing flow-thru BMP approvals. Research was conducted though nothing found was consistent enough for regional applicability. The document does suggest that if the pollutants of concern are particulates, then TAPE can be used

as a procedure for testing. If the pollutants are dissolved, then TAPE may not apply. Regardless, these removal efficiencies will need to be approved by the local jurisdiction.

- Are the equivalency calculation worksheets already available on Project Clean Water?
    - Yes. A link for a zip file containing a PDF of the WQE Guidance Document, Excel calculation spreadsheets, and the Excel comment form can be found on the website. The Excel calculation spreadsheet has five total computation worksheets – one for land use factor and four for BMP efficacy.

- It appears there is room for uncertainties regarding the variations in values for Land Use Factors (L). What is the responsibility for individual municipalities to develop the associated L data sets?
    - Appendix B provides detailed land use mapping from Southern California Association of Governments (SCAG) and San Diego Association of Governments (SANDAG) in PDF form, which have been correlated into the ten land uses for which pollutant concentrations are available. These values are available as a tool for the communities to use, though communities can update these data sets, as they desire, perhaps via aerial observations of tributaries.
    - The final WQE Guidance Document will provide the GIS files for land use mapping.
    - Criteria to identify appropriate land use categories for project site are identified within the WQE Guidance; however, this exercise has inherent subjectivity. It will be the responsibility of the Copermittees to ensure applicants are identifying appropriate land use categories for their project sites.

- (In reference to slide #33) It appears that one of the main opportunities for ACPs is in urban infill areas to accommodate more compact urban development. Will the value of L differ if the City of San Diego is the sponsor of a project as opposed to if a developer proposes a project in the same geographic area?
    - The value of L is not influenced by if the project supporter is the City, a developer, or a non-governmental organization. The value will change according to whether the ACP is Independently Implemented or Applicant Implemented.
    - An Independent ACP will not have information about a specific PDP that it will be offsetting. Therefore, applicants will reference Table 2-3 of the WQE guidance to determine typical land use compositions for PDPs within their watershed management area.
    - An Applicant Implemented ACP will have information about the specific PDP that it will be offsetting. Therefore, applicants will input land use compositions associated with their specific PDP into the reference tributary portion of the Land Use Factor calculation tables.
- If a city, for example, or a former redevelopment agency that wants to promote urban infill seeks to develop an alternative compliance system, are they obligated to look at

the larger drainage area for impacts? Or, could they refine the drainage area for what they are proposing?

  - They could refine the drainage area to a degree. If one chooses to do a more specific analysis, one would be restricted as to where they could apply the ACPs. But those choices could be made if they are more favorable. What is provided here are default values for conducting initial analyses, but they can be modified per communities' needs.

- In reference to slide #27 and the figures with the various drawdown times: Are drawdown times to be calculated for each BMP?
  - Yes. The provided capture is dependent on the drawdown times. They will be calculated on specific geometries and soil conditions of the particular BMP. Worksheets are provided in Appendix A.

- **Mr. Van Rhyn:** Several questions are pointing at places where there is or may be uncertainty in the data. The project team fully recognizes there is an amount of uncertainty that needs to be accommodated. Therefore there is a great deal of redundancy built into these formulas. Furthermore, there are still additional benefits incurred onsite, such as volume still being treated with flow through BMPs to a high or medium removal efficiency.

- In a redeveloped urban area, could a park be considered both an ACP and PDP? Meaning, if paved area is converted to a pervious area, can alternative compliance credits be created for reduction in impervious area while still doing its own PDP treatment controls?
  - In this scenario, changing impervious surface to pervious surface would not be considered a PDP. However, if a project triggers PDP requirements, then the applicant is responsible for treating onsite water to pollutant control standards. There might not be an opportunity to generate credits for treating pollutants from your PDP directly, but one could potentially allow offsite unmitigated pollutant runoff onto the project for treatment and receive credits in this way.
  - The document does discuss opportunities for a PDP to treat offsite runoff separately to receive credits.

- Please clarify what it means to take offsite unmitigated runoff and treat it separately. Could one oversize the treatment for the PDP runoff?
  - It is easier and allowable to treat offsite runoff separately. However this document does not require that they stay separate. Combining the treatment of runoff sources complicates the process for demonstrating the water quality benefit for offsite water and for demonstrating PDP requirements are met. Allowing this is up to the discretion of the local jurisdiction.

