



**SCVURPPP
C.3 Workshop
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Stormwater Treatment for Public Right-of-Way Areas Replaced as part of Regulated Projects – Challenges and Solutions

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Presentation Overview

- Requirements: Parcel-Based Project Frontages
 - Frontage Areas
 - Treatment Measure Examples
- Frontage Areas
 - Challenges
 - Solutions
 - Opportunities
 - Alternative Compliance Options



Project Frontage Requirements

- Off-site improvements in the public ROW that are required as part of a regulated parcel-based project must be included in the calculations:
 - Altered IS areas count toward thresholds
 - Altered IS areas must be treated
 - Altered IS areas count towards 50% rule
- Example redevelopment project:

- Development site boundary
- Sidewalk replacement
- Road improvements
- Project boundary



Parcel-based Projects and the “50% Rule”

- Where a redevelopment project alters $\geq 50\%$ of the impervious surface of a previously existing development, runoff from the entire project (i.e., all existing, new, and/or replaced impervious surfaces) must be treated.
- Where a redevelopment project alters $< 50\%$ of the impervious surface of a previously existing development, only runoff from the new and/or replaced impervious surface of the project must be treated.
- The calculations in the scenarios above must include portions of the public right of way (e.g., frontage) that are developed or redeveloped as part of the Regulated Project.
 - Tip: Define project boundary to include parcel boundary plus just the offsite impervious surface that is being altered.

Types of Bioretention in the Streetscape

Stormwater Planter



Stormwater Curb Extension



Tree Well Filter/
Pervious Pavement



Credit: ICPI

Types of Bioretention in the Streetscape



6 Two-way, raised, separated bikeway with stormwater planter (Emeryville, CA)



Credit: SMCWPPP

Stormwater curb extension in Safe Routes to School improvements (San Mateo, CA)

Types of Bioretention in the Streetscape

Tree Well Filter (Silva Cells)



