CONTRA COSTA CLEAN WATER PROGRAM

C.3 Annual Training

Provision C.3 Compliance Training – May 31, 2023

CONTRA COSTA CLEAN WATER PROGRAM

Greeting

Erin Lennon, Watershed Management
Planning Specialist

Agenda

9:00 – 9:10	Greeting (Erin Lennon, Program)
9:10 – 9:30	Background of Provision C.3 and Design Basics (Yvana Hrovat, Haley & Aldrich)
9:30 – 10:00	Changes to Provision C.3 and the Stormwater C.3 Guidebook (Nancy Gardiner, Haley & Aldrich)
10:00 – 10:30	Green Infrastructure Design Considerations (Rachel Kraai, Lotus Water)
10:30– 10:40	Break
10:40 – 11:50	Panel/Audience Discussion
11:50 – 12:00	Summary and Wrap-Up (Erin Lennon, Program)
12:00	Adjourn

Presenters/Facilitators

- **Yvana Hrovat**, P.E., Haley and Aldrich
  - Haley and Aldrich assists CCCWP and Permittees with C.3 implementation
  - 19 years of experience in assisting California municipalities and agencies with:
    - Planning, design, construction, monitoring and maintenance of Green Infrastructure and LID measures
    - Development of LID guidance and stormwater standards manuals
    - Facilitation of outreach, trainings, and public workshops

Presenters/Facilitators

- **Nancy Gardiner**, CPESC, QSD, QISP, Haley and Aldrich
  - Technical Advisor for CCCWP's C.3 implementation
  - 30 years of experience in assisting California municipalities and agencies with:
    - MS4 planning and permitting
    - Stormwater guidance manuals, monitoring, and compliance
    - Facilitation of outreach, trainings, and public workshops

Presenters/Facilitators

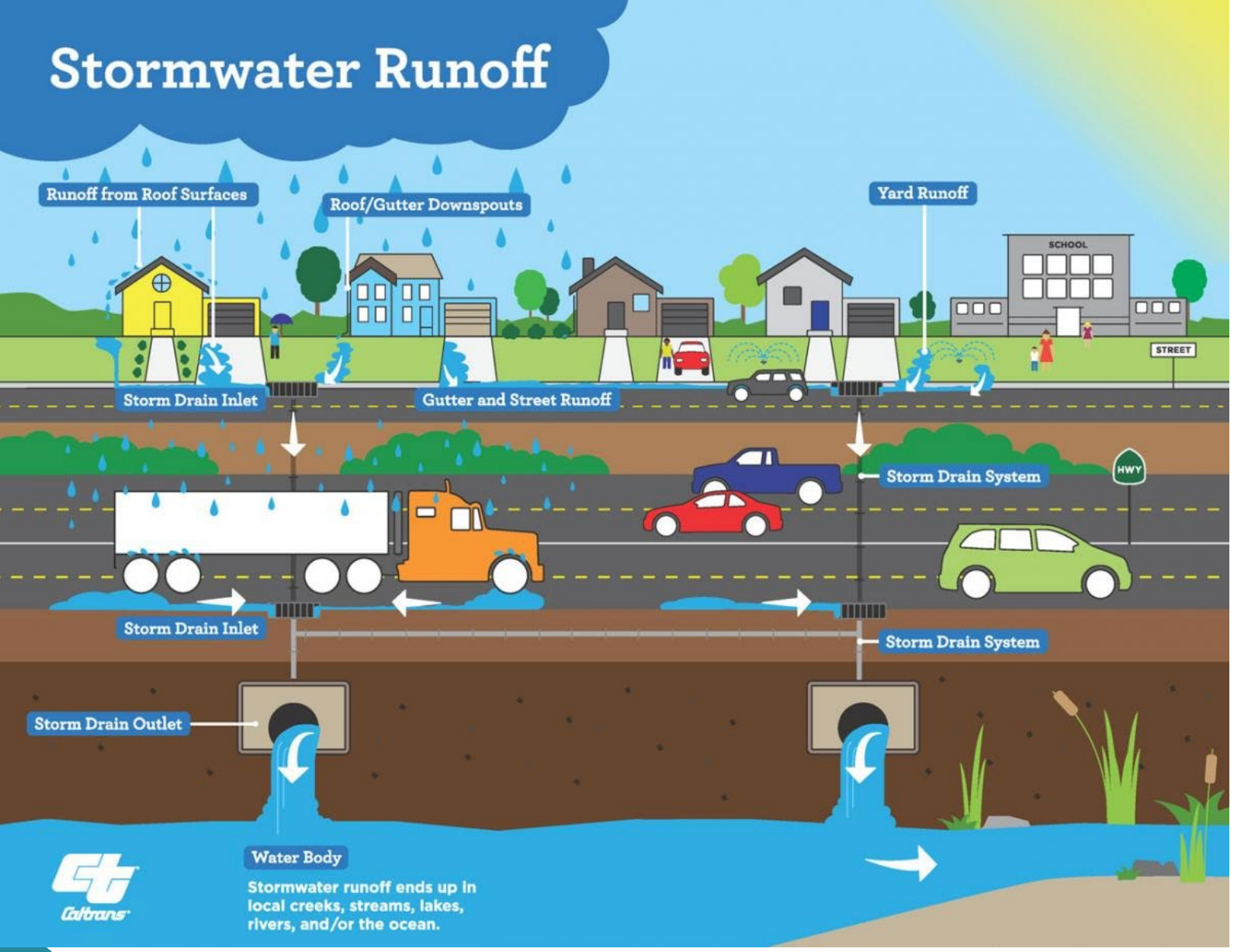
- **Rachel Kraai**, Senior Planner and PM, Lotus Water
  - Lotus Water assists CCCWP and Permittees with C.3 implementation
  - 13 years of experience in assisting Bay Area municipalities and agencies with:
    - Watershed and collection system planning for both CSS and MS4 systems
    - Planning and design of Green Infrastructure with a focus on public projects

Logistics

- Meeting is being recorded.
- Participants have been muted by default.
- To comment or ask a question, use the “Q&A” function at bottom of screen. Questions will be tracked throughout presentation.
- We’ll address as many questions throughout and at the end of each presentation as we can.
  - After the break, the following topics will be discussed with the panel:
    - Stormwater Control Plans (SWCP) Submittals
    - C.3 and Developments w/ Public ROW Improvements
    - Application of O&M Lessons Learned to C.3 Facility Design

About You (Workshop Participants!)

- Poll Questions 1 and 2



Consider: How might development impact...

...**Amount** of runoff?

...**Level of pollutants** in the runoff? (sediment, toxic chemicals, trash)

Regulatory Background

- Federal and State clean water laws
  - Local municipal agencies to eliminate/reduce stormwater pollution
  - National Pollutant Discharge Elimination System (NPDES) Permits
- **M**unicipal **R**egional **P**ermit (**MRP**)
  - Stormwater NPDES Permit
  - Region 2: San Francisco Bay
    - Developed & enforced by SF Bay Regional Water Quality Control Board (SFBRWQCB).
    - "Permittees": Alameda, **Contra Costa**, San Mateo, Santa Clara Counties; Vallejo, Fairfield-Suisun
  - waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater

Contra Costa Clean Water Program

CONTRA COSTA CLEAN WATER PROGRAM

- Formed 1991; includes 21 local municipal agencies
  - Contra Costa County,
  - Cities of Antioch, Brentwood, Clayton, Concord, El Cerrito, Hercules, Lafayette, Martinez, Oakley, Orinda, Pinole, Pittsburg, Pleasant Hill, Richmond, San Pablo, San Ramon and Walnut Creek
  - Towns of Danville and Moraga
  - Contra Costa County Flood Control and Water Conservation District
- CCCWP assists and represents 21 permittees with MRP implementation
  - Water quality monitoring, pollution prevention (trash, sediment,
  - **Low Impact Development and Green Infrastructure,**
  - response and clean-up of illicit discharges and dumping,
  - construction site controls and
  - much more

Learn more at cccleanwater.org/about

CONTRA COSTA CLEAN WATER PROGRAM

Background of Provision C.3 and Design Basics

Familiarity with MRP 3.0 and C.3 Guidebook

- Poll Questions 3 and 4

MRP 3.0 Provision C.3

- Permit amended in 2005 to add Provision C.3
- MRP 1.0 adopted in 2009
- MRP 2.0 adopted in 2015
- MRP 3.0 adopted May 11, 2022

C.3 - New Development and Redevelopment

Permittee use of appropriate source control, site design, and stormwater treatment measures in new development and redevelopment projects to address stormwater runoff pollutant discharges and prevent increases in runoff flows from new development and redevelopment projects, primarily through LID.

Introduction to Stormwater C.3 Guidebook

- Confirm requirements & engage project team.
- Go for an integrated design.
- Use the *Guidebook* and ancillary documents.
- Prepare a complete Stormwater Control Plan submittal.
- Ask questions.

Stormwater C.3 Guidebook Effective Dates

- First Edition, February 2005
- Seventh Edition, May 2017
- Eighth Edition, December 2022
- Adopted by ordinance by the County and its 19 cities and towns
- Uniformity of compliance and design approach
- Updates and revisions
  - Based on experience with development projects countywide over 17 years
  - Input from and review by municipal Stormwater Control Plan reviewers

Stormwater C.3 Guidebook

CHAPTER 1: Policies and Procedures

Applicability, review process, subdivisions, phased projects, HM compliance, offsite compliance

CHAPTER 2: Preparing a Stormwater Control Plan

Checklist, step-by-step, sample outline, template, examples.

CHAPTER 3: Low Impact Development Site Design Guide

Site analysis and “first cut” drainage design

Documentation procedure. Preparing an exhibit and using the IMP Sizing Calculator.

Check to integrate stormwater plan with site, landscaping, and grading plans

Stormwater C.3 Guidebook

CHAPTER 4: Design and Construction of Bioretention Facilities And Other Integrated Management Practices

- What to show on construction plans
- Detailed design criteria for facilities
- Ideas and guidance for applications
- Items to be inspected during construction (with checklist)

Chapter 5: Operation And Maintenance of Stormwater Facilities

- Ownership responsibility
- Maintenance requirements
- O&M plans

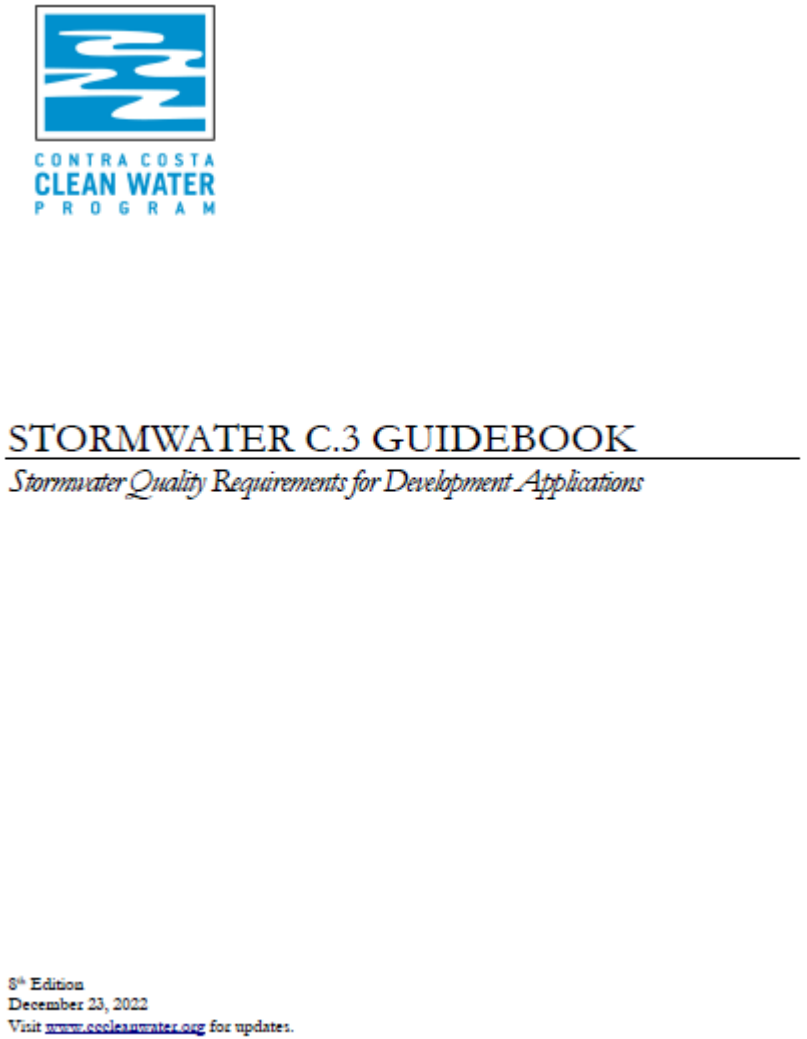
Chapter 6: Retrofitting with Green Infrastructure

- Project identification
- Design, construction, and maintenance

Stormwater C.3 Guidebook

APPENDICES

- A:Local Exceptions and Requirements
- B: Bioretention Plant Recommendations
- C: Small Projects
- D:Source Control Checklist
- E: Background



Integrated design basics

Existing Condition

- How does the site drain now (pre-project)?
- Where is the connection to the municipal storm drain or off-site drainage?
- Where are the low points (or existing inlets)?

Thinking about the Site Plan

- What spaces can or should be vegetated?
- Where can the bioretention facilities go?
- How can I route drainage across the surface?

Bioretention at Shadelands Sports Complex in Walnut Creek

Flow-through Planters at Broadway Plaza in Walnut Creek

Stormwater Control Plans

Stormwater Control Plan for a Regulated Project will demonstrate your project complies with all applicable requirements in MRP 3.0 to:

- Minimize imperviousness and reduce runoff,
- Slow runoff rates and retain or detain stormwater,
- Incorporate required source controls,
- Treat stormwater prior to discharge from the site,
- Control runoff rates and durations if required, and
- Provide for operation and maintenance of stormwater facilities

Walnut Creek Public Library Flow-through Planters

Bioretention at Oakley Civic Center

Hydromodification Management (HM)

- Applies to:
  - Projects that create or replace ≥ 1 acre impervious surface, unless:
    - Post-project impervious surface is less than or same as pre-project
    - Project is in a catchment that drains to a hardened (e.g., continuously lined with concrete) engineered channel or channels or enclosed pipes, which extend continuously to Bay/Delta or tidal zones
    - Project is in a catchment that drains to channels that are tidally influenced
    - Project is in exempt/highly developed watershed (70 percent or > imperviousness)
- Compliance
  - Control range of flows and durations from a site
  - Infiltration of runoff, and/or
  - Detention with very slow release via weir or orifice

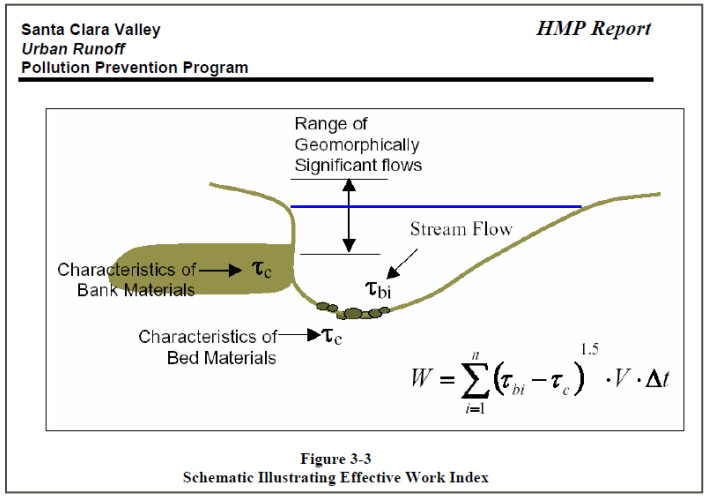


Figure 3-3
Schematic Illustrating Effective Work Index

Hydromodification Management During MRP 3.0

- **Applicability Maps**
  - Maps CCCWP are being finalized and will be submitted with 2023 Annual Report. Maps will be available once approved.
  - In interim, evaluate each proposed project
- **HM Facility Sizing**
  - Continue to use methods and criteria (sizing factors) in *Guidebook 8*th Edition and IMP Sizing Calculator

    until the Bay Area Hydrology Model (BAHM) is available

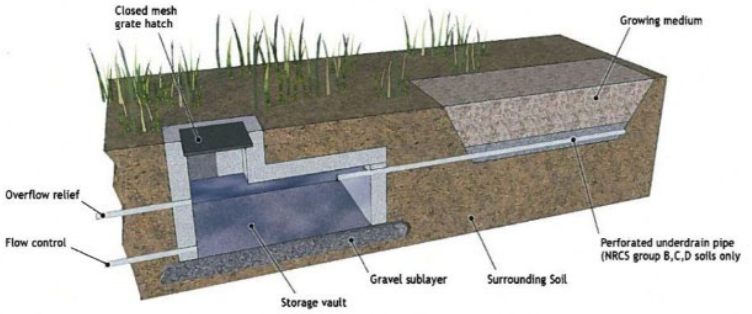


Figure 8. Bioretention with Vault BMP Example Illustration

Figure 7-5: Example of a multi-purpose detention facility for HM control in San Jose.

