

Planning for On-Site Water Retention

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Benefits of retention in park design

- Reduce volumes in storm water and treatment systems.
- Retention areas trap and infiltrate rainfall and storm water, and concentrate sediments, pollutants and nutrients.
- Systems designed to mimic the appearance and hydrology of nature provide habitat, recreation and interest.
- Retention areas can often reduce costs of parklands.



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Retention Site Analysis

- Document soil structure and infiltration (1/2" per hour – low, 2" per hour average)
- Salvage vegetation, adjacent uses, intended use?
- Rainfall estimates, sources of water (parking lot, waste water from development?) and watershed size.
- One basin or several? Consider the entire site.
- Natural low points
- Desired maintenance level?



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Design parameters

- Intensity of uses range from simple catch basins to habitat restoration and recreation uses.
- Landforms are softened over time, so try to include more diversity in grading plans.
- Storm intensity should be overestimated for the first three years of new site.
- Buffer and upland areas are critical to the system.
- Overlapping jurisdictions need to be understood.



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Design considerations

- Regional character and original habitat can be referenced even in urban areas.
- Definitions of “landscape” and “habitat” should blur.
- Durable materials are a must; these sites are demanding and not well funded for repairs.
- Buffers and upland areas are critical to the site.
- Recreation and social uses should be more strongly integrated.



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Hydrology

- Understand natural systems for storm intensity, low flow channels, overflow terraces
- Hydrology controls vegetation.
- Channel roughness should be provided to slow storm flows
- Anticipate movement of sediment and debris
- Incorporating pervious paving in watersheds provides delayed runoff



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Grading

- Allow for gentle transitions of slope and grade breaks or nature will rearrange the site after the first rain.
- Flat basin bottom enables maintenance.
- Max. side slope 5:1 enables maintenance.
- 1% minimum flow lines.
- Accuracy of construction is critical to meet hydrology needs.
- Protect new construction with slope covers or temporary vegetation like clover or sterile wheat.



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Irrigation

- Drip can be used on slopes, perimeters.
- Spray is preferred for large basin floors and establishing seed.
- Retention areas must have their own controller stations to account for seasonal variation.
- Temporary irrigation does not work, tends to be easily damaged.
- Defensive design needed because irrigation can get overgrown, clogged.



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Basin Planting

- Ideal species are low water use, seasonal wetland plants with fibrous root systems, adapted to seasonal extremes.

Sedges

Rushes

Horsetail

Wild Rye

- Native plants not always easy to cultivate or maintain.

- Combination of seeded and plug planted starts is best for fast cover.



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Buffer Planting

- Some riparian companions:

Toyon

Buckeye

Wild Rose

Walnut

Deer Grass

- Leave adequate space at margins for ornamental buffers.

- Buffers can improve public perception of retention sites.

- Hard barriers rarely needed.



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Maintenance

- Vegetation succession will occur rapidly, beware of woody weeds and let the rest happen naturally.
 - Willow, Blackberry, Pampas Grass
- Long term, all weather access needs to be considered.
- Knowledge of seasonal maintenance is key, well timed mowing can promote growth and reduce weed invasion.
- Good record keeping and as-built plans needed because these sites are dynamic.



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The Future ?

- Entire projects are low water use, zero run-off.
- Water harvested from retention areas for re-use.
- Landscapes are managed in a seasonal way.
- Higher tenant demand at properties with sustainable landscapes.
- Recreation, retail and residential sites use converge.



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Sources

- Corn Flower Farms, Elk Grove CA
Native and seasonal wetland plants
(916.689.1015)
- Hedgerow Farms, Winters CA
Native and adapted grasses
(530.662.6847)
- Regional Water Authority, Citrus Heights
Water agency rebates, River Friendly
Green Gardener Training
(916.967.7692)
- Pacific Coast Seed, Livermore CA
Native and cover crop seed
(925.373.4417)
- Regional Water Authority, Citrus Heights CA

www.riverlandscaping.org



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