CASE STUDY #2

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Building Description

- The Ale House is located at 226 W 6th St. Moscow ID, 83843
- A small restaurant with standing tables, booths, bar and an outdoor patio space.
- Space has a large parking lot made of gravel
- Open from Mon.-Sun. 11am-10pm
- Average occupancy 120 people

Current Rainfall

Normal Precipitation

(MOSCOW U OF I Weather station, 1.63 miles from Moscow)

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Inch	2.99	2.52	2.57	2.52	2.62	1.87	1.12	1.19	1.28	2.01	3.54	3.14	27.37

Averages:

Temperature: 36.5°F
High Temp. (July): 83°F
Average Low Temp. (January): 22.5°F
Dew Point: 31°F
Humidity: 31%
Rainfall: 27.37 in.
Snowfall: 49.5in

Water Using Fixture Inventory

FIXTURE	#	OUTFLOW WATER QUALITY / RECYCLABLE?
Lavatory	4	Grey Water / Y
Urinal	1	Black Water / N
Toilet	3	Black Water / N
Dishwasher	1	Grey Water / Y
Kitchen Sink	6	Grey Water / Y

WATER USE ESTIMATE

SPACE	PER CAPITA USE (G/D)	# PEOPLE
Restaurant w/ toilet facilities (per patron)	7-10	120

Total Gallons Per Day Used: **1200 (WU)**

Found on MEEB pg. 872 Table 20.2

Conventional Water Supply

GPFU = (WU/FU)

1200/73.4 = 16.35 WU/FU

Found on MEEB 991 Table 21.15

FIXTURE	**#**	**COLD**	**HOT**	**WSFU**	**TOTAL FU**
Lavatory	4	1.5	1.5	2	8 (FU)
Urinal	1	10	0	10	10 (FU)
Toilets	3	10	0	10	10 (FU)
Dishwasher	1	0	1.4	1.4	1.4 (FU)
Kitchen Sinks	6	3	3	4	24 (FU)
					TOTAL: 73.4 (FU)

Conventional Supply Fixtures Estimates

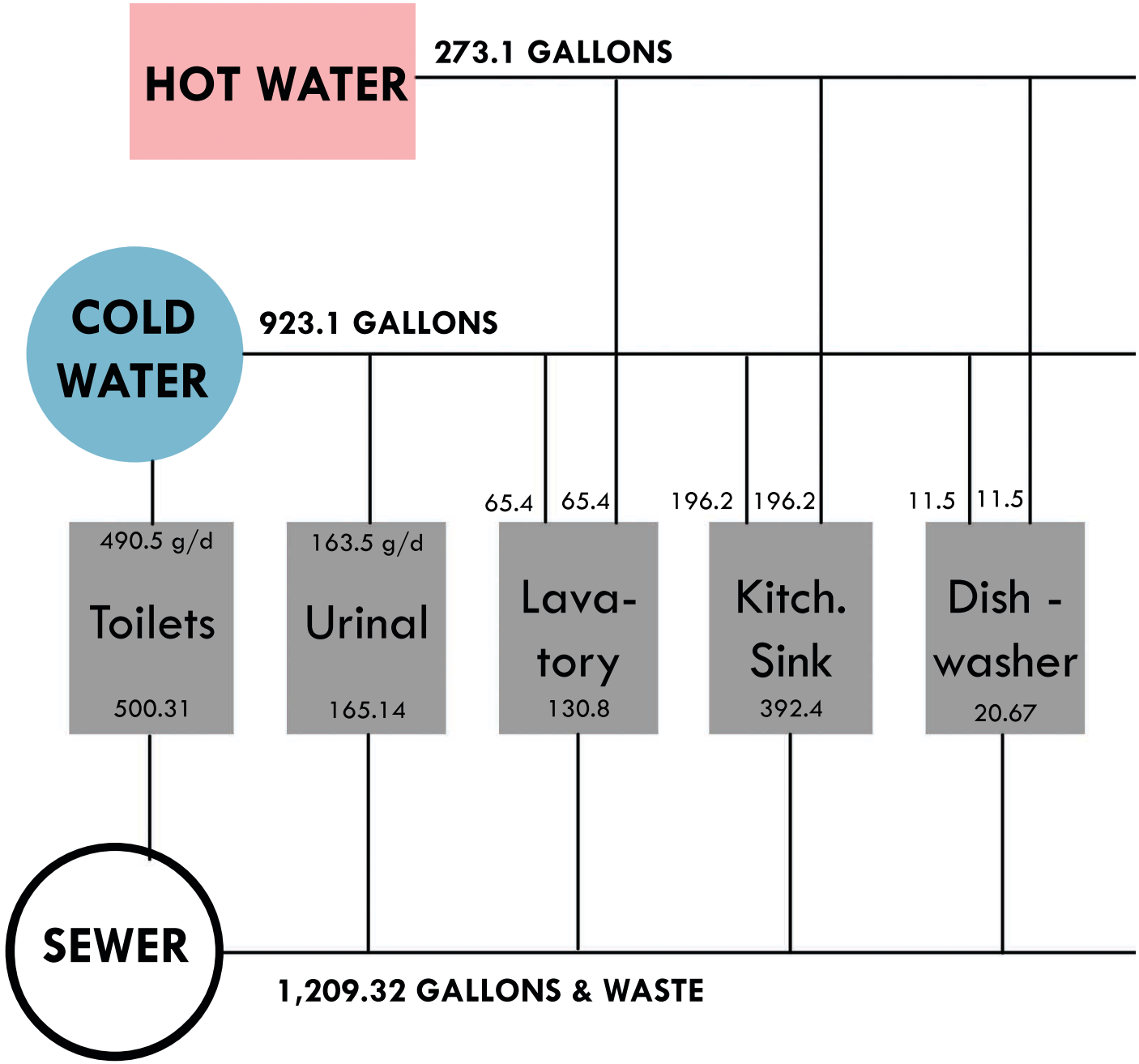
FIXURE	TOTAL F(U)	GPF
Lavatory	8 FU	130.8
Urinal	10 FU	163.5
Toilets	30 FU	490.5
Dishwasher	1.4 FU	22.89
Kitchen Sinks	24 FU	392.4
		TOTAL SUPPLY: 1200.09

