

21ST CENTURY LIBRARY and Community Learning Center for **HAYWARD**

CITY OF HAYWARD

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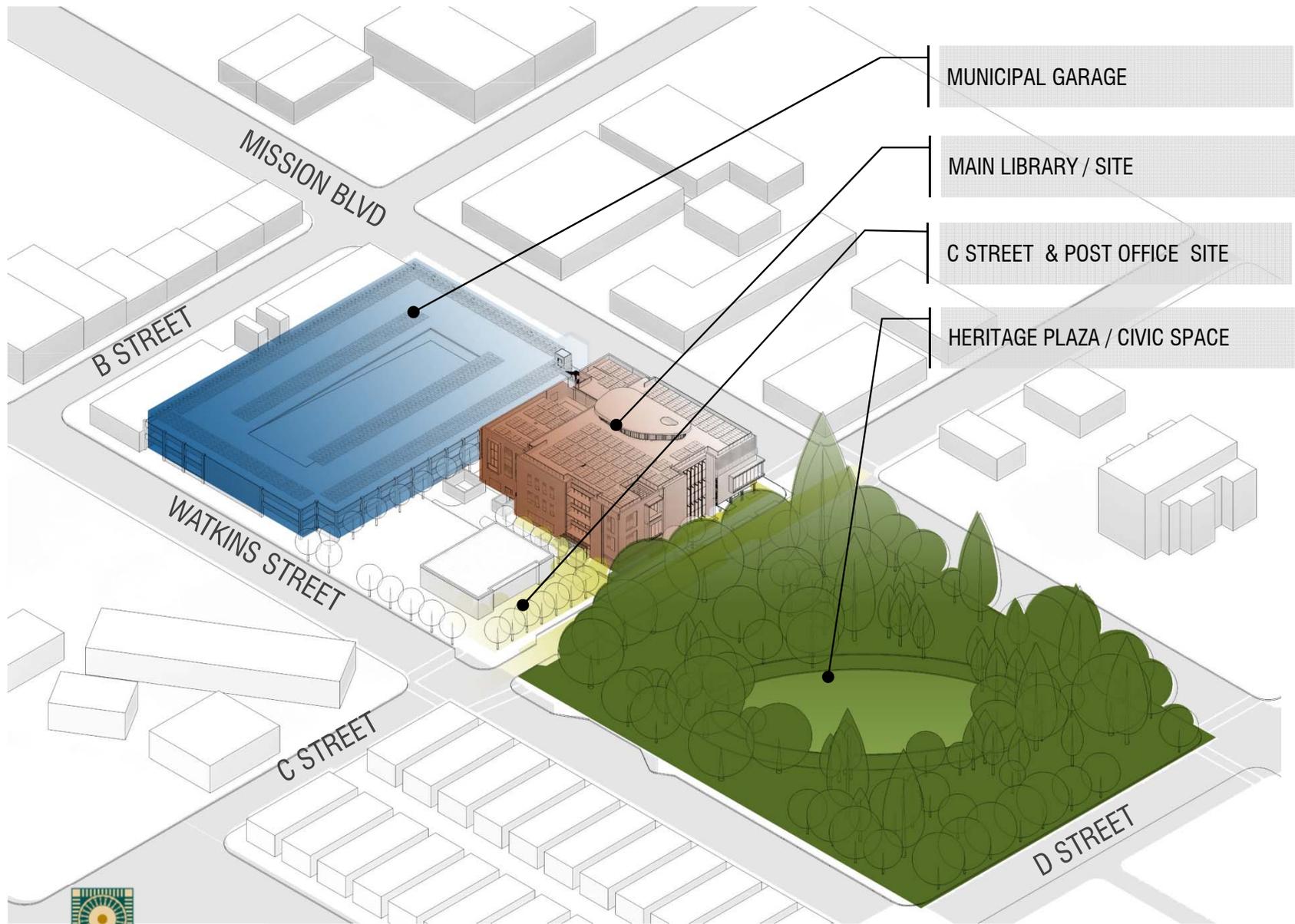


