

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

CITY OF HAYWARD

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RAINWATER CAPTURE

| noll & tam | 15 Sept 2015



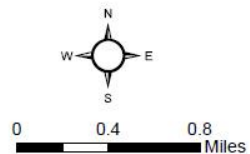
SAFE

CLEAN

**GREEN
SUSTAINABLE**



Figure 2
Proposed Project/
Action Facilities



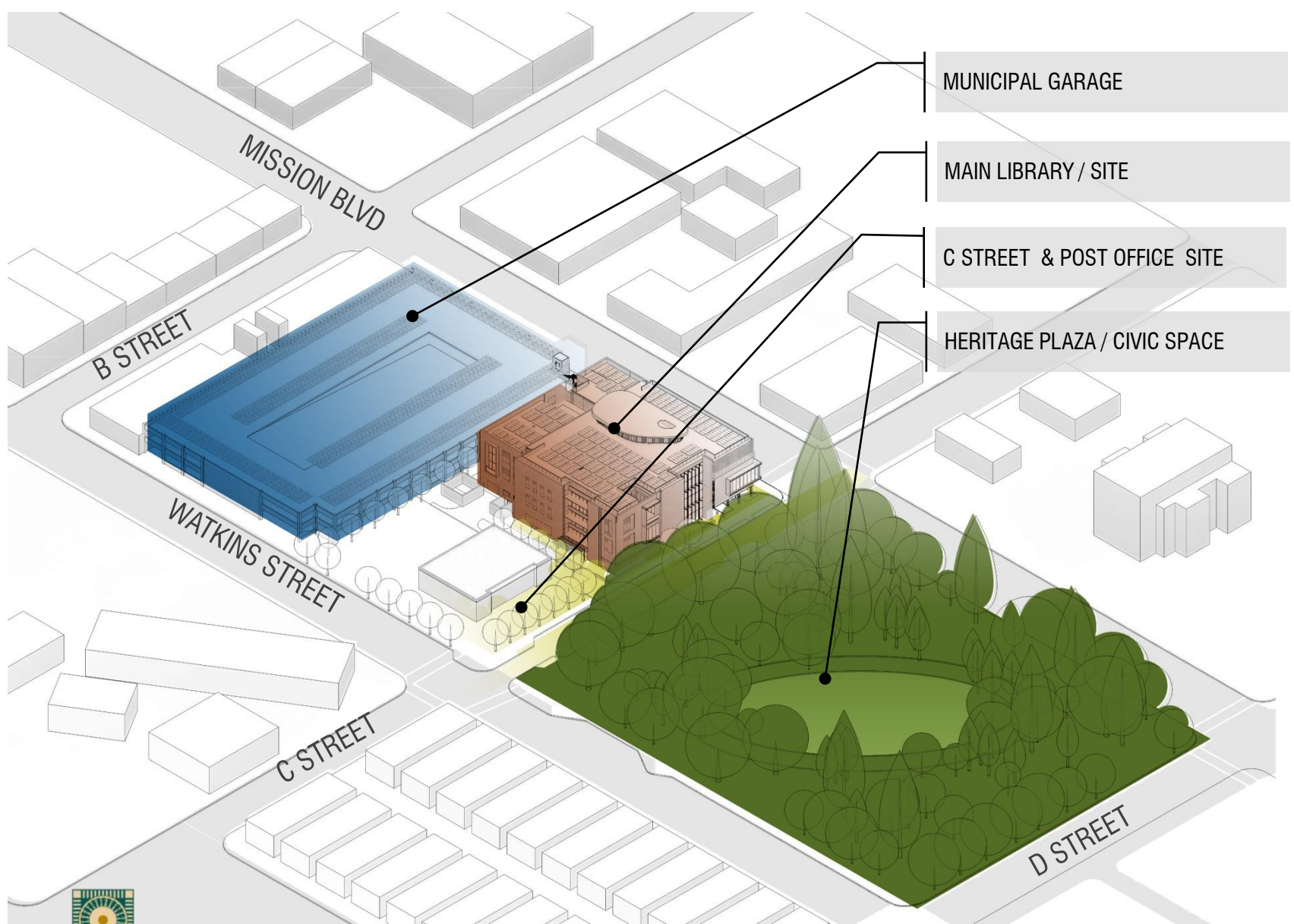
Revised October 2014

Source: RMC



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PROPOSED NON-POTABLE WATER DISTRIBUTION SYSTEM