4. WQE HYDROMODIFICATION FLOW CONTROL

Please refer to presentation slides #40-80.

Laura Henry, RICK Engineering, presented on Hydromodification Management and Flow Control Equivalency (Section 3 of the WQE Document). The following topics were reviewed:

- **Hydromodification Management Introduction**
  - What is hydromodification?
    - Changes in a watershed's runoff characteristics resulting from development, together with associated morphological changes to the channels receiving the runoff
    - Changes in sediment transport characteristics and the hydraulic geometry (width, depth, slope) of channels.
    - The changes result in stream bank erosion and sedimentation, leading to habitat degradation due to loss of overhead cover and loss of in-stream habitat structures
  - Development effects to watershed are physical process that result in habitat degradation. They may include:
    - Greater runoff volume
    - Higher peak flow
    - Longer duration
    - Increased erosion
  - What can we do to control hydromodification?
    - Preserve streams and use natural conveyance systems
    - Retain excess runoff volume from new impervious surfaces for use or infiltration on-site.
    - If discharge cannot be retained, the discharge excess runoff volume at a flow rate less than the critical channel flow rate (Qc).
      - Qc is the channel flow that produces the critical shear stress that initiates bed movement or that erodes the toe of channel banks
      - For San Diego County, Qc has been determined to be a fraction of Q_2 based on continuous simulation modeling
  - MS4 permit requirements for PDPs to address hydromodification
    - Flow control for post-project runoff: Structural BMPs
    - Protection of critical coarse sediment yield areas is not addressed because they are not part of ACPs, rather they involve land planning practices.
  - Lane's diagram
    - Demonstrates how hydromodification can occur by interrupting sediment supply to the channel, or (almost always) increasing the volume of runoff.
- **Alternative Compliance for Hydromodification**
  - Offsite Flow Control Facilities: Regional BMPs, Retrofit BMPs, groundwater recharge and water supply augmentation

- Stream Rehabilitation
- HMP Flow Control Facilities
  - Retention, biofiltration, and/or detention for runoff storage and/or flow control for runoff that is discharged
  - Designed based on continuous simulation modeling
  - Controls a range of flows starting from Qc (lower flow threshold) up to Q10
  - Discharges excess volume at flow rate < Qc
- These three approaches all provide volume for runoff storage in some configuration. If a portion of runoff is going to be discharged to downstream systems, there will be flow controls.
- The following reference documents will help with design for Alternative Compliance for hydromodification:
  - "Final Hydromodification Management Plan Prepared for County of San Diego, California," March 2011
  - Model BMP Design Manual San Diego Region, June 2015

- **Hydromodification Management Flow Control Equivalency**
  - HMP Currency
    - Volume was <u>not</u> selected as a currency because within the guidelines of the BMP Design Manual, different HMP volumes can be established using different acceptable continuous simulation models.
      - Additionally, volumes must be discharged at a specific flow rate, which may vary between properties. Volume cannot be separated from flow control.
    - Impervious Area was proposed as the currency because, from the stream's perspective, impervious area does not differ between residential or commercial impervious areas.
      - The TAC raised concerns that not all impervious surfaces are equivalent.
      - Thus, the currency of Directly Connected Impervious Area was selected.
  - Directly Connected Impervious Area (DCIA)
    - DCIA affects the volume of runoff delivered to a stream, is a strong predictor of stream ecological condition, and is a measurable feature of a PDP and an ACP drainage area.
      - Currency for PDP: total impervious area that would have required onsite mitigation (total, not just DCIA). BMP Design Manual dispersion factors are for pollutants and do not have a major effect on runoff, therefore assuming total impervious area as all DCIA.
      - Currency for ACP: Existing DCIA mitigated within the ACP drainage area, either directly measured or estimated as a subset of total impervious area and the Sutherland equations

- HMP flow control facilities may adhere to strict location requirements
    - Location requirements are intended to prevent a new impact to a stream from new impervious area
    - Guidelines for ACP location relative to PDP location depend on PDP scenario type

