CENTRAL COAST POST-CONSTRUCTION REQUIREMENTS

IMPLEMENTATION GUIDANCE SERIES[1]

SERIES ISSUE #1: THE USE OF SELF-RETAINING AREAS TO SUPPORT POST CONSTRUCTION STORMWATER CONTROL COMPLIANCE

LID is a stormwater management approach that mimics the natural hydrologic cycle by capturing, treating, and infiltrating runoff on-site. LID strategies include limiting the amount of impervious surfaces that contribute stormwater runoff and directing any runoff that is generated to on-site landscape features. Use of landscape for stormwater quality management often involves routing stormwater runoff from impervious areas, such as rooftops, walkways, and patios, onto the surface of adjacent landscaped areas where treatment and infiltration can occur. If there is sufficient space, the use of landscape can be a cost-effective way to address stormwater control requirements for new and redevelopment projects. As such, the Central Coast Regional Water Quality Control Board (Water Board) post-construction stormwater control requirements (PCRs) allow for the use of landscaping to support compliance (See Note 1). This issue of the Central Coast PCR Implementation Guidance series is focused on the sizing and design of Self-Retaining Areas (SRAs) that receive runoff from contributing impervious areas.

Definition of a Self-Retaining Area (SRA)

According to the PCRs, a SRA is defined as a landscape area that retains the entire design storm (i.e. no stormwater runoff associated with the design storm is discharged from the SRA). For the Central Coast region, this includes the rain falling directly on the SRA, but can also include the contributing runoff from a drainage management area for either the 85^{th} or 95^{th} percentile 24-hour storm event (based on the site specific requirements).

Sizing and Design Guidance for a SRA that Receives Runoff from Impervious Surfaces

The sizing and design of SRAs is intended to be simple to encourage use of landscape areas as a cost-effective stormwater management tool. Some regional and statewide LID guidance documents outline a simple sizing approach of a maximum of two parts contributing impervious area to one part landscape area. To use the SRA 2:1 sizing approach for Central Coast PCR compliance, the performance of the SRAs must be consistent with the stormwater control measure sizing methods allowable in the PCRs (i.e. the Simple Sizing or Routing Method). To determine situations where the 2:1 ratio would meet the PCRs, Water Board staff evaluated various rainfall depth and saturated soil infiltration rate permutations. To comply with the PCRs using a maximum 2:1 ratio, the site rainfall and saturated soil conditions within the SRA must fall within the acceptable range on Rainfall Depth vs. Infiltration Rate curve (See Figure 2 in Note 3). If using the 2:1 sizing for SRAs, additional design parameters must be followed to ensure PCR compliance:

- After final site grading, ensure the prescribed runoff volume from the 85^{th} or 95^{th} percentile 24-hour storm event (as per project requirements), associated with the SRA Drainage Management Area, is routed to the SRA and retained.
- Only include the functional area for stormwater infiltration in the SRA footprint of the 2:1 ratio. Sloped sides or edge conditions represent additional area that must be added to the SRA (See Note 2).

[1] The PCR Guidance Series is developed by the Central Coast Joint Effort Review Team (JERT). The JERT is a group of regional stakeholders focused on addressing issues associated with post-construction stormwater quality control requirements. Water Board staff facilitate JERT meetings, which are focused on issues where regulator input is desired to clarify the pathway to PCR compliance. JERT bulletins are a means to disseminate information, findings, and direction resulting from the JERT to the broader group of PCR stakeholders.

- Allow for a minimum ponding depth of 3 inches within the SRA footprint.
- Ensure landscape area is relatively flat such that infiltration is evenly distributed. Berms or similar design elements may be needed to help distribute flow.
- Side slopes and flow paths need to be protected from erosion.
- No lining(s) (pervious or impervious) should be used that hinder vertical infiltration.
- Minimize compaction of the SRA soils to avoid reduced infiltration rates. Soil amendments are generally helpful to improve infiltration.
- Include appropriate plant palettes that can tolerate periodic ponding as well as extended periods of little to no irrigation or precipitation. Generally, native drought-tolerant vegetation is preferred.
- As with any stormwater infiltration project, evaluate the suitability for infiltration in regards to site conditions, proximity to buildings, geotechnical considerations, and potential exacerbation of existing conditions (e.g., contaminated soils or groundwater).
- Methods to manage sediment inputs must be addressed in the design; otherwise, sediment captured within the SRA can create an impervious layer limiting infiltration. For example, at curb cut inlets, use of gravel or cobble can reduce erosion from incoming stormwater runoff while also providing locations for sediment capture that can be easily maintained.