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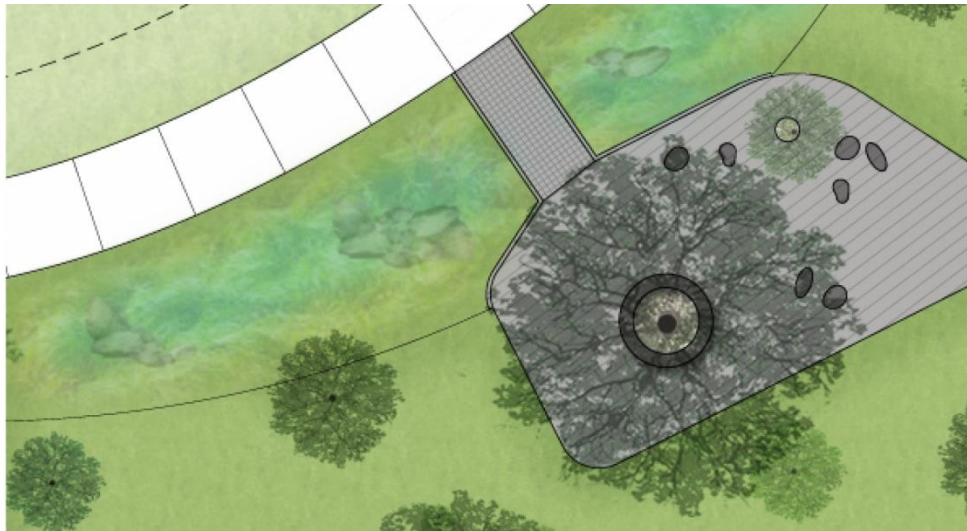
LIBRARY AND ARBORETUM PROJECT SCOPE

HAYWARD 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 Annually
- 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"

RAINWATER CAPTURE



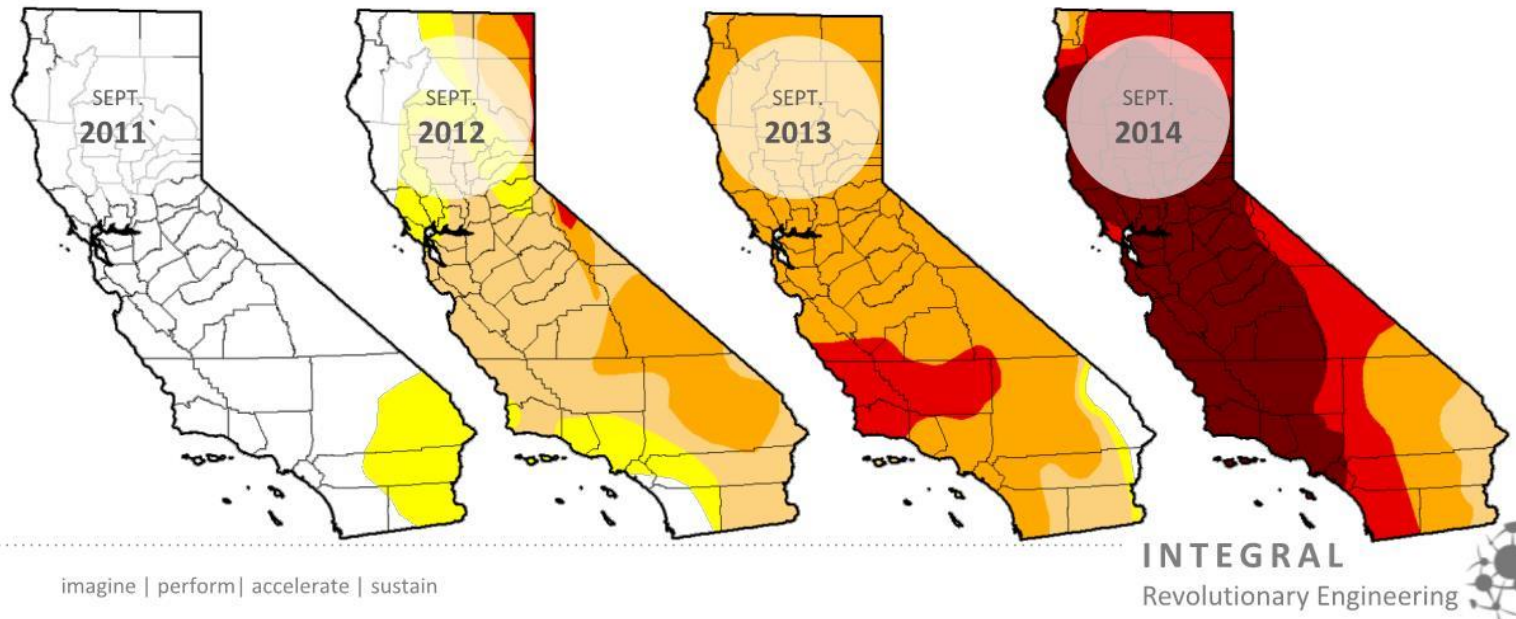
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California - Drought

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.



