Title:
The Bottom Feeder

Problem Statement:
When cleaning storm drain pipes greater than thirty-six inches in diameter, traditional vacuum truck systems leave a large amount of debris in the last six to ten feet of the pipe due to the angle that the cleaning head and hose are pulled back through the pipe. (See Figure 1.) This angle also contributes to inefficiencies while cleaning since much of the water stream is aimed at the top and upper sides of the pipe. (See Figure 2.) The leftover debris would normally be cleaned by manual labor using shovels and water hoses. This often required people to crawl inside the pipe and is very time consuming.

Summary of Solution:
ACHD employees have devised a system to keep the cleaning head on the bottom of the pipe. They attach The Bottom Feeder to the bottom one-third of the pipe and adjust the roller guide as necessary. (See Figure 3.) The cleaning head now rides along the bottom of the pipe, cleaning the pipe with better efficiency and effectiveness. (See Figure 4.) This device also helps remove the debris that would be left at the end of the pipe, virtually eliminating labor work and dramatically increasing the overall safety of the operation.

Labor, Equipment, Materials:
See Summary of Expenses below.

Summary of Expenses:

| | | | |
|---|---|---|---|
| Labor | 20 hours @ $50/hour | = | $1,000 |
| Scrap Steel for Prototype and Final Build | | = | $100 |
| Misc. Nuts, Bolts, Pins, Etc. | | = | $75 |
| | | **TOTAL** | **$1,175** |

Savings/Benefits of this Solution:
In a comparison between two pipes of equal size with similar amounts of debris, ACHD determined that what used to take eight hours with two vacuum trucks, one water truck, and two laborers can now be completed with two vacuum trucks, no water truck, and no laborers in only one and one half hours. This is a time savings of 81%! The net savings are broken out below:

| | | | |
|---|---|---|---|
| Vacuum Truck w/ Crew (2) | 13 hours @ $275/hour | = | $3,575 |
| Water Truck w/ Operator | 6.5 hours @ $110/hour | = | $ 715 |
| Laborer (2) | 13 hours @ $50/hour | = | $ 650 |
| Water | 7500 gal @ $0.007/gal | = | $ 55 |
| | | **TOTAL** | **$4,995** |

In addition to financial savings, the biggest benefit is the increased safety for the crew.


Figure 1


Figure 2

The Bottom Feeder attaches securely to the pipe with sturdy steel clamps which use three ¾ in. bolts. The hose roller guide slides over the main support tube and movement is restricted using blue T-handle. The guide can then be positioned anywhere along the support tube to aid in efficient cleaning. The main support tube is also held in place by blue T-handles allowing positioning flexibility.

Figure 3

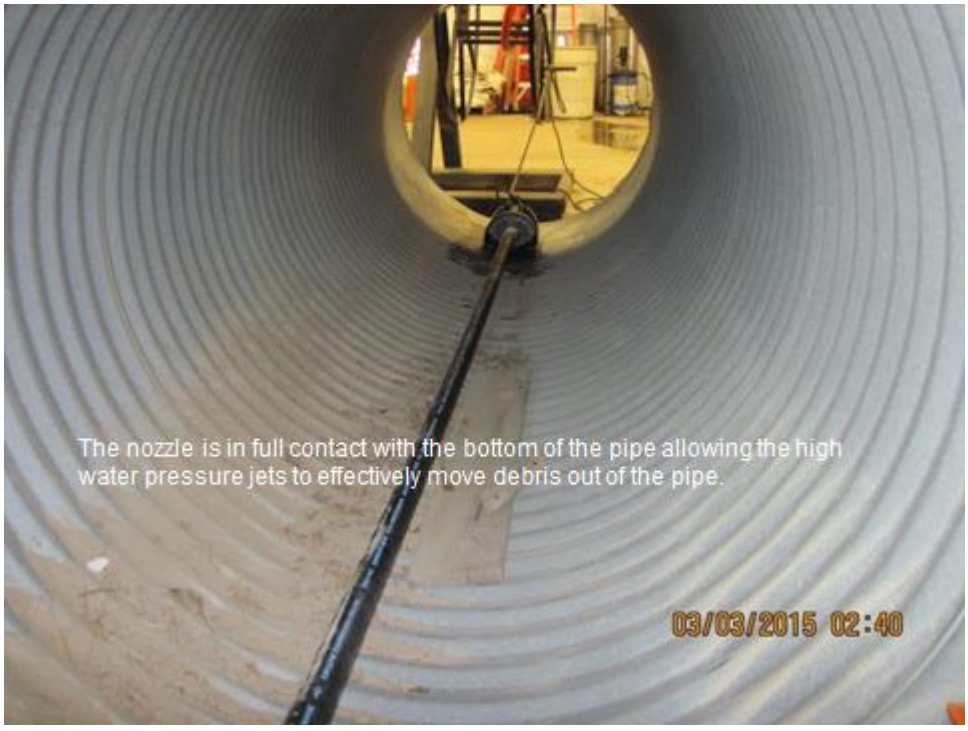


Figure 4