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Feasibility Analysis of Greywater at WPI

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Abstract

- Address the issue of water sustainability on the campus of Worcester Polytechnic Institute.
- Propose a feasible water recycling system
- Assess the feasibility of implementing greywater systems in residential structures at WPI.
- Determine what place, if any, would be the most ideally suited for greywater implementation.

Background

- Greywater: water that after being slightly polluted by human activities can still be reused^[3]
- Greywater systems reuse greywater for appropriate tasks like irrigation ^{[6] [7] [12]}
- Core issues:
 - Cost effectiveness/3 year payback ^[12]
 - Treatment systems/controlling contaminants^{[6][8]}
 - Margin of greywater production and uses ^[2]
- Affected by regulations, cost, maintenance, health and public acceptance^[6]

S.W.O.T.

Strengths:

- Reduces freshwater usage by large margins
- Simple principle and simple solution

Weaknesses:

- High initial costs to implement ^{[9] [10]}
- Significant planning and new infrastructure ^{[9] [10]}

Opportunities:

- Save significant money on water bill
- Accolades for efforts in sustainability

Threats:

- Feasibility exists in water/plumbing markets ^{[5] [6] [11]}
- Government Regulations, health and safety ^[6]

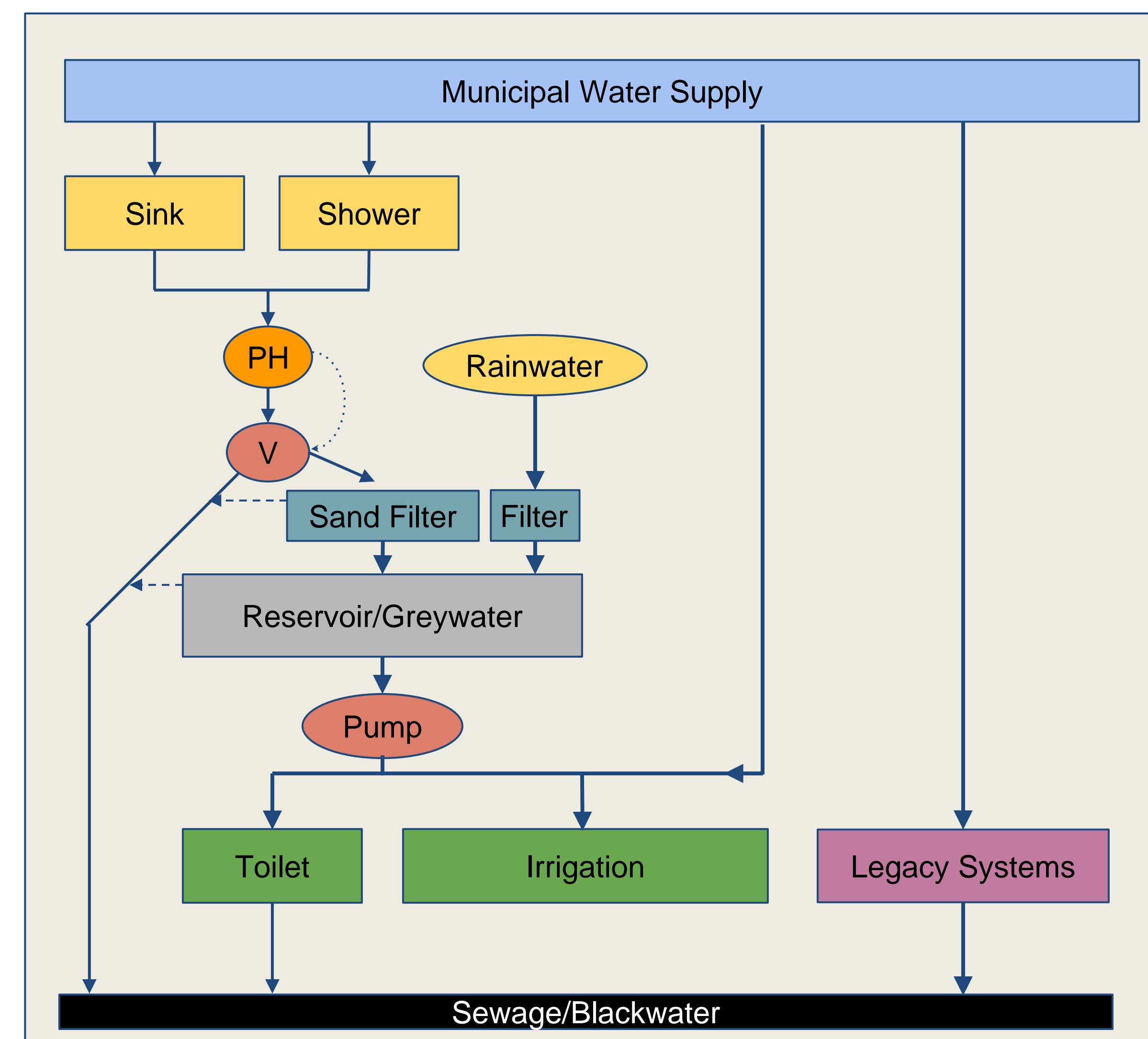


Example of a Household Greywater Tank ^[4]

Statistics of Greywater

- A 450 person dorm uses 6750 Gal/day 15 Gal/person^[1]
- 5400 Gallons is recyclable greywater^[1]
- Valued at \$37.8/day, \$27,216 over 3 years at 0.7cents/gallon and 270 days^[12]
- Greywater system will cost about same
- Enough water to irrigate 8000 square feet + flush toilets 600 times each day at 0.7 Gallons/Flush and 0.6 Gal/sq. ft.

Proposed System Strategy



1)Reservoir to collect Greywater 2.) Input from Sink and Shower 3.) Input from Rainwater 4.) PH monitor 5.) Tank/Sewer Valve 6.) Sand Filter 7.) Supply for Irrigation 8.) Supply for Restroom ^{[5] [6] [8] [11]}

Conclusions/Recommendations

- Greywater is not feasible for use at WPI unless it is part of the design of a new construction.
- Mainly infrastructure issues are the main impediments toward Greywater Implementation.
- Other, more traditional, water saving techniques would be best.
- Greywater would be a great plan, but only with a strong intention and foresight.

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