- **General Guidelines for ACP Location**
    - Three project scenarios demonstrated:
        - 1) New development
            - Within the same local watershed
            - Provide mitigation prior to discharge to a susceptible receiving water
            - Existing DCIA draining to ACP ≥ PDP DCIA, because area needs to generate enough runoff to be controlled (you can only control what is delivered)
        - 2) Redevelopment increasing impervious area
            - Same as for new development
        - 3) Redevelopment with no increase of impervious area
            - Within same hydrologic unit
            - Not in an HMP exempt location
            - Existing DCIA draining to ACP ≥ PDP DCIA
            - Note: Projects with no increase in imperious area are <u>no longer</u> exempt from permit as mitigation to pre-development standards is now required.
    - Designing HMP flow control facilities as ACPs
        - HMP flow control facilities can be: retention (infiltration or harvest and use), biofiltration, or detention.
        - Applicant-Implemented ACP steps:
            1. Calculate PDP debit (DCIA to be mitigated)
            2. Identify PDP scenario type and location requirements
            3. Identify appropriate ACP location
            4. Control existing DCIA ≥ PDP DCIA
            - Examples were provided for the three scenarios listed above.
            - Scenario 3 (redevelopment with no increase of impervious area) allows for the option of placing the ACP project outside of the local drainage of the PDP. The ACP must be designed to the stream the ACP discharges to. This may mean the ACP discharges to a higher susceptible stream and the facility may be bigger than it would at the PDP location to mitigate for the same amount of impervious area.
        - Independent ACP steps:
            1. Identify ACP drainage area
            2. Determine existing DCIA
            3. Determine receiving channel susceptibility

4. Control up to 100% of existing DCIA
5. Sell or trade credit for existing DCIA mitigated to PDPs if the ACP location meets the PDP location requirements
   - One consideration is that credits can only be sold to buyers where they meet their mitigation requirements. Selling and trading must also occur within the same hydrologic unit.

- **Combined Pollutant Control and Flow Control Facilities**
  - Retention and biofiltration structural BMPs can achieve combined credits
  - Detention can achieve HMP credits only
- An example application of hydromodification management (utilizing the same 20 acre land parcel as was used in the stormwater control example) was provided.
  - Mock-calculations for designing a regional flow control facility as an Independent ACP were demonstrated. Refer to Slides #69-79.
  - In comparison to pollutant control facilities, a much larger area is required for hydromodification primarily due to restricted flow rates.
  - It is imperative to always re-check provided capture values.

Questions and Discussion

- Please clarify the drawdown requirements for hydromodification flow control facilities.
  - These facilities attempt to meet the 96-hour drawdown time of surface waters only (from the crest of the overflow structure down to the soil) for vector control purposes. However, flow control facilities have a maximum discharge rate and occasionally draining a large volume in 96 hours is not possible. In this case, a vector management plan would be required.
  - Pollutant control sizing considers drawdown rates of full design capture volume.

- Assume one owned a piece of land with a conservation easement that is appropriately located within DCIA. Is building an ACP required, or could one just calculate values of that undevelopable land to meet discharge requirements?
  - This is not specifically discussed in the WQE Guidance and would require a case-by-case analysis. If the land was a natural sump infiltration area and the owner was going to maintain control of it, then possibly the calculations would suffice. However if anything were to be discharged, then the calculations for the easement alone would likely <u>not</u> meet the requirements. It takes a large amount of storage/infiltration volume to mitigate flow from impervious surfaces.
  - Land preservation is limited because the future development scenario is likely to require that HMP and BMPs be built for PDPs. Only in limited instances where future development will not exceed a PDP threshold would land preservation be able to be used for HMP and pollutant reduction credits.

- Why are drawdown times required only for the ponding area of HMPs? Currently the City of San Diego requires drawdown for the full volume to the orifice.

    - The project team has discussed this with County of San Diego vector control. They have confirmed that the drawdown for vector control is only required for the surface storage, as the water in the soils is not available for mosquito habitat.
    - This should be consistent with what is set forth in the final HMP Chapter 6.

- Drawdown is important for purposes beyond vector control, such as having that volume be available for periodic storm events.
    - HMP is different from pollutant control, wherein HMP volume and flow requirements were based on continuous simulation modeling so they already account for the repeat storm scenarios. Thus, drawdown is just for vector control/public health.
    - For biofiltration, plant health is incorporated into the BMP Design Manual. There is a 24 hour drawdown time to keep the plants alive, ensuring they are not flooded. A fact sheet for biofiltration can be found in Appendix E, which defines drawdown for biofiltration for vegetation management.

