

INTRODUCTION

- Chesapeake Bay far exceeds current nitrogen TMDL
- Smart monitors can be used to measure nutrient loads being discharged from green infrastructures
- In current bioreactor gardens, only water levels are measured, so nitrogen sensing is needed
- Green Mechanics has been implementing data transmission through satellite to determine water readiness to discharge

DESIGN OBJECTIVES

- To increase applicability to present systems, a small-scale bioreactor garden was constructed to run synthetic wastewater
- Through influent and effluent testing, we sought to establish a correlation between nitrogen and dissolved oxygen (DO), pH, oxidation-reduction potential (ORP), and electric conductivity (EC)
- The microcomputer processes and displays data from effluent to determine whether the garden should extend retention or discharge

SAP & SOP

SOP:

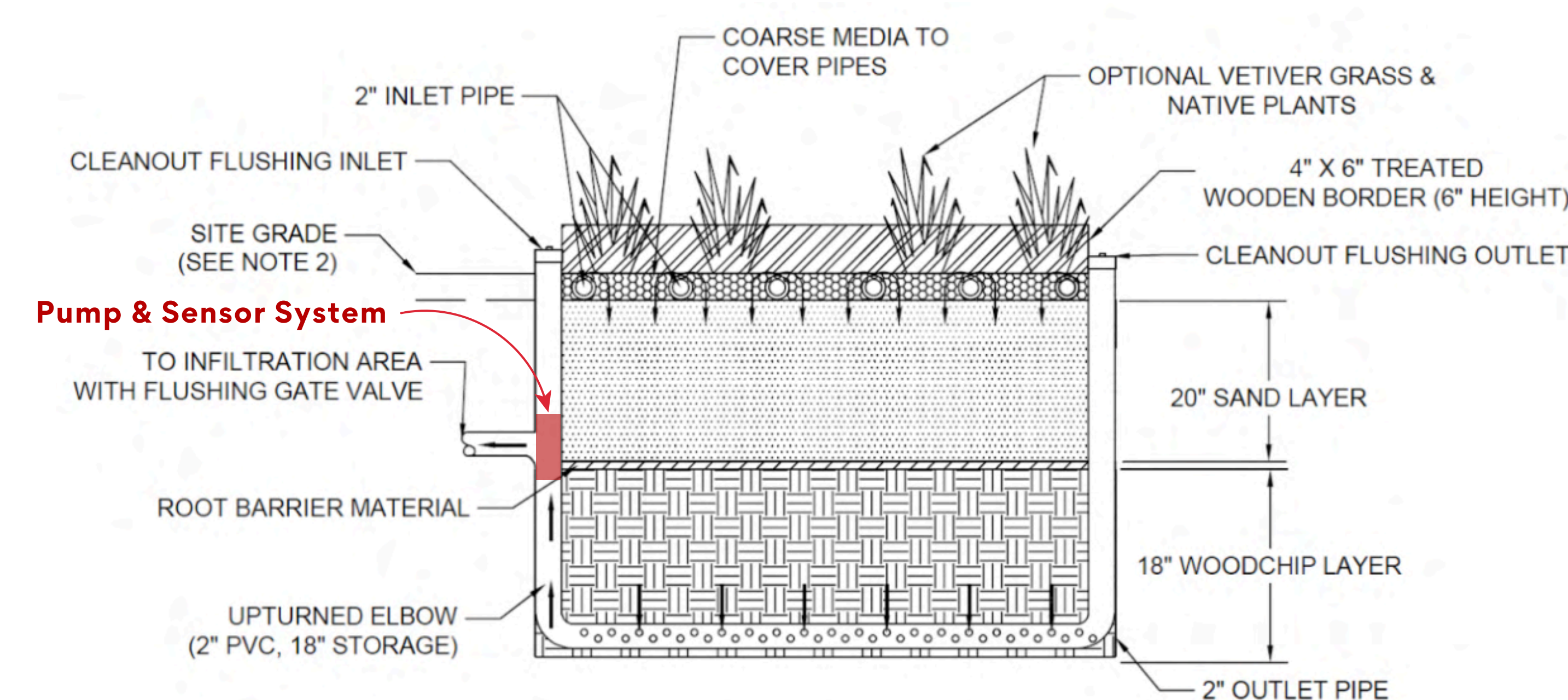
- 1) Soak Dog Food in DI water for 24 hours
 - a) 6 cups of Dog food for 1 gallon of DI
- 2) Filter water to remove large solids
- 3) Run filtered water through garden using a pump
- 4) Leave water to sit for 24 hours retention time
- 5) Take measurements for Nitrate, DO, pH, ORP, and EC on effluent

SAP:

- 1) Remove outliers from analysis through Z value
- 2) Plot all points and find a trendline with R^2 value
- 3) Use correlations where $R^2 > 0.5$

DESIGN SKETCH

The sensor will be installed above the outlet pipe and connected by cable to the existing RockBLOCK, which detects water height and connects to the satellite transmitter. A pump will pull a sample for testing. The data and discharge command will be sent and the discharge valve will open or remain closed.



CORRELATION
PLACEHOLDER

WIRING
DIAGRAM
PLACEHOLDER

CORRELATION RESULTS

FINAL DESIGN
PICTURE
PLACEHOLDER

COST ESTIMATE

COST ESTIMATE