Credit: DeepRoot Green Infrastructure

Tree Well Filter - Box



Credit: StormTree

Tree Well Filter - Open

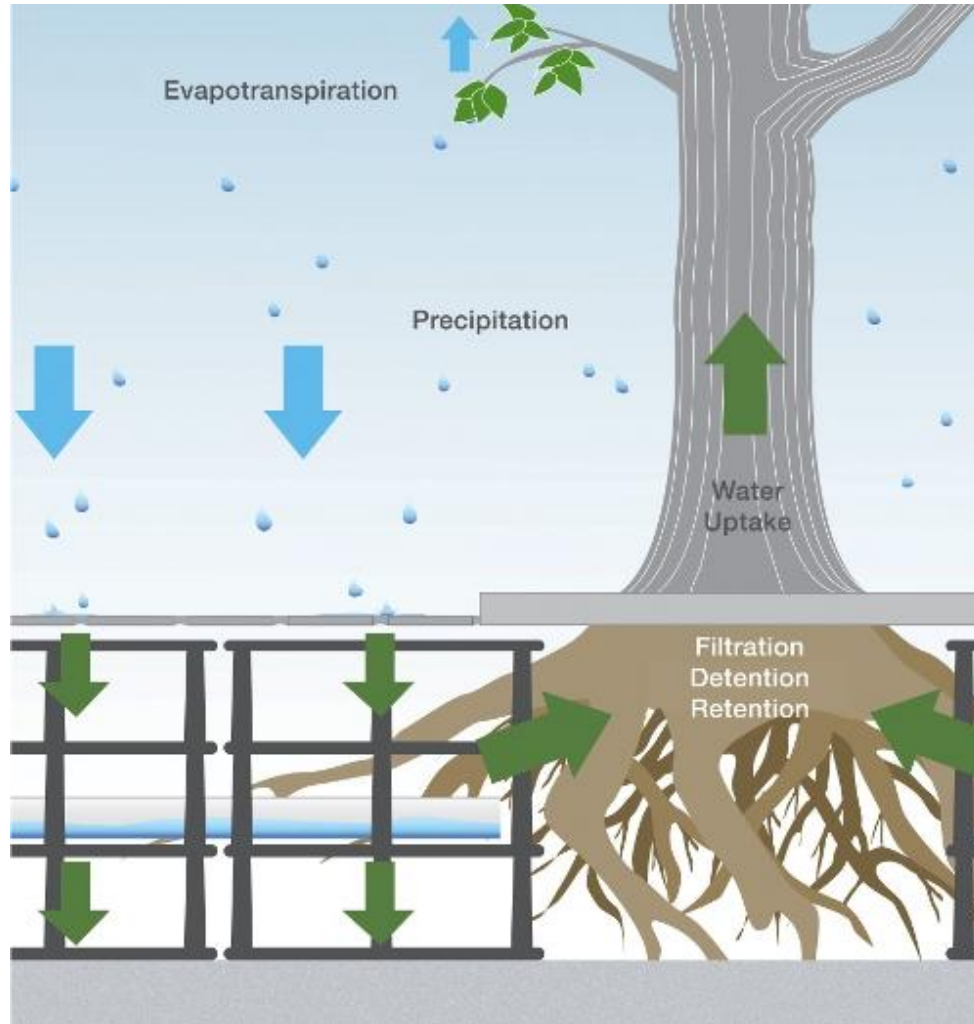


Suspended Pavement System with Structural Soil under sidewalk (Emeryville, CA)

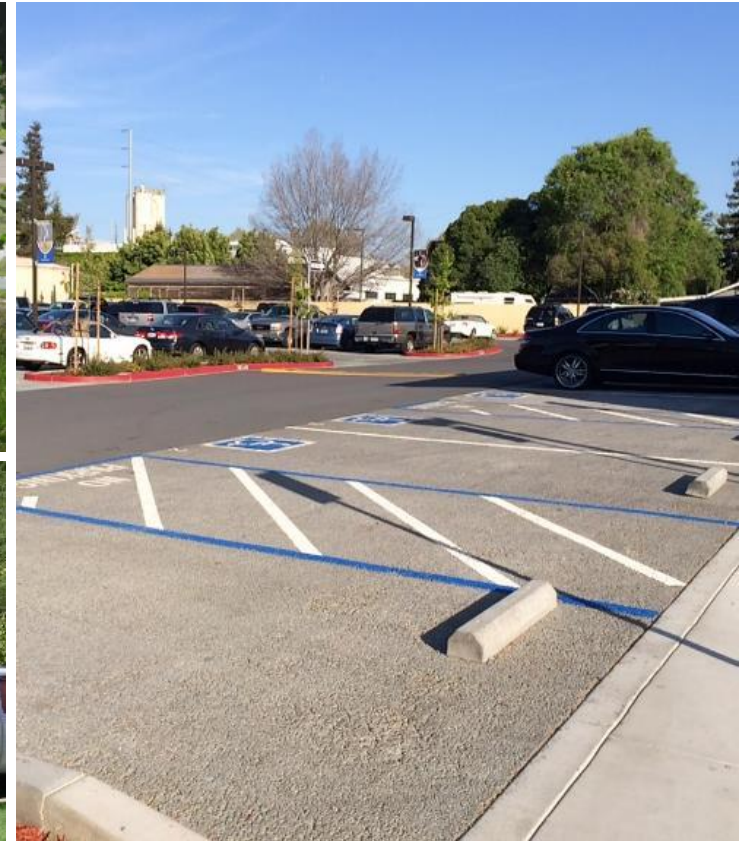
Suspended Pavement System with Silva Cells under Pervious Pavement (Palo Alto, CA)

Open box tree well filter (StormTree)

Biotreatment with Trees



Pervious Pavement Types



Clockwise from left:
Permeable pavers,
Pavers with grass,
Pervious concrete,
Porous asphalt

Pervious Pavement in the Streetscape



Stormcrete Pre-cast Pervious Concrete
(Berkeley)



Permeable Interlocking Concrete Pavers
(San Jose)

Pervious Pavement in the Streetscape



Pervious Pavers
(Palo Alto)



Grid Supported Gravel Pavement
(Stanford)

Frontage Topic Summary



Challenges

- Challenges
 - Policy
 - Space
 - Utilities
 - Street parking
 - Existing trees
 - Safety
 - ADA