- If the Guidance Document is providing both HMP and pollutant control in one biofilter, which use dictates drawdown time?
    - The use with the more restrictive regulation dictates drawdown time.

- There is a discrepancy among drawdown time requirements between what is being stated in this document and what the City of San Diego dictates, which is 96 hours for all water, including soil water. Please confirm what is the current applicable standard.
    - **Summer Hasenin, City of San Diego:** The City of San Diego will work with the WQE project team to review the BMP Design Manual and BMP sizing calculator and subsequently provide this clarification. A notice will be posted on the Project Clean Water website. Stakeholders may also receive an email from the City in this regard.

5. STREAM REHABILITATION OPTIONS

Please refer to presentation slides #81-100.

Eric Mosolgo, City of San Diego, provided an overview on potential WQE pathways for stream rehabilitation (Appendix E of the WQE Document). The following topics were reviewed:

- **Stream Rehabilitation Options Overview as Related to WQE**
    - Hydromodification here refers to preparing a channel for future flow conditions.
    - The amount of stream rehabilitation design is dependent on the current stream conditions and the planned extent of development.
    - In-stream control occurs downstream of a project.
    - It is applicable primarily to urban development/conditions.
    - <u>In-stream Project Benefits</u>:

        - Hydromodification management
            - Rehabilitate for future and legacy impacts
            - Rehabilitate for additional directly connected impervious area
        - Water quality improvement
            - Restoration activities to improve water quality
            - Improvement of physical and ecological health
- **Hydromodification Management Approach**
    - An equivalency approach has been developed, but there is not yet an associated metric.
    - General steps: Identify scenario → Evaluate future condition based on a scenario [estimate geomorphic impact] → Evaluate the existing condition [channel assessment] → Compare outcomes and estimate credits from stream rehabilitation
- **Hydromodification Management: Basis for Equivalency**
    - Methodology was based on previous methodology from the HMP plan, WMAA, and various reports developed by Southern California Coastal Water Research Project (SCCWRP).
    - Equivalency Equation: $SR_{GCA} = GI_{FC} – GS_{RW}$
        - Where SR = Stream Rehabilitation, GI = Geomorphic Impact and GS = Geomorphic Stability
    - Alternative Equivalency Equation: SGC = GS – GI
        - Where SGC = Stream Geomorphic Capacity
    - Several Hydromodification Management Scenarios were provided
        - To determine GS and GI, one must consider the Erosion Potential and the Specific Stream Power (refer to slide #89).
        - Stream stability related to specific stream power can be charted. A straight line is representative of a stable equilibrium.
        - For proper in-stream control, it must be demonstrated that Geomorphic Stability is greater than the Geomorphic Impact.
        - If GI > GS, one will need to consider different Stream Rehabilitation options .
- **Hydromodification Channel Assessment**
    - General steps for Channel Assessment were reviewed (refer to slide #92).
    - When determining the domain of analysis, one will most likely be assessing at the watershed or sub-watershed level.
    - Channel evolution models are reviewed, and the channel is assessed in its existing state.
    - Metrics for Erosion Potential and/or Specific Stream Power will be determined per the stability of the stream. If the stream is unstable, the SCCWRP methodology will be employed.
- **Stream Rehabilitation Options: Guidance Document**
    - Stream Rehabilitation guidance includes:
        - Stream widening

        - Stream flattening
        - 100-year flow conveyance
        - 401, 404, and 1602 permits
- **Stream Rehabilitation Options: Water Quality Improvement**
    - Potential future pathways for pollutant control equivalency metric
        - Increased runoff volume reduction
        - Increased hydraulic residence time
        - Increased settling of solids
        - Increased decay coefficient for plant assimilative capacity
        - Removal of concrete
        - Focus on water quality effect at low flow conditions
- A detailed Stream Rehabilitation document is in development by the City.
- Stakeholders can contact Mr. Mosolgo directly with additional questions related to this program: EMosolgo@sandiego.gov.

Questions and Discussion

- Page 64 of the document requires looking at every segment of the water body. Would it be appropriate to look only at the most sensitive segment of the water body rather than the entire distance? In other words, could one design their project to the most vulnerable section of the water body?
    - The HMP requirements include avoiding cumulative watershed impacts. Furthermore, the geomorphic impacts of each segment of a water body differ (e.g. one segment could be widening, another narrowing). Thus, one must review all segments of the water body and design to the cumulative impacts such that all reaches are stable down to the exempt system.