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RAINWATER CAPTURE

| noll&tam | 23 March 2015

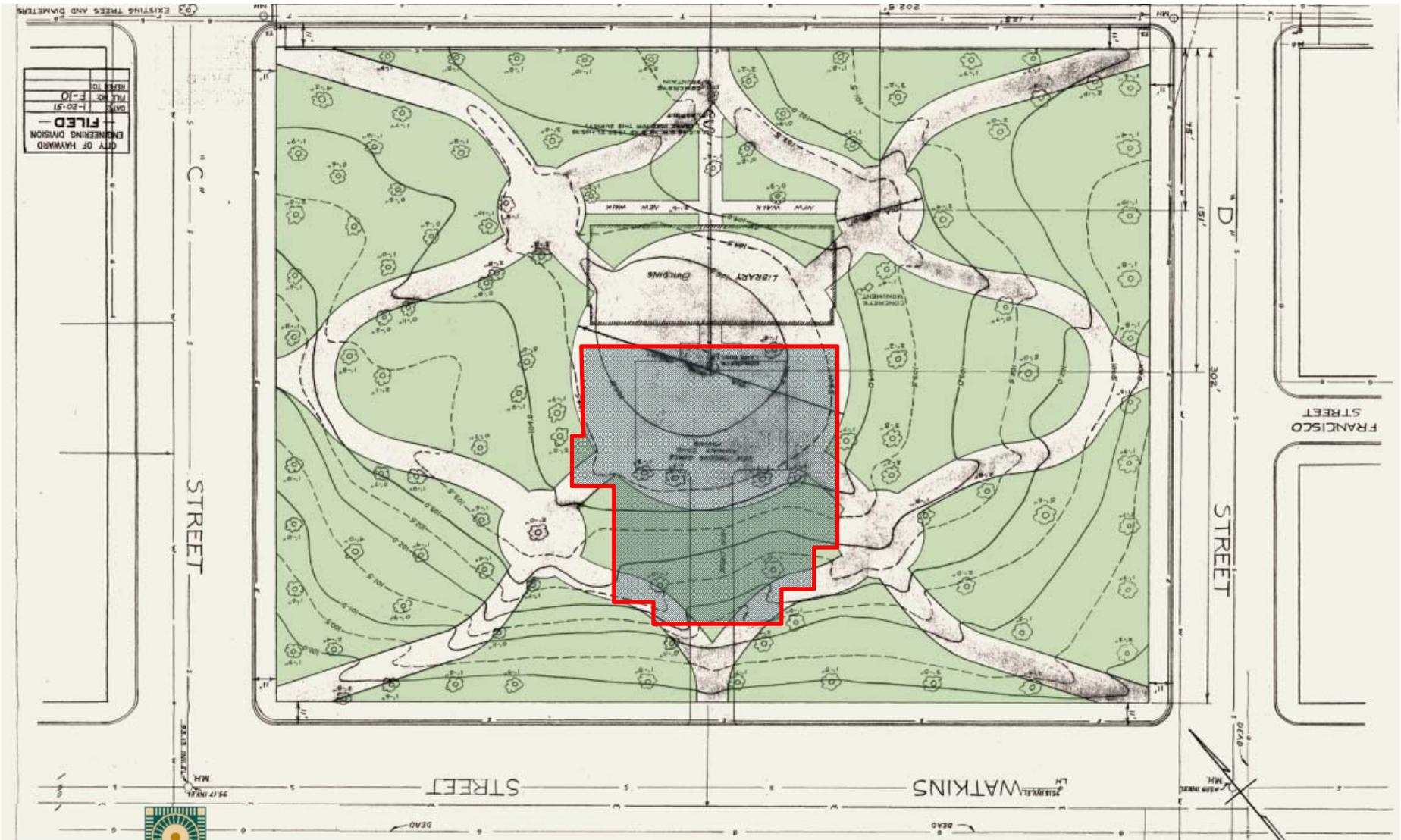




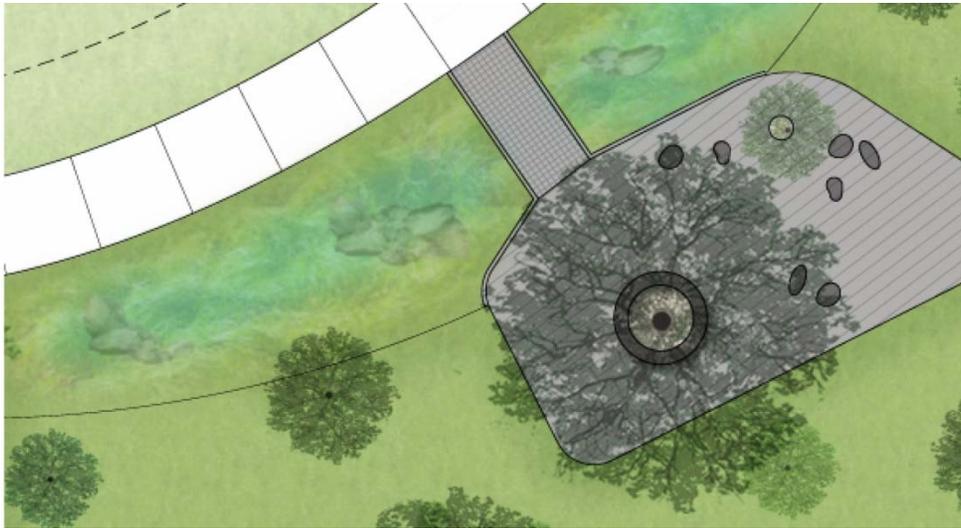
HERITAGE PLAZA



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LEED CERTIFICATION AND BEYOND



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GREEN BUILDING AND SUSTAINABILITY GOALS

- Minimum building lifespan goal of 75 years
- Achieve LEED Gold Certification but Striving for LEED Platinum
- Eliminate building use of fossil fuels
- Harvest and reuse 320,000 Gallons of Rainwater
- Model of civic stewardship to the bay area and the nation

ANNUAL BUILDING ENERGY USE GOALS BEYOND LEED

- Reduce the Library's energy consumption by 50%
- 100% solar powered Library to achieve annual "Zero Net Energy"

SUSTAINABLE SITE

INNOVATIVE
DESIGN

WATER EFFICIENCY
AND RE-USE

ENVIRONMENTAL
QUALITY

DAYLIGHTING AND
ENERGY EFFICIENCY

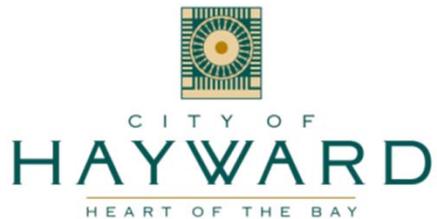
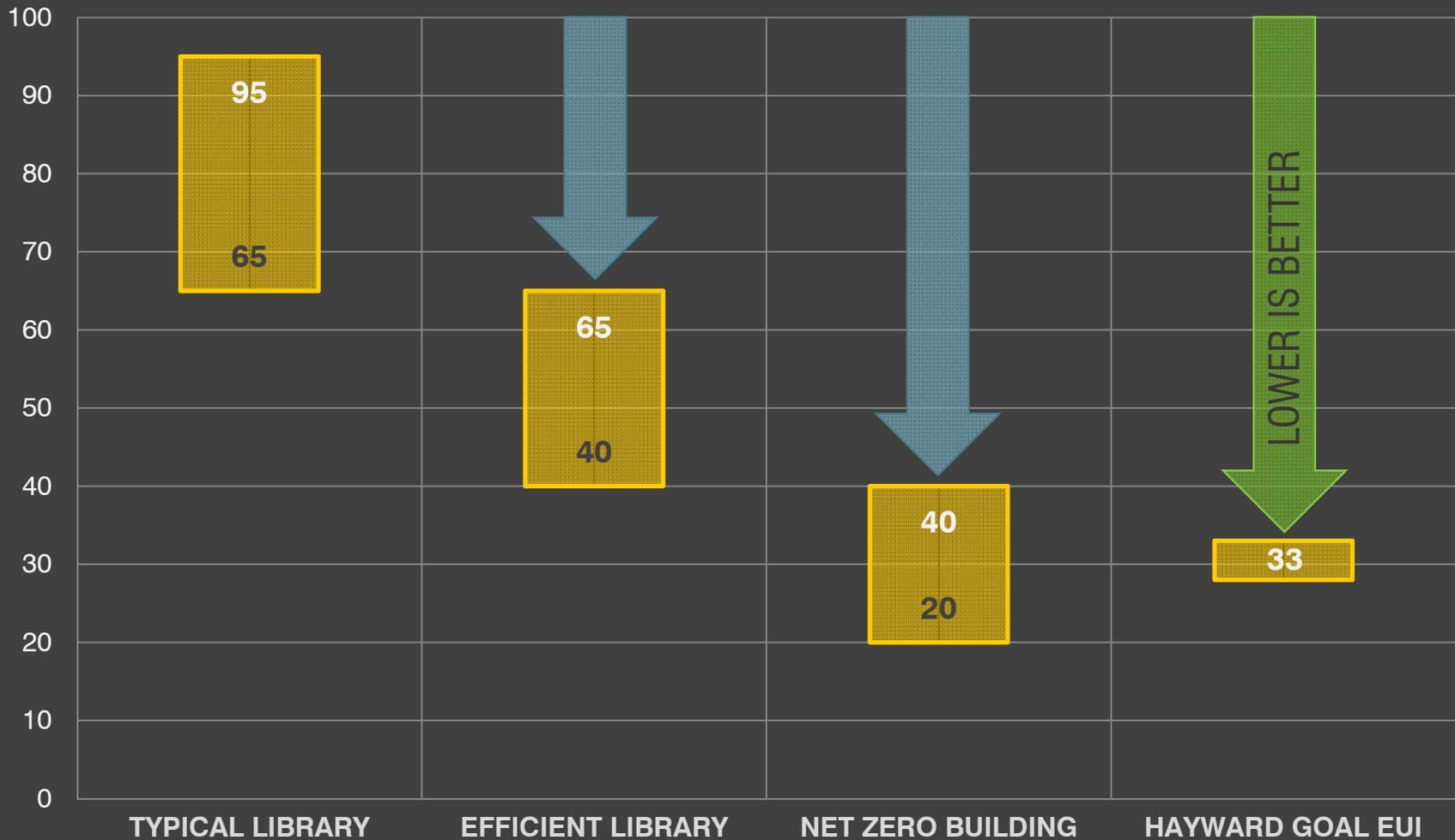
MATERIALS AND
RESOURCES



WHAT IS LEED?