NOTE 1: Relationship of SRAs to the Central Coast PCRS

Projects adhering to this guidance can achieve compliance with PCR Performance Requirements Nos. 2 and 3 (Water Quality Treatment and Runoff Retention respectively).

- ✓ PCR Performance Requirement No. 2 (Water Quality Treatment) provides the option to use LID systems that are designed to retain the runoff generated by the rainfall event specified by the PCRs (PCR Section B.3.b.i).
- ✓ PCR Performance Requirement No. 3 (Runoff Retention) provides the option to route runoff from impervious surfaces, generated by the rainfall events identified in the PCRs, to undisturbed or natural landscaped areas, so long as the applicant can demonstrate that the runoff will be infiltrated and will not produce runoff or nuisance ponding (PCR Section B.4.d.iv.2).

Project applicants may opt to use SRA designs differing from this guidance series, so long as the applicant can demonstrate PCR compliance.

NOTE 2: SRA Sizing and the Functional Footprint

If designing a flat-bottomed SRA, where stormwater is intended to pond across the entire footprint (i.e., width X length), the entire area is considered functional for stormwater infiltration. However, if designing an SRA that will include side-slopes or perimeter areas, these areas are not included in stormwater infiltration calculations and must be added to the SRA (Figure 1). As an example, consider an SRA of 500 square feet, 10 feet by 50 feet, that is accepting runoff from 1000 square feet of impervious area (2:1 sizing). If an additional two foot perimeter is needed to accommodate a side-slope condition all the way around the SRA, then the total footprint of the facility will be 14 feet by 54 feet or 756 square feet.

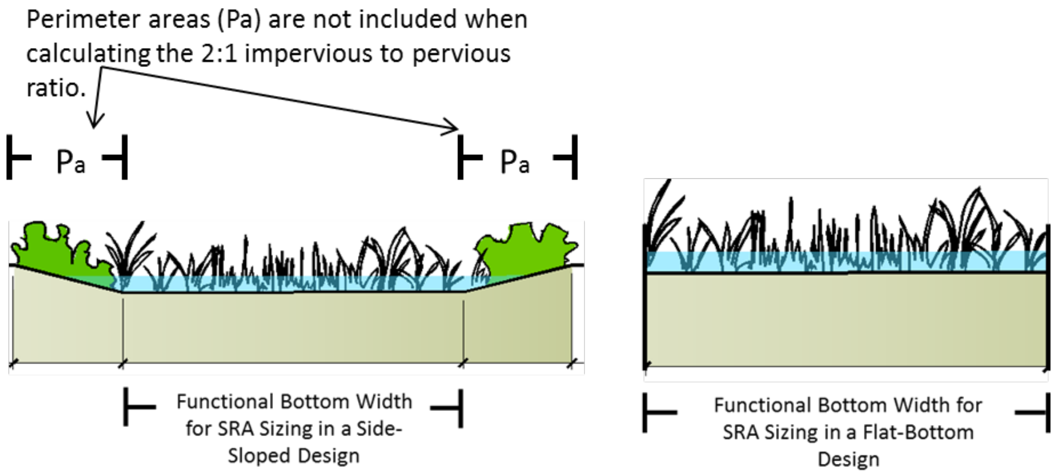
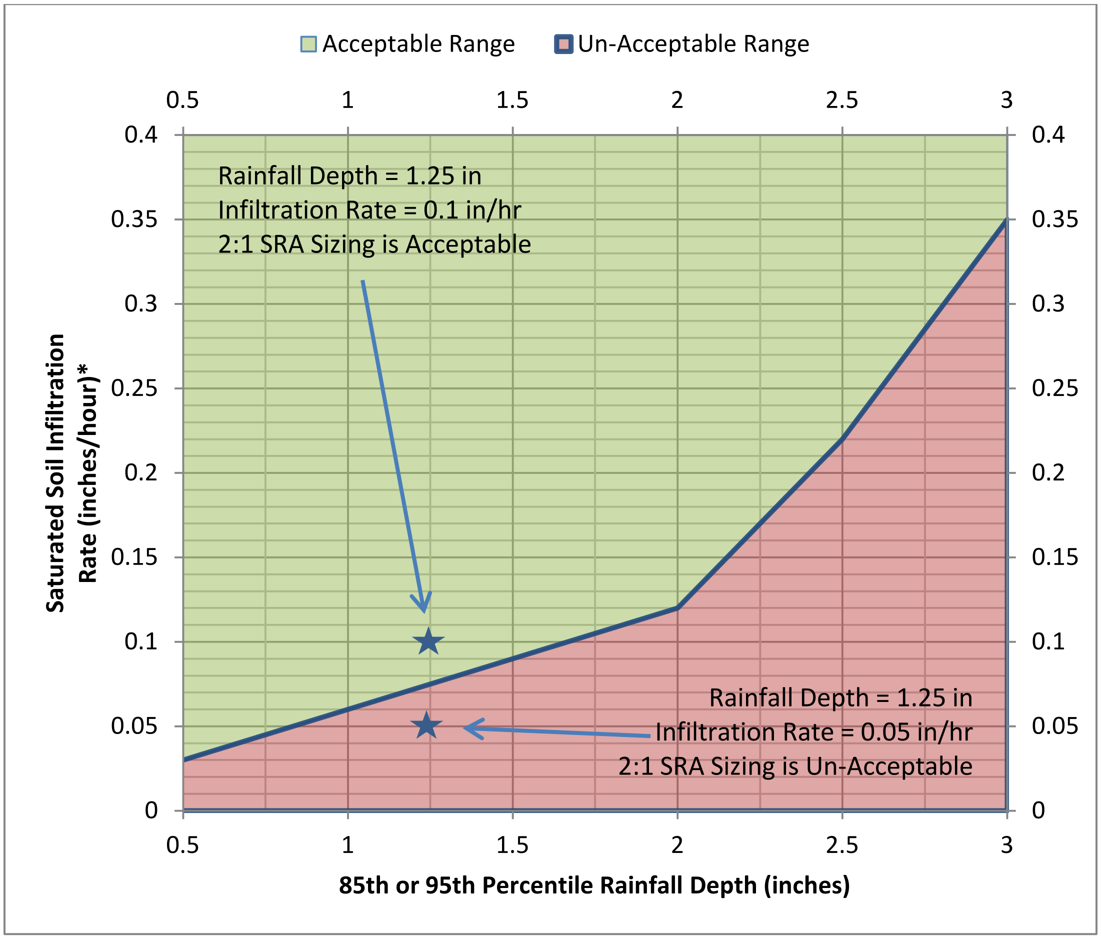