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DROUGHT IN CA

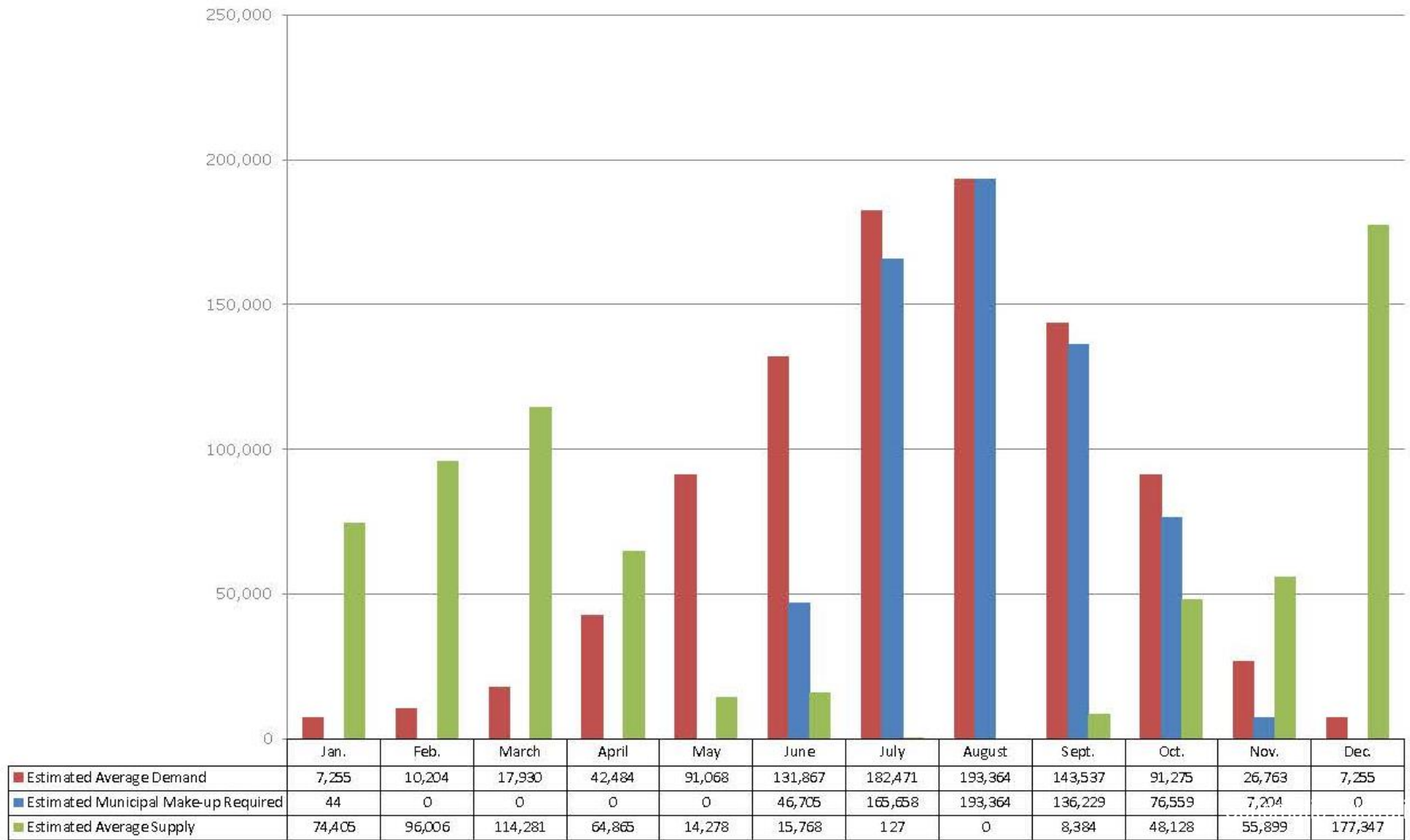
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Precipitation Profile for Hayward, CA