(GPF) = GPFU x FU

GPF = Gallons/day/supply fixture

GPFU = gallons/day/supply fixture unit

FU = weight in supply fixture


HOT WATER
273.1 GALLONS
COLD WATER
923.1 GALLONS
65.4
65.4
196.2
196.2
11.5
11.5
490.5 g/d
Toilets
500.31
163.5 g/d
Urinal
165.14
Lava-tory
130.8
Kitch. Sink
392.4
Dish - washer
20.67
SEWER
1,209.32 GALLONS & WASTE

How Does The AleHouse Conserve Water?

- NO!!!!
- The AleHouse utilizes all conventional fixtures. The bathroom includes standard toilets, sinks and urinals.
- They use the bare minimum to meet code.

Storm Water Analysis

How Does the AleHouse Deal With Storm Water?

- NO!!!!
- The AleHouse parking lot doesn't have any drainage system to deal with storm water other than gravel.
- The gravel cant suffice storm water for the whole parking lot – cause for the water gathering area.

How Can We Improve It?

- Creating bio-swales around the perimeter of the parking lot
- Slant the parking lot so storm water is directed into a antiquate drainage system that goes to a sewer
- Create a mini storm water retention pond where the current water gathering area is.
- Using the gravel but adding a porous asphalt pavement under – distributing storm water into the ground.