Solutions

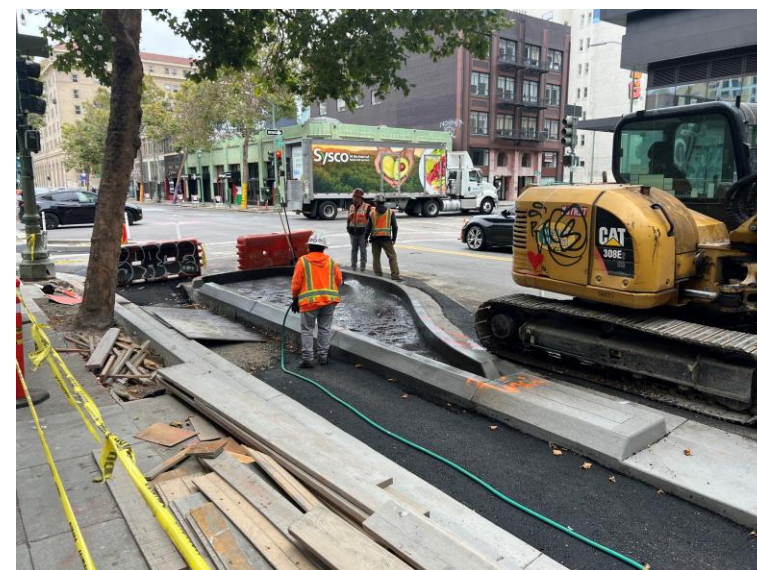
- Solutions
 - Self-retaining areas
 - Siting areas together
 - Street trees
 - Silva cells
 - Pervious pavement
 - Separated bikeways
 - Alternative compliance

Opportunities

- Opportunities
 - GSI targets
 - Maintenance
 - Infiltration
 - Urban greening
 - Tree planting
 - Shade/cooling
 - Beauty

Challenges

- **Municipal Policy Examples**
 - No GSI in the public right of way (PROW) allowed to be constructed by private developers
 - No pervious pavement in PROW
 - No GSI in the PROW allowed to be maintained by private companies
 - No runoff from private property allowed in the PROW
 - No runoff from PROW allowed to drain to private property
 - No mixing of private and public runoff



Challenges

■ Space

- Some sidewalks are too narrow for a stormwater planter
- Some roadways are too narrow for a stormwater curb extension
- May not be enough space available along the roadway edge for bioretention between lighting, driveway cuts, trees, hydrants, designated parking, etc.



Challenges

■ Utilities

- Above ground utilities conflict with new tree planting in GSI
- Below ground utilities conflict with bioretention system depth, function, and underdrain connections
- Major issue is lack of storm drain in PROW to connect GSI underdrain to
- Lack of irrigation system for bioretention area vegetation can affect long term plant health



Challenges

■ Street parking

- Loss of on-street parking to make space for bioretention can be politically challenging
- Need to providing space for people getting out of vehicles through GSI
- If there is no parking lane, there is typically no space for a stormwater curb extension
- Need to coordinate parking meter, streetlight, and other infrastructure locations with GSI design



Challenges

■ Existing trees

- Large existing tree roots can be damaged with excavation work
- Large trees can have canopies that cross property boundaries
- Removal or changes to adjacent landscaping (turf) can affect trees
- Large trees may be protected by a tree preservation ordinance



Challenges

■ Safety

- Sight lines for moving vehicles and GSI measures including vegetation and trees
- People exiting vehicles into GSI measures and tripping
- Maintenance crews working in the roadway



Photo courtesy of SMCWPPP

Challenges

■ ADA

- Handicapped parking needs more space and clear path of travel from on-street parking to sidewalk – bioretention can be a barrier
- Providing clear ADA path of travel can take up space reducing area available for GSI
- Slopes in GSI next to sidewalks can cause trip and fall hazard
- Pervious pavement must meet ADA requirements (smoothness/gaps)



Solutions

- **Self-retaining areas**
 - Sidewalk areas with sufficient space can be designed as self-retaining areas with a simpler design and sizing
 - Max 2:1 ratio (example 10-ft sidewalk with 5-ft planter strip or enlarged tree well)
 - Depressed area with up to 3” ponding depth may be needed



