SAN FRANCISCO rainwater harvesting


Photo: Ingrid Severson


Photo: Margo Bors


Photo: Mara Seiling

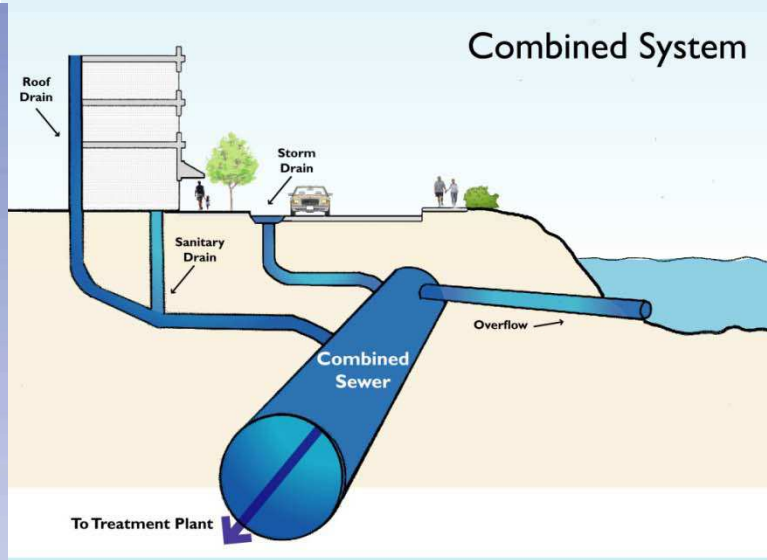
SFPUC
WATER
WASTEWATER
POWER

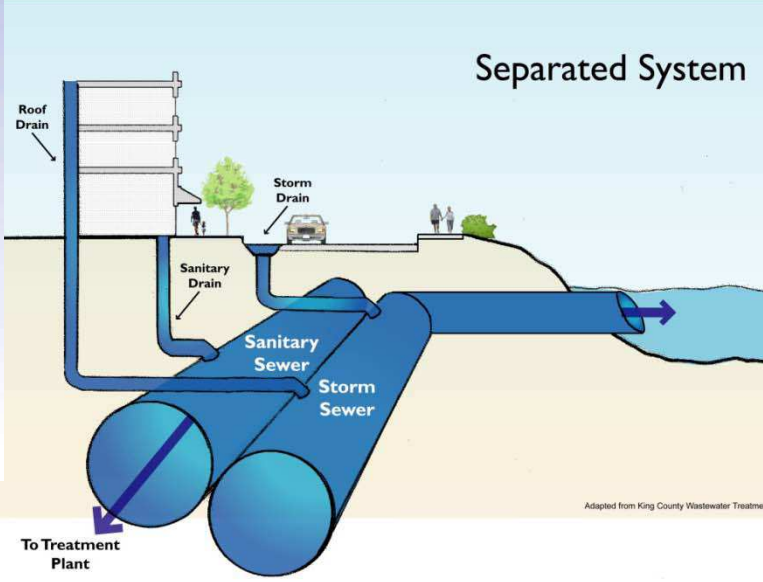
BIG BLUE BUCKET Sarah Minick 10.11.2008

Big Blue Bucket
Rainwater Harvesting Workshop

- Overview of San Francisco's combined sewer system
- San Francisco's watersheds
- Low Impact Design (LID)
- Rainwater harvesting
  - Why harvest rainwater?
  - Six basic elements
  - Outdoor workshop


San Francisco Public Utilities Commission
Wastewater System
North Point
Wet Weather Facility
Broadway
Geary Blvd.
Balboa St.
Fulton St.
Richmond Transport
Pacific Ocean
San Francisco Bay
Channel Outfalls Consolidation
Channel Pump Station
Marker St.
Twin
Peaks
Oceanside Drainage
Bayside Drainage
Flows to Oceanside Plant
Flows to Southeast Plant
Cesar Chavez St.
Southeast
Treatment Plant
Islais Creek Transportation/Storage
Portola Dr.
Sloat Blvd.
Westside Pump Station
Oceanside
Treatment Plant
Southwest Ocean Outfall
Lake
Merced
Ocean Ave.
Geneva Ave.
Lake Merced Transport
Yosemite Facilities
Hunters Point Facilities
Sunnydale Facilities
LEGEND
Westside Core System
Bayside Core System
Southeast & Richmond Facilities
Lake Merced Transport