HM Applicability

- Poll Question 5

Preparing a Complete Submittal: Key Parts

EXHIBIT

- Entire site divided into separate Drainage Management Areas
- For each DMA: unique identifier, type, and square footage
- Proposed locations and sizes of treatment and HM facilities

REPORT

- Calculator output (if IMP Calculator used)
- Project Data form

DEPENDING ON THE COMPLEXITY OF THE SITE

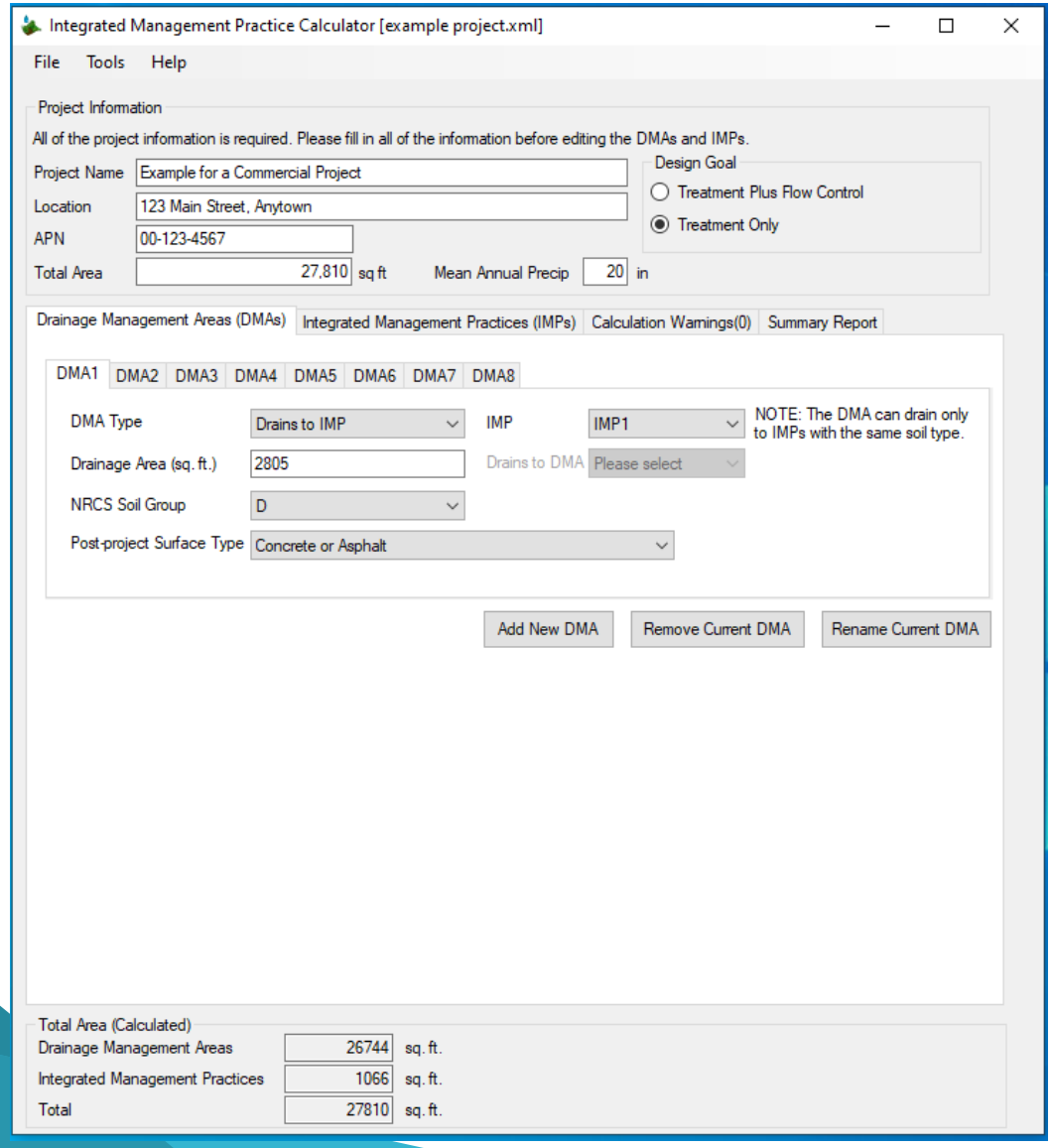
- Cross-sections and/or details showing how drainage and facilities will be integrated into the site

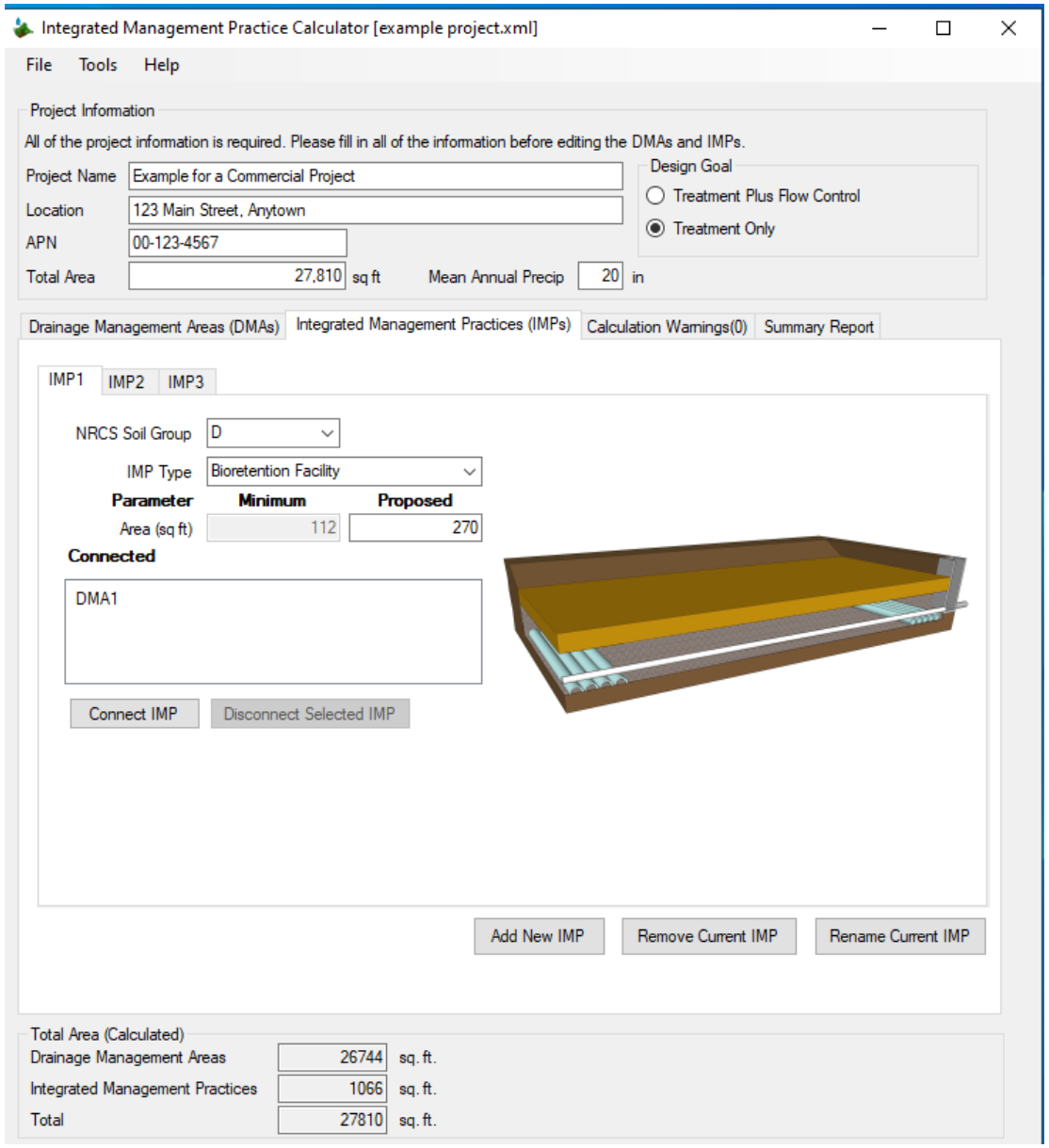
I. PROJECT DATA

Table 1. Project Data

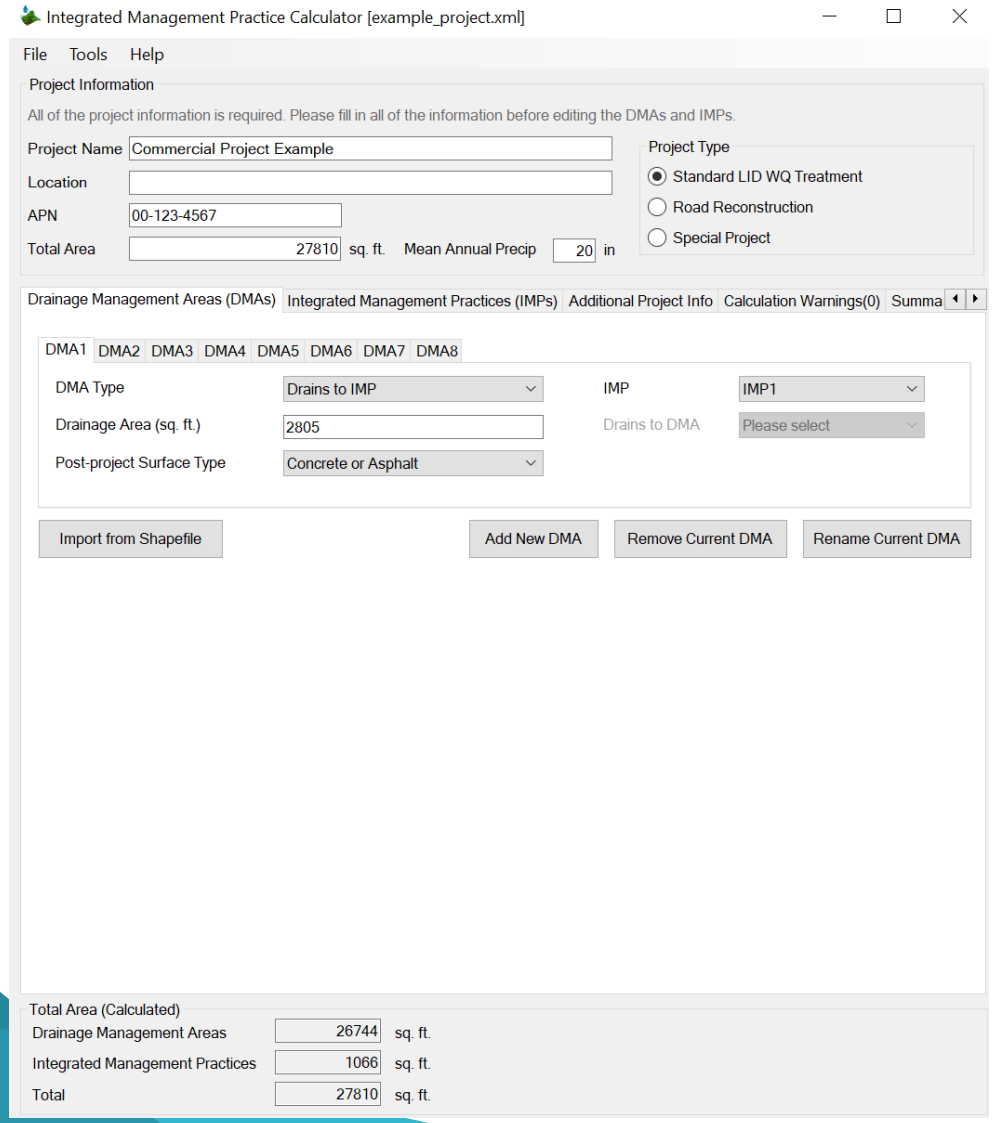
Project Name/Number	Example for a Commercial Project
Application Submittal Date	December 1, 2017
Project Location	123 Main Street, Anytown
Name of Developer	XYZ Corporation
Project Phase No.	Not applicable
Project Type and Description	4,680 SF Retail Building with drive-through lane and parking
Project Watershed	Pristine Creek
Total Project Site Area (acres)	0.6 acres
Total Area of Land Disturbed (acres)	0.6 acres
Total New Impervious Surface Area (sq. ft.)	0 SF
Total Replaced Impervious Surface Area	21,050 SF
Total Pre-Project Impervious Surface Area	24,000 SF±
Total Post-Project Impervious Surface Area	21,050 SF
50% Rule	Applies
Project Density	FAR = 0.2
Applicable Special Project Categories	None
Percent LID and non-LID treatment	100% LID
HMP Compliance	Exempt (less than one acre of impervious area created or replaced)

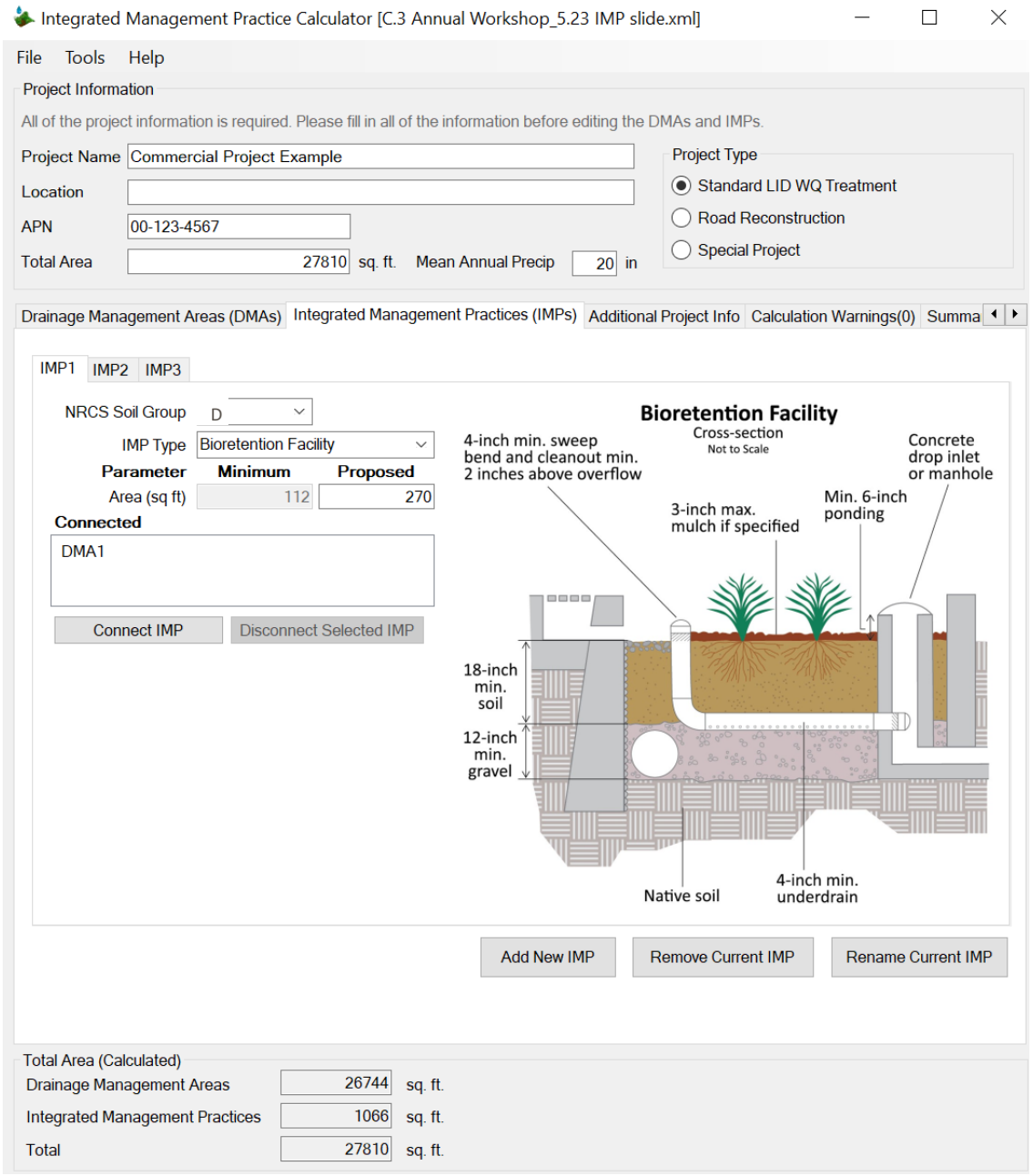
IMP Sizing Calculator





IMP Sizing Calculator





Project Name: Example for a Commercial Project
Project Type: Treatment Only
APN: 00-123-4567
Drainage Area: 27,810
Mean Annual Precipitation: 20.0

