

SITE & BUILDING WATER USE

Case Study #2

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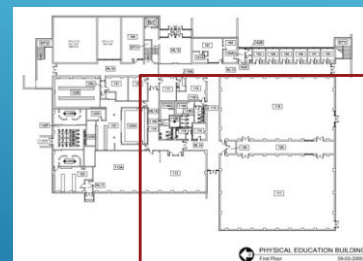


Location: South of Mem. Gym

Area: 52,846 square feet

Established: 1970

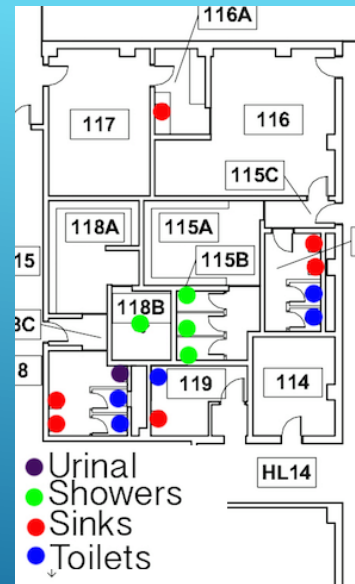
Use: Athletic Facilities, Dept. Offices,
Faculty & Grad Offices



PHYSICAL EDUCATION BUILDING (S/W)

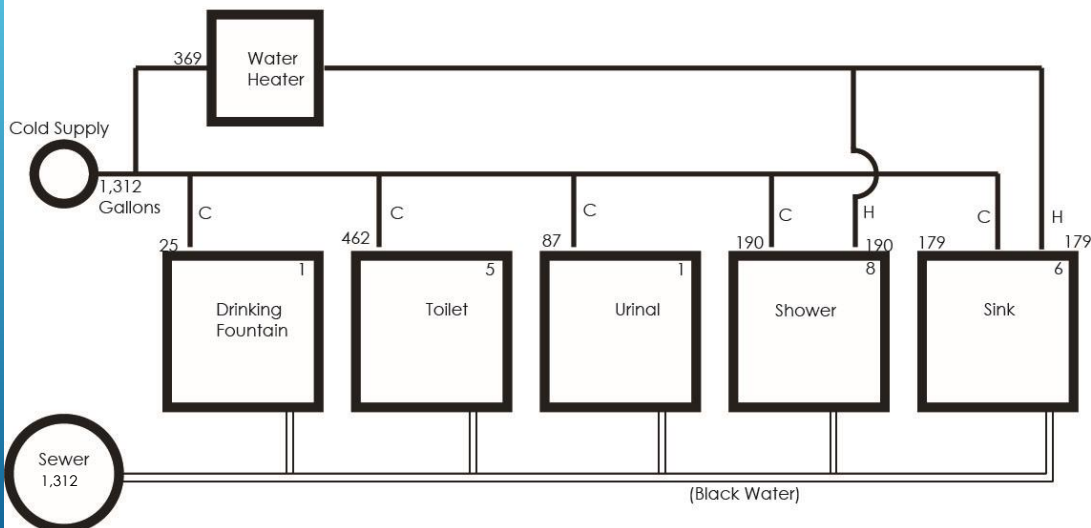
25 Gallons per person at 55 people					
Fixtures	% of total water use	Gallons by fixture type	# of fixtures	Gallons/fixture/day	
Sinks (6)	24%	356.4	6	59.4	
Toilets (5)	27.30%	461.6	5	92.3	
Urinal	8.90%	80.2	1	86.2	
Showers (8)	25.80%	379.8	8	47.5	
Drinking Fountain	9.10%	25	1	25.1	

- ▶ Standard sinks that use 2.5 gallons per use
- ▶ Standard toilets that use 3.5 gallons per flush
- ▶ 3 single-head shower and 1 5-head shower all use 2 gallons a minute
- ▶ This section also includes a drinking fountain that uses 25 gallons a day and a urinal that uses 1.5 gallons per flush
- ▶ The average school uses 25 gallons per person and we are assuming 55 people use this building per day