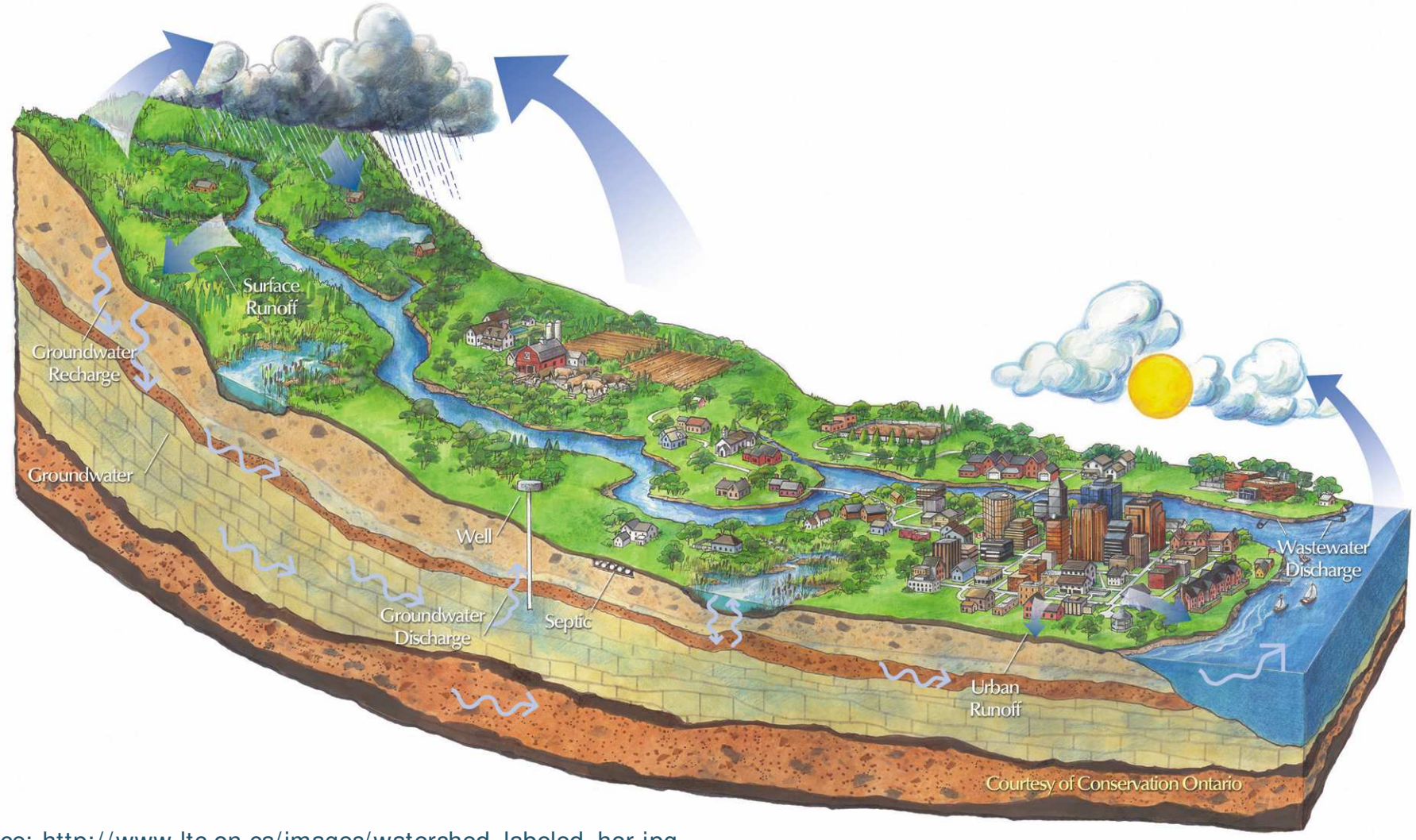

Combined System
Roof
Drain
Storm
Drain
Sanitary
Drain
Overflow
Combined
Sewer
To Treatment Plant


Separated System
Roof
Drain
Storm
Drain
Sanitary
Drain
Sanitary
Sewer
Storm
Sewer
To Treatment
Plant
Adapted from King County Wastewater Treatme