Leadership in Energy and Environmental Design (LEED)

HAYWARD LIBRARY - ENERGY USE INTENSITY (EUI kbtu/sf/yr)



BENCHMARKING BUILDING ENERGY USE GOALS

2	Sacred Heart Schools Stevens Family Library* Atherton 6,300 SF, 2012
3	Berkeley West Branch Library Berkeley 9,300 SF, 2013
5	Environmental Tech. Center Sonoma State* Rohnert Park 2,200 SF, 2001
6	Leslie Shao-Ming Sun Field Station (Stanford) * Woodside 13,200 SF, 2012
7	IDEAs Z2 Design Facility* San Jose 13,200 SF, 2012
10	David & Lucille Packard Foundation* Los Altos 49,161 SF, 2012
11	Redding School for the Arts Redding 77,091 SF, 2011
13	Exploratorium San Francisco 330,000 SF, 2013
14	BEST Center at Laney College Oakland District, under const.
15	La Escuelita Education Center Oakland 123,000 SF, under const.

*Denotes ZNE Verified



RAINWATER CAPTURE



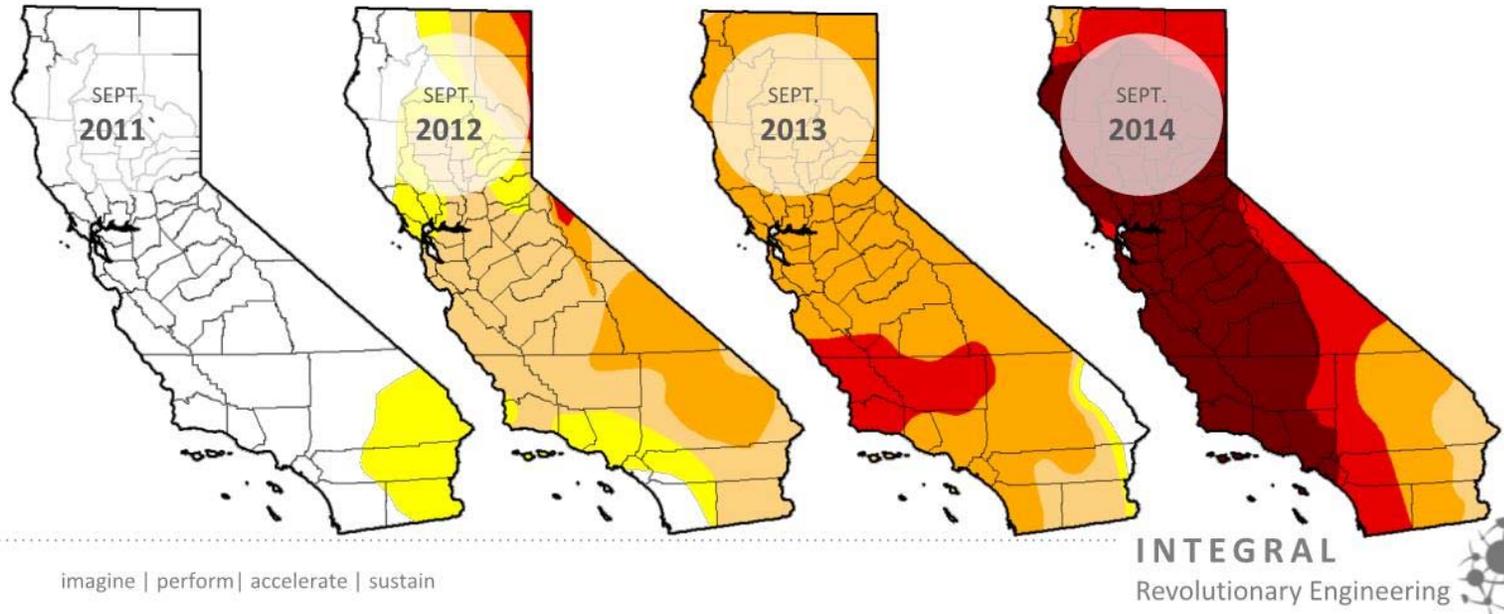
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California - Drought

Intensity:

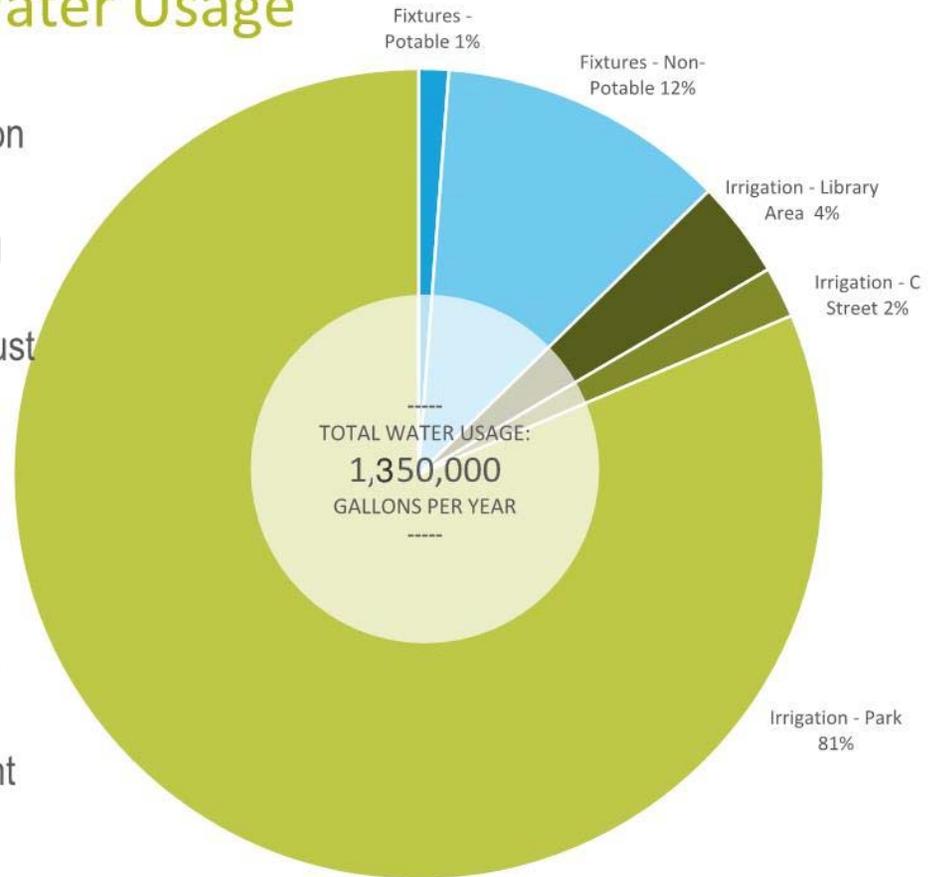


- 2013 was driest year on record.
- Intensifying drought; 95% of state is in a severe drought or worse.
- Water municipalities are at risk of reservoir depletion.
- State water allocations are greater than available supply.
- Groundwater table is overdrawn which has negative ecological and economic impacts on California.