II. Self-Retaining Areas

Self-Retaining DMA	
DMA Name	**Area (sq ft)**
DMA4	1,770
DMA5	155
DMA6	550
DMA7	4,285

IV. Areas Draining to IMPs

IMP Name: IMP1
IMP Type: Bioretention Facility
Soil Group: IMP1

DMA Name	Area (sq ft)	Post Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	IMP Sizing
DMA1	2,805	Concrete or Asphalt	1.00	2,805	
			Total	2,805	
				Area	0.040

IMP Sizing Factor	Rain Adjustment Factor	Minimum Area or Volume	Proposed Area or Volume
0.040	1.000	112	270

IMP Name: IMP2
IMP Type: Bioretention Facility
Soil Group: IMP2

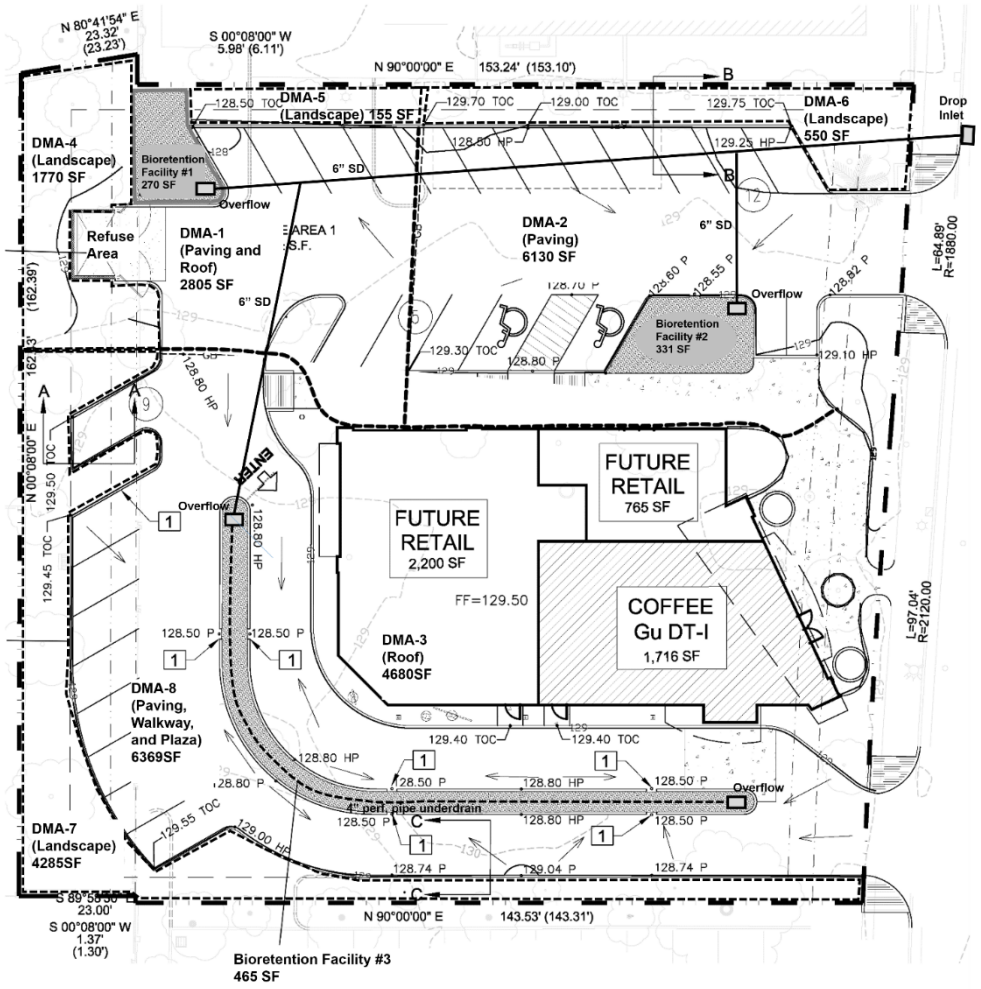
DMA Name	Area (sq ft)	Post Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	IMP Sizing
DMA2	6,130	Concrete or Asphalt	1.00	6,130	
			Total	6,130	
				Area	0.040

IMP Sizing Factor	Rain Adjustment Factor	Minimum Area or Volume	Proposed Area or Volume
0.040	1.000	245	331

IMP Name: IMP3
IMP Type: Bioretention Facility
Soil Group: IMP3

DMA Name	Area (sq ft)	Post Project Surface Type	DMA Runoff Factor	DMA Area x Runoff Factor	IMP Sizing
DMA3	4,680	Conventional	1.00	4,680	
		Roof			
DMA8	6,369	Concrete or Asphalt	1.00	6,369	
			Total	11,049	
				Area	0.040

IMP Sizing Factor	Rain Adjustment Factor	Minimum Area or Volume	Proposed Area or Volume
0.040	1.000	442	465



CONTRA COSTA CLEAN WATER PROGRAM

Changes to Provision C.3

and changes to the *Stormwater C.3 Guidebook*

Key C.3 changes from MRP 2.0 to 3.0

- Effective Dates
- Key C.3 changes from MRP 2.0 to 3.0
  - Regulated Project Thresholds
  - Hydromodification Management (HM)
  - Green Infrastructure Retrofits
  - HM compliance demonstration and BAHM
- Updates to Stormwater C.3 Guidebook
- MRP 3.0 Administrative Draft Amendment

Changes are Effective July 1, 2023

- Until then, MRP 2.0 thresholds and requirements will apply to:
  - Projects with approved or conditionally approved Tentative Maps
  - Projects with applications deemed complete
  - Housing projects for which a preliminary application has been submitted (per SB 330 and SB 8)

Regulated Project Thresholds

Parcel Based Projects			
Project Type	**Threshold Area**	**MRP 2.0**	**MRP 3.0**
• Parking lots • Auto service facilities • Retail gasoline outlets • Restaurants	Cumulative	5,000 SF	5,000 SF
Other Development or Redevelopment	Cumulative	10,000 SF	5,000 SF
Parking Lot Renovation	Cumulative	Exempt*	5,000 SF
Detached Single-Family (not part of larger plan)	Cumulative	Exempt	10,000 SF

*Application of C.3 requirements to parking lot renovations has varied by jurisdiction and by project

Regulated Project Thresholds

Roads, Sidewalks, and Trails

Project Type	Threshold Area	MRP 2.0	MRP 3.0
New roads, including sidewalks and bike lanes • Includes widening with additional lanes	Contiguous	10,000 SF	5,000 SF
New stand-alone trail projects ≥ 10 feet wide • Unless are pervious pavement per *Guidebook* criteria • Or direct runoff to a vegetated area @ 2:1 ratio	Contiguous	10,000 SF	5,000 SF
Stand-alone Public Works ROW projects • Sidewalk gap closures • Sidewalk replacement • ADA curb ramps	Contiguous	10,000 SF	5,000 SF

Regulated Project Thresholds

Roads, Sidewalks, and Trails

Project Type	Threshold Area	MRP 2.0	MRP 3.0
Reconstructing* existing roads • Includes sidewalks and bicycle lanes	Contiguous	Exempt	1 acre
Extending pavement surface without adding lanes (e.g. safety improvements or paving shoulders)	Contiguous	Exempt	1 acre
Utility trenching projects ≥ 8 feet wide on average	Contiguous	Exempt	1 acre

*Removing and replacing an asphalt or concrete pavement to the top of the base course or lower, or repairing the pavement base in preparation for surface treatment

Thresholds

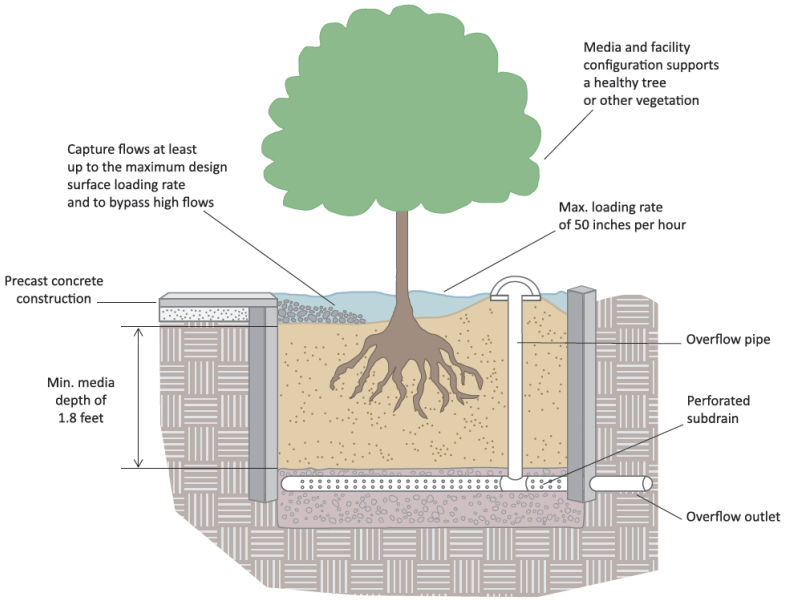
- Poll Question 6

Special Projects

- For certain higher-density projects, “Special Projects” allows treatment of a portion of runoff by facilities other than bioretention:
  - Tree-box-type high-flowrate filters
  - Vault-based high-flowrate media filters

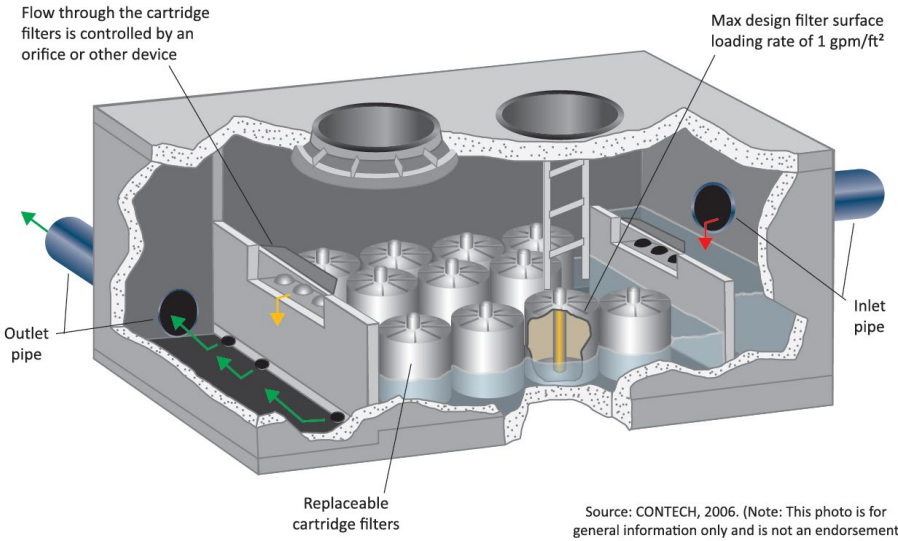
- Applicant is required to demonstrate infeasibility of 100% LID treatment

Tree-Box-Type High-Flowrate Biofilters
Not to Scale



Source: Adapted schematic from UNH Stormwater Center 2007 Annual Report.

Vault-Based High-Flowrate Media Filters
Not to Scale



Source: CONTECH, 2006. (Note: This photo is for general information only and is not an endorsement of this or any other proprietary product.)

Special Projects in MRP 3.0

- **Category A** (unchanged):
  - Project size up to ½ acre, 85% lot coverage
  - Non-auto, pedestrian-oriented, zero surface parking
- **Category B** (unchanged):
  - Project size up to 2 acres
  - 25-100% non-LID, scales with FAR or DU/acre
- **Category C** (changed):
  - MRP 2.0: Applies to certain Transit Oriented Developments
  - MRP 3.0: Will apply to certain affordable housing projects only
    - Amount of non-LID is by proportion of extremely low, very low, low, and moderate-income housing
    - Additional credits for proximity to transit, more dwelling units per acre, and minimized surface parking

Special Projects - Familiarity

- Poll Question 7

Green Infrastructure Retrofits

- **MRP 1.0** (2009)**:** Ten Green Streets Pilot Projects
- **MRP 2.0** (2015):
  - Green Infrastructure Plans submitted in 2019
  - Review all capital projects for “no missed opportunities”
- **MRP 3.0** (2022):
  - Implement retrofit projects during permit term to treat runoff from a minimum acreage of existing impervious surface

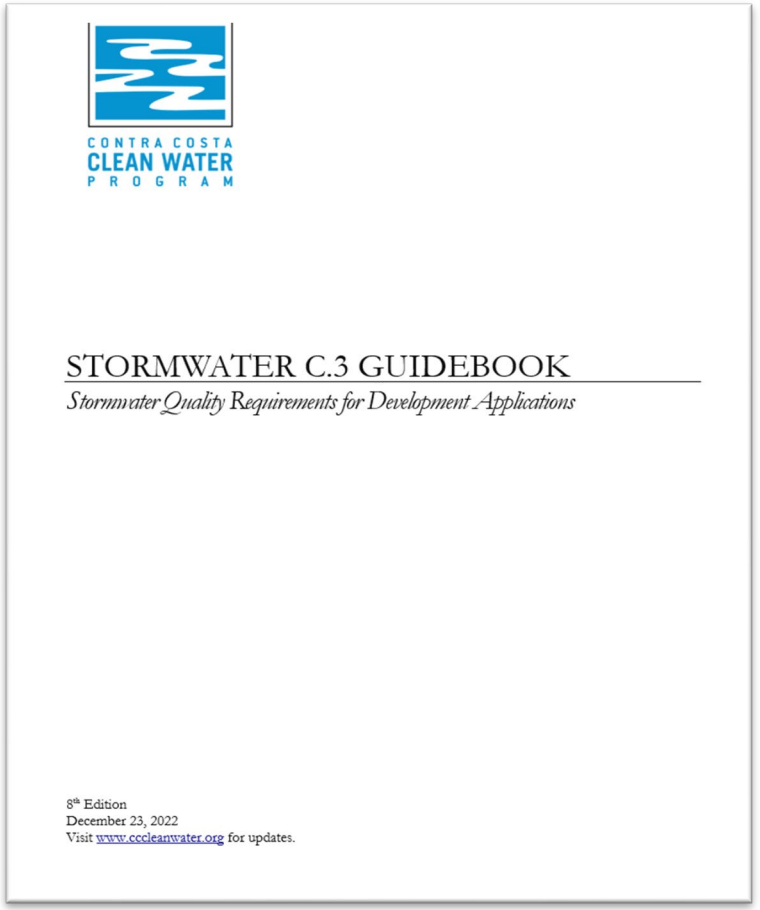
MRP 3.0 Minimum Green Infrastructure Retrofits

- By June 30, 2027
  - 3 acres per 50,000 population
  - May be met by each municipality or countywide
  - Minimum of 0.2 acres in each municipality
  - Capped at 5 acres

- May count toward minimum:
  - Excess existing impervious area retrofit in connection with a Regulated Project
  - Regulated Projects that are road maintenance or reconstruction projects
  - Projects completed after January 1, 2021
  - Projects that are approved and funded by June 30, 2027