WATER USE: CONVENTIONAL

Conventional System



WATER USE: CONVENTIONAL

Conserving Water Use

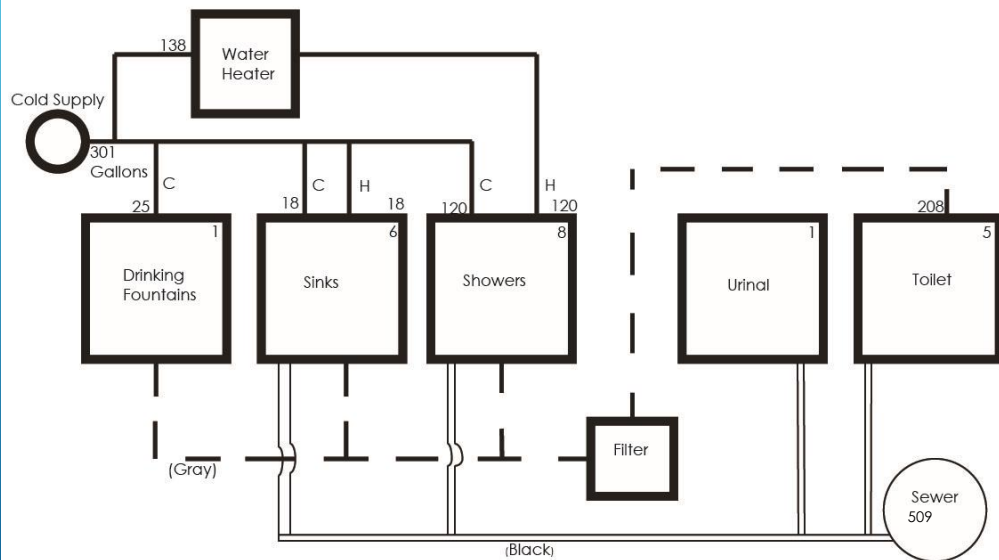
Fixture	FUconv	USEcons	USEconv	Fucons
Sinks (6)	2	0.25	2.5	0.2
Toilets (5)	10	1.6	3.5	4.6
Urinal	5	1	1.5	3.33
Showers (8)	4	1	2	2
Drinking Fountain	0.25	x	x	x

$$Fucons = (Fucov)[(USEcons)/(USEconv)]$$

- We decided to swap the standard sink for a metering faucet that emits .25 gallons of water per cycle
- We replaced the blowout valves on the toilets with flush-o-meter valves
- We replaced the standard urinal with a waterless urinal
- In the showers we swapped the shower heads with 1 gallon a minute shower heads

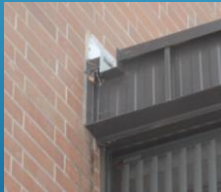
WATER USE: CONSERVING

Conserving System

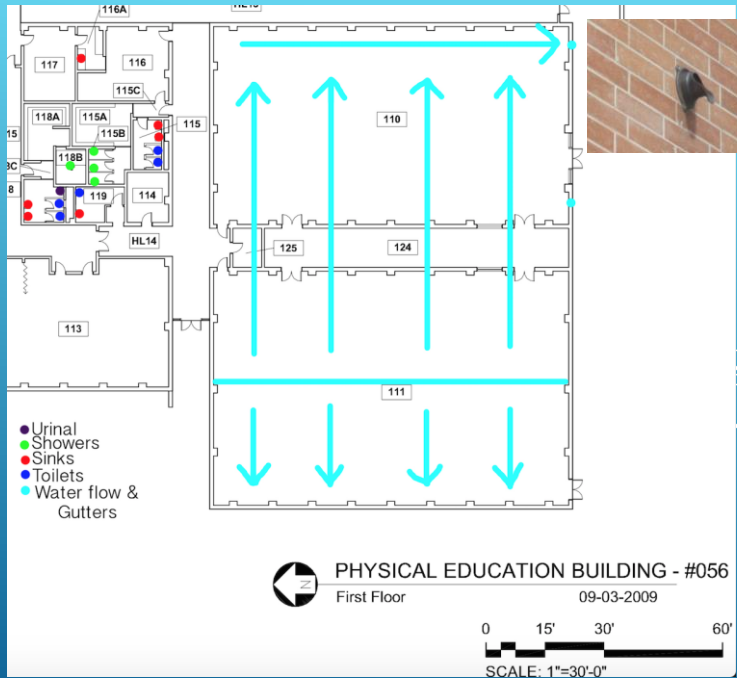


WATER USE: CONSERVING

- There's not a need for landscape irrigation because the sprinklers surrounding the building are on a different system
- The PEB has a roof with a large surface area from which water can be collected
- The roof is capable of capturing 14,326 gallons a month (on average)