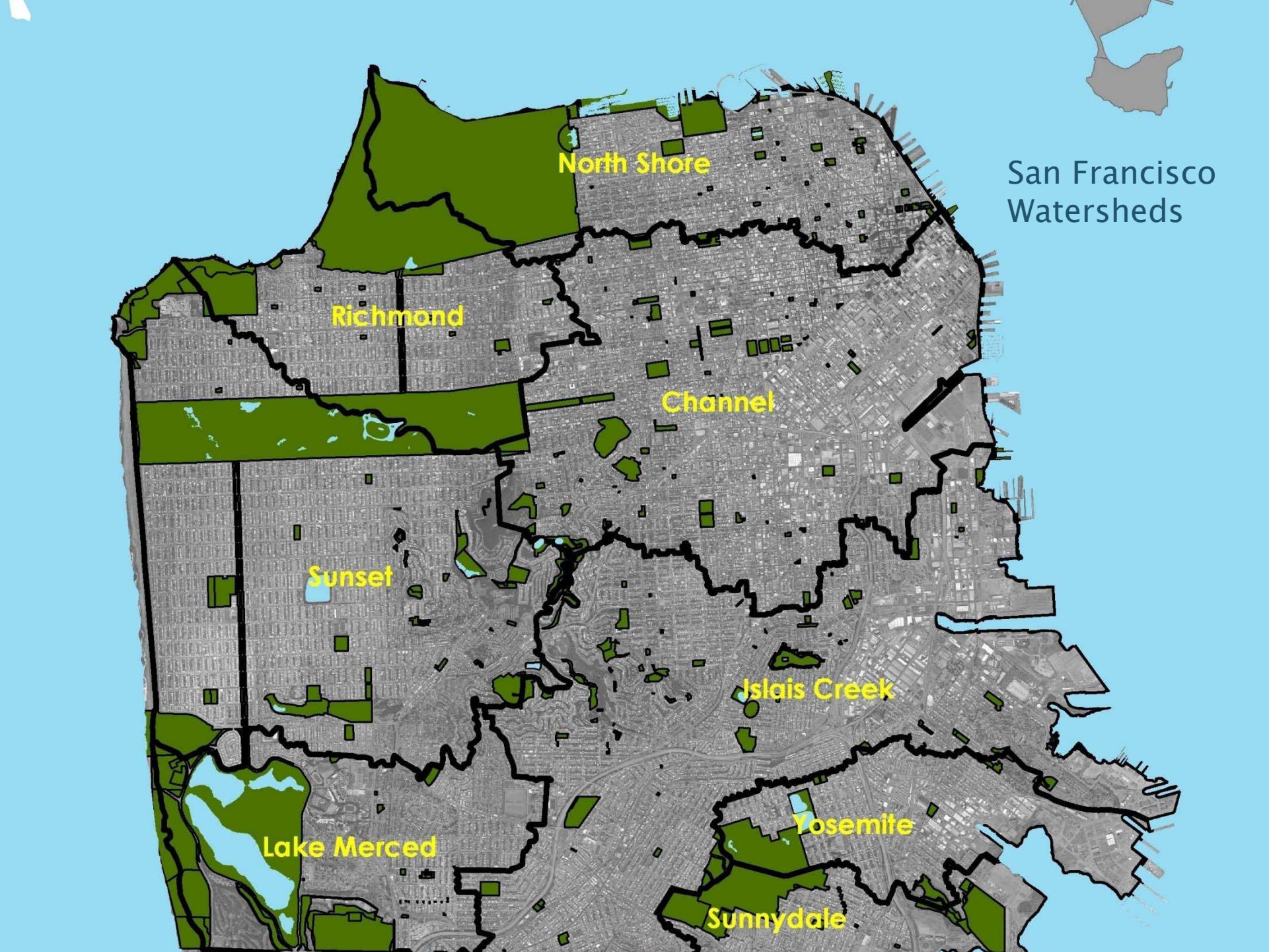
Combined sewer infrastructure

Capital improvement projects
Repair and replace

Everywhere you go, you are in a watershed.

