Costa Mesa Sanitary District

….an Independent Special District

Case Study

Privatizing vs In-House Services for Sewer Collection System Pipeline Cleaning

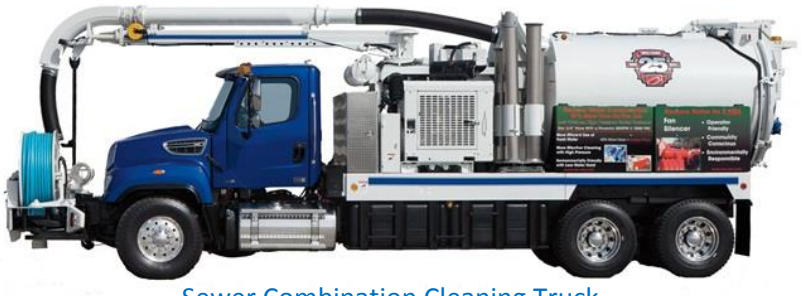
BACKGROUND

The Costa Mesa Sanitary District (CMSD) was formed in 1944 as an independent special district under the Sanitary District Act of 1923. Solid waste collection was the primary reason for the formation of CMSD, but in 1953 CMSD expanded its service to include owning and maintaining a sewer collection system. 1953 was also the year when Costa Mesa became a general law city and two years after the City's incorporation, the City and CMSD agreed to enter into a partnership where the City would provide the employees and equipment to operate and manage CMSD's sewer collection system. This arrangement lasted until 2006 when CMSD decided to go its separate ways by hiring its own employees and acquiring its own equipment and facilities to manage solid waste and sewer collection systems. This study will look at the different methods CMSD used to maintain its sewer collection system to prevent sanitary sewer overflows (SSO) and determine what method was the most effective to protecting the environment and the community's health at the least amount of cost to the ratepayers.

CMSD SEWER COLLECTION SYSTEM

The Costa Mesa Sanitary District has 219.4 miles of gravity sewer pipes and 4.8 miles of pressurized pipes otherwise known as force mains. The diameter pipe size for gravity and pressurized pipes ranges from six to thirty inches. The majority of pipe material in CMSD's system is vitrified clay, but some pipeline are made of polyvinyl chloride, ductile iron and cast iron. CMSD also has twenty sewer lift stations, 4,650 manholes and 24,870 service lateral connections. Approximately two percent of sewer pipes were constructed after 2000 and 95% of the infrastructure was built between 1953 and 1979. The last lift station was constructed in 1991 (21st Street).