Updates to the Stormwater C.3 8th Edition Guidebook

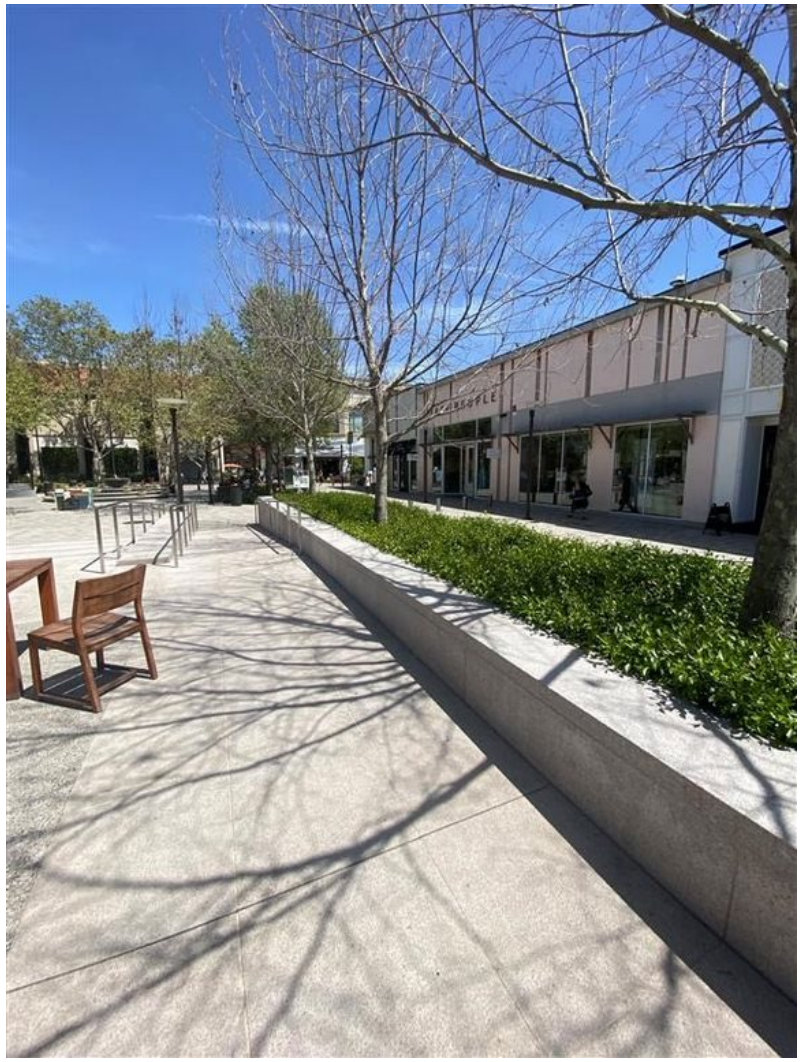
- Unchanged from 7th Edition:
  - Stormwater Control Plan and Exhibit required
  - Approach to documenting your LID design
    - Four types of Drainage Management Areas
    - Five types of Integrated Management Practices (IMPs)
  - Design criteria for IMPs
- More emphasis on integration of LID drainage design into site and landscape design
- Some updates to:
  - What to show on construction plans—details and notes
  - Bioretention soil submittal and inspection requirements



Updates to the Stormwater C.3 Guidebook

- MRP 3.0 changes to Provision C.3
  - Regulated Projects Thresholds
  - Special Projects

- Retrofitting with Green Infrastructure
  - New Chapter 6 covers Green Infrastructure Project Identification and Conceptual Design



Updates to the Stormwater C.3 8th Edition Guidebook

- Hydromodification Management
  - Brief intro and background on future HM compliance using BAHM in 9th Edition Guidebook
- Appendices and Supporting Documents
  - More detailed background on C.3 issues in an expanded Appendix E

BAHM

- Bay Area Hydrology Model (BAHM) provides a visually-oriented interactive tool to optimally size stormwater control facilities (both water quantity and water quality) to mitigate stormwater and water quality impacts of land use changes on local streams and rivers.

CCCWP Updates:

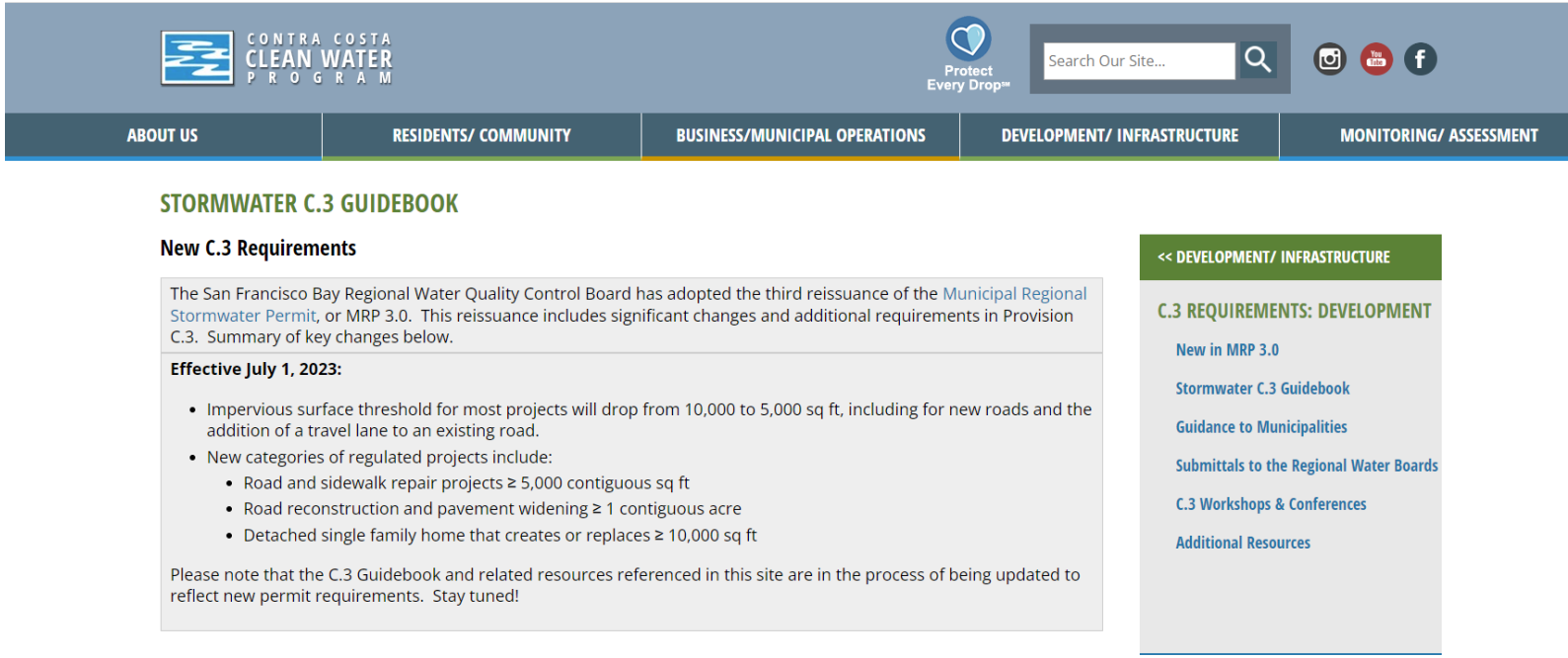
- BAHM updates complete by July 2023
- CCCWP focused BAHM training by September 2023
- 9th Edition Guidebook will provide guidance on BAHM for HM compliance

MRP 3.0 Administrative Draft Amendment

- MRP 3.0 Tentative Order 11 May 2022 MRP 3.0 Adoption Hearing
- CCCWP Draft Comment letter to address permit amendment/ omitted language suggestions from following Workgroups:
  - Alternative Treatment: Provision C.3.c.i. (2)(c)(ii)(a)(iii)
    - Criteria for allowances
  - Special Projects Category C: Provision C.3.e.ii.(5)
    - More details on calculations and allowances
  - Road Reconstruction in Disadvantaged Communities (DACs)
    - Language still being developed
- Public Draft – July 9th
- Board Hearing – August 9th

Other Resources at cccleanwater.org

- Stormwater Control Plan Template
- Example Stormwater Control Plans
- Sizing Calculator
- Isohyetal Map
- Green Infrastructure Planning and Design Resources



CONTRA COSTA CLEAN WATER PROGRAM

C.3.j Green Infrastructure Numeric Retrofit Requirements & Pathways to Compliance

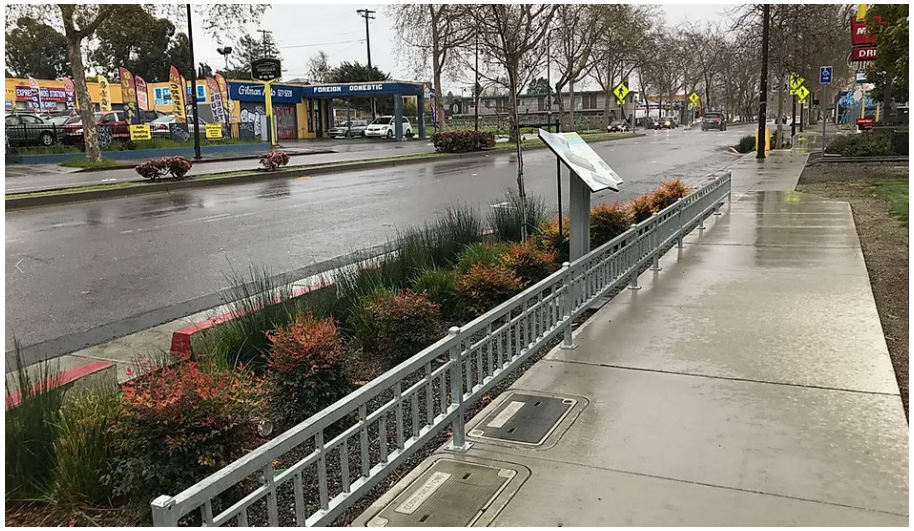
C.3.j - GI Planning and Implementation

It's Time to (Keep) Implementing your GI Plans…

- Continue to update your GI Plans as needed
- Complete updates to related planning documents
- Revise to include coordination with other partners like schools
- Develop funding and funding mechanisms
- Review and update GI guidance, details and specifications
- Implement tools to track and map completed projects
- Adopt/amend policies, ordinances, and legal mechanisms
- Conduct outreach, education, and training

And It's Time to Build Projects!

- Implement GI retrofit projects during permit term to treat runoff from a minimum acreage of existing impervious surface
- Continue "no missed opportunities" review



San Pablo Ave Green Stormwater Spine (Urban Rain Design)

So how much retrofitted GI acreage is required?

Minimum GI Retrofits by June 30, 2027

- 3 acres treated per 50,000 population - capped at 5 acres per municipality
- 57.32 acres total for Contra Costa County
- May be met by each municipality individually or on a countywide basis
- Minimum of 0.2 acres per municipality

The Rumrill Boulevard Complete Streets Project in San Pablo is currently under construction

MRP 3.0 Green Infrastructure Retrofit Minimums

Municipality	Acres
Antioch	5.00
Brentwood	4.45
Clayton	0.74
Concord	5.00
County	5.00
Danville	2.67
El Cerrito	1.53
Hercules	1.58
Lafayette	1.60
Martinez	2.30

Municipality	Acres
Moraga	1.07
Oakley	2.55
Orinda	1.20
Pinole	1.16
Pittsburg	4.36
Pleasant Hill	2.09
Richmond	5.00
San Pablo	1.86
San Ramon	4.56
Walnut Creek	4.21

57.32 acres countywide

From Attachment H in MRP 3.0

What counts towards the Numeric Retrofit Requirements?

Eligible Project Acres*

- Existing road, parcel, or regional retrofits that are not Regulated Projects
  - There is an exception: Regulated Road Reconstruction projects (these count!)
- "Excess" impervious area treated by a Regulated Project
- Projects completed after January 1, 2021
- Projects approved and funded by June 30, 2027
- Remember, if a countywide strategy is pursued, at minimum Permittees need to implement GI to treat .2 acres of impervious surface in their jurisdictions or "contribute substantially" to .2 acres outside their jurisdiction but within Contra Costa County

**See MRP 3.0 c.3.j for additional, less common scenarios allowing eligibility*

CCCWP is Investigating Ways to Get There Together

Pathways to Compliance: Scenarios Under Discussion

1. Public GI project implementation by individual Permittees
2. Large regional project(s) which meets the bulk of Permittees' numeric requirements
3. Regional Alternative Compliance System including Pilot Project(s)
4. **CCCWP Permittee Probable Path:** Pursue a hybrid multiple pronged approach using all these strategies that would also consider compliance in future permit cycles

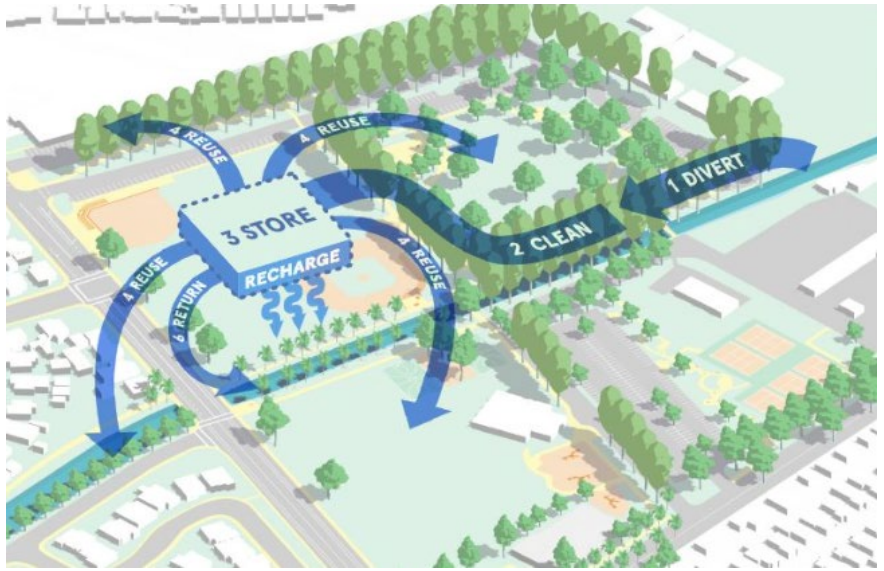
Regional Innovations in Public GI

Innovative Solutions for Compliance

1. **Large Regional Capture Projects like Orange Memorial Park**
   Drainage from Multiple SMC Jurisdictions

2. **Large GI Retrofits Grant Program: 9 Schoolyard Retrofits**
   Administered by SFPUC

3. **Regional Alternative Compliance System**
   Led by Contra Costa Permittees including San Pablo, Walnut Creek, Richmond, and Contra Costa County



Orange Memorial Park in South San Francisco captures stormwater from over 2,500 impervious acres

Lafayette Elementary received a stormwater retrofit from San Francisco's Large Green Infrastructure Grant Program

Highlight: Contra Costa Regional Alternative Compliance System

Pilot Project - San Pablo's Sutter Ave Green Street

- Will treat 2.3 impervious acres through C.3.d sized facilities and an additional 8.7 acres through undersized facilities due to space constraints
- The 2.3 acres are available for sale as part of the Regional Alternative Compliance System
- A potential pilot exchange buyer has been identified
- Construction expected to be complete in 2024
- For more info: https://www.sanpabloca.gov/2685/Regional-Alternative-Compliance

Existing conditions on Sutter Avenue

CONTRA COSTA CLEAN WATER PROGRAM

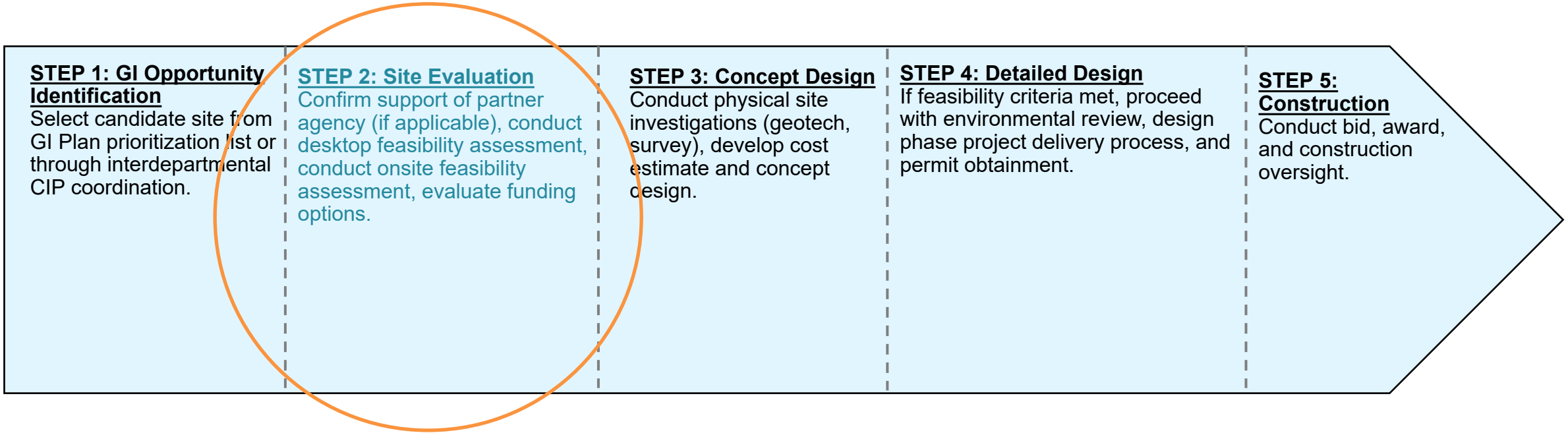
Assessing GI Feasibility in ROW Projects

Have you assessed a street for GI retrofit potential?