Figure 1: Example of a side-sloped (left) and a flat-bottomed (right) vegetated SRA. The perimeter area due to the side slopes, illustrated in the figure to the left, is not part of the functional infiltration portion of the SRA, and is not included when calculating the impervious to pervious ratio.

NOTE 3: LOOK UP CHART FOR APPLICABLE CONDITIONS FOR SRA 2:1 SIZING

Water Board staff evaluated various rainfall depth and saturated soil infiltration rate permutations to assess under what conditions the 2:1 sizing approach would apply throughout the Central Coast region. Water Board staff created a look-up chart (Figure 2) to identify the conditions when project applicants can use the 2:1 SRA ratio to meet the PCRs. Using the Santa Barbara Urban Hydrograph method and National Resources Conservation Service Type I rainfall distribution, Water Board staff developed the Chart by routing runoff from an impervious area to a pervious SRA. The impervious area is twice the size of the SRA. Outflow from the SRA was limited to overtopping and infiltration through the soil surface based on the saturated hydraulic conductivity of the soil surface. The hydraulic conductivity was iterated for each rainfall depth resulting in a minimum saturated hydraulic conductivity that would not result in overtopping the SRA (i.e. stay below a ponded depth of three inches), and ponded water would be emptied within 48 hours. Water Board staff chose 48 hours as this is the time the facility would be required to empty to meet water quality performance requirements. The Chart shows that simply using a ratio of 2:1, without considering site conditions, does not always meet the intention of the PCRs, and that discharge from the SRA could occur under certain situations. The example shown in the Chart illustrates an SRA at a site, with a design storm depth of 1.25 inches and a hydraulic conductivity of 0.1 inches per hour, will drain within 48 hours and result in no discharge for the design storm. For storms greater than the design storm and soils with a hydraulic conductivity of 0.125 inches per hour or lower, ponding may last longer than 48 to 72 hours, therefore necessitating additional considerations for vector control.



*Underlying saturated soil infiltration rate, as indicated by locally accepted data approved by the municipality. If native soils directly underlying SRAs will likely sustain an unsaturated or partially saturated condition during the wet season, project applicant may use infiltration rates associated with an unsaturated or partially saturated condition when using the look-up chart. Note that infiltration rates provided by NRCS soil maps are typically based on saturated conditions.

Figure 2: Look-up chart used to determine applicable range of "2:1 Ratio" for Self-Retaining Areas subject to various rainfall depth and infiltration rate combinations. Graph based on SBUH Model, SCS storm Type I, and assumes no ponded water after 48 hours to meet PCR Performance Requirements 2 and 3 (water quality treatment and retention). Values generated assuming maximum 3-inch uniform ponding and a self-retaining area with 0 percent slope.