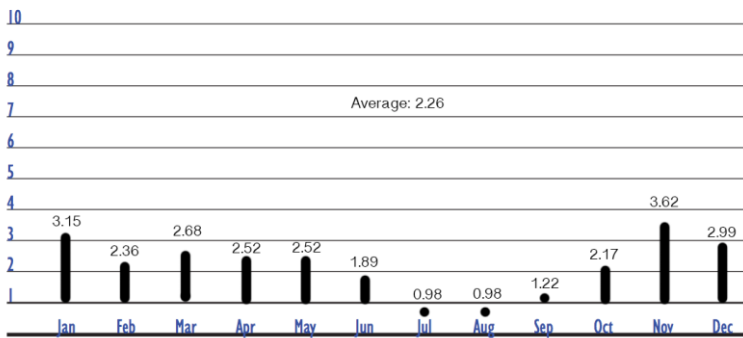


STORMWATER



Monthly Rainfall Bar Graph

Average Rainfall (in inches) per Month



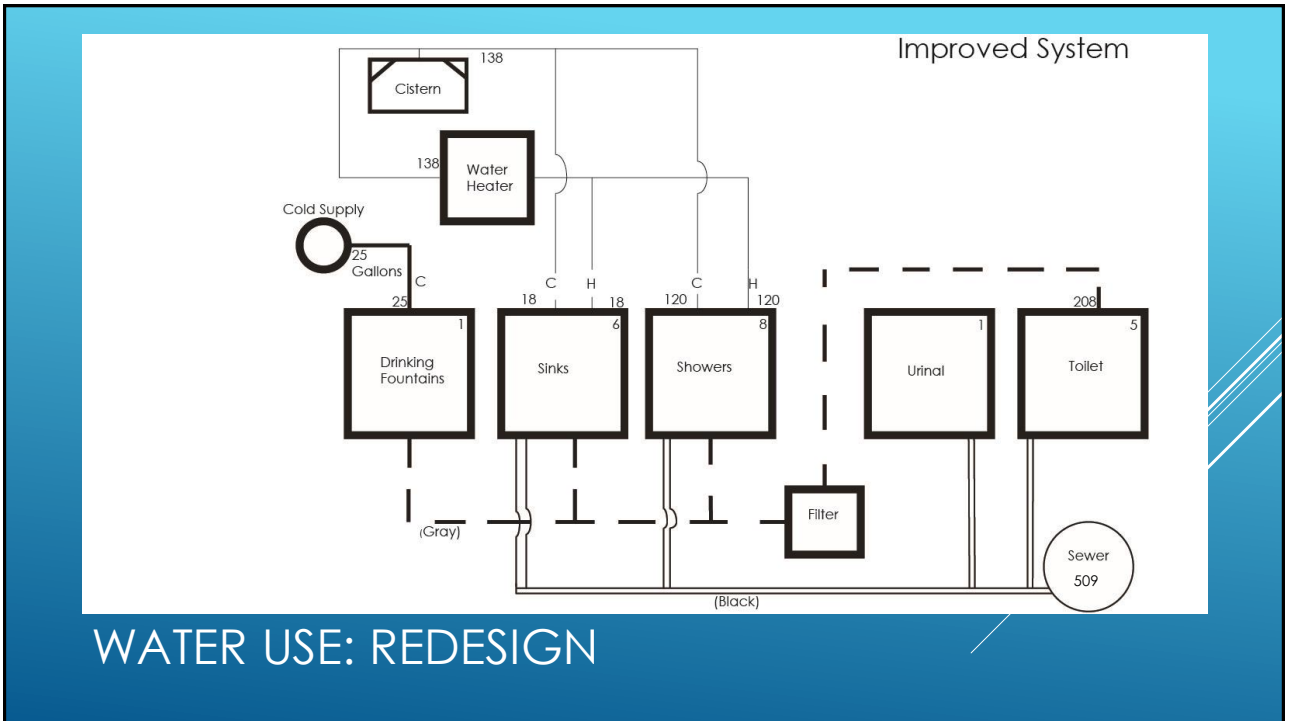
*In inches

- We assumed a drier year when calculating expected rainfall by only using 2/3 of the average rainfall

STORMWATER



- We calculated the cistern size to be 3,500 gallons. This should be able to hold 3 months worth of water
- We multiplied the surface area of the roof by the annual rainfall in feet
- Then we multiplied this number by 7.48 gallons because one cubic foot contains 7.48 gallons
- This gave us 9,534 gallons a month to use



- ▶ Our redesign reduced the water use from the city by 98% and we reduced total water use by 61%!!!
- ▶ If we used a heavy duty filter and a more complex cistern system, we could ideally rely solely on rainwater
- ▶ The cistern we chose would probably be pretty expensive to implement but it drastically reduces water use
- ▶ If we could use more cisterns, we could probably add some landscaping or bio swells to the existing site
- ▶ The only design flaw we have is the need to put up signage warning people the water in the sinks and showers are non-potable

CONCLUSION