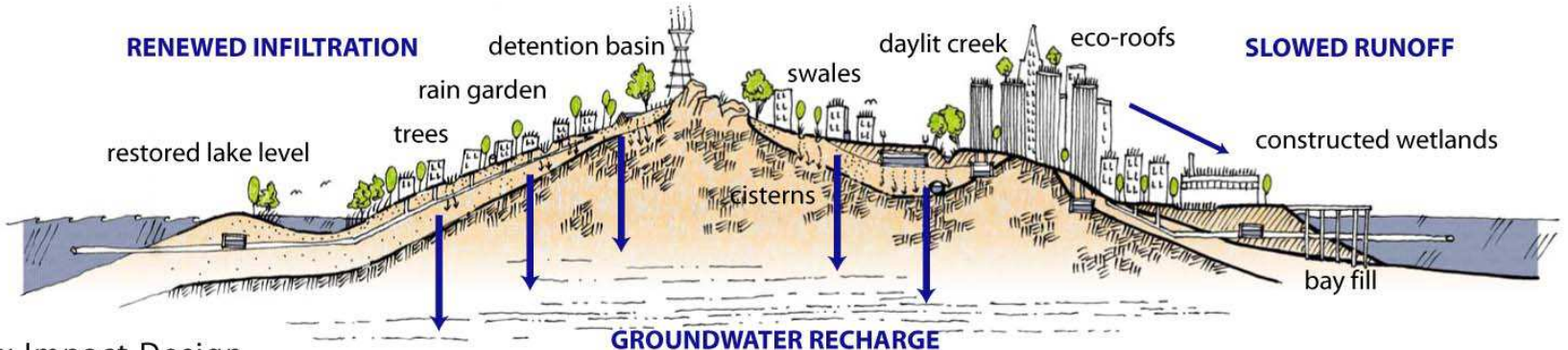


Source: http://www.ltc.on.ca/images/watershed_labeled_hor.jpg

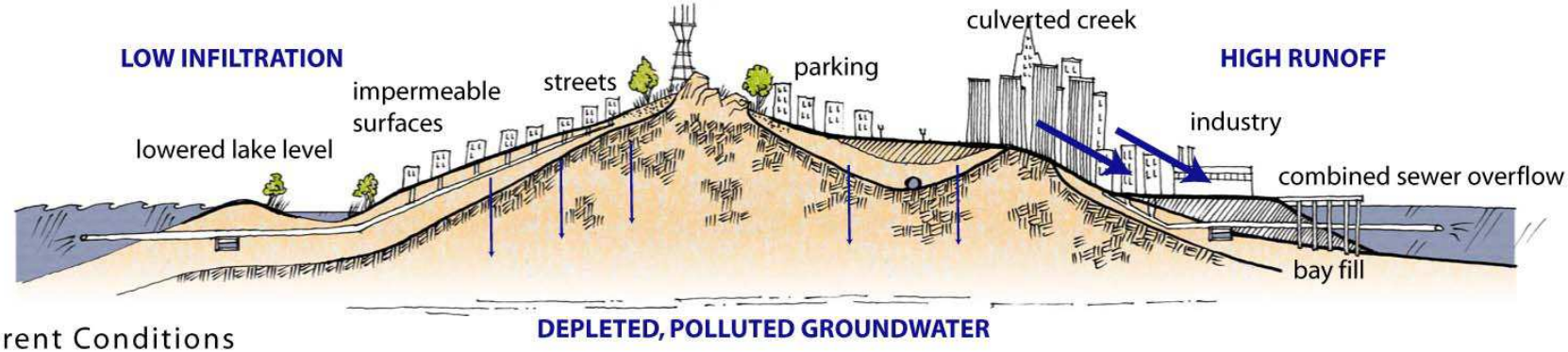

San Francisco
Watersheds
North Shore
Richmond
Channel
Sunset
Islais Creek
Yosemite
Lake Merced
Sunnydale