Predicted Annual Water Usage

- Irrigation is 87% of water use on site.
- Large irrigation demand during dry months when you do not have available rainwater so must store large amount of water.
- Non-potable fixture demand (efficient fixtures) is 12% or an estimated 162,000 gallons of water /year.
- Supplying non-potable fixtures is a good fit for captured rainwater because it is constant demand all year round.



Assumptions:

- 60,000 sq. ft. Library with an average density of 1 person/300 sq. ft. so average person load is 200 full time equivalents.
- Irrigation demands are net of rainfall and are provided per 2008 year. 2008 is the 20th percentile year; 80% of all years on record had more rainfall.
- Toilets are 1.28 gal/flush, Urinals are 0.125 gal/flush
- Irrigated area is a total of 88,790 sq. ft.

imagine | perform | accelerate | sustain

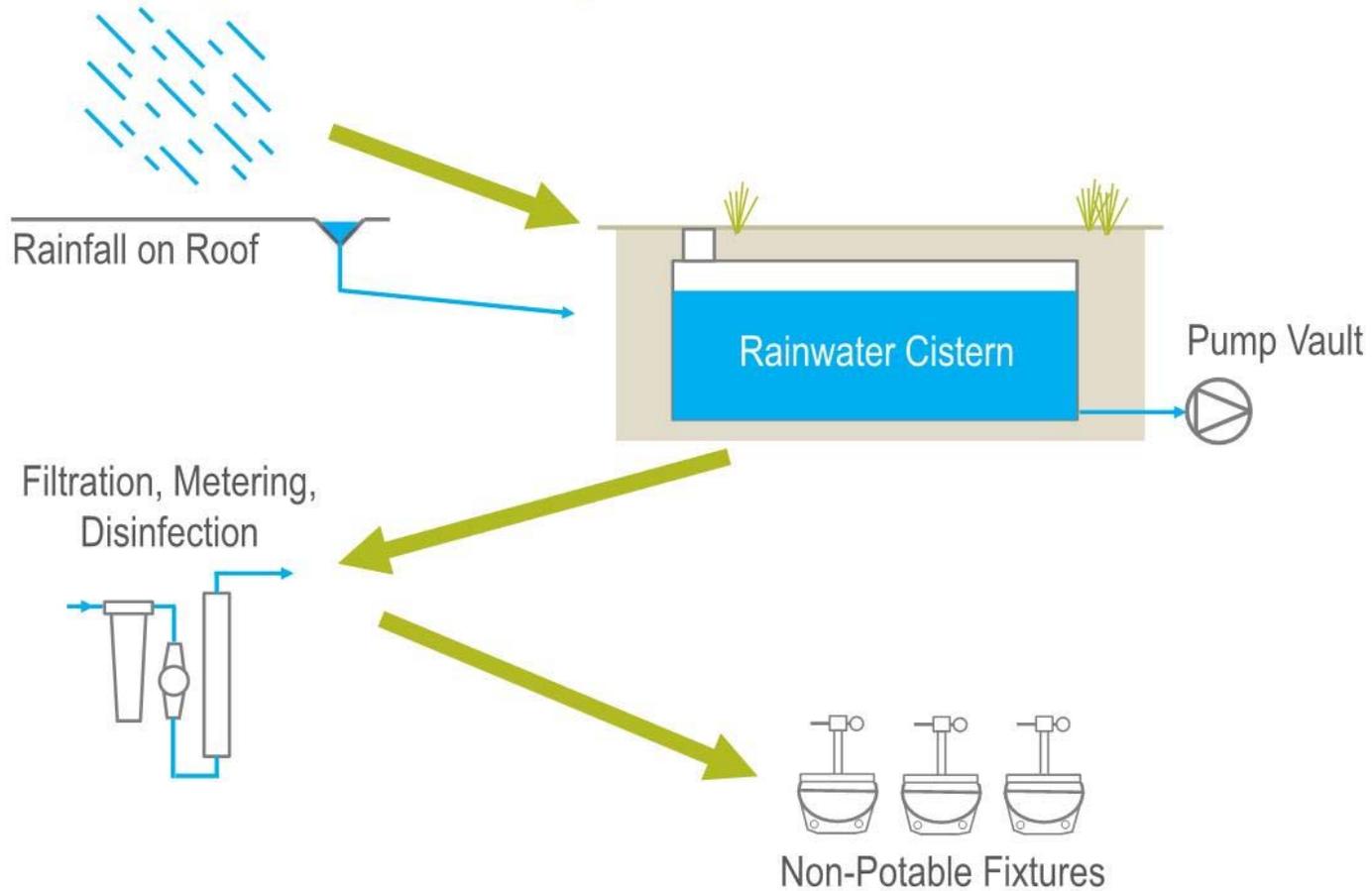
INTEGRAL
Revolutionary Engineering 



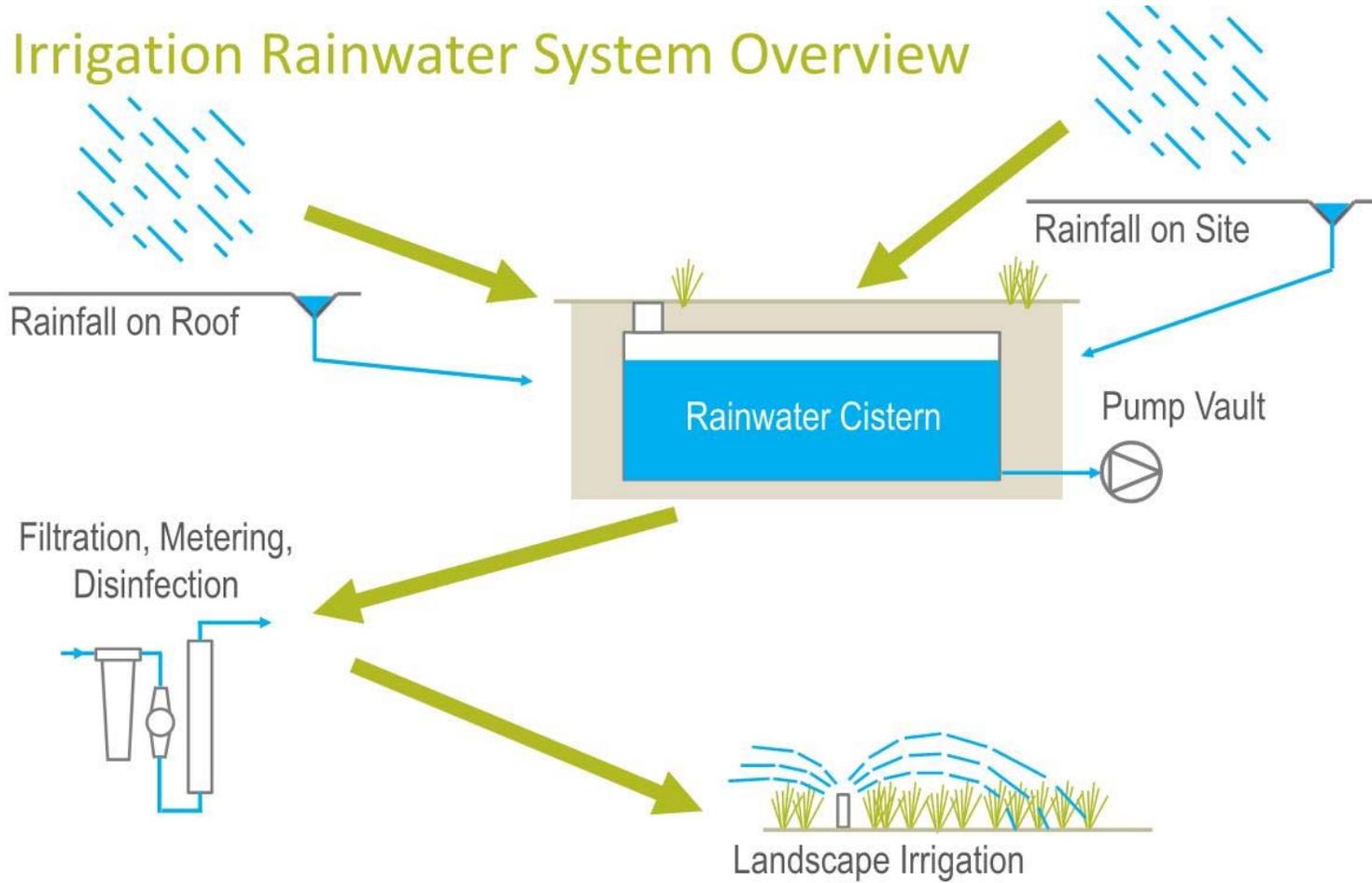
ANNUAL USAGE

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Building Rainwater System Overview



Irrigation Rainwater System Overview



Building System Design Requirements

What are the system components required?

- Vortex Pre-Filter / First Flush.
- Cistern – Modular, underground.
- Delivery Pumps
- Treatment Equipment
 - Filtration
 - UV Disinfection
 - Metering
 - Bladder Tank
- Control System
- Accessories: valves, piping, etc.
- Dual fixture piping