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

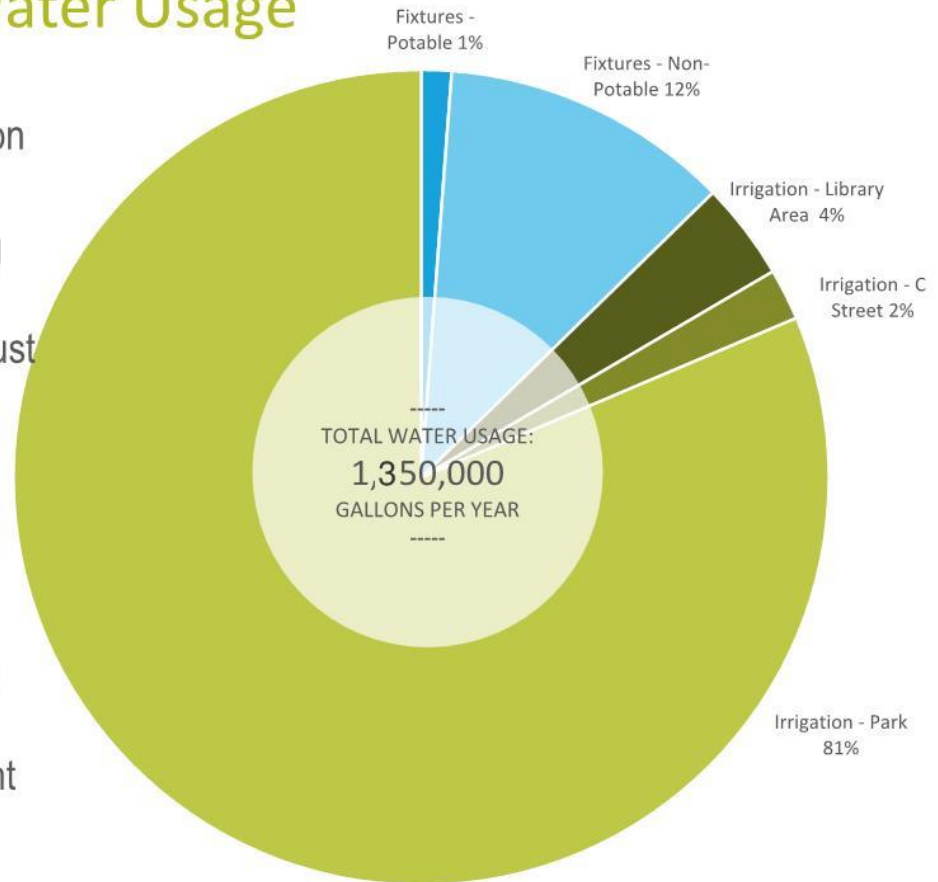
INTEGRAL ENGINEERS AND WAHASO WATER HARVESTING SOLUTIONS



INTEGRAL ENGINEERS AND WAHASO WATER HARVESTING SOLUTIONS

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.



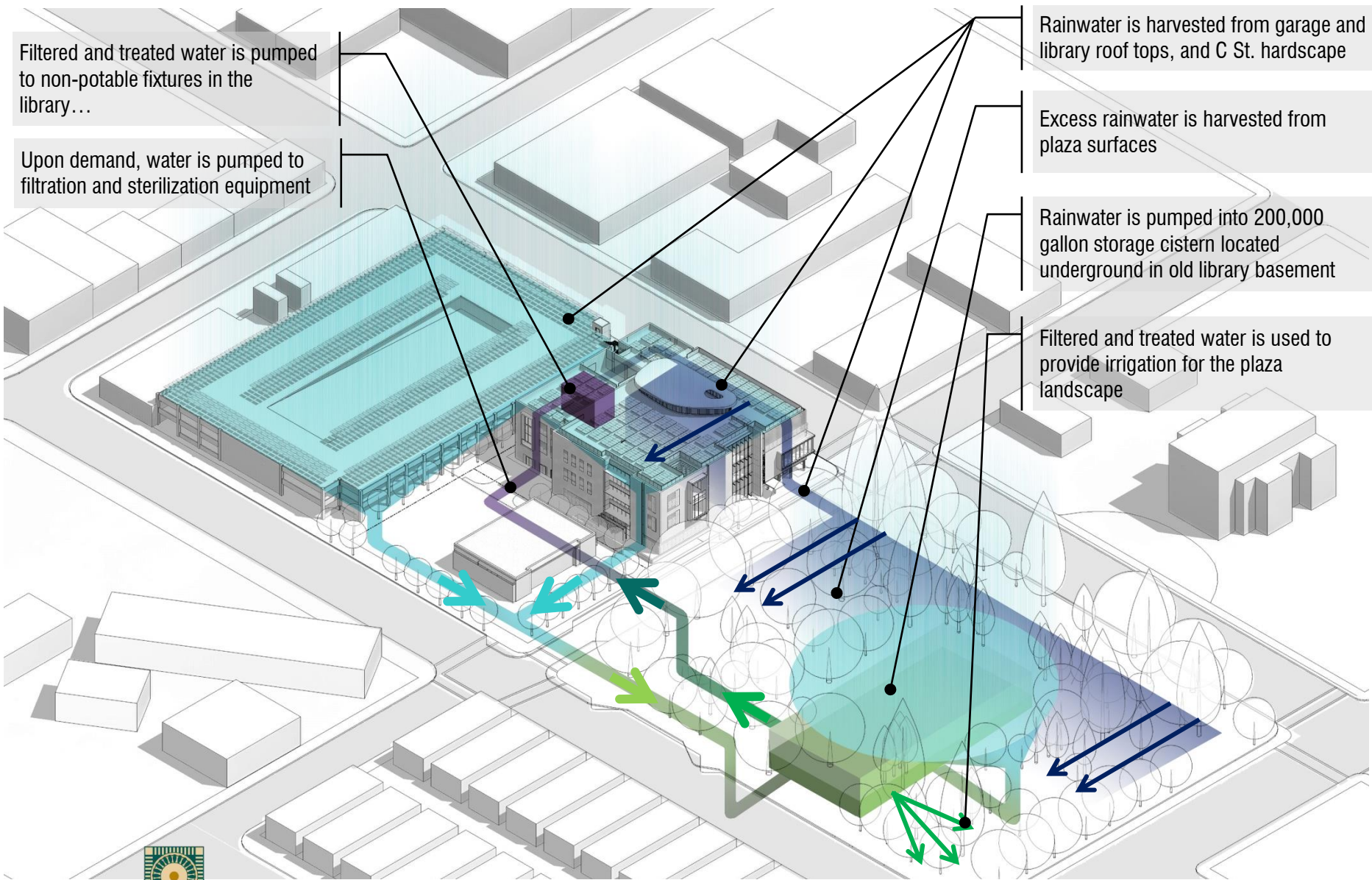
Assumptions:

- 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.

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Revolutionary Engineering





Filtered and treated water is pumped to non-potable fixtures in the library...