Solutions

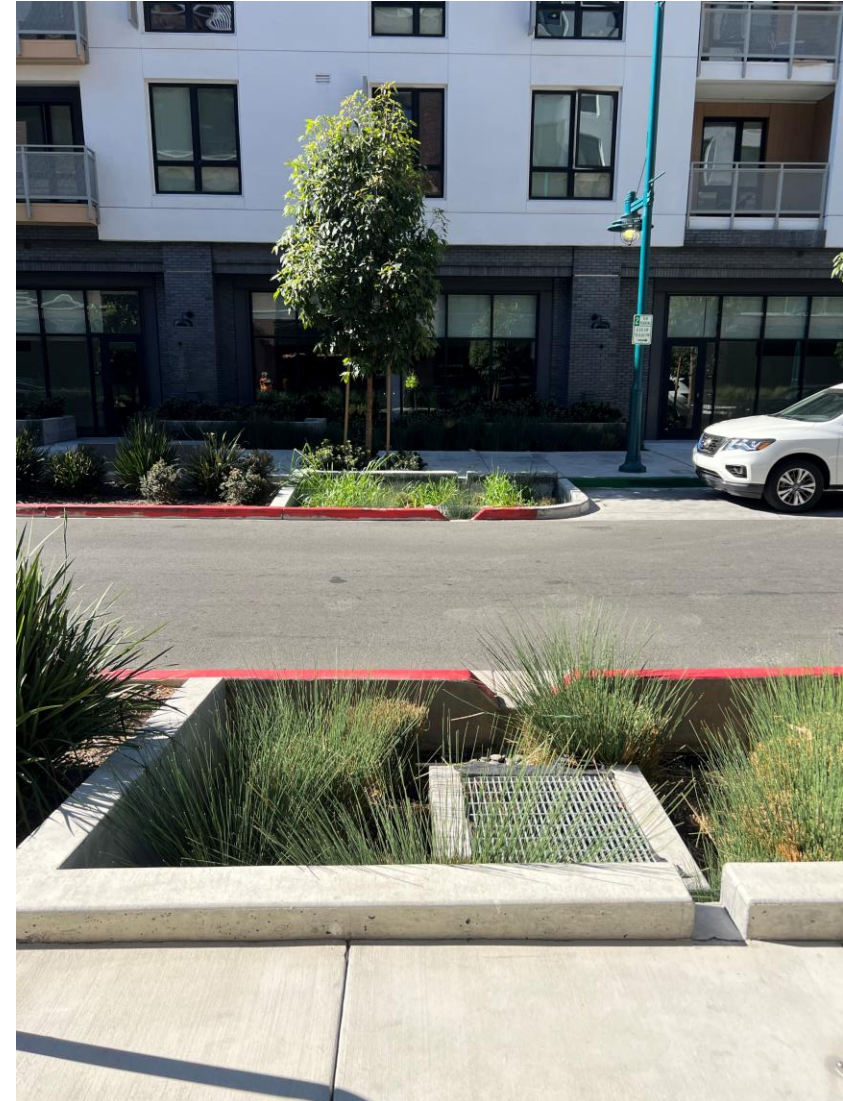
■ Siting

- If several small areas of IS are being created or replaced, they can be aggregated and treated in one area where there is space available instead of many small areas
- Look around the frontage for sites that have fewer constraints



Solutions

- **Street trees (new)**
 - Trees provide multiple benefits and can be designed with partial underground bioretention areas that allow sidewalks over them (e.g., Silva Cells), thus taking up less space in a frontage
 - New trees may be already required to be planted
 - Integrate tree and GSI areas



Solutions

- **Silva cells**
 - Silva Cells and Strata Vaults are proprietary modular suspended pavement systems that can be constructed under sidewalk areas – saving space
 - Silva Cells allow for larger tree species to grow without heaving sidewalks



Solutions

- Pervious pavement
 - If there is no room for bioretention consider using a type of pervious pavement
 - Examples include:
 - Pervious gutter
 - Pervious sidewalk
 - Pervious pavers in travel lane
 - Pervious pavers in parking lane



Solutions

- **Bikeways and bulbouts**
 - Protected bikeways and bulbouts can provide space for GSI while improving safety and creating active transportation facilities
 - Protected bikeway barrier areas can be used for GSI
 - Bikeways can be pervious pavement