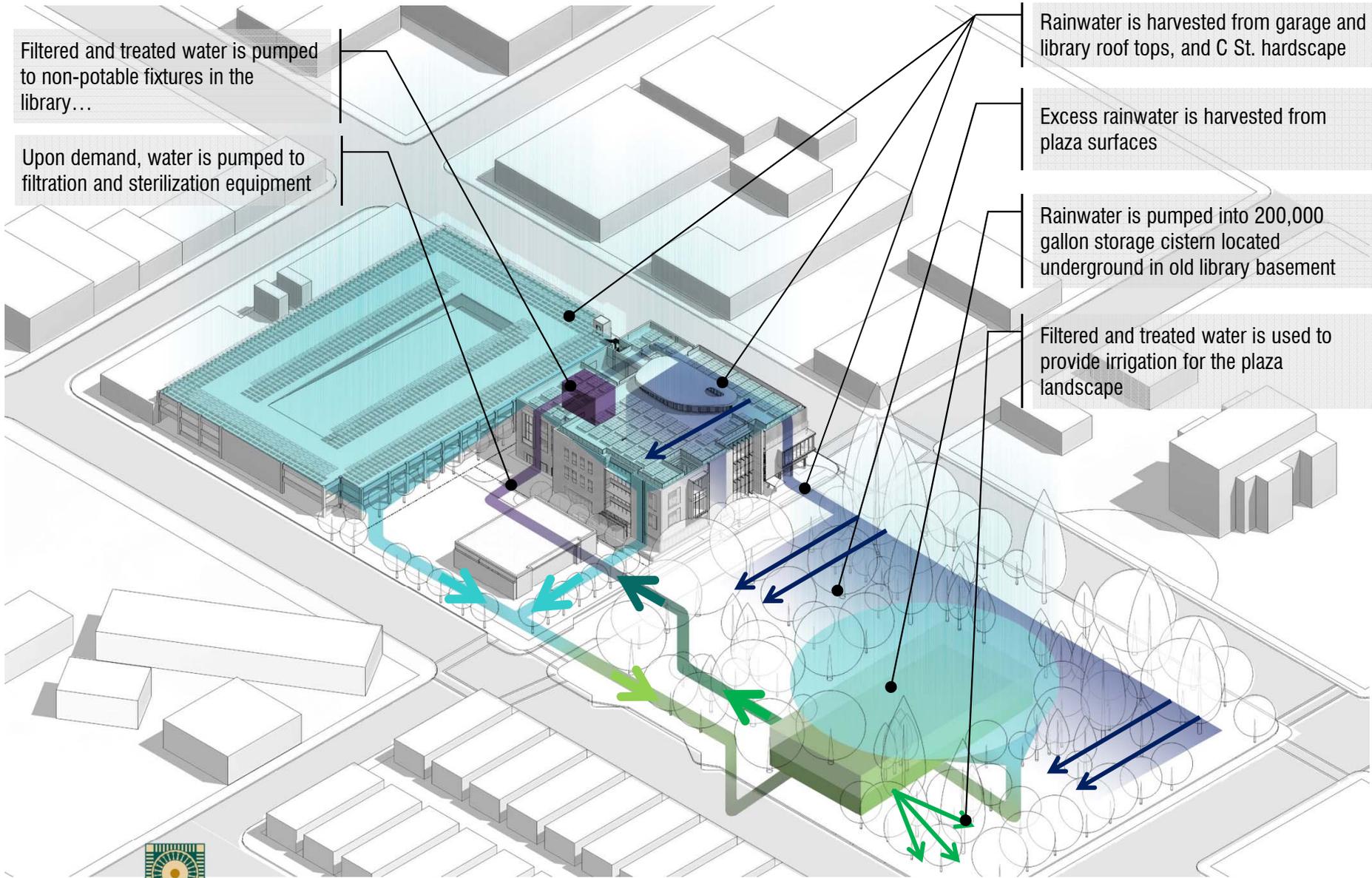


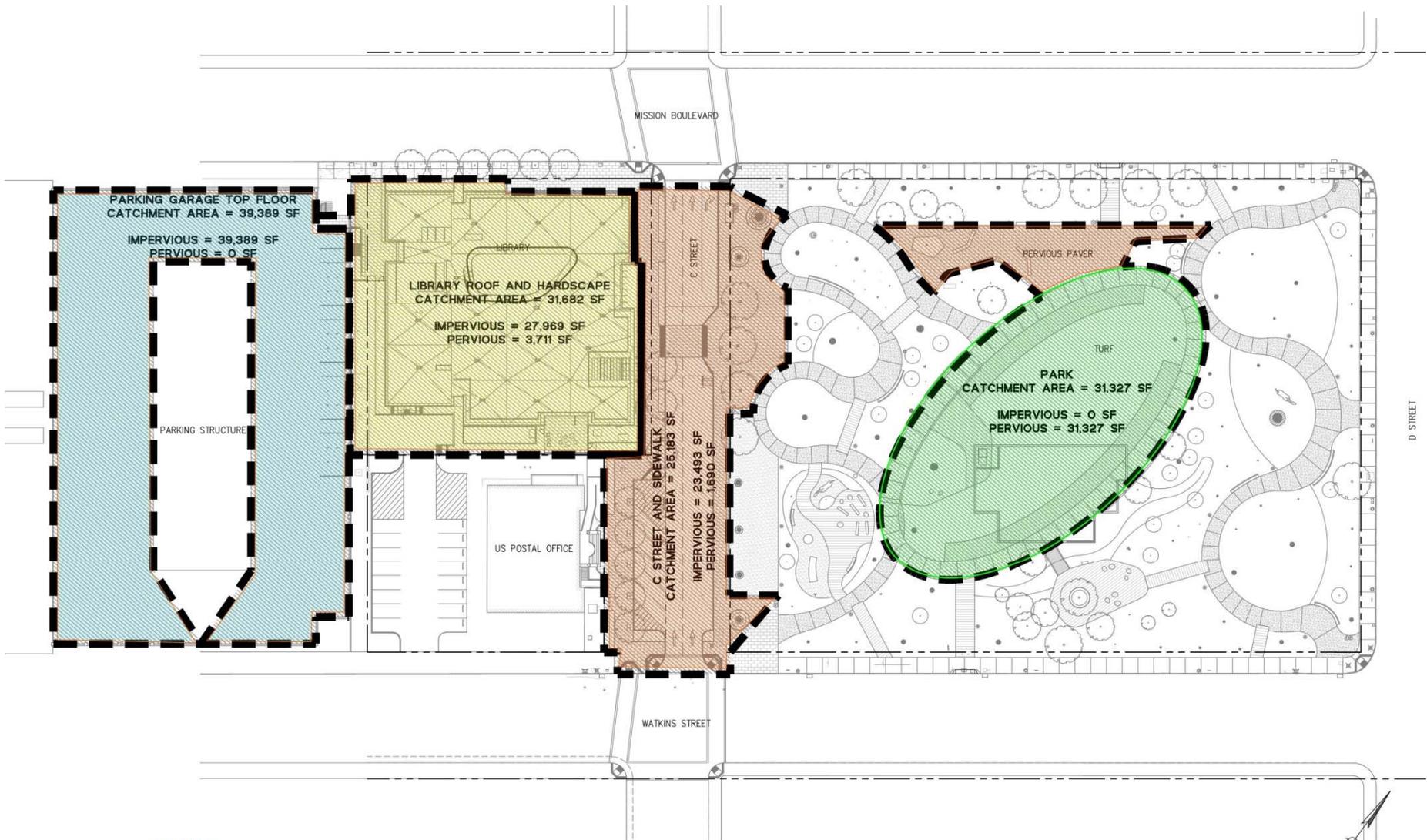
Irrigation System