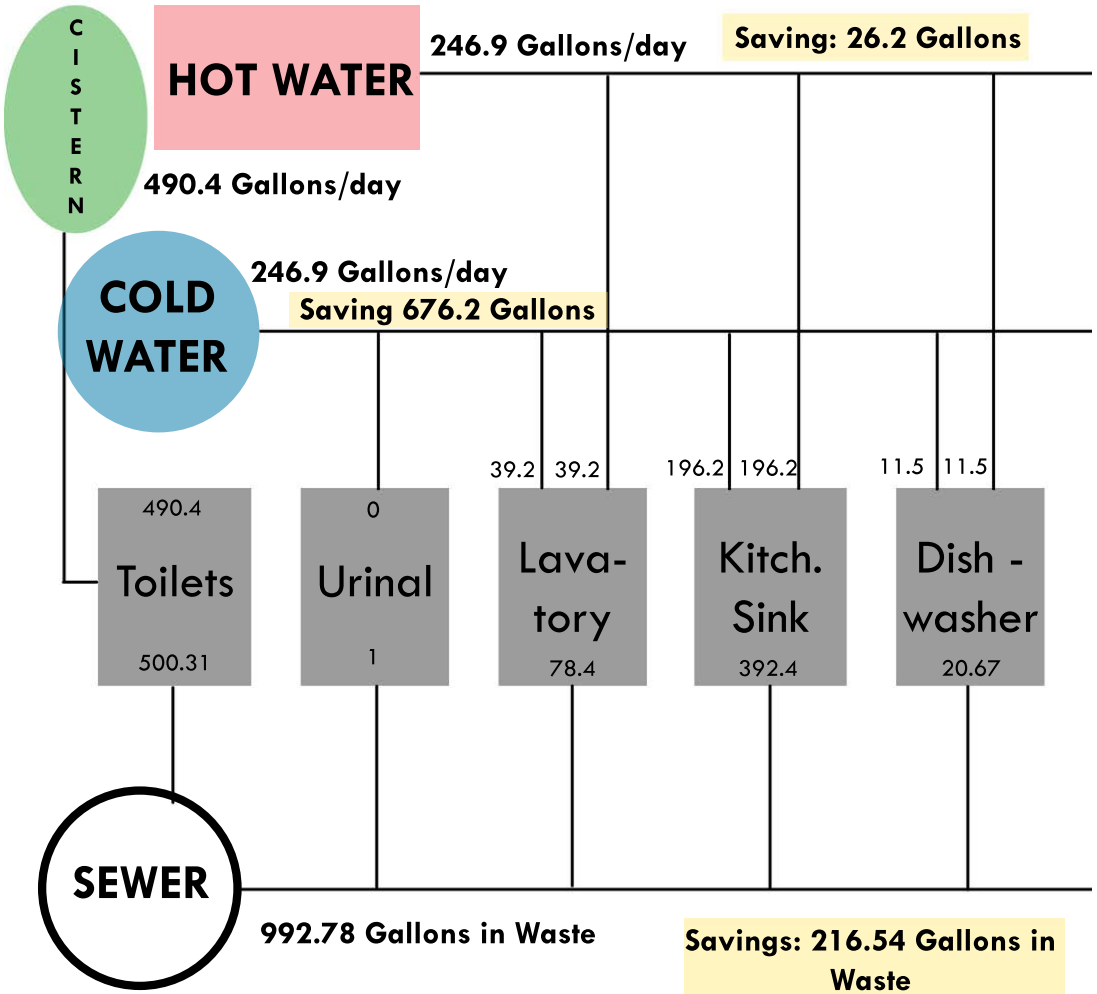
Water Conservation Re-Design

FIXTURE	#	WSFU	TOTAL (FU)
Toilets – Dual Flush (Supplied by Cistern)	3	0	0
Waterless Urinal	1	0	0
Restroom Motion Sinks	4	0.7	2.8
Kitchen Sinks	6	4	24
Dishwasher	1	1.4	1.4
		Previous Total: 73.4	**Total: 28.2**

Fixture	Total (FU)	GPF
Toilet – Dual Flush (Supplied by Cistern	0	0
Waterless Urinal	0	0
Restroom Motion Sinks	2.8	78.4
Kitchen Sinks	24	672
Dishwasher	1.4	39.48
	Previous Total: 1200.09	Total: 789.88