SEWER PIPELINE CLEANING

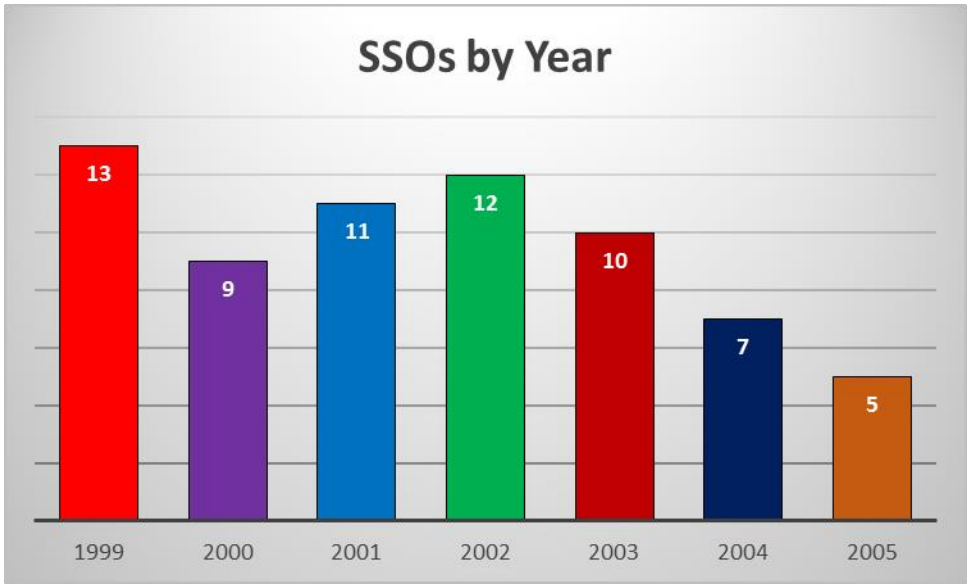


Sewer Combination Cleaning Truck

The best way to preventing SSOs is cleaning the pipes on a regular basis by using a high pressured water hose with a warthog nozzle, known as jetting, that can cut away roots and remove FOG (Fats, Oil, Grease) from sticking to pipes. Many public and private agencies use heavy duty combination cleaning trucks that include a high pressure water hose (jetting) and a vacuum to extract solids and debris from sewer systems. The jetting and vacuuming can be performed simultaneously and requires two people to operate. One person, the operator, will operate the jetter and vacuum hose, while the other person, the technician, will stand further upstream of the manhole to ensure the hose is moving forward as it should and he/she will indicate when the hose has reached the end of the manhole. The technician will also assist with traffic control.

The best way to determine the effectiveness of cleaning sewer pipeline are the number SSOs that occur. As mentioned earlier, in 1955 the City of Costa Mesa was cleaning CMSD sewer system, but documenting and maintaining data about SSOs did not begin until 1999. In fact, public agencies were not required to report SSOs until the California Water Resources Control Board adopted the Statewide General Waste Discharge Requirements for Sanitary Sewer System in 2006 (Order No. 2006-0003-DWQ). As shown below, from 1999 through 2005 CMSD experienced a total of 67 SSOs or an average of 9.6 SSOs per year.

System Cleaned by City of Costa Mesa



The industry standard for benchmarking the effective outcome of a cleaning program is the number of SSOs per 100 miles of sewer. However, the industry standard was not established until the state issued Order No. 2006-0003-DWQ in 2006. The first benchmark was identified in the State's 2008 Annual Compliance Report. From January 12, 2007 to May 6, 2008 the Statewide SSO per 100 miles of sewer was 5.5 (source: http://www.waterboards.ca.gov/water_issues/programs/sso/docs/compliance_report2008.pdf). Using this data to compare the SSOs that occurred when the City maintained the system shows CMSD was experiencing the same amount of SSOs or slightly below the statewide average. CMSD's average SSO per 100 miles during this seven year period is 4.4.

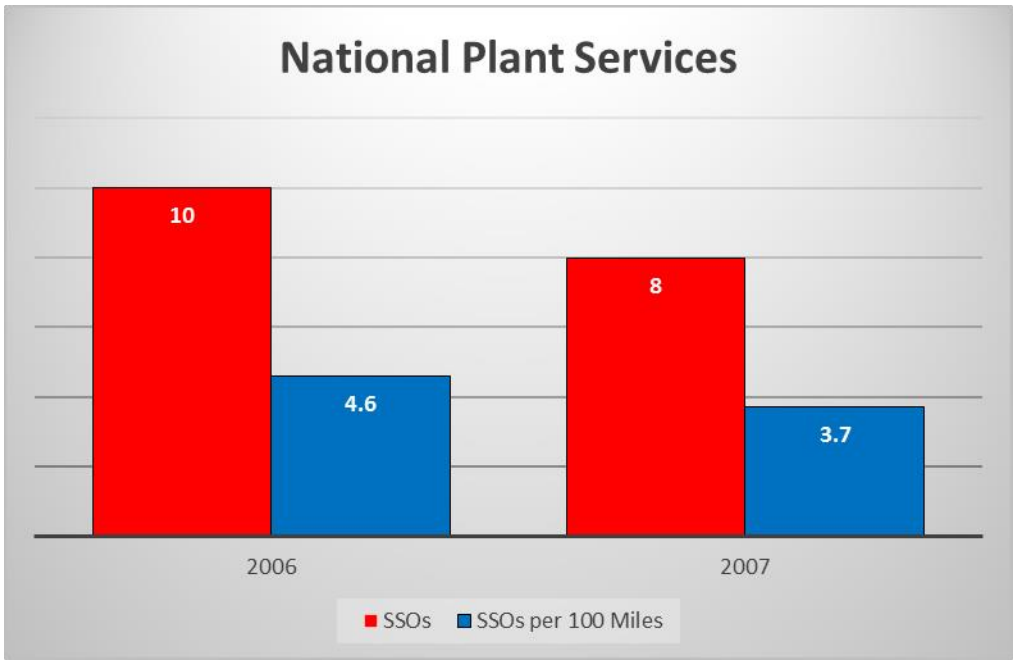
System Cleaned by City of Costa Mesa

CMSD's cost to have City employees perform cleaning of the sewer system is unknown because CMSD's financials were not transferred to the new financial system when CMSD discontinued the partnership with the City in 2006, two years after CMSD moved to a new facility.