Design Requirements

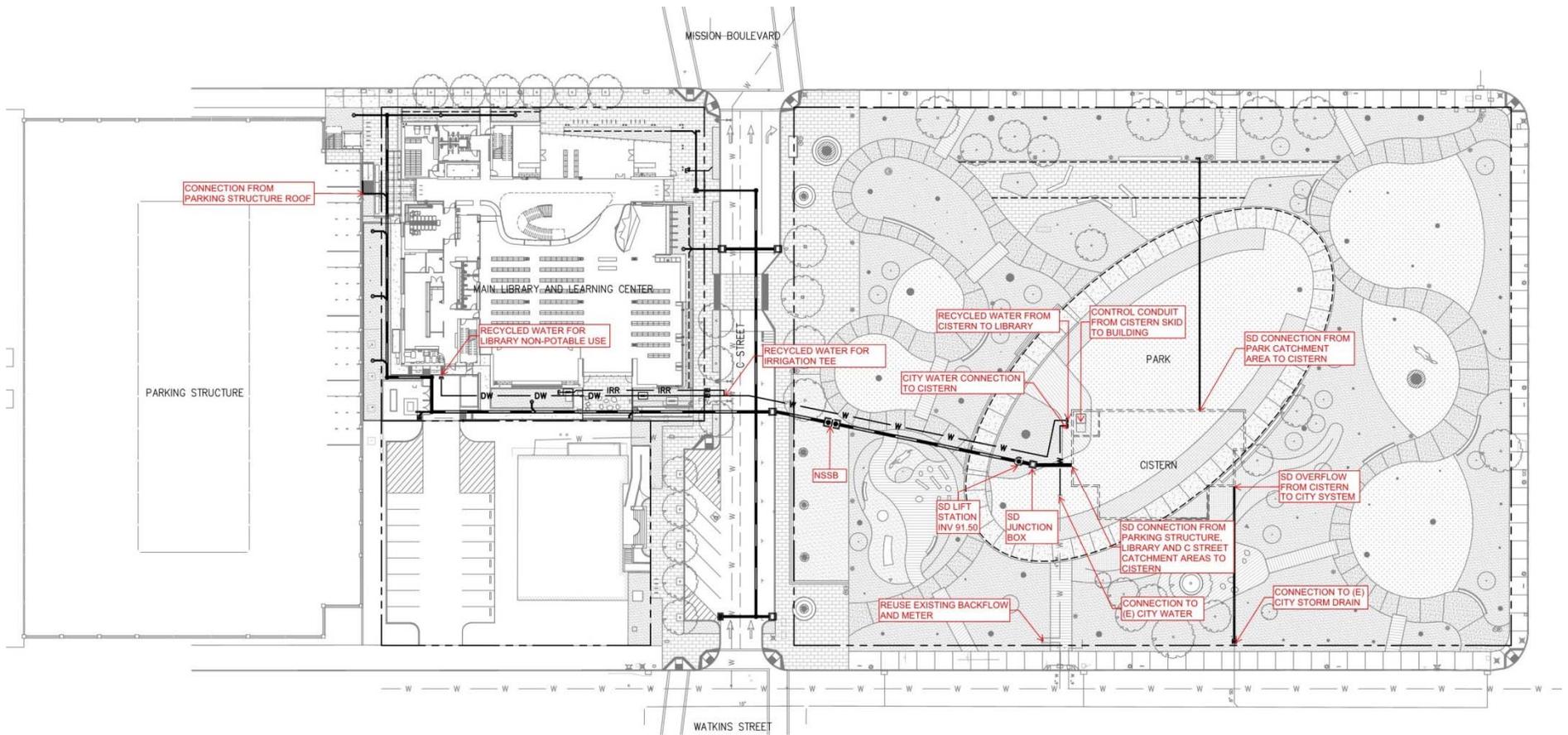
What are the system components required?