- Poll Questions 8 and 9

Today's Deep Dive:
Desktop Analysis for GI Feasibility for ROW Projects

ROW GI Project Development Stages

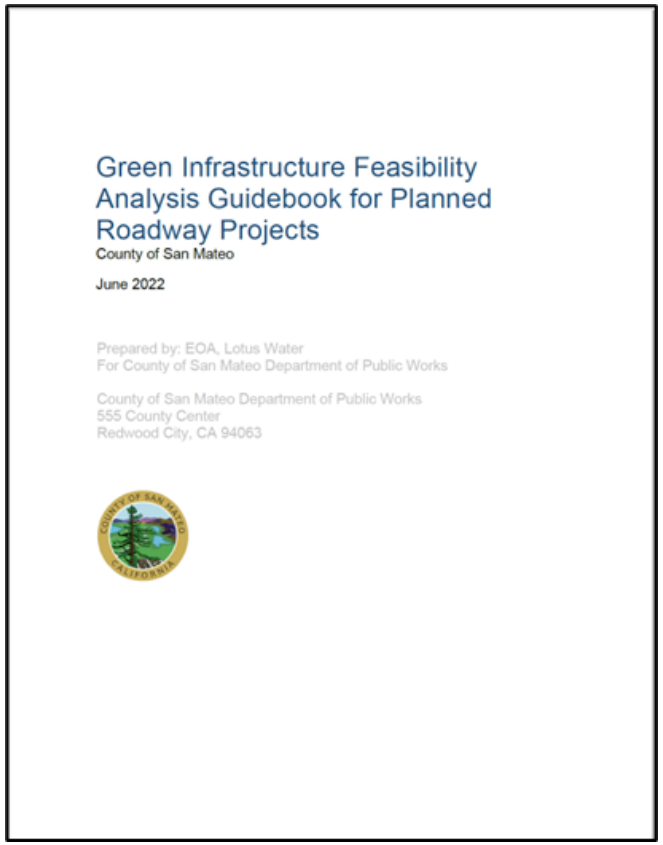


Process Overview:
Desktop Analysis for GI Feasibility in ROW Projects

Before going out in the field, you can investigate from your desk…

Desktop Feasibility Assessment Steps

1. Initial Screening
2. Project Location Considerations
3. Infiltration Considerations
4. Spatial Considerations
5. Initial Feasibility Evaluation
6. Documentation



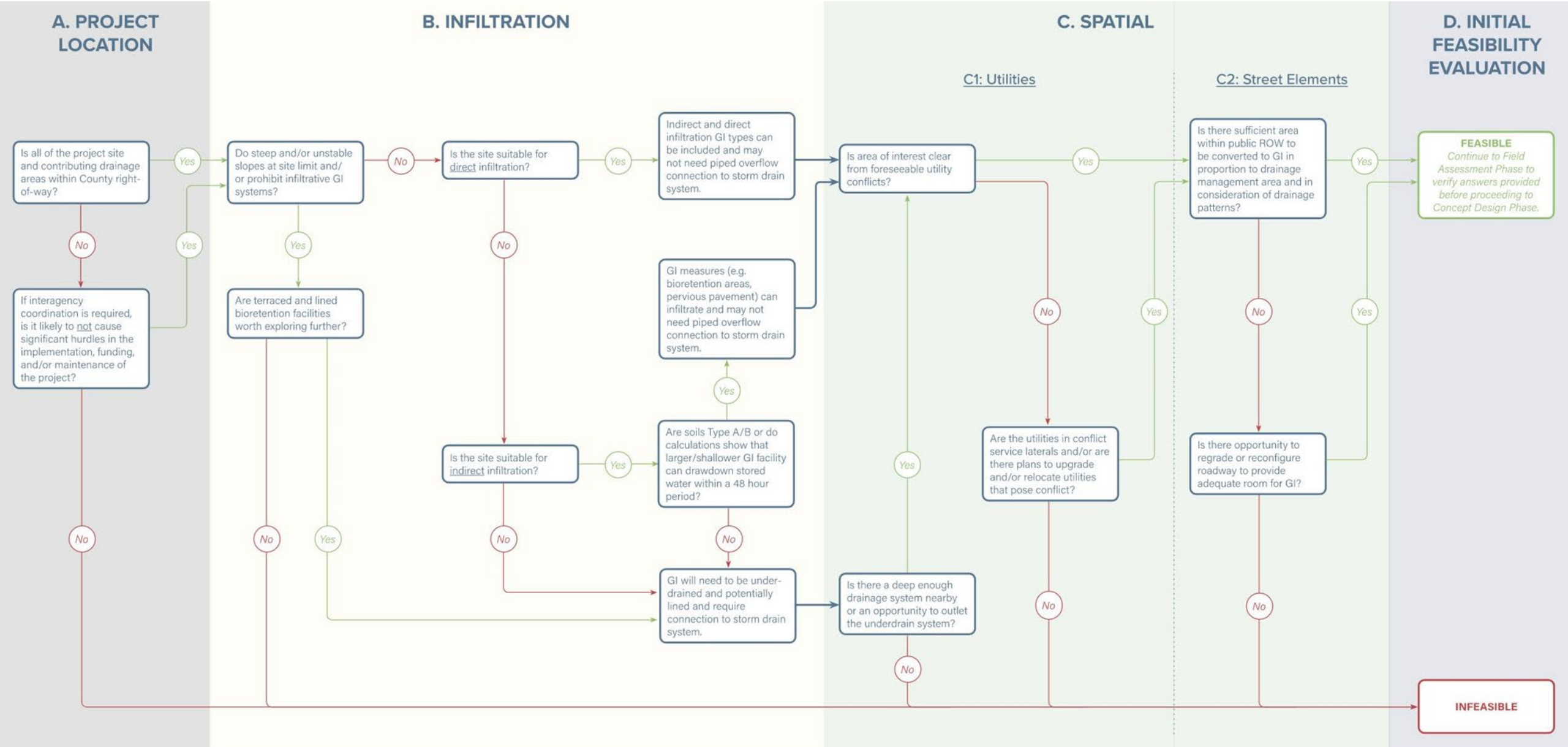
Thank you to the County of San Mateo for sharing materials from their GI Feasibility Analysis Guidebook

Process Overview:
Sources for Potential GI Projects in the ROW

1. Contra Costa Stormwater Resource Plan
2. Municipal GI Plans
3. Results of regular reviews of CIP lists
4. Prioritized lists of roads for maintenance and resurfacing

Desktop Analysis: Data Collection & Decision Flow Chart

1) Project Location 2) Infiltration Feasibility 3.) Spatial Feasibility 4). Initial Feasibility Evaluation



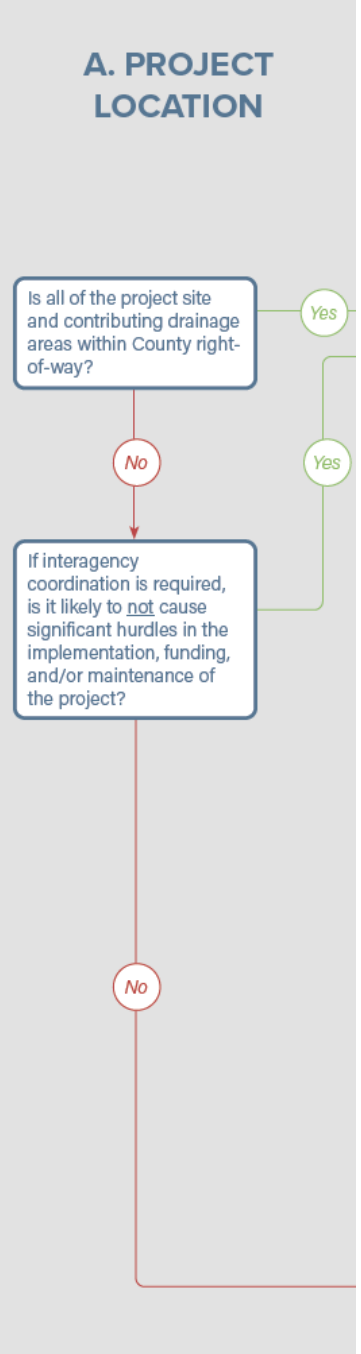
Desktop Analysis – Project Location Assessment

Key Questions

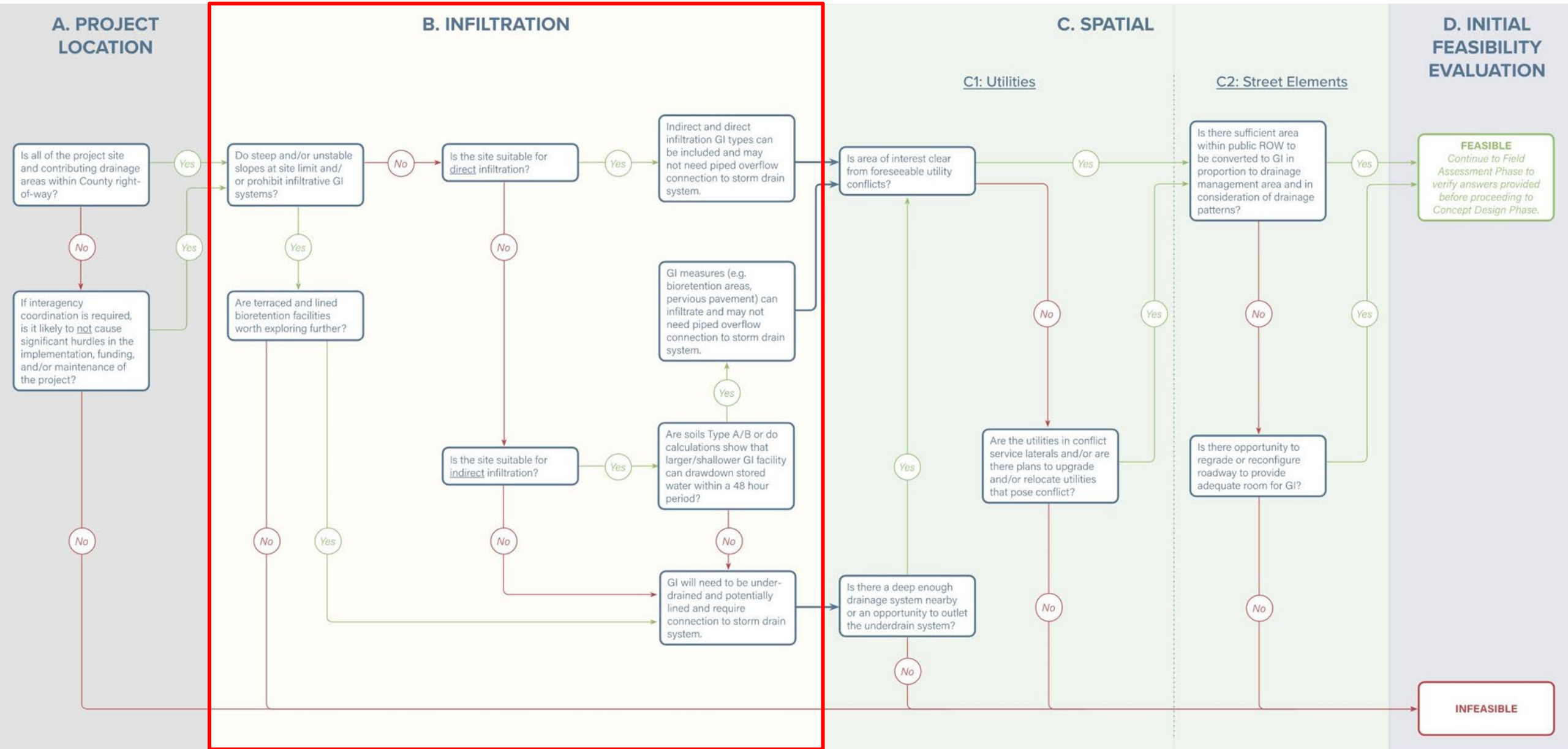
- Is the project site and drainage area within jurisdiction's right-of-way?
- What are the interagency coordination opportunities?
- Is interagency coordination going to be a barrier to implementation?

Needs

- GIS Base Map
- Assess and map drainage patterns
- Identify potential locations for GI



Desktop Analysis – Infiltration Feasibility Assessment



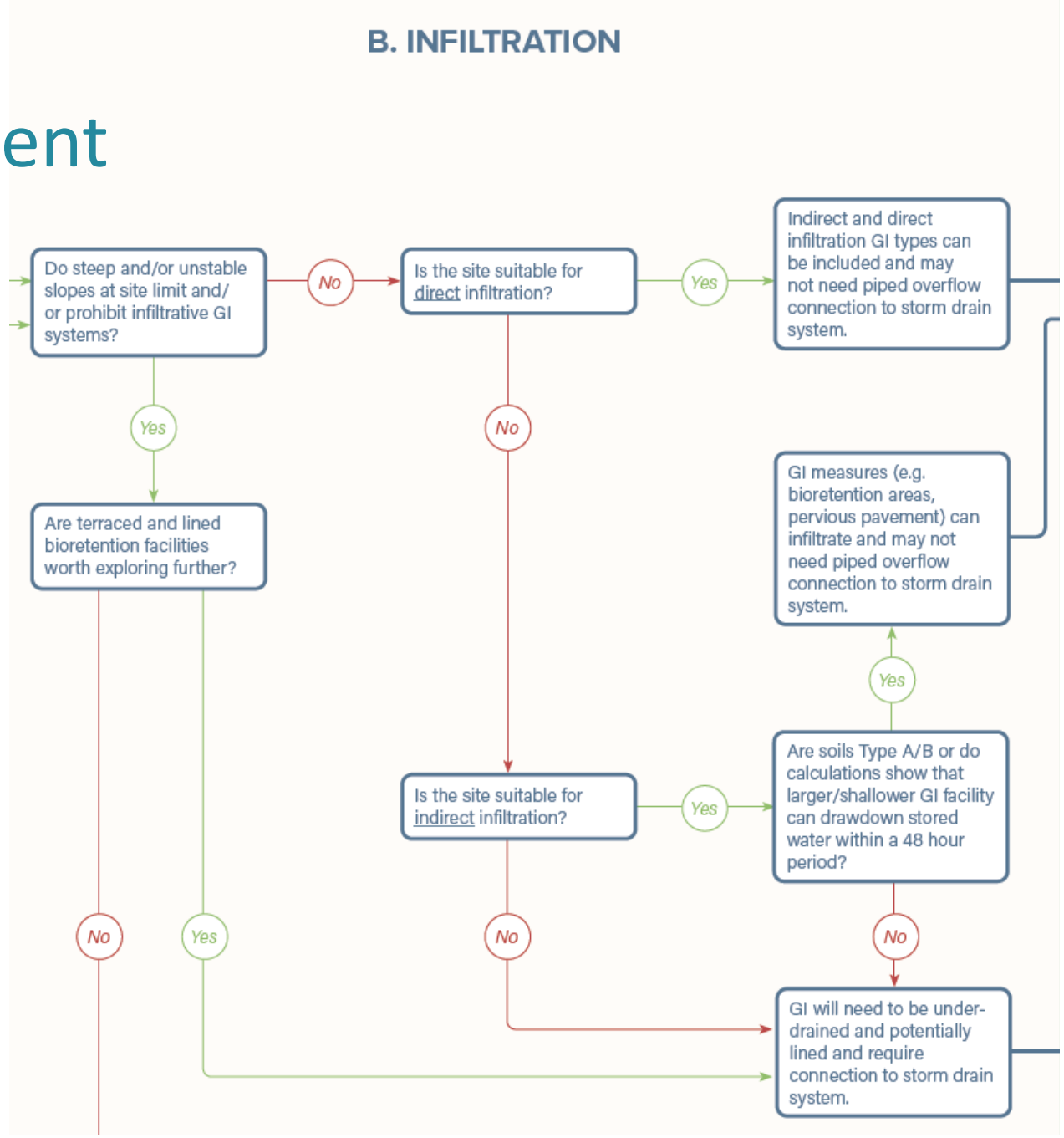
Desktop Analysis – Infiltration Feasibility Assessment

Key Questions

- Are steep slopes or unstable slopes present?
- Are soils Type A or B?
- Or are soil infiltration rates high enough to drawdown GI in 48 hours?
- Is seasonal high groundwater separation achievable?