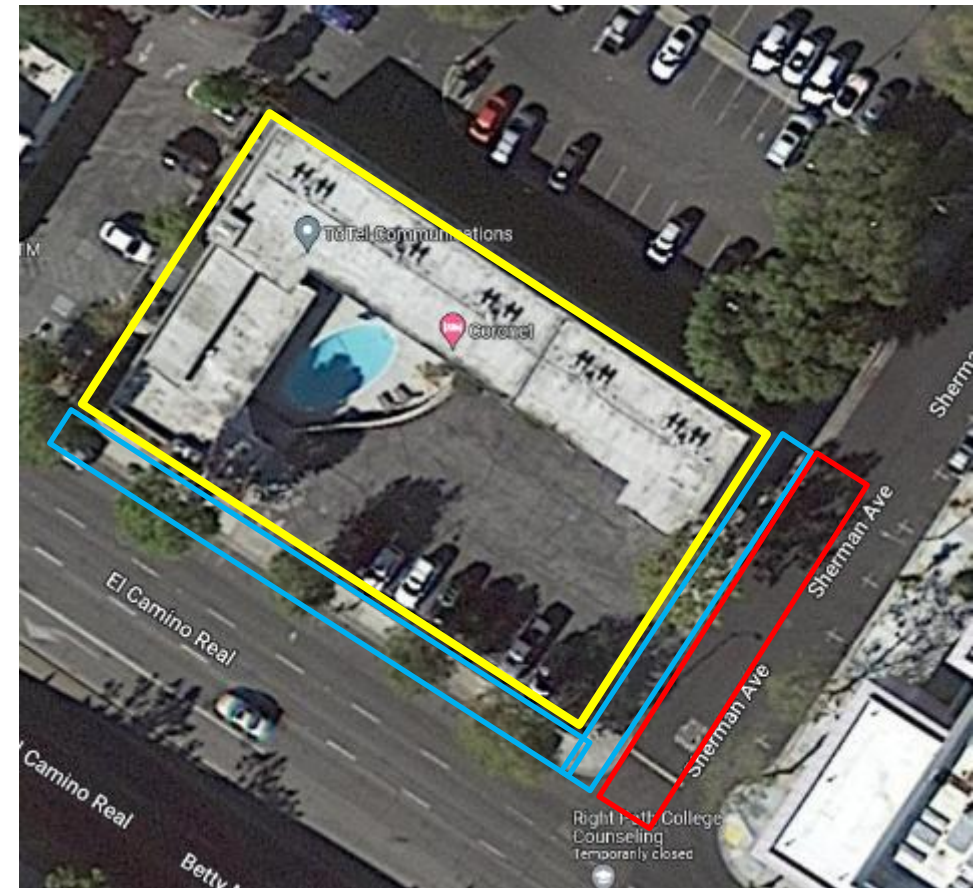
Solutions

- **Alternative compliance (AC)**
 - AC can be used where there are too many constraints in the frontage area.
 - Examples of AC include:
 - Building GSI measures in another nearby location or site chosen by the jurisdiction
 - Paying an in-lieu fee for construction and/or O&M



Solutions for Example Project Frontage

- **Sidewalk area**
 - Drain toward new landscaped strip (self-retaining area)
 - Pervious pavement
 - Suspended pavement system + trees
- **Street area**
 - Bioretention or pervious pavement
 - Check drainage management area (DMA) size, flow direction and low point
 - Look for feasible location near that point
 - If infeasible, consider alternative compliance (AC) at another location
 - Consider including sidewalk area as part of impervious area treated via AC



Opportunities

- **GSI targets**

- Private and public parcel-based development projects that construct GSI in the frontage areas may treat additional areas of IS - beyond what is required by the MRP - that can assist the Permittee with meeting numeric targets



Opportunities

- **Maintenance**
 - Requiring private development projects to maintain GSI in the frontage areas can reduce the burden on permittees to maintain GSI in the public ROW
 - But training, inspection and verification is recommended and may take public resources



Opportunities

- **Urban greening**
 - Reap the benefits of urban greening by requiring GSI in the frontage areas such as:
 - Increased infiltration
 - Soil restoration
 - Improved habitat for plants and animals
 - More natural areas for residents to enjoy