Upon demand, water is pumped to filtration and sterilization equipment

Rainwater is harvested from garage and library roof tops, and C St. hardscape

Excess rainwater is harvested from plaza surfaces

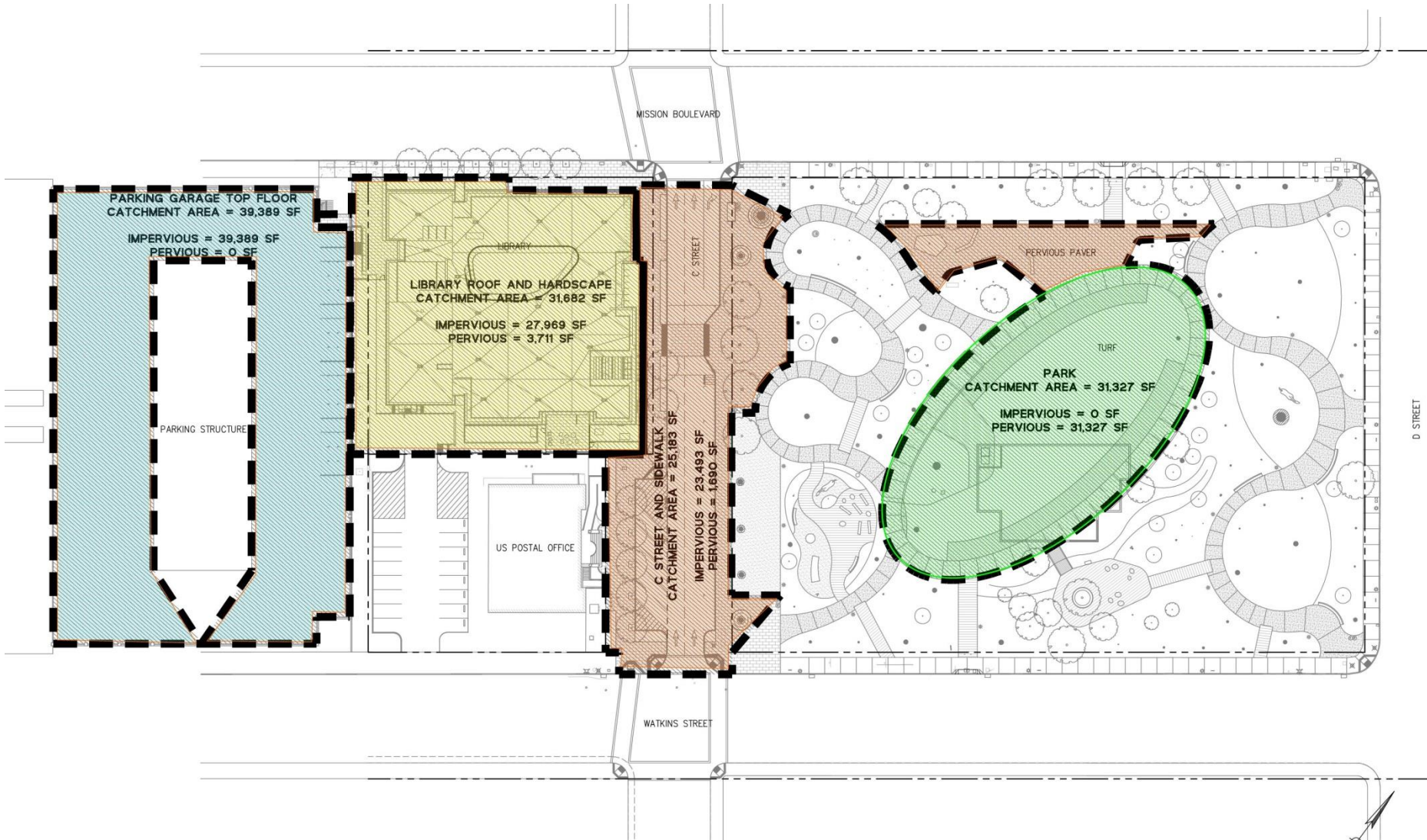
Rainwater is pumped into 200,000 gallon storage cistern located underground in old library basement