Urban Hydrology

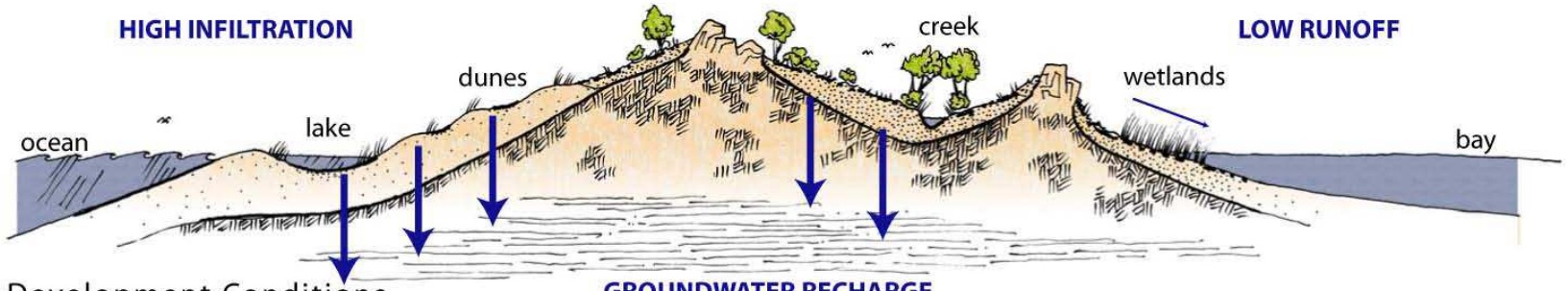
Urbanization dramatically changes the natural hydrologic cycle. Low Impact Design (LID), applied across the watershed, can partially repair the cities hydrologic cycle while beautifying the city. LID uses stormwater as a resource and reduces combined sewer overflows.