Opportunities

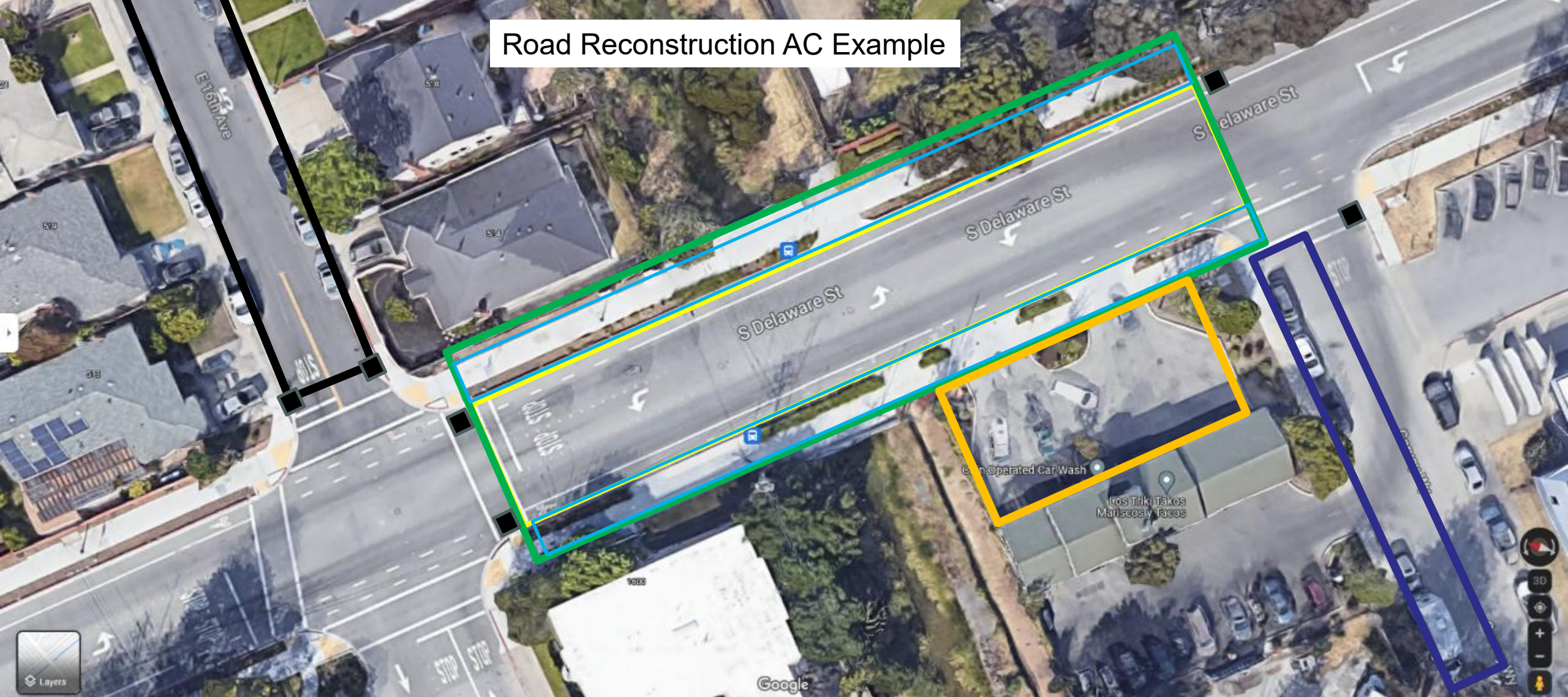
- Tree planting (new)
 - Integrating tree planting into GSI measures in the frontage can provide many benefits such as:
 - Shade
 - Cooling
 - Beauty
 - Habitat for birds and insects
 - Improved air quality



Alternative Compliance

- Alternative Compliance (AC) is an option in Provision C.3.e that allows flexibility in meeting C.3 requirements for regulated projects
- The options for AC include:
 - LID treatment of equivalent impervious surface in another location off-site
 - Payment of in-lieu fee for off-site or regional project treatment
- AC projects must be in same watershed (defined broadly) and achieve a net water quality benefit (not defined)
- AC projects must be completed within 3 years of regulated project completion (up to 5 years with Water Board approval)

Road Reconstruction AC Example



- Road, bike lane and gutter replacement boundary (Regulated treatment area)
- Sidewalk replacement (Regulated treatment area)
- Project boundary (Regulated treatment area)
- Possible alternative compliance treatment area
- Possible alternative compliance treatment area
- Parking lot contributing runoff

For More Information:

- SCVURPPP New and Redevelopment Resources Webpage
<https://scvurppp.org/newdev/>
- SCVURPPP C.3 Stormwater Handbook
<https://scvurppp.org/2024/10/28/c-3-stormwater-handbook-2024/>
- SCVURPPP GSI Handbook
<https://scvurppp.org/swrp/gsi/>
- SCVURPPP Stormwater Treatment Measure Data Portal
<https://scvurppp.org/gsi/>
- Municipal Regional Stormwater Permit (MRP 3.0)
www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/MRP/mrp5-22/R2-2022-0018.pdf

Questions?

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