Filtered and treated water is used to provide irrigation for the plaza landscape

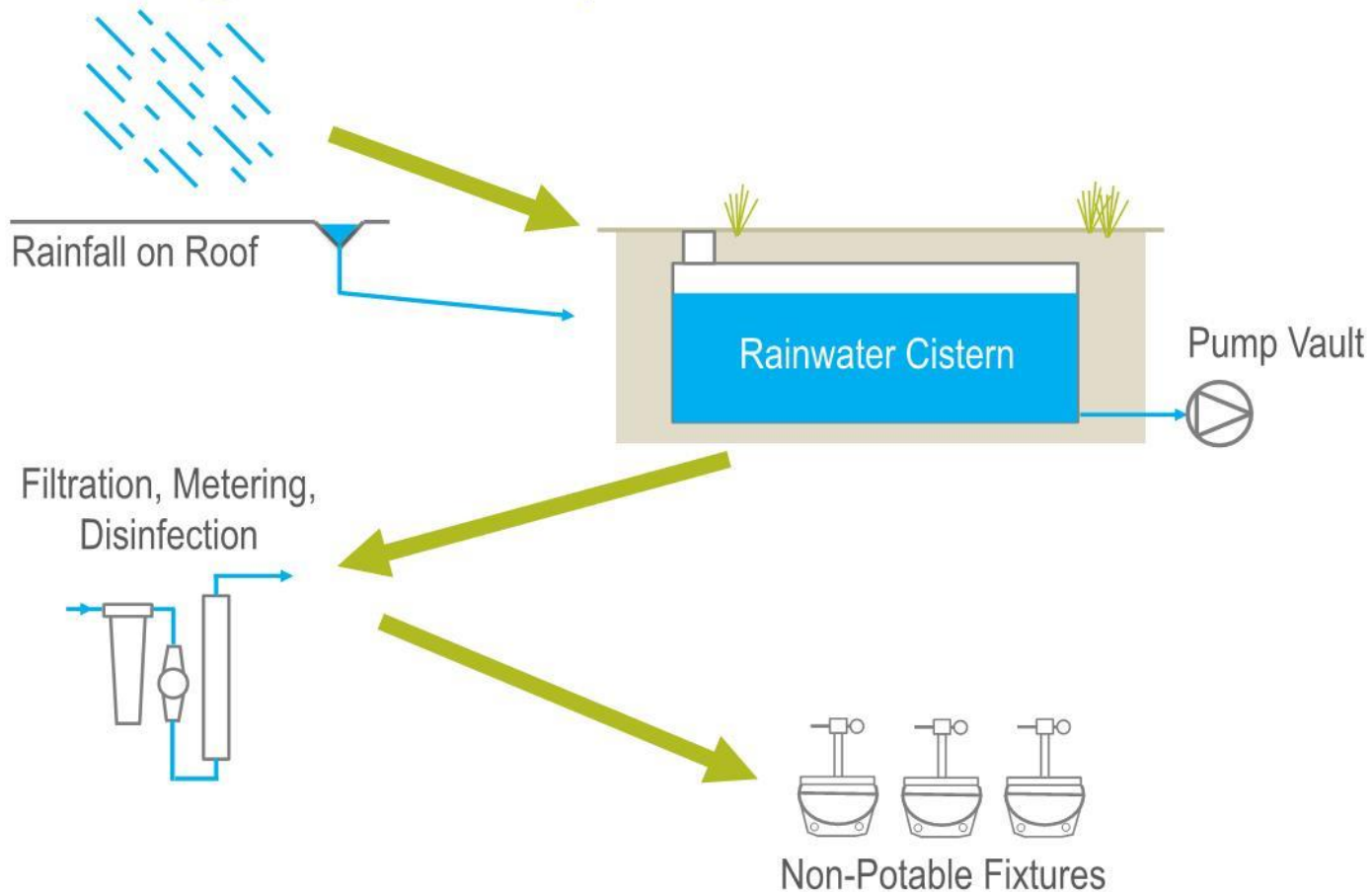


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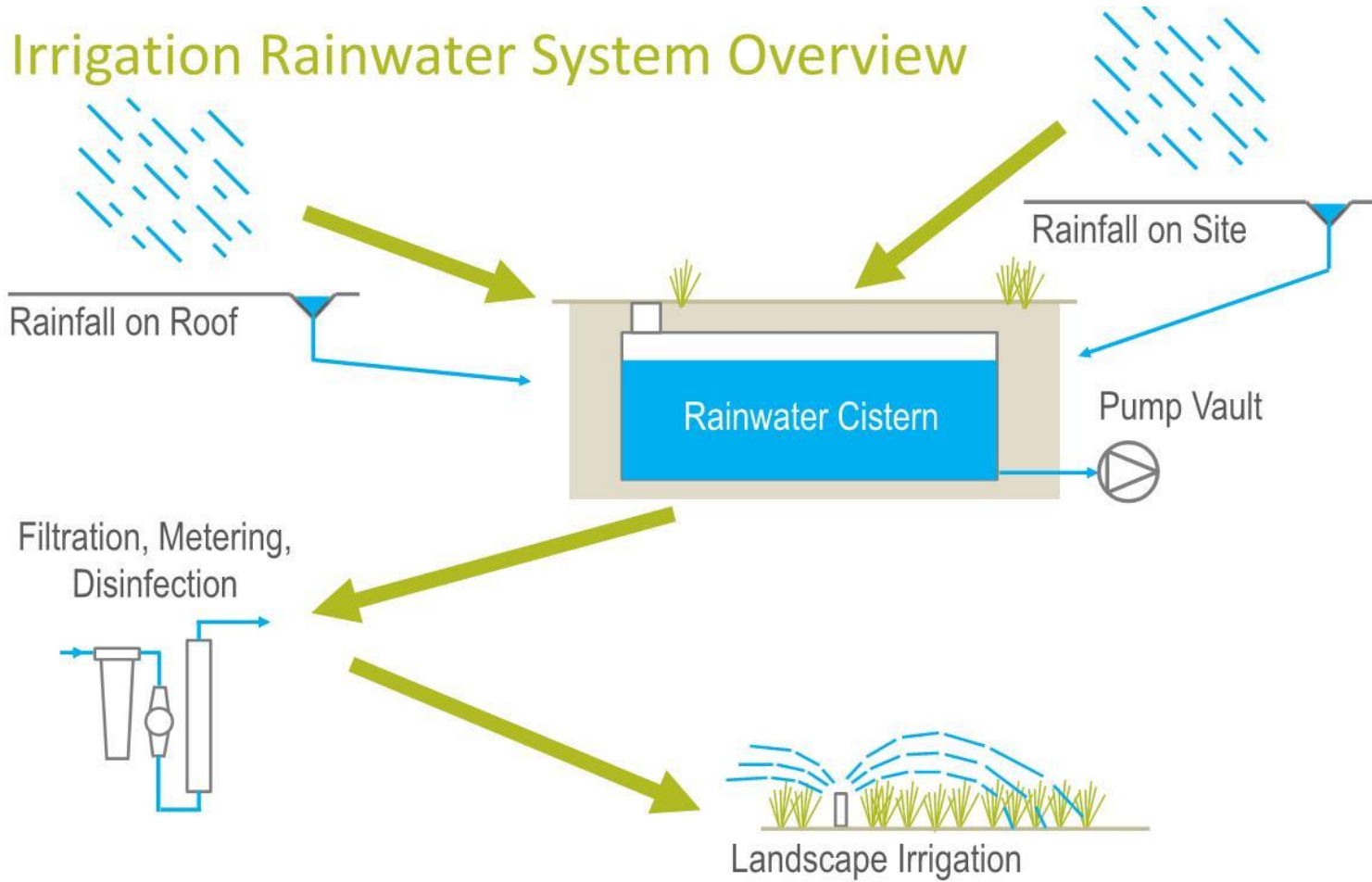
HARVESTING SITE RAINWATER FOR RE-USE