Data Needs

- Soils type or measured infiltration rates
- Topography
- Groundwater depth
- Conflicts: underground storage tanks, wells, septic tanks, basements

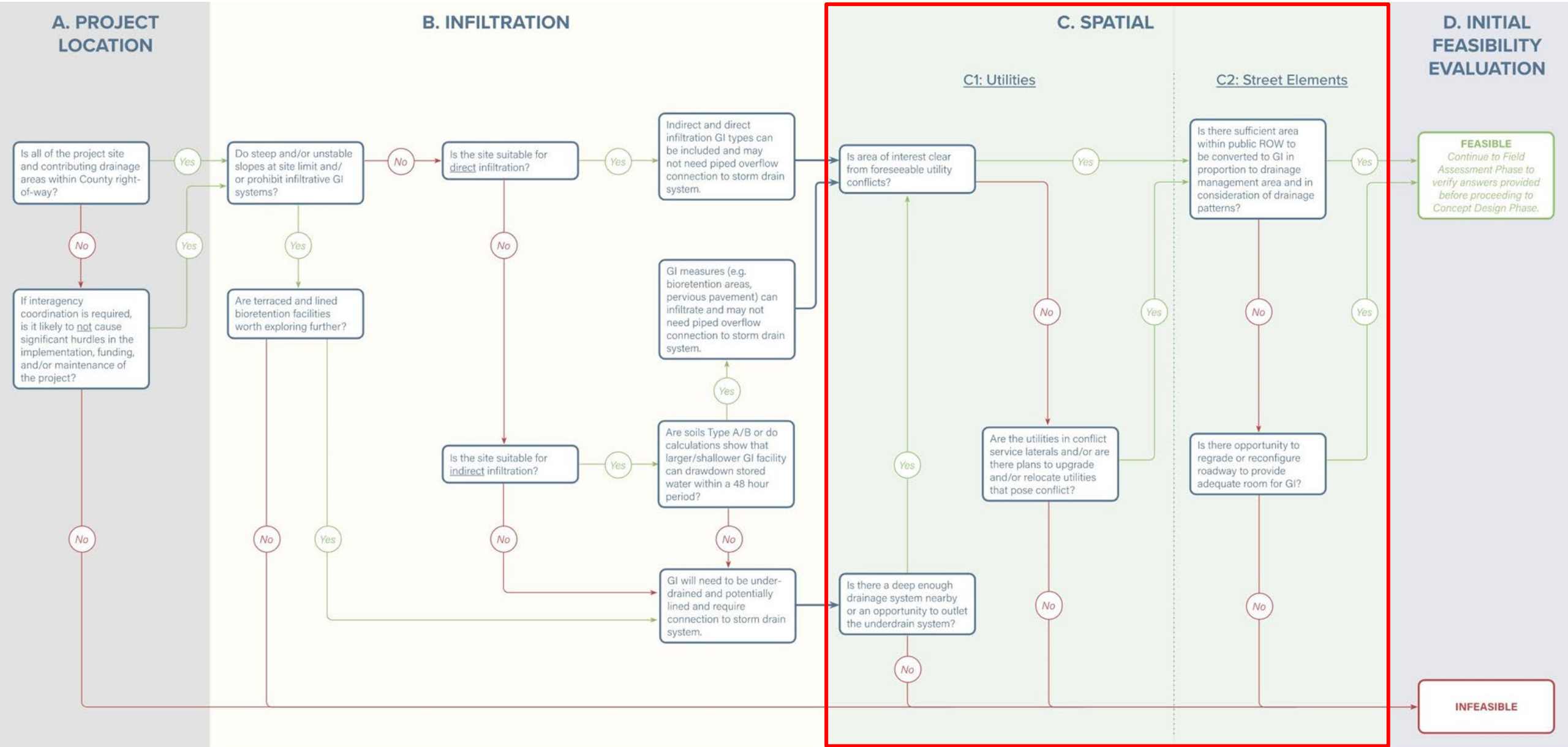


Desktop Analysis – Infiltration Feasibility Assessment

Resources

- USDA NRCS Web Soil Survey
  Find soils types and which hydrologic soils group (HSG) they belong to
- CA Water Board GeoTracker Site
  Find information on contamination and monitoring reports with depth to groundwater
- Geotech reports from nearby projects

Desktop Analysis – Spatial Feasibility Assessment



Desktop Analysis – Spatial Feasibility Assessment

Key Questions

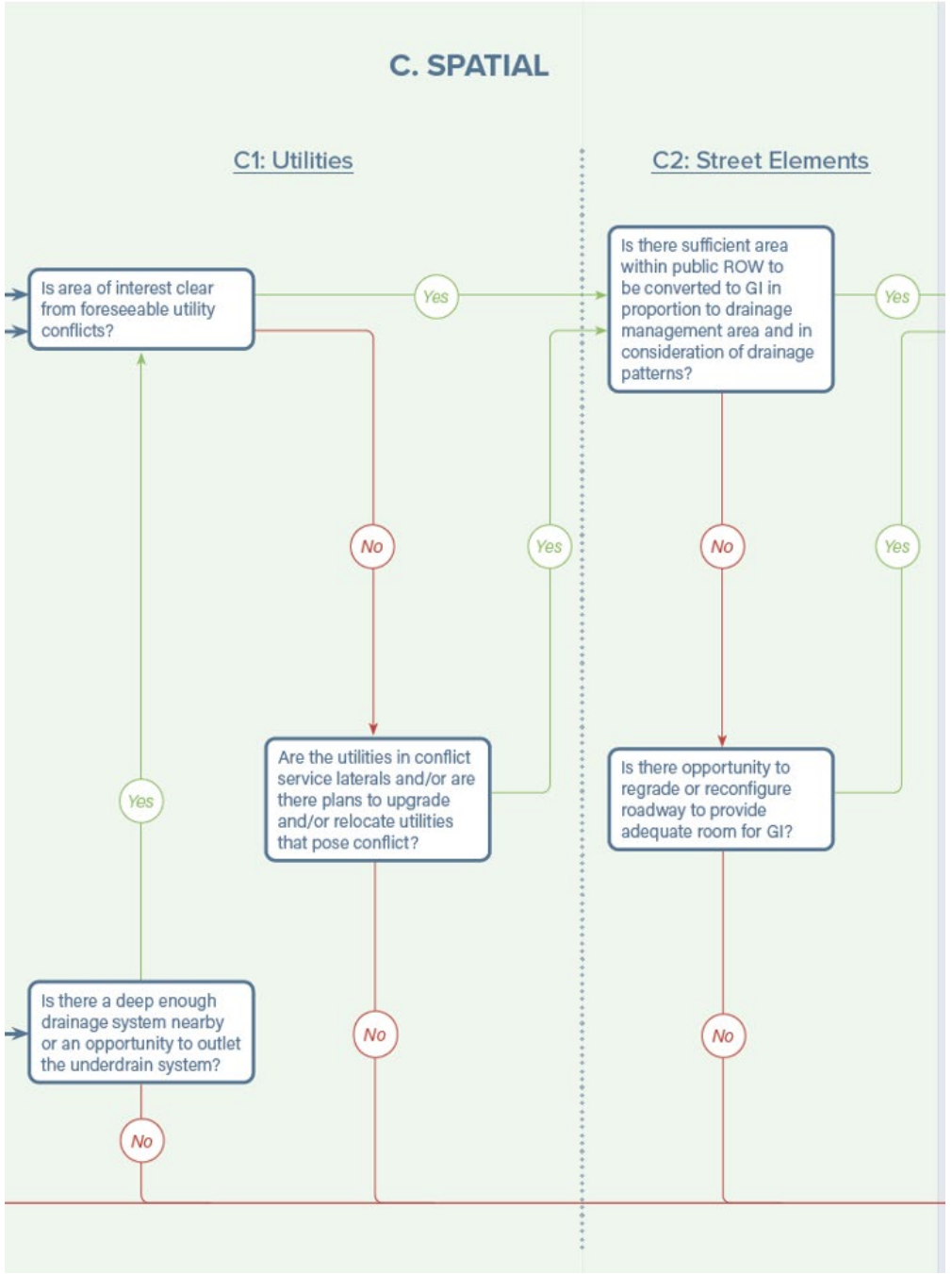
- Are there utility conflicts?
- Is there space available?

Data Needs

- Utility data, e.g., water, sewer, gas, electric, telecom
- Estimated drainage area and GI sizing

Resources

- CCCWP C.3 Guidebook
- Specific GI Design Guidance for your jurisdiction
- Specific utility setback guidance for your jurisdiction



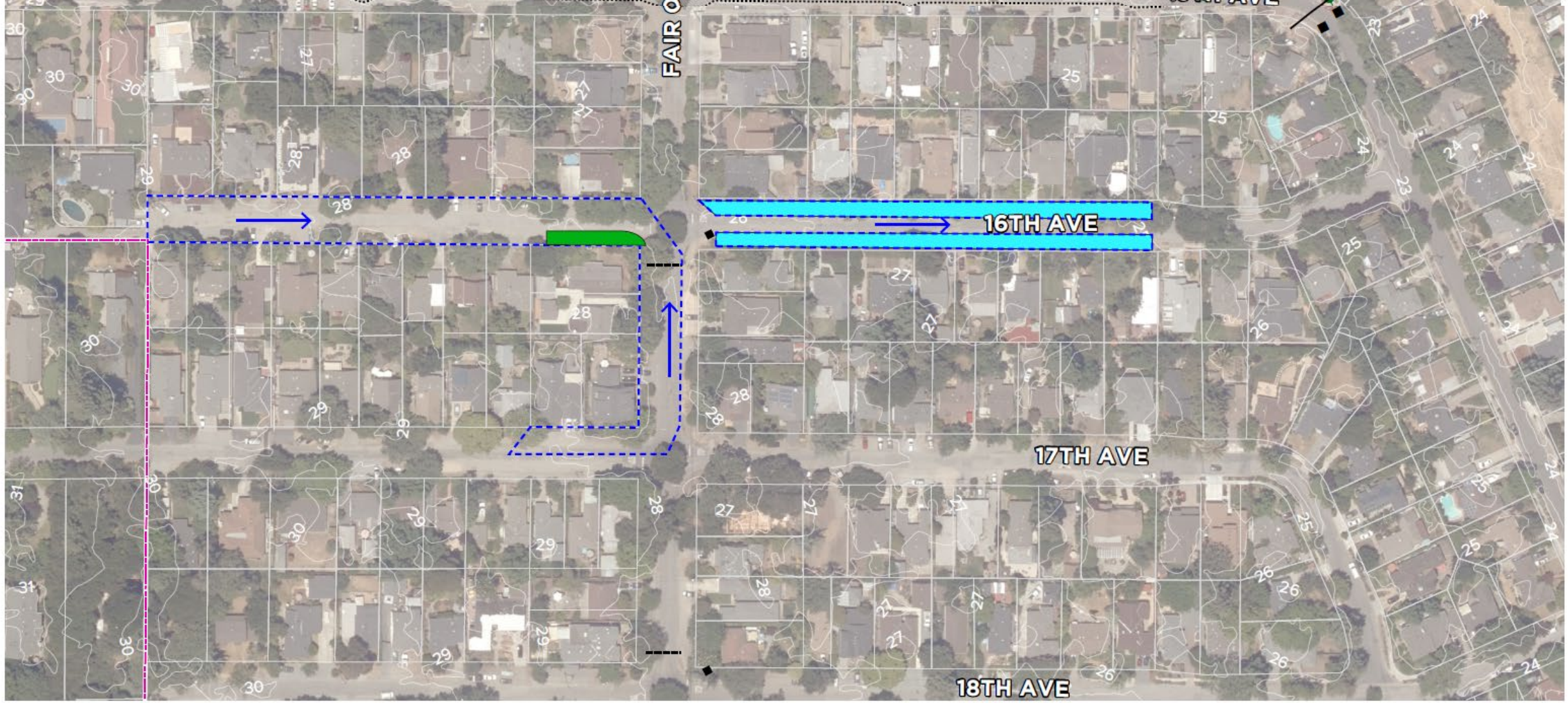
Desktop Analysis – Spatial Feasibility Assessment

Drainage area delineation and sizing of GI facilities to determine if there is adequate space

- Typical cross-sectional widths of different GI types
- Assume 4% sizing ratio for bioretention for planning (bioretention surface area compared to drainage area)
- < 2:1 run-on ratio for pervious pavement systems

Table 2-1 Typical Physical Design Parameters of GI Types within the Right-of-Way

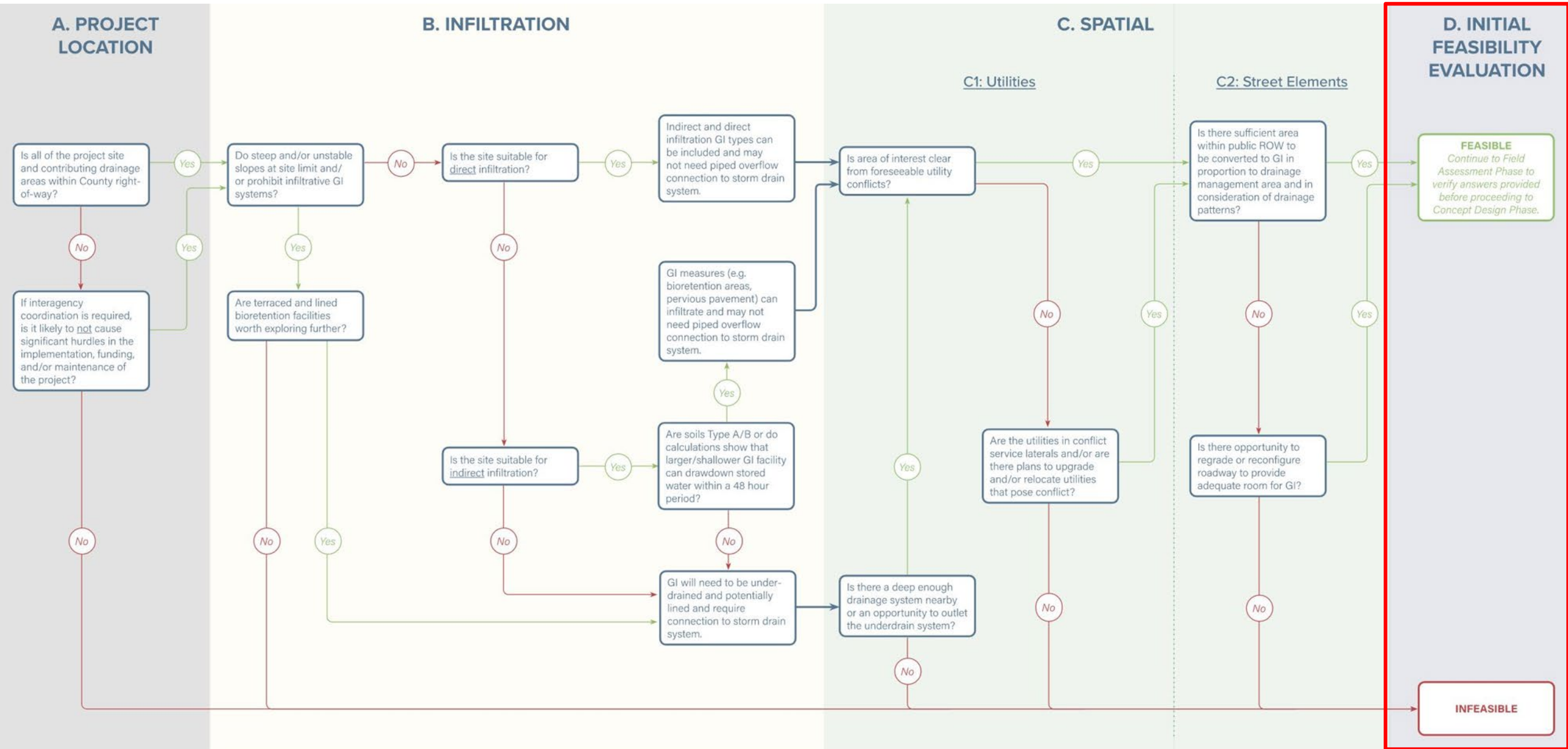
GI Type	Typical Cross-Sectional Width	Typical Locations within ROW to Consider	Suitable Slope Range
Stormwater planter	3.0' (min) without tree 4.0' (min) with tree	• Sidewalk Zone • Medians or islands • Parking Zone	• <4% (max 2% inner cell slope with overall slope <8%)
Stormwater curb extension	6.5' typ. (4.0 min) with 3' (min) flat bottom and 4:1 (3:1 max) side slopes if used	• Parking zone	• <4% (max 2% inner cell slope with overall slope <8%)
Rain garden	7' min with additional 4:1 (3:1 max) side slopes	• Wide shoulders • Parking zone • Leftover landscape/paved spaces • Roundabouts	• <4% (max 2% inner cell slope with overall slope <8%)
Tree well	N/A	• Sidewalk zone • Parking zone	• <4% (max 2% inner cell slope with overall slope <8%)
Subsurface infiltration systems	N/A	• Roadways • Parking zone • Driveway	• Not suitable on steep slopes – TBD by geotechnical engineer
Infiltration trench	N/A	• Parking area • Driveway	• Upgradient drainage area slope <5% • Downgrade slope <20%
Pervious pavement	N/A	• Parking zone • Sidewalk zone • Plazas • Low-traffic roadway or alley	• <5% (1% recommended) • >3% with subsurface berms and check dams