Low Impact Design

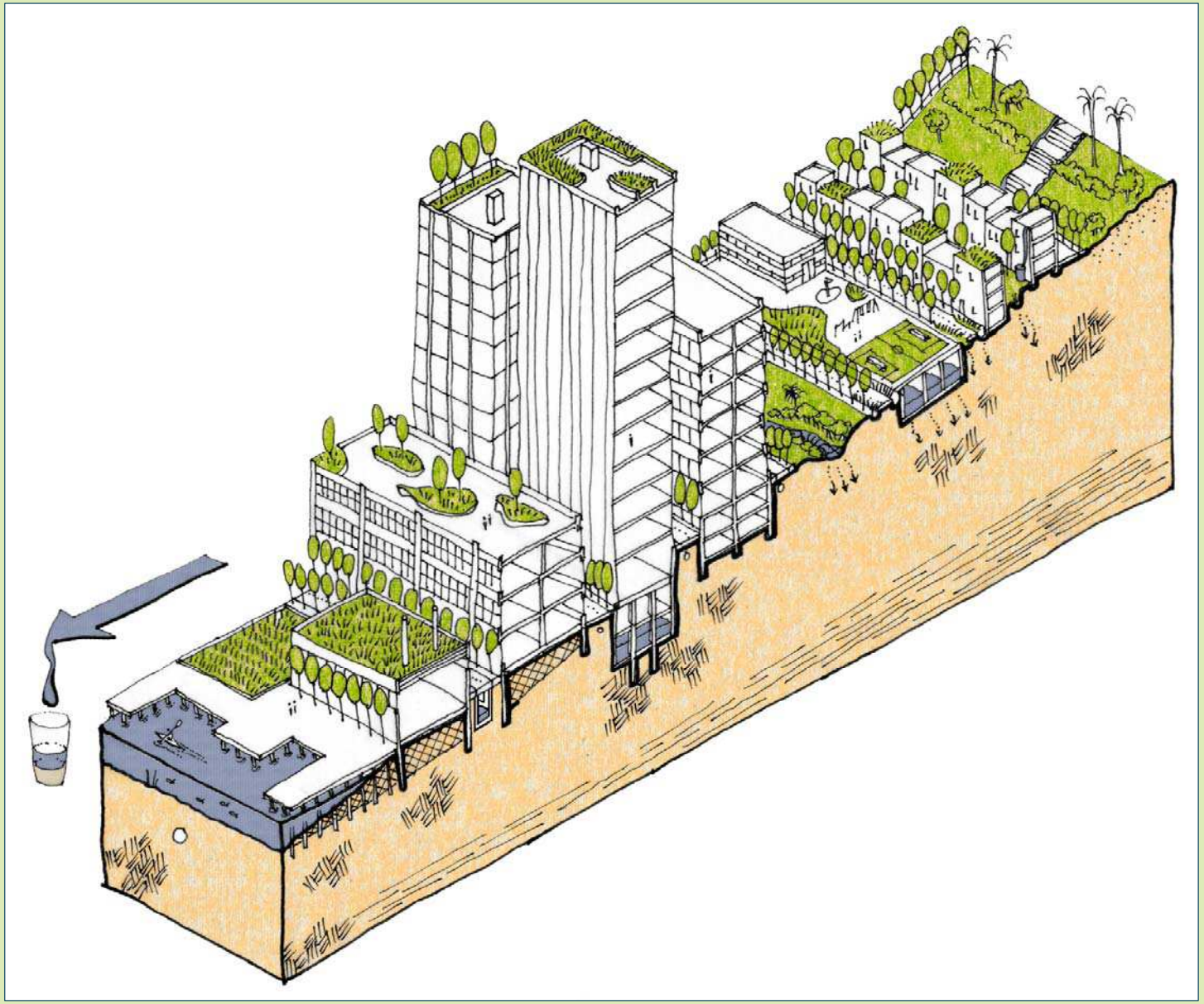


Current Conditions



Pre-Development Conditions

Low Impact Design (LID)