411.02 Gallons Savings

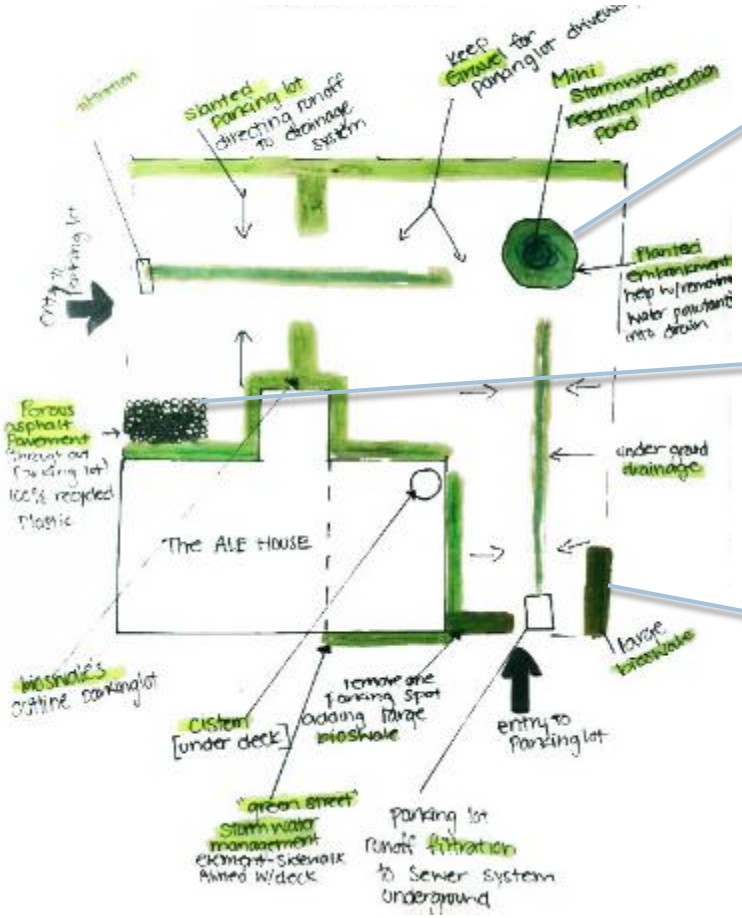
ReDesign Diagram



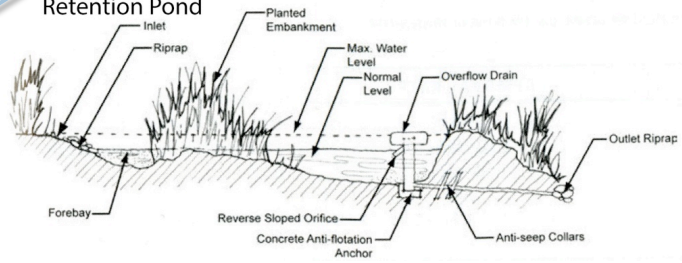
Storm Water Redesign

Ale House

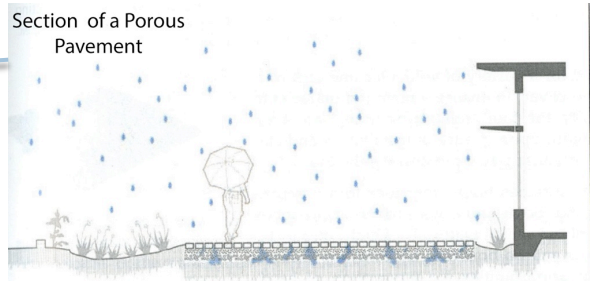
Parking lot Redesign
for Storm water



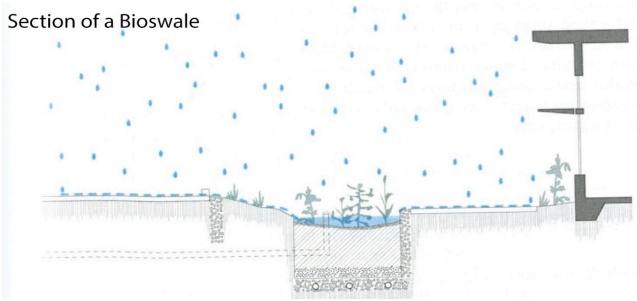
Section of a
Retention Pond



Section of a Porous
Pavement



Section of a Bioswale



Cistern Sizing

2,576 SF x .6 gallons = 1,545.6 gallons/SF

1,545.6 x 27.08 in. Rain Annually = 41,854.8 g

You can only harvest 75% of water. The first 25% is tainted.

41,854.8 x .75% =

31,391.1 collects gallons annually

1 ft cubed = 7.48 gal (found in Green Studio pg. 284).

Therefore…

31,391.1 gallons annually / **7.48 = 4,196.7 Cubed ft Cistern**

We would need to install a 20x20x11 Cistern to hold this amount of water!

Cistern would provide water for dual-flush toilets and vegetation watering during summer months.

Conclusion

- Currently the Alehouse utilizes all standard fixtures.
- Our redesign, effectively saves about 702.4 Gallons per Day with:
  - Dual-Flush Toilet
  - Cistern
  - Motion Sensor Sinks
  - Bio-swales
  - Porous Asphalt
  - Retention pond
  - “Green street” – lined with deck- (bio-swale?)