City County Boundary
Parcels
Catch Basin
Storm Drain
Trench Drain
Valley Gutter
Managed Area
Flow Direction
Bioretention
Pervious Pavement

0 175 350 Feet

Desktop Analysis – Initial Feasibility Evaluation

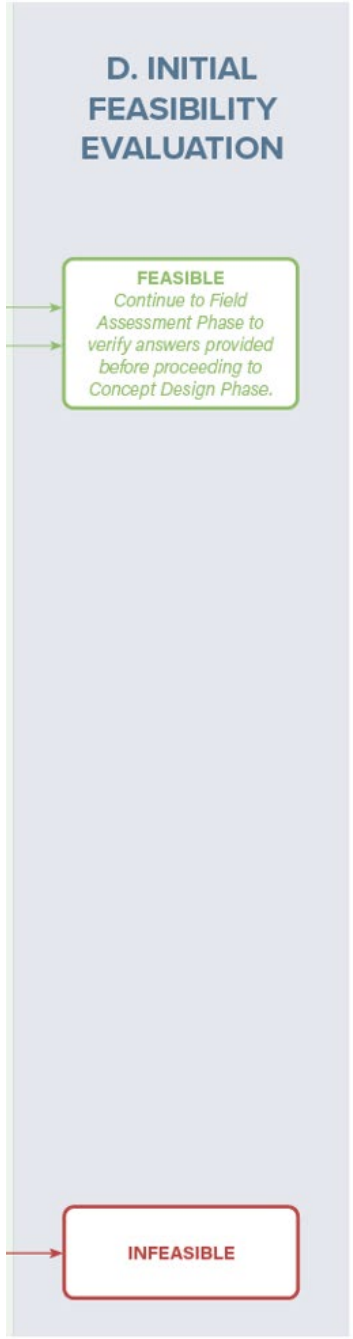


Desktop Analysis – Initial Feasibility Evaluation

Initial Feasibility Evaluation

- **Feasible** – document findings and recommend conducting a detailed field assessment
- **Infeasible** – document findings and end assessment

- Don't forget to document! Permit requires documentation and reporting on completed GI feasibility evaluations.



Desktop Analysis – Sample Feasibility Analysis Documentation

SMC GI Potential within Planned Project 4th Ave - Green Infrastructure Feasibility			
Planned Project Description	4th Ave between Middlefield Rd and Edison Way will be repaved with a 36-ft roadway with curb and gutter		
Road Type	A-3 Urban Residential Collector or Minor Commercial with a 60-ft ROW, 40-ft roadway and 8-ft sidewalks		
GI Opportunities	• Bioretention • Pervious Pavement (Parking Zone) • Stormwater Curb Extension (Parking Zone)		
GI Plan Prioritization	High		
Site Conditions	Soil	unknown	
	Groundwater	10'-20'	
Drainage	• Low slope, drains north with high point at Middlefield Rd and low point at Edison Way • Each block drains to catch basins at cross streets		
Utility Conflicts	unknown		
GI Evaluated	Stormwater Curb Extension	Stormwater curb extensions may be feasible along 4th Ave at the south side of its intersection with Park Rd. These curb extensions will utilize an underdrain that connects to the storm drain at the southeast corner of 4th and Park.	
	Bioretention	A midblock curb extension/bioretention area may be feasible in the minimally landscaped area on the north side of the entrance to Everest High School between the sidewalk and the existing trees. To maximize performance, the road would need to be re-graded to pitch eastward and trench drains would be needed to hydraulically connect the bioretention area under the sidewalk. The bioretention area could potentially drain through the existing storm drain inlet at the center of the landscaped area. Another bioretention area may be feasible at the eastern corner where 4th Ave intersects with Edison Way, utilizing an underdrain to connect to the nearby storm drain.	
	Pervious Pavement	Pervious pavement may be feasible along the parking area on either side of 4th Ave north of Everest High School to Edison Way. An underdrain would be installed at the low end of the pervious pavement strips to tie into the nearby storm drain.	
GI Performance	Total street area managed		1.7 acres
	Pervious Pavement		14,000 sf
	Bioretention/Curb Extension Areas	Total Planter Area	2,050 sf
		Sizing Ratio	4%
	Parking Loss		6 parallel spaces lost at intersection with Park St
Design Criteria	Curb Extension Width		6 ft
	Roadway Min Width		20 ft
	Planter Setbacks		Hydrants - no encroachment on access Driveway - 2 ft separation 1 ft setback from driving lanes
	Sidewalk Through-Way Min Width		5 ft
	Pervious Pavement Width		6 ft
GI Feasibility	Curb extensions along 4th Ave at the south side of the intersection with Park Rd and bioretention area at intersection with Edison Way are likely feasible, though sizing and performance may depend on the location of water, gas, and sewer utilities. Feasibility of bioretention area outside of Everest High School may depend on school approval. Pervious pavement is likely feasible though large tree root systems may limit entire coverage of parking zone.		

4th Ave looking NE towards Park Rd

4th Ave looking NE towards Everest High School

4th Ave looking NE towards Edison Way

Upcoming Resources to Support GI Plan Updates and GI Planning and Design for ROW Projects

- CCCWP is in process of updating the GI planning and design resources it provides for planners, designers, and GI implementers in Contra Costa jurisdictions

- CCCWP GI Planning and Design webpage will be updated in June 2023 with links to new or updated regional resources for GI planning, design & implementation:
  - Green Street Design Guidebooks
  - Asset Protection Standards Guidebooks
  - Regional GI Typical Design Details & Specifications Sets (SFPUC and San Mateo County)
  - GI Construction Guidebooks
  - GI O&M Guidebooks

- CCCWP Specific GI Typical Design Details and Specifications are anticipated to be available in Winter 2023/24

CONTRA COSTA CLEAN WATER PROGRAM

BREAK

Panel Discussion Begins at 10:40

CONTRA COSTA CLEAN WATER PROGRAM

Panel Discussion

SCWP Submittals,C.3 in the Public ROW, and O&M Considerations

Panelists

- **Frank Kennedy,** Kennedy and Associates
- **Phil Hoffmeister,** City of Antioch
- **John Steere,** Contra Costa County Public Works
- **Carlton Thompson**, City of Concord

Topics for Discussion

1. Stormwater Control Plans (SWCP) Submittals
2. C.3 and Developments with Public ROW Improvements
3. Application of O&M Lessons Learned to C.3 Facility Design

CONTRA COSTA CLEAN WATER PROGRAM

Stormwater Control Plan (SWCP) Submittals

SWCP Submittals

STORMWATER CONTROL PLAN

for

[NAME OF PROJECT]

[date]

[This template is to be used in conjunction with the instructions, criteria, and minimum requirements in the Contra Costa Clean Water Program *Stormwater C.3 Guidebook, 8th Edition.*

The contents and level of detail required for a Stormwater Control Plan varies with project characteristics. Check with local staff regarding requirements for your project.

Check the Contra Costa Clean Water Program website at http://www.cccleanwater.org/new-development-c-3/ **for new information and updates to the Guidebook and this template.]**

[Name of Owner]
[Owner's Representative and Contact Information]

prepared by:

[Preparer's Name]
[Preparer's Contact Information]

STORMWATER CONTROL PLAN CHECKLIST

CONTENTS OF EXHIBIT

Show the following on drawings:

- ❒ Existing natural hydrologic features (depressions, watercourses, relatively undisturbed areas) and significant natural resources.
- ❒ Existing and proposed site drainage network and connections to drainage off site.
- ❒ Layout of buildings, pavement, and landscaped areas.
- ❒ Impervious areas proposed (including roofs, plazas, sidewalks, and streets/parking) and area of each.
- ❒ Entire site divided into separate Drainage Management Areas (DMA), with each DMA identified as self-treating, self-retaining (zero-discharge), draining to a self-retaining area, or draining to an Integrated Management Practice (IMP). Each DMA has one surface type (roof, paving, or landscape), is labeled, and square footage noted.
- ❒ Locations, footprints, square footage, and top of soil elevation of proposed treatment and flow-control facilities.
- ❒ Potential pollutant source areas, including refuse areas, outdoor work and storage areas, etc. and corresponding required source controls listed in Appendix D.

CONTENTS OF REPORT

Include the following in a report:

- ❒ Narrative analysis or description of site features and conditions that constrain or provide opportunities for stormwater control. Include soil types (including Hydrologic Soil Group as defined by the Natural Resources Conservation Service (NRCS), slopes, and depth to groundwater.
- ❒ Narrative description of site design characteristics that protect natural resources.
- ❒ Narrative description and/or tabulation of site design characteristics, building features, and pavement selections that minimize imperviousness of the site.
- ❒ Tabulation of DMAs, including self-treating areas, self-retaining areas, areas draining to self-retaining areas, and areas draining to IMPs, in the format shown in Chapter 4. Output from the IMP Sizing Calculator may be used.
- ❒ Sketches and/or descriptions showing there is sufficient hydraulic head to route runoff into, through, and from each IMP to an approved discharge point.
- ❒ A table of identified pollutant sources and for each source, the source control measure(s) used to reduce pollutants to the maximum extent practicable. See Appendix D.
- ❒ General maintenance requirements for infiltration, treatment, and flow-control facilities.
- ❒ Means by which facility maintenance will be financed and implemented in perpetuity.
- ❒ Statement accepting responsibility for interim operation and maintenance of facilities.
- ❒ Identification of any conflicts with codes or requirements or other anticipated obstacles to implementing the Stormwater Control Plan.
- ❒ Construction Plan C.3 Checklist.
- ❒ Certification by a civil engineer, architect, and landscape architect.
- ❒ Appendix: Compliance with flow-control requirements

SWCP Submittals

- Submit Early
- Guidebook
- Complete
- SWCP Exhibit
- What is assumed
- Coordination
- Final Submittal

Audience Q&A

CONTRA COSTA CLEAN WATER PROGRAM

C.3 and Developments with Public ROW Improvements

C.3 and Developments with Public ROW Improvements

- **Provision C.3.b.ii (Regulated Projects)** : "….including sidewalks and any other portions of the public right of way that are developed or redeveloped as part of the project"
- Requires developments that trigger C.3 to treat public ROW stormwater if the cities require them to do any ROW improvements
- Many development projects are required to replace sidewalk along their frontage and some adjacent roadway

C.3 and Developments with Public ROW Improvements

- Presents a few potential issues:
  - A developer can treat this stormwater on their property (but then have mix of public and private stormwater treatment)
  - Many times the street or sidewalk is lower than the property or the direction of flow is away from the site, which presents a flow issue (or would require pumps)
  - A City could require the treatment in the public ROW, but who will maintain it?
  - For small sites this may require the treatment of stormwater directly adjacent to a building

C.3 and Developments with Public ROW Improvements

- Clear communication early in the process
- Maintenance responsibility discussions
- If public maintenance, funding mechanisms are available

Example project: Laurel Ranch


Country Hills Dr

Audience Q&A

CONTRA COSTA CLEAN WATER PROGRAM

Application of O&M Lessons Learned to C.3 Facility Design

Stormwater Facilities O&M Plan

- Guidance provided in Guidebook Chapter 5
- Available on Program website:
  - Template for a Stormwater Facilities O&M Plan
  - Example O&M Plan for Commercial Project
  - Example O&M Plan for Residential Subdivision
  - Fact Sheet for Bioretention Facilities
  - O&M Legal Agreement Forms

Operation and Maintenance of Stormwater Facilities

Stormwater Facilities Operation and Maintenance Plan Template

- Template (for Cities) (PDF)* (Feb. 2018)
- Contra Costa County O&M Plan Template

Example Stormwater Facilities Operation and Maintenance Plans

- Example Stormwater Facilities Operation and Maintenance Plan for a Commercial Project (PDF)
- Example Stormwater Facilities Operation and Maintenance Plan for a Residential Subdivision (PDF)

Stormwater Facilities O&M Plan

- Typical Maintenance Program includes:
  - General maintenance rules, including prohibition on using synthetic fertilizers, pesticides, or any soil amendments other than aged compost mulch or the approved sand/compost mix.
  - Routine trash removal and weeding.
  - Observations and corrections following significant rain events.
  - Annual vegetation and other maintenance during winter.