- Can stream rehabilitation be used to mitigate critical coarse sediment flow areas?
    - No, the permit does not allow use of stream rehabilitation for critical flows at this time.

6. NEXT STEPS & CLOSING REMARKS

Jon Van Rhyn, County of San Diego, displayed the summary slide also shown at the beginning of the meeting. He reviewed the current status of Offsite Alternative Compliance, and identified the areas where there will be future work conducted and opportunities for creating pathways that have not yet been fully vetted (e.g. flow-thru and proprietary BMPs, non-proprietary BMPs, and Hydromodification).

The next ACP Category the Project Team will examine is Natural Systems Management, as they recognize its importance for pollutant control and ACP. Information on Natural Systems Management is limited at this time. There is not a specific budget or process for developing

equivalencies for the ACP categories with limited availability. However during the current fiscal year, the project team will be developing a credit system.

Mr. Van Rhyn also reviewed the comment schedule:

- Provide written comments on Draft WQE Guidance Document to charles.mohrlock@sdcounty.ca.gov by Tuesday, **August 18th, 2015**.
    - Formal response to comments is not anticipated for this particular comment window.
- Anticipated submittal date to San Diego Water Board on **September 15th, 2015**. Review schedule to be determined.
    - A 30-day comment period will follow submission of the draft document.
    - The Project Team is hoping for approval by the San Diego Water Board on or before December 24, 2015.

Questions and Discussion

- Are there any particular areas of the Document where the Project Team would specifically like to receive public comment on?
    - Comments on the following sections would be beneficial:
        - Sections 2 and 3 discuss the WQE metrics and equations, and how to apply them.
        - Page 11 includes footnotes of what is in the slides and what is in the document where users can understand the limitations and uncertainties of the equivalency program.
        - The methodology and the accessibility of the formula would be beneficial. If stakeholders find difficulties in applying the formula, please provide suggested revisions.
    - The Project Team tried to capture a middle ground – the WQE needs to be implementable and still protect water quality and stream stability.
    - The Project Team needs to hear from stakeholders if this is too complicated to implement, is not protecting water quality enough, or is over protecting water quality.
    - If one has limited time, it is suggested to review the examples throughout Sections 2, 3, and 4.

- Were there any similar programs that the Project Team used as a starting point for developing the WQE Document?
    - The Project Team researched examples from across the country on what other jurisdictions were implementing in terms of establishing in-lieu fees and watershed protection (e.g. Center for Watershed Protection, parts of Chesapeake Bay, the Pacific Northwest) and drew what they could. However it was found that for the most part, due to the nature of the region and the permit, the Project Team had to develop things largely from scratch.

- The Team also knows now that for non-point source pollutant load credit trading, San Diego County is moving ahead of the country.
- **Matt Yeager, County of Orange:** Orange and Riverside Counties are also partners in this program. Orange County will be moving forward to implement these procedures on example projects to assess their functionality. It will be another 6-12 months before results can be reviewed.

- Please post the presentation and the sign-in sheet from this workshop on the Project Clean Water website.

Sheri McPherson thanked participants for attending the workshop, noting that the Project Team values their input and is looking forward to receiving additional comments before August 18th. She then closed the meeting.

7. ATTENDANCE

Participants

#	Last Name	First Name	Affiliation
1	Ajideh	Hossein	City of San Juan Capistrano
2	Alsop	Trevor	Geosyntec
3	Apt	Daniel	Michael Baker Intl.
4	Arias	Christina	San Diego Regional Water Quality Control Board
5	Bartley	Ernest	County of San Diego
6	Bennetts	Shawna	NV5
7	Biggs	Dan	Earth Wind Water Civil Eng.
8	Cadena	Eduardo	Snipes Dye
9	Canning	Jack	City of San Diego
10	Chennapragada	Soumya	Stevens Cresto
11	Davies	Helen	City of Escondido
12	DeSanti	Joe	Oldcastle Company
13	Dieli	Tony	Leppert Engineering
14	Doenges	Nick	J Wahlen Associates
15	Dowden	Doug	City of San Marcos
16	Dugan	Max	Geosyntec
17	Escobar	Raymond	Hunsaker
18	Esquer	Ramon	Snipes Dye
19	Filar	Cheryl	City of Vista
20	Foltz	Tyler	City of Imperial Beach
21	Fromelius	Laddie	Oldcastle Company
22	Gaines	Stephanie	County of San Diego
23	Gannon	Keri	AECOM
24	GC	Min	BWE