- Vortex Pre-Filter / First Flush
- Sand/Oil Interceptor
- Cistern – Modular, underground.
- Delivery Pumps
- Treatment Equipment
 - Filtration
 - Metering
 - UV Disinfection
 - Bladder Tank
- Control System
- Accessories: valves, piping, etc.
- Site excavation including excavation of C-Street.

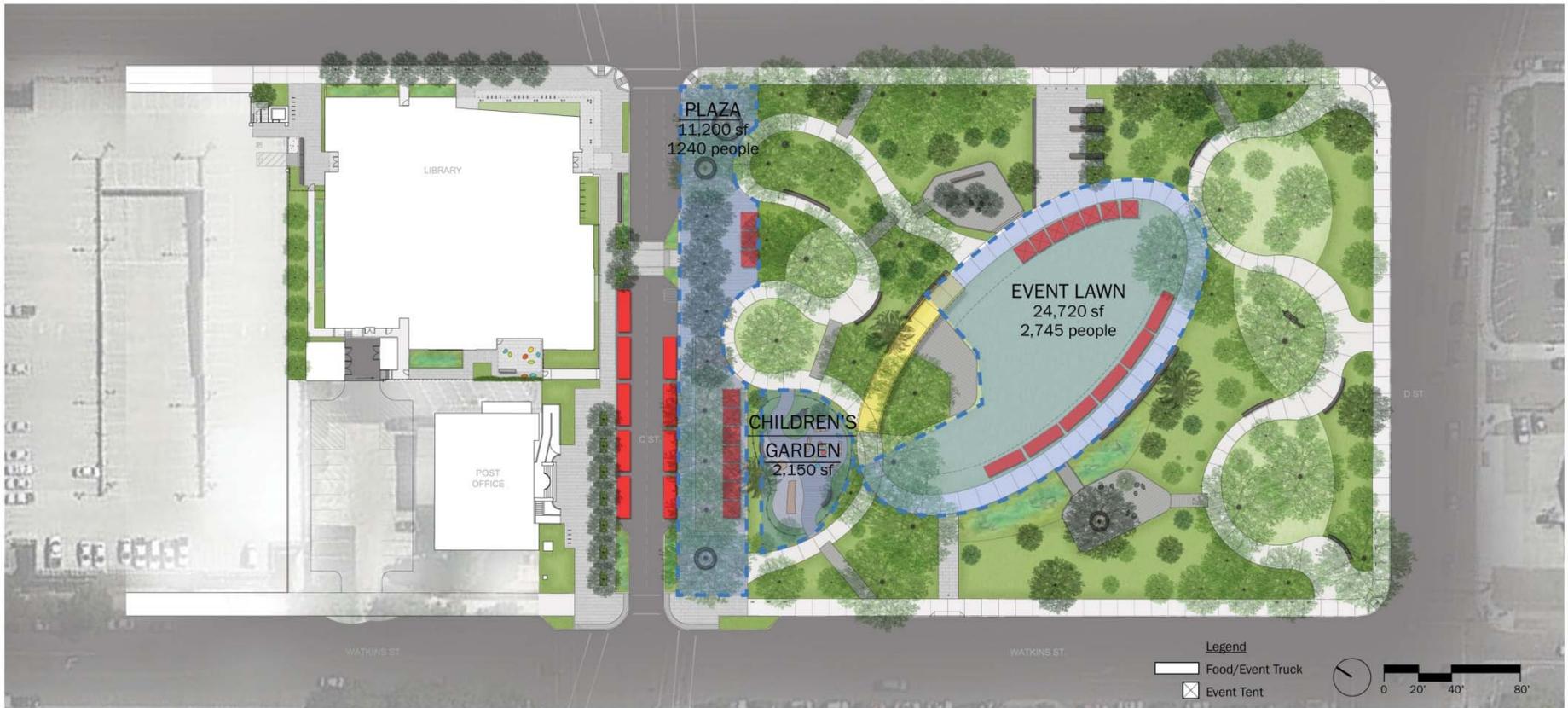














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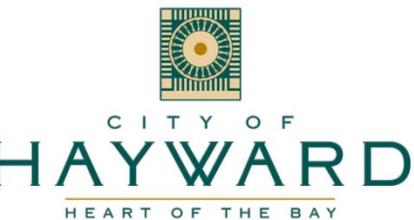
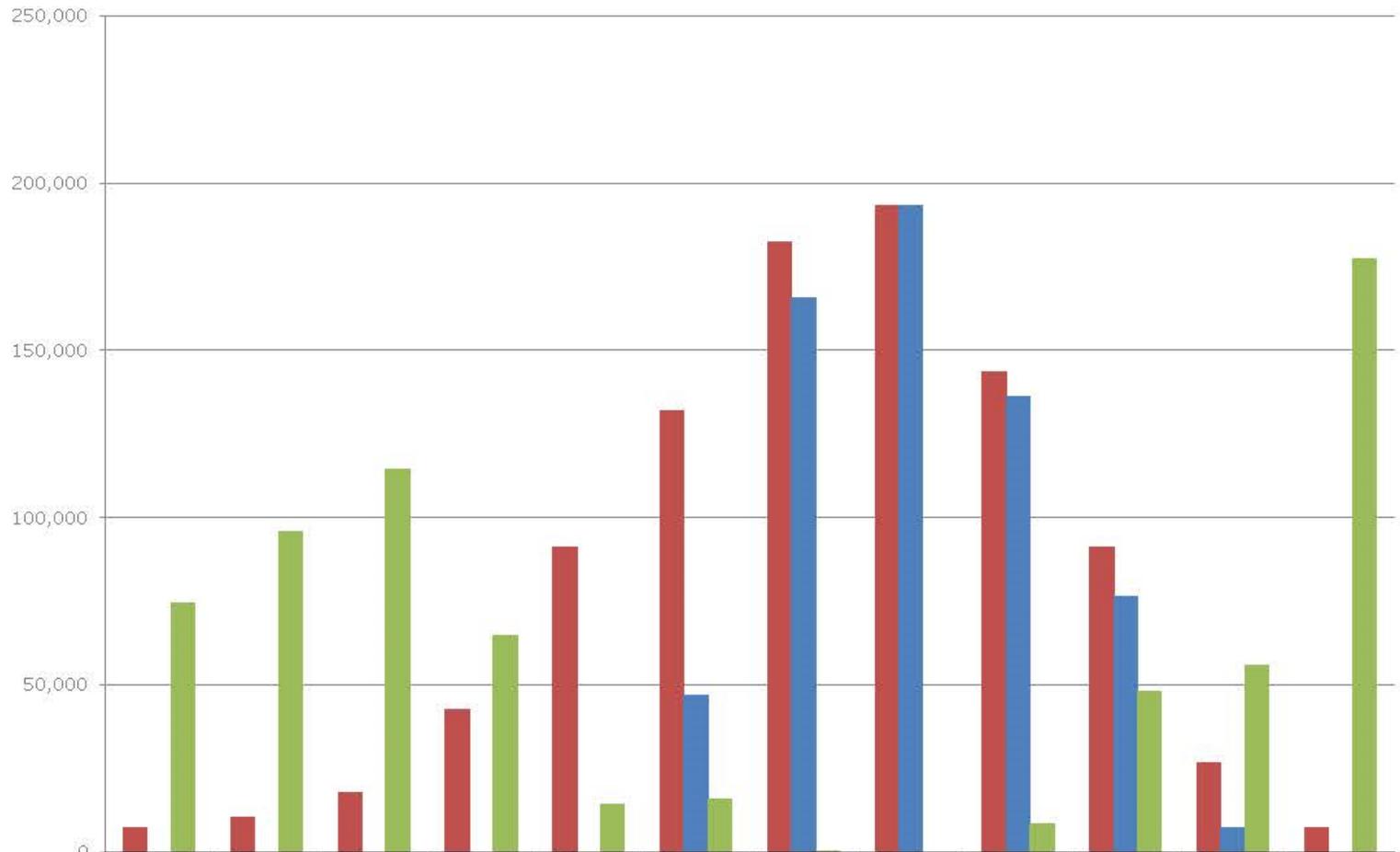
DURABILITY

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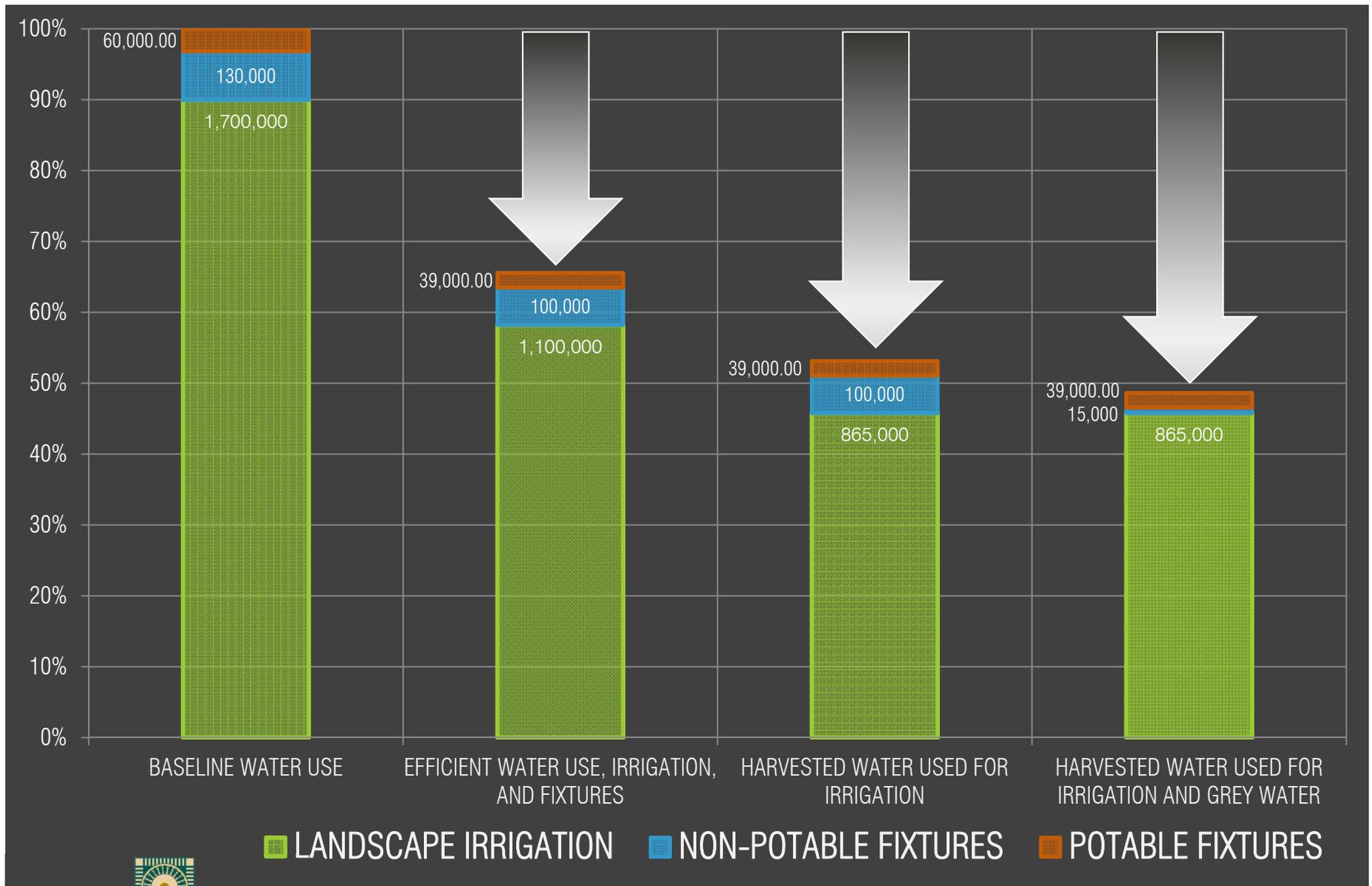
Precipitation Profile for Hayward, CA

Rain event distribution is unique to each location and is important when considering the storage capacity necessary to avoid losing rainwater during an event. In Hayward, CA, only 4% of the rain events are larger than one inch. Our recommended cistern will hold a 4.04 inch rain event

Size of Rain Event:	Percent of Rain Events:	Annual Averages Past Six Years:
.02"-.25"	62%	31 events
.25"-.50"	21%	10 events
.50"-1.0"	13%	6 events
1.0"-2.0"	3%	2 events
>2.0"	1%	0 events
Average Annual Precipitation Past Six Years (Inches):		13.6 Inches



ESTIMATED SUPPLY & DEMAND





Schematic Illustration