Intensive eco-roof

Rain screen

Permeable paving

Rainwater harvesting

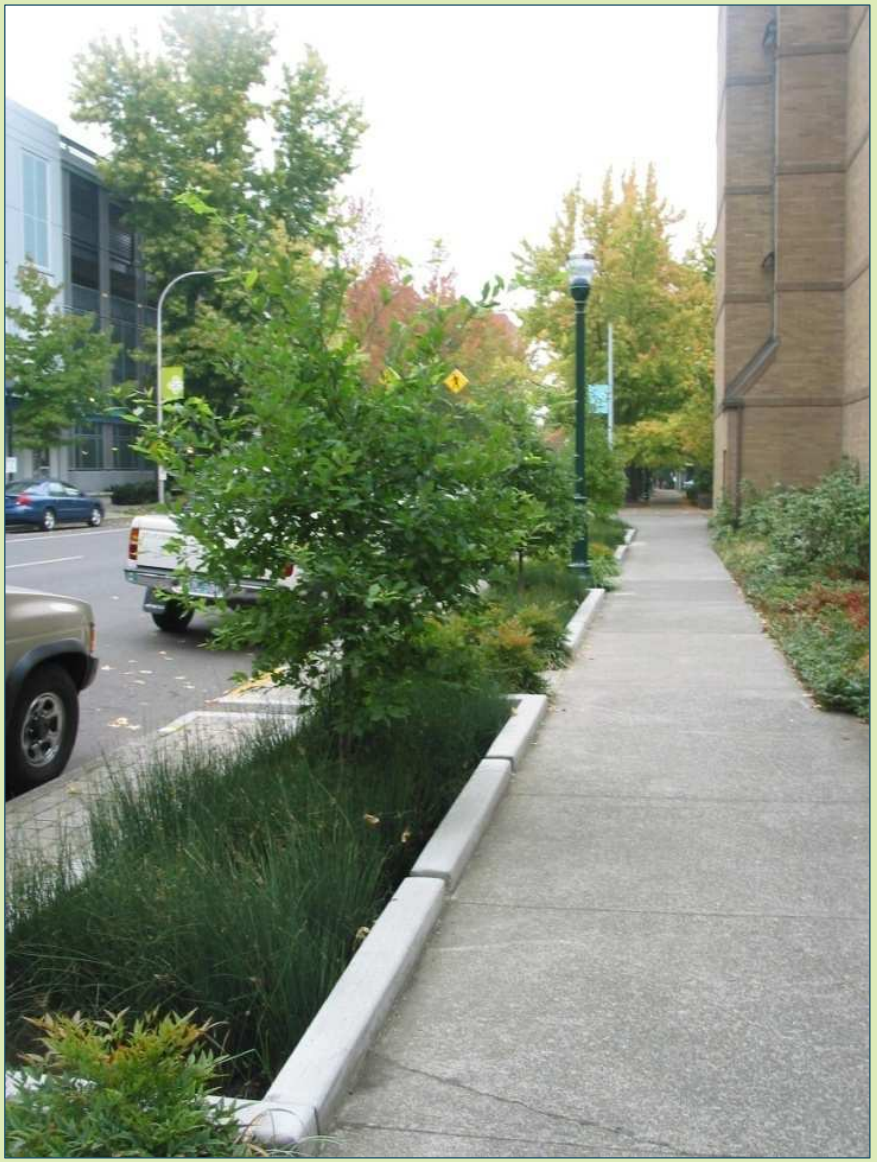
In-street planter

Sunset Circle Parking Lot

Academy of Sciences Green Roof

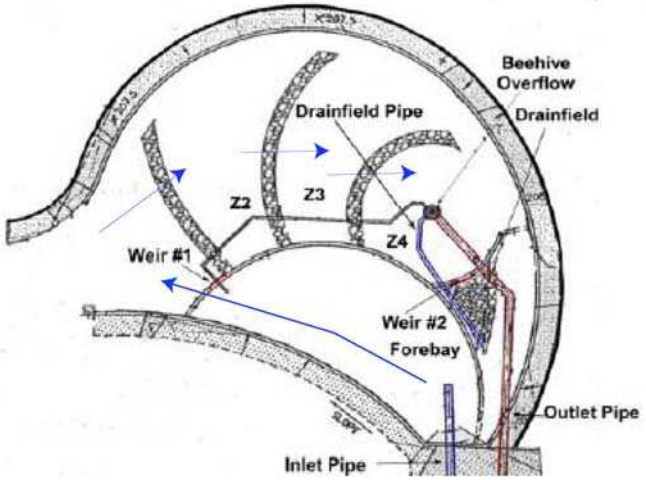
Photo: Rana Creek Living Architecture

Green Streets



Rain Garden

A full Glencoe Rain Garden during flow testing



Source: Portland BES

Why harvest rainwater?

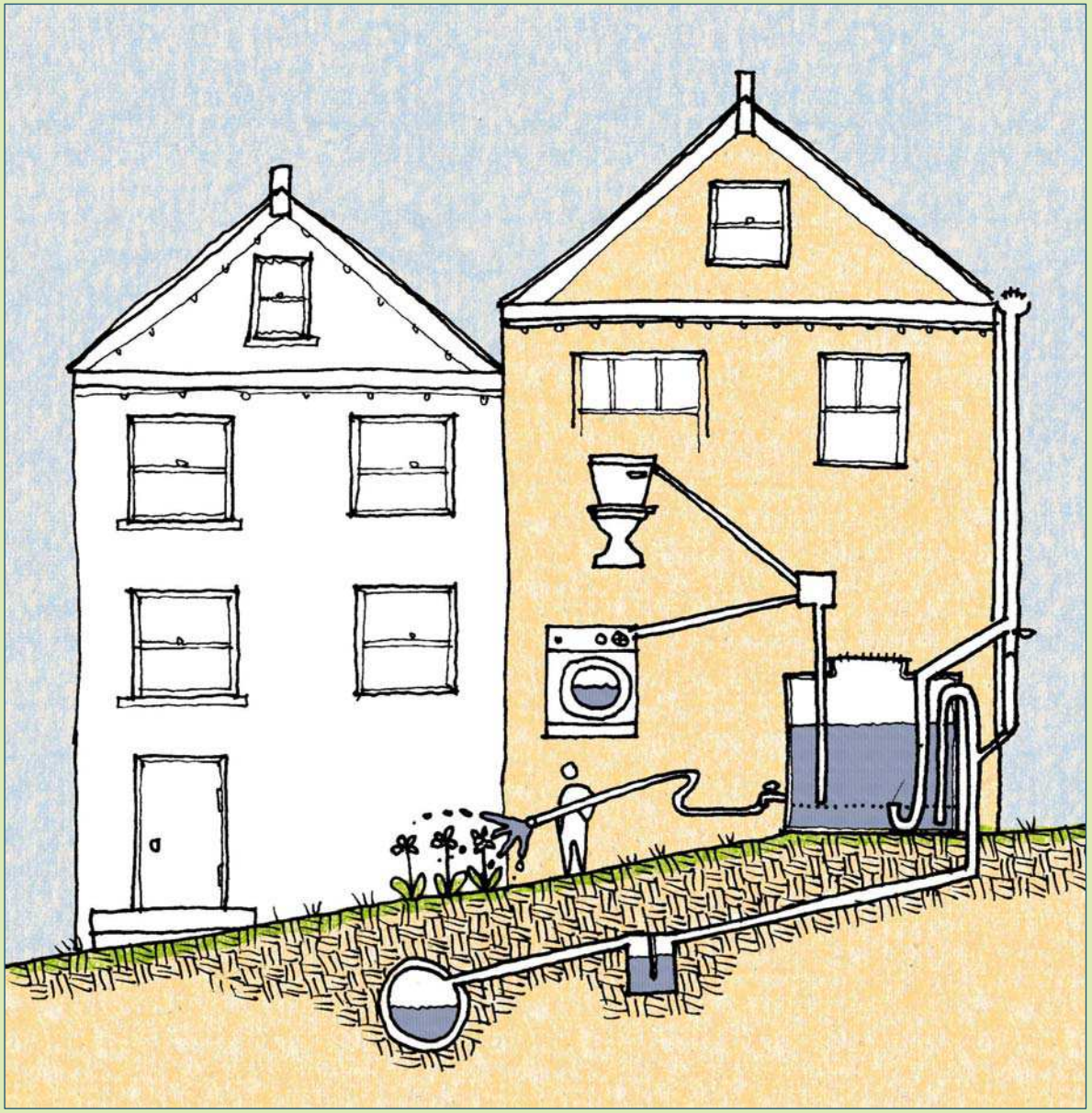
- Decrease the volume of potable water used for irrigation
- Decrease the burden on San Francisco's combined sewer
- Recharge groundwater
- Help reduce flooding and combined sewer discharges
- Broadens San Francisco's water portfolio

