Measuring Flow Rates in Small Urban Stormwater Systems

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INTRODUCTION

Urban stormwater runoff from streets, parking lots, lawns, and roofs is one of the largest impairments to our shared water systems. Untreated stormwater can contaminate surface water, making it unfit for human use and/or as aquatic habitat. In an effort to reduce stormwater runoff, the City of Logan installed street-side bioretention bays along 300 E. This project attempts to determine the hydraulic efficiency of these retention basins during storm events, as well as the water quality in the basins. The results of this study can be used to decided whether or not to revise these designs or implement more. throughout the community.

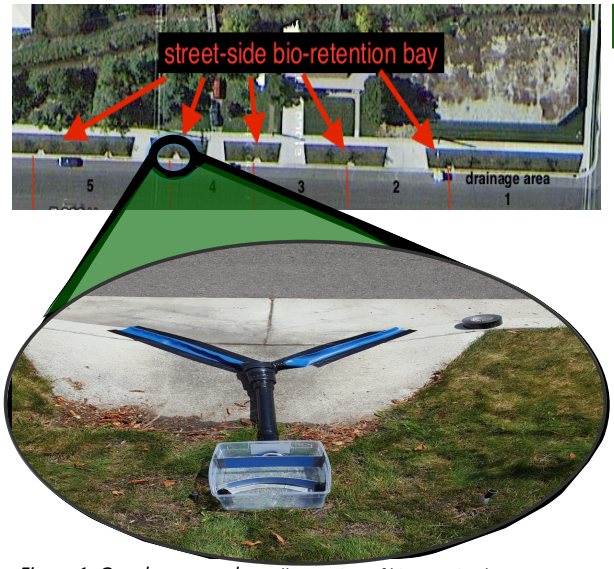


Figure 1: Google map and Installment view of bioretention bays on 300 East, Logan, UT.

METHODS

→ Rational formula (Q=ciA) to predict the maximum flow rate that will enter each bay
→ Use V-Notched weir boxes to measure the flow rate in gallons per minute (gpm) controlled by Siemens (STRANS FM MAGFLO MAG6000) flow meter
→ Calibration of HOBO U20L-004 water level logger in v-notched weir to know flow rate
→Analyze the hydraulic efficiency (i.e., the gutter flow interception rate) of the curb cutout system at field scale

GOALS

→Develop system to measure low flow rates.
→ Measure water quality before and after filtration
→Collect and analyze data in the evaluation of the hydraulic efficiency (i.e., the gutter flow interception rate) of the curb cutout system

RESULTS

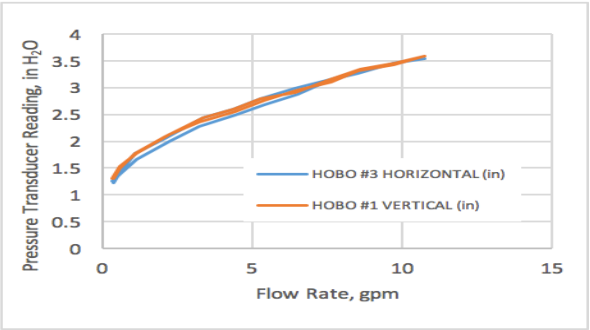
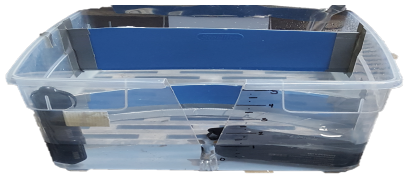


Figure 2: Flow calibration curve showing pressure transducer readings in horizontal versus vertically mounted configuration.

CONCLUSIONS

→Vertical transducer placement in weir boxes improves flow measurement precision.
→Temperature highly affects transducer measurements.



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