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.



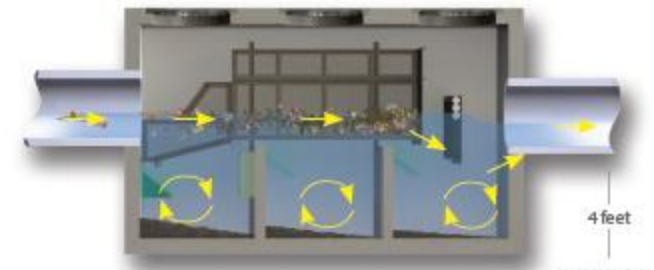
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Between Storm Events



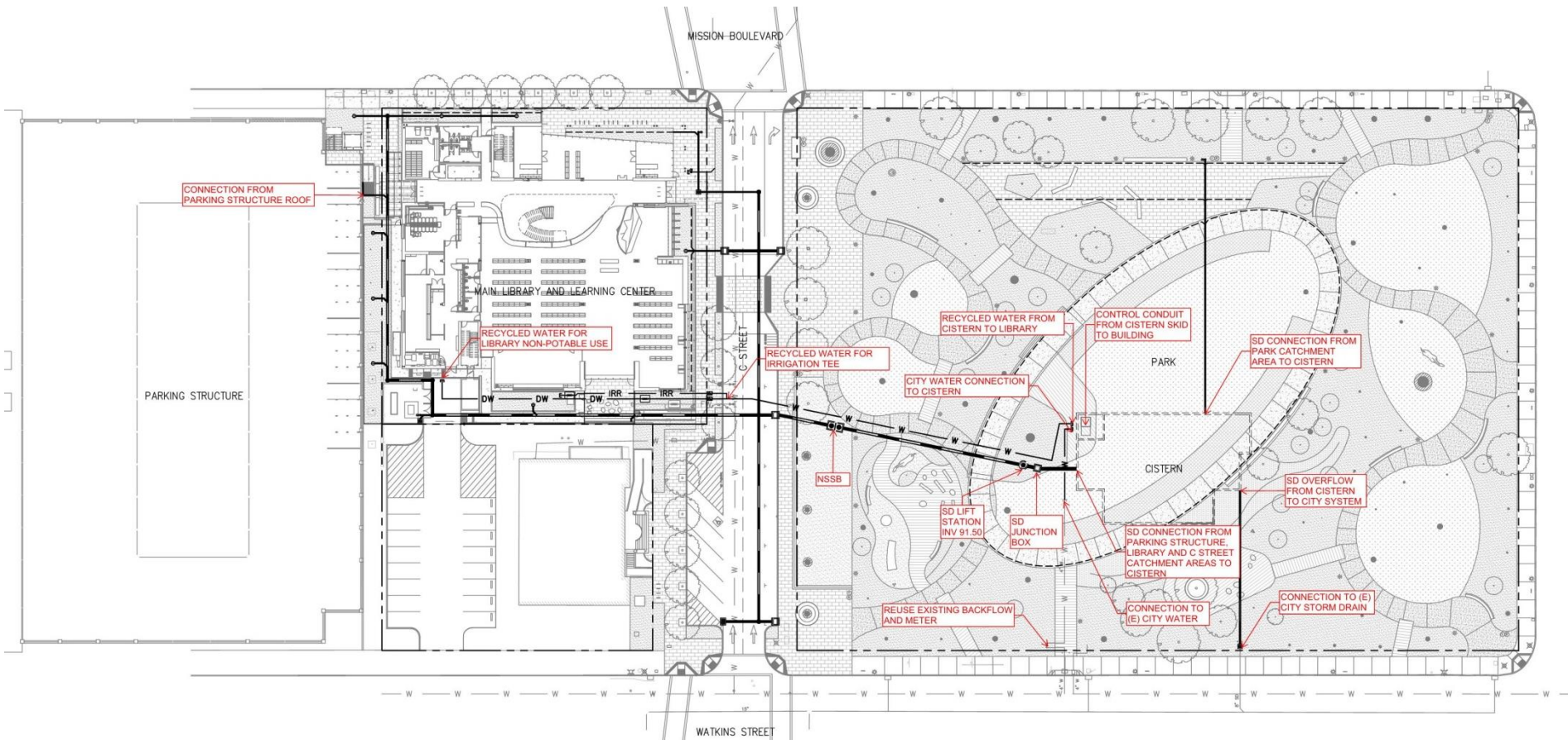
DUAL STAGE
Hydrodynamic Separator (NSBB)