#	Last Name	First Name	Affiliation
25	Gierlichs	Sven	BergerABAM
26	Hall	Shelby	Contech
27	Hasan	Sean	Bio Clean Environmental
28	Hasenin	Sumer	City of San Diego
29	Hastie	Brendan	Rick Engineering Company
30	Helmer	Chris	City of Imperial Beach
31	Horn	Erika	KCM Group
32	Howard	Sherri	City of Carlsbad
33	Humphreys	Sharon	SANDAG
34	Illig	Victor	Huitt-Zollars
35	Jauregui	Rudy	City of San Diego
36	Jinds	J.B.	University of California, San Diego
37	Kilgore	Jim	Latitude 33
38	Kleis	Drew	City of San Diego
39	Kozlik	Kenneth	Fuscoe Engineering
40	Kuhn	Joe	City of La Mesa
41	Kuhn	Stuart	County of San Diego
42	Kunch	Dorian	County of San Diego
43	Lai	Amanda	Kleinfelder
44	Lehotsky	Genene	City of San Diego
45	Leiter	Bob	University of California, San Diego
46	Liles	Christopher	Hargis + Associates, Inc.
47	Linn	Jarrett	Nasland
48	Mallett	Cynthia	City of Oceanside
49	Mansour	Amanda	City of San Diego
50	McFadden	Kris	City of San Diego
51	Menkel	Jim	County of San Diego
52	Murakami	Nobu	Rick Engineering Company
53	Najera	Crystal	City of Encinitas
54	Nguyen	Son	Snipes Dye
55	Nguyen	Toan	San Diego State University
56	Nottage	Jon	City of Vista
57	Nowak	Steve	City of Encinitas
58	Othmer	Ed	AECOM
59	Owens	Jesse	City of Encinitas
60	Patague	Phillipp	Terramar Engineering
61	Pellos	Rey	County of San Diego
62	Plantz	Marshall	City of Carlsbad
63	Reece	Debby	PDC
64	Reyes	Alan	City of Chula Vista
65	Richardson	Nancy	County of San Diego

#	Last Name	First Name	Affiliation
66	Riddle	Jeremy	City of Carlsbad
67	Rieger	Nicole	Dokken Engineering
68	Rosenbaum	Wayne	Opper & Varco
69	Salem	Boushra	City of Chula Vista
70	Schillinger	Hal	Torrent Resources
71	Schultz	Louis	City of San Diego
72	Seaton	Seth	Oldcastle Company
73	Shapouri	Mike	Shapouri Engineering
74	Slaven	Devin	City of Lake Forest
75	Swessy	Mike	Dudek
76	Talamayan	Jonard	City of San Diego
77	Thomas	Reed	City of San Marcos
78	Tomlinson	Richard	Michael Baker
79	Torres	Robert	County of San Diego
80	Torres	Sean	City of San Diego
81	Vidales	Rene	County of San Diego
82	Walsh	Laurie	San Diego Regional Water Quality Control Board
83	Widelski	Matt	County of San Diego
84	Williams	Kim	Geosyntec
85	Yagodin	Serge	County of San Diego
86	Yazdanifard	Roya	CalTrans
87	Yeager	Matt	Yeager Environmental Associates (OCPW)
88	Yeh	David	Landmark Consulting
89	Yescas	Alex	Atkins Global
90	Zawaski	Liza	City of Dana Point

Staff

#	Last Name	First Name	Affiliation
91	Fougeres	Dorian	Center for Collaborative Policy
92	Gonzalez	Gladys	County of San Diego
93	Gummadi	Venkat	Geosyntec
94	Haimann	Richard	HDR Inc.
95	Henry	Laura	Rick Engineering Company
96	Janda-Timba	Jayne	Rick Engineering Company
97	Louie	Sarah	Rick Engineering Company
98	McPherson	Sheri	County of San Diego
99	Mohrlock	Charles	County of San Diego
100	Mosolgo	Eric	City of San Diego
101	Shamblin Gray	Stephanie	HDR Inc.
102	Van Rhyn	Jon	County of San Diego
103	Wylie	Meagan	Center for Collaborative Policy