Rain sculpture, Mills College
Photo: Ingrid Severson

Rainwater Harvesting MOU

- Commitments by the participating agencies
- Allowable uses of rainwater
- Required system components for barrels and cisterns
- Safety and maintenance
- Labeling
- Permitting
- Responsibility

Rainwater harvesting system



1. **Catchment area** (roof)
2. **Conveyance** (scupper, gutter, downspout)
3. **Roof washer**
4. **Storage** (barrel, cistern, tank)
5. **Distribution** (pipes and pumps)
6. **Use** (irrigation, toilet flushing, vehicle washing, etc.)
7. **Overflow** (landscape or collection system)

Photo: Clear Air Gardening

Cesar Chavez Elementary School

Rain sculpture, Mills College, Oakland, CA

Photo: Ingrid Severson

Private development

Photo: Sherwood Design Engineers

Chartwell School, Monterey, CA

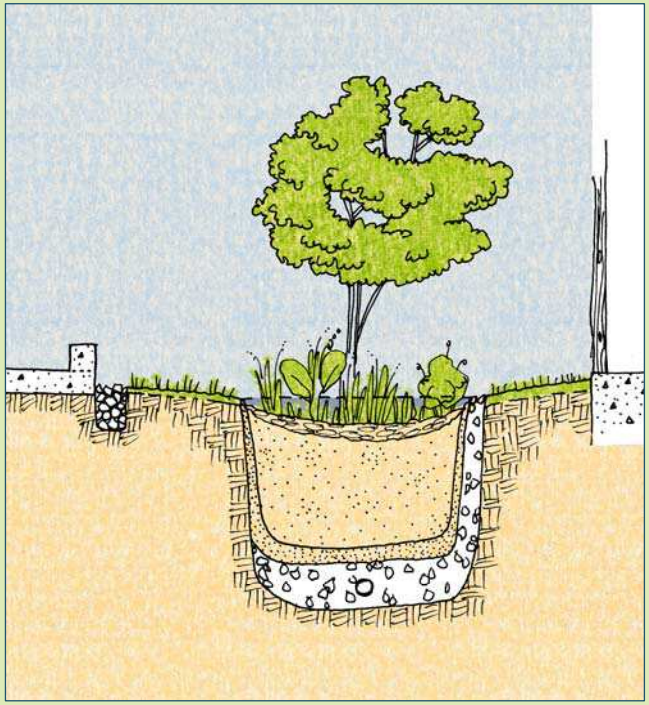
Size: 5,000 gallons

Primary use: toilet flushing overflow/bypass line feeds the irrigation system

Photos: courtesy of Sherwood Design Engineers

Vine Street, Seattle WA

DaVinci Water Garden
Outdoor Learning Lab



If you'd like to learn more about rainwater harvesting, join Tara Hui's workshop at our demonstration project, just outside this building.

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WASTEWATER
POWER

Questions?
Contact Sarah Minick at
sminick@sfwater.org

* Photos and drawings by SFPUC staff unless otherwise noted