During Storm Events



DUAL STAGE
Hydrodynamic Separator (NSBB)

SITE IRRIGATION



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SYSTEM DIAGRAM



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WATER MATRIX SYSTEM

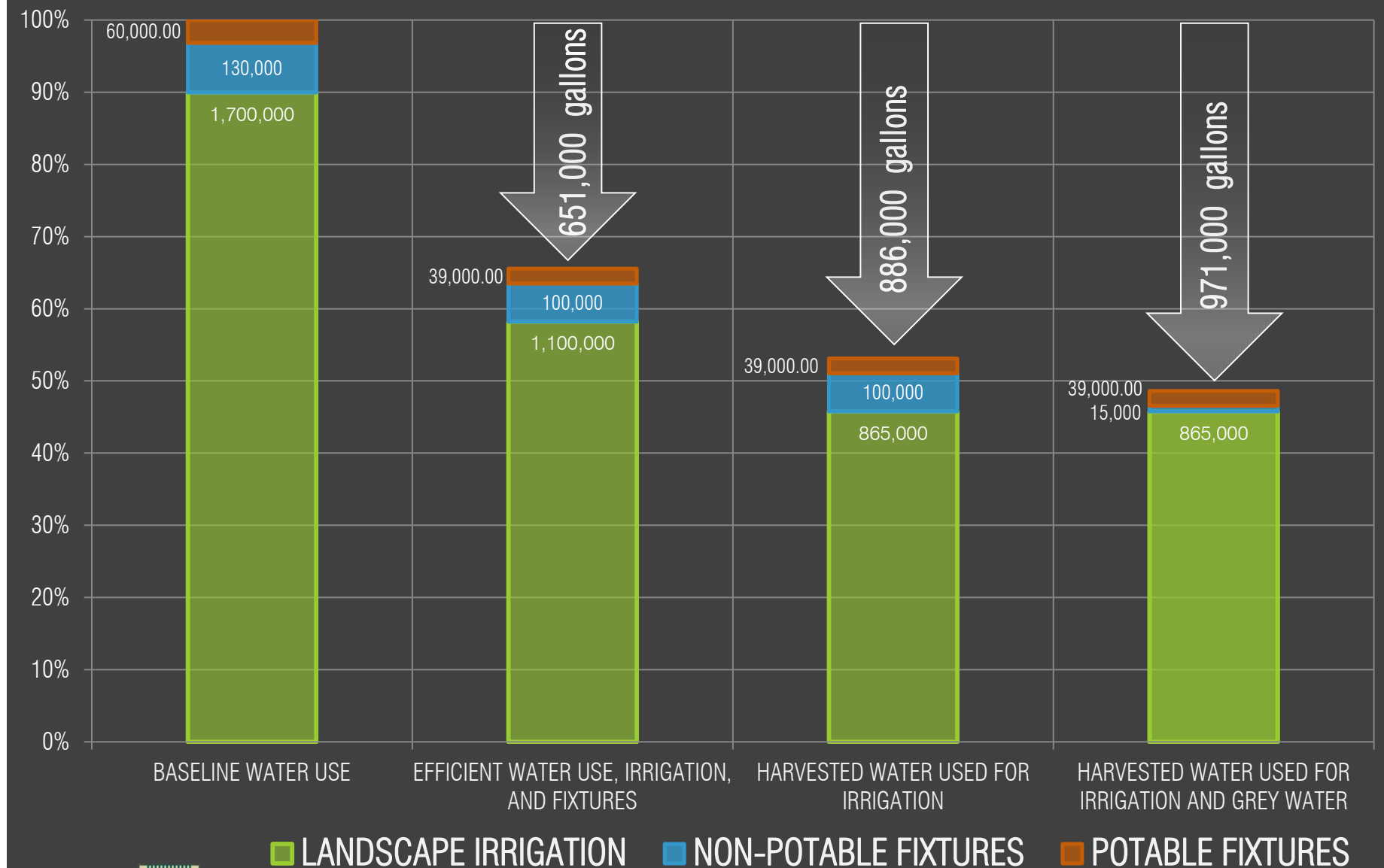
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DURABILITY

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Schematic Illustration



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QUESTIONS

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