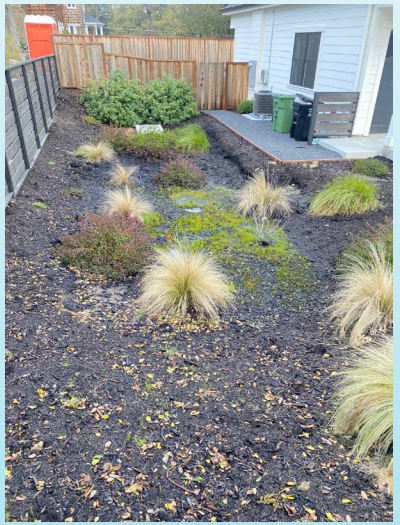
- Typical maintenance actions include:
  - Inspect weekly for trash and remove
  - Weed monthly
  - Check drainage and inspect facilities before the rainy season
  - Inspect after each significant rainfall
  - Annual vegetation cut-back and maintenance

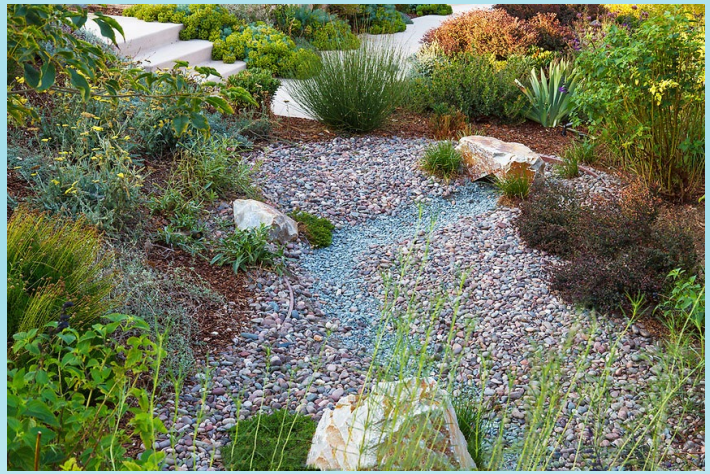
Application of O&M Lessons Learned to C.3 Facility Design

1. Common maintenance problems and patterns

2. Long term and “structural” maintenance issues

3. Applying lessons learned from rain gardens’ maintenance to their design





Common Maintenance Patterns and Problems

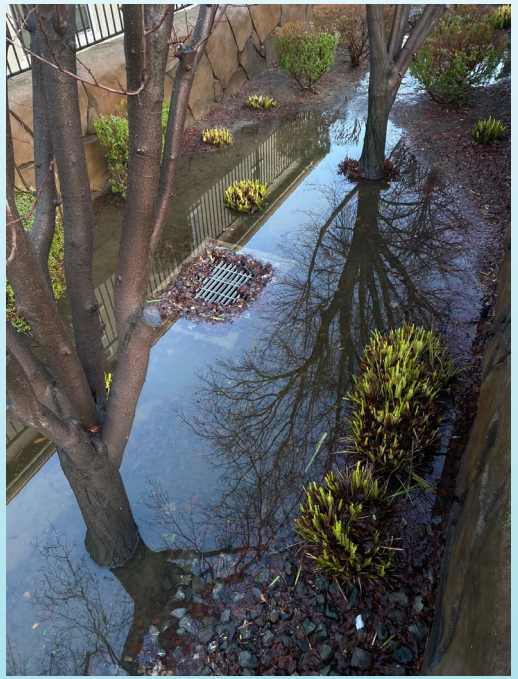
- Differential erosion and sedimentation of basins, i.e., eroding on side and collecting sediment on the lower end

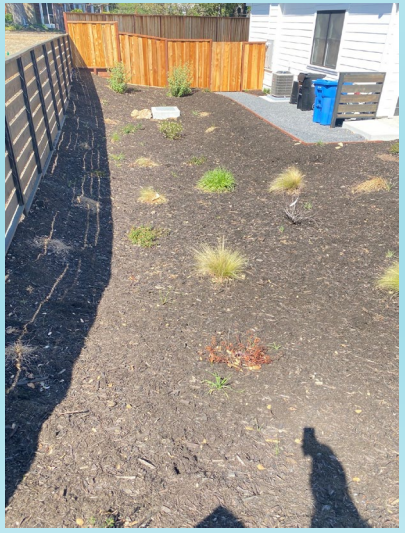
- Insufficient or lack of cobbles below curb cuts

Common Maintenance Patterns and Problems

- Drop inlets being less than 1 inch to 3 inches above the soil layer rather than 6 inches

- Plant die-off, and/or insufficient planting (weed growth and desiccation)

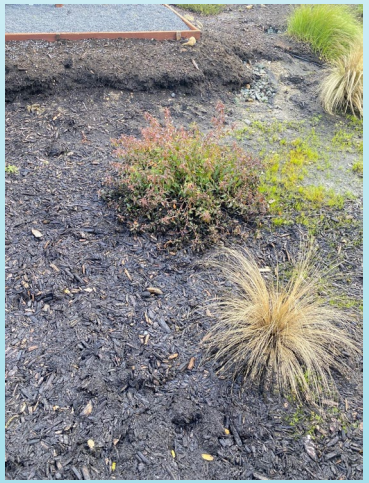




Common Maintenance Patterns and Problems

- Lack of or insufficient mulch

- Use of bark rather than composted mulch



- Erosion of basin walls when they exceed 3:1 slope (Need for cobbles and or planting)

Common Maintenance Patterns and Problems

- Inappropriate pruning of sedges and rushes

- Trash and/or weed growth that chokes out plants meant for rain garden

Long term and “Structural” Maintenance Issues

- ✓ No official O and M manager due to lack of HOA or untrained landscape team (use Rescape)
- ✓ Failure to address potential sedimentation issues caused by erosion of surrounding slopes (whenever slopes are steep)

Belmont Terrace under construction – 2008

Belmont Terrace Swales flooding due to erosion and sedimentation from surrounding slopes - 2023

Long term and “Structural” Maintenance Issues

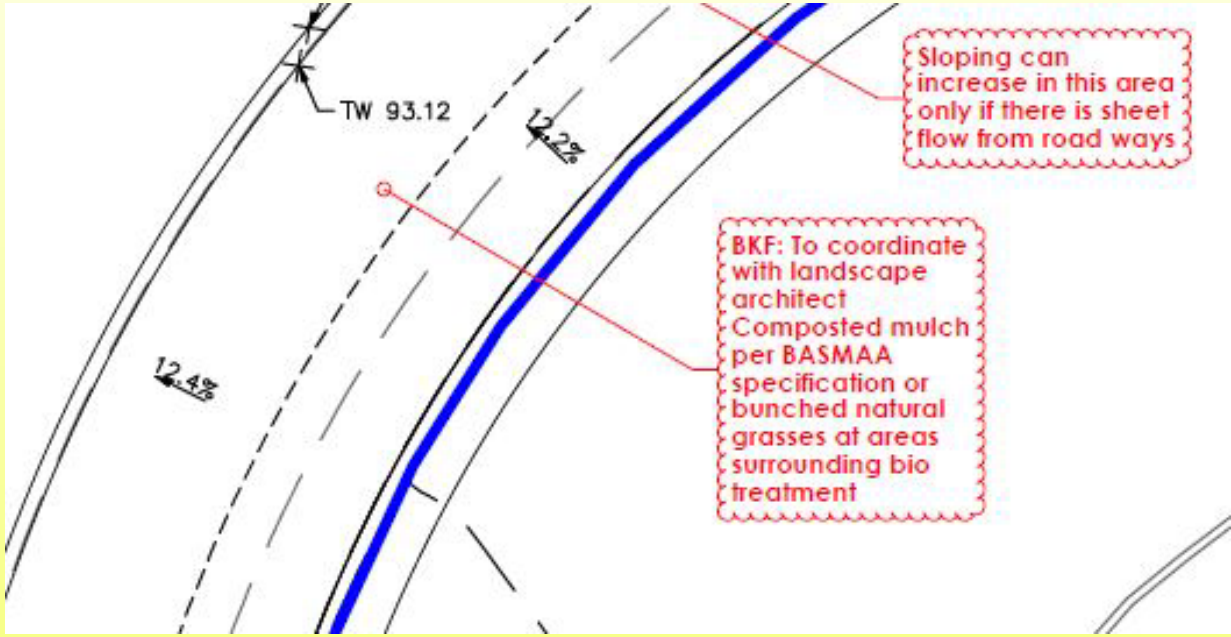
- ✓ Catastrophic failure of basins when they are not maintained regularly.
- ✓ Need for complete reconstruction when they have silted in, especially during heavy rainy season
- ✓ Challenges of working with O and M managers of large corporations and franchises (e.g. Walgreens, Sam’s Club)

California Shakespeare festival raingardens - 2015

California Shakespeare festival raingardens - January 2023

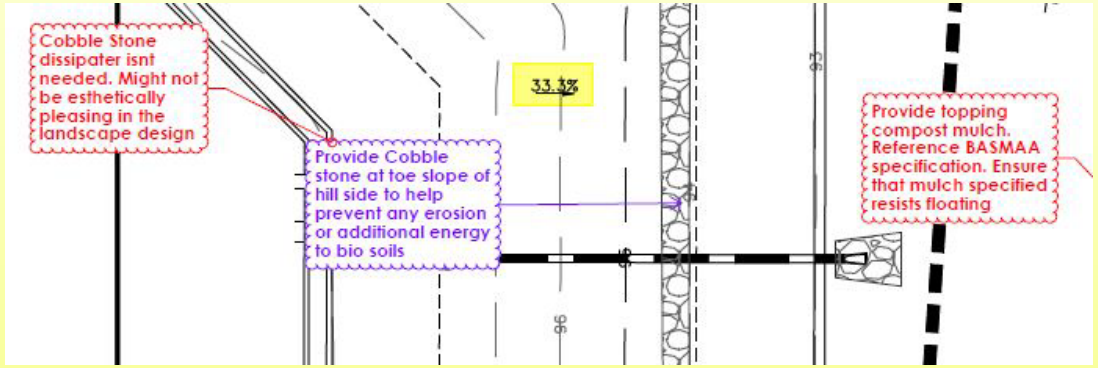
Applying Lessons Learned from Raingardens' Maintenance to their Design

- ✓ Increase vitality and stability of plants in bio-retention basins and by having sufficient plant density and species variety

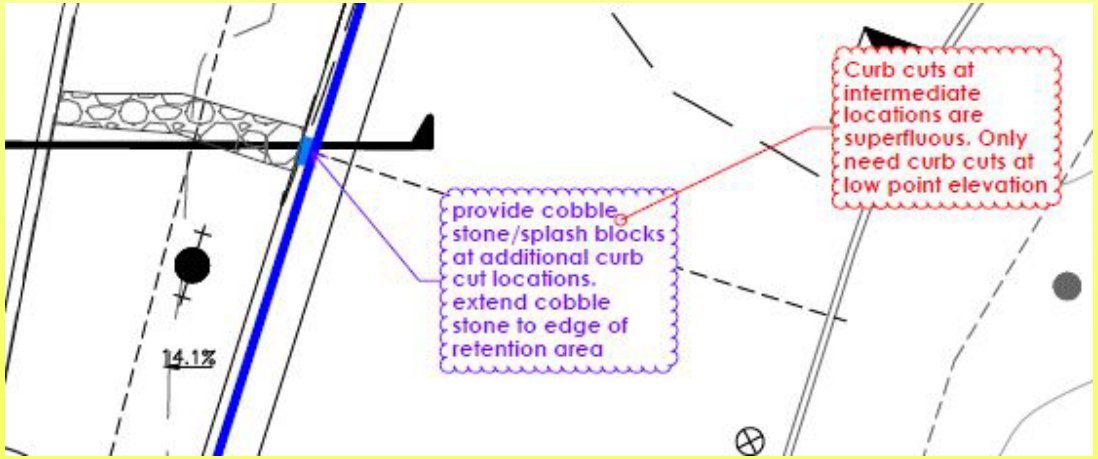


Applying Lessons Learned from Raingardens' Maintenance to their Design

- ✓Basin bottoms should be flat or have no more than a 2% inclination and 3:1 slopes

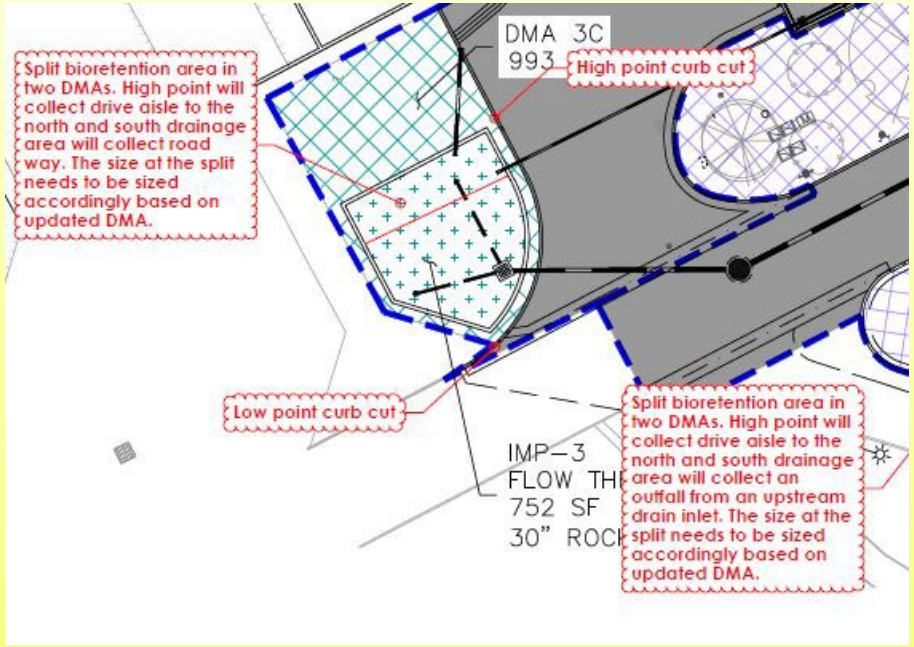


- ✓Have cobbles below curb cuts

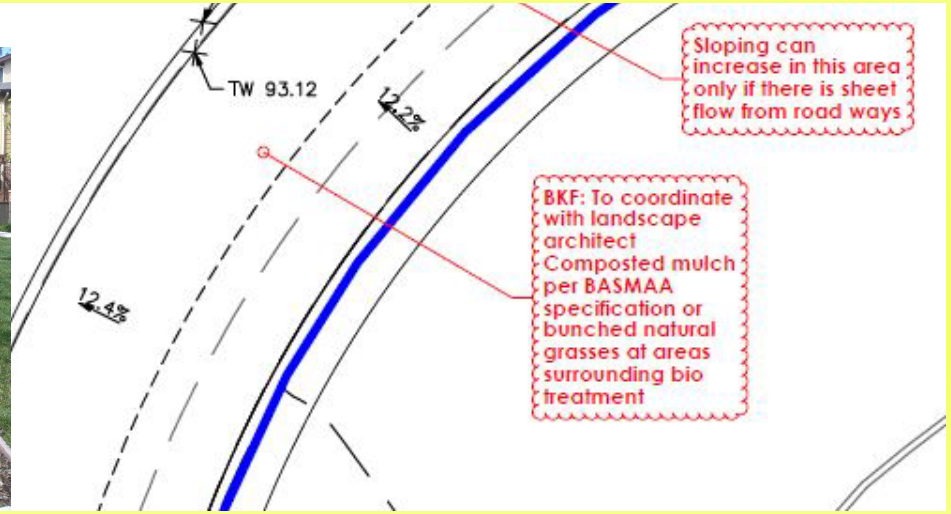


Applying Lessons Learned from Raingardens' Maintenance to their Design

- ✓Divide basins that occupy hillsides into 2 or more basins or adding weirs or check dams to handle steeper slopes.



- ✓Include landscape architect in rain garden design



Application of O&M Lessons Learned to C.3 Facility Design

- Plants basic requirements need to be met, list in Guidebook are suggestions
- Flood Zone – ground water issues and siltation from flooding
- Overflow structure not near edge

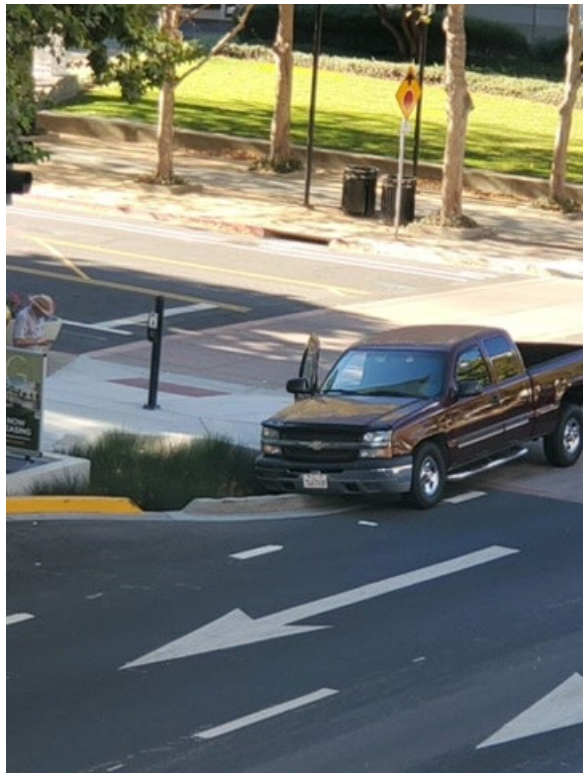
Application of O&M Lessons Learned to C.3 Facility Design

- Depth (too deep)
  - 8" from overland release point.
  - Inlet flows DO NOT need to daylight in the bottom

- Building Structures (too close, requires waterproofing of foundation)

Application of O&M Lessons Learned to C.3 Facility Design

- Basins too close to road or drive aisle



Audience Q&A

Wrap up

Final Comments

Questions and Further Information

- Use the *Stormwater C.3 Guidebook*
  - cccleanwater.org
- Contact CCCWP (*Guidebook* and LID design questions)
  - CCCWP main line (925) 313-2360
  - Erin Lennon, Erin.Lennon@pw.cccounty.us
- Contact your local reviewer (project-specific questions)
- cccleanwater.org/about/contact