Because of this high number of SSOs, CMSD saw a need for assessing the conditions of the sewer system and awarded a contract to National Plant Services (NPS) to do a "Closed Circuit Televise and Video" (CCTV). It was quickly found that improper cleaning by the City of Costa Mesa had left so much debris in parts of the sewer line segments that extra cleaning was required in order for NPS to get the video cameras through the lines

PRIVATE CONTRACTOR

In 2006, CMSD entered into an agreement with National Plant Services (NPS) to perform cleaning of CMSD's sewer system. By now that state issued Order No. 2006-0003-DWQ, which required public agencies to adopt a Sewer System Management Plan that describes methods for cleaning and maintaining sewer systems. Included in the maintenance program were "hot spots" that required more frequent cleaning. In fact, many hot spot locations required monthly cleaning. For instance, some locations required cleaning four times a year due to heavy roots, FOG, and/or structural defects. It took NPS three years to entirely clean the system at a cost of $1.3 million. In 2006 and 2007 CMSD still experience a significant amount of SSOs as shown below in the graph.

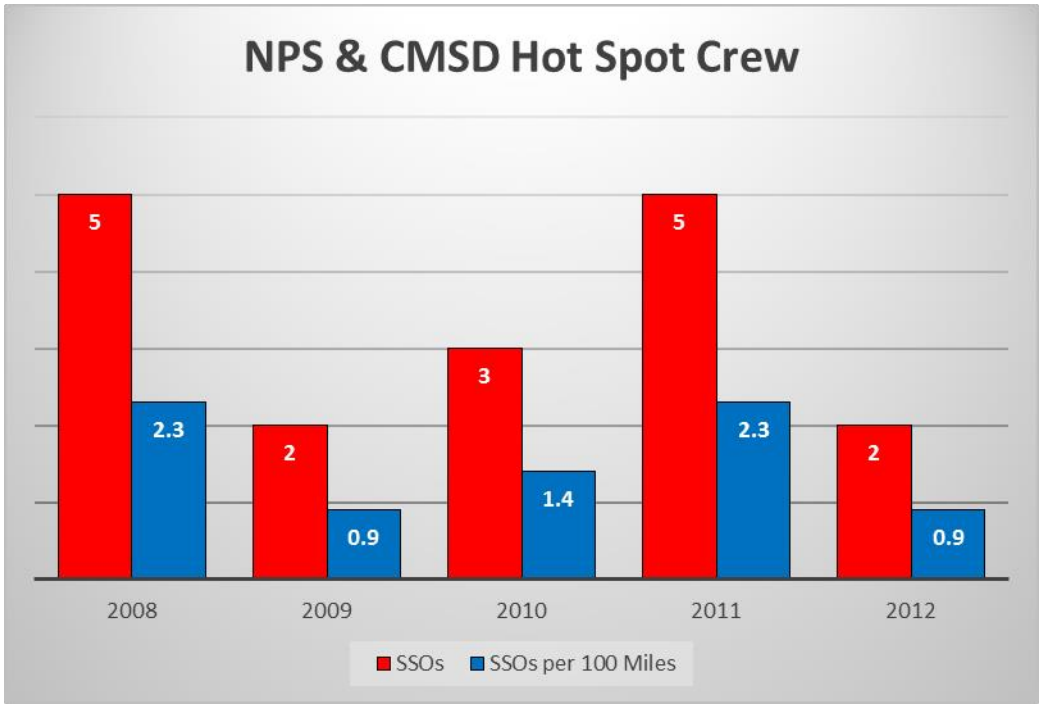


In 2006/07 it cost CMSD $389,280 to have NPS clean the system and $472,910 in 2007/08 due to heavy cleaning that was required as a result of the City's past cleaning practices.

HOT SPOTS

1992 Sewer Combination Cleaning Truck and CMSD WMWs

In 2008 CMSD hired two wastewater maintenance workers and purchased a 16 year old 6 cubic yard sewer cleaning combination truck. The CMSD workers was assigned to clean hot spot locations while NPS continued to clean the entire system in three years. CMSD had identified nearly 100 hot spot locations that required increase cleaning frequencies ranging from two to four times a year. Hot spot locations needed special cleaning because of the high risk for SSOs. As a result of hiring staff and acquiring the necessary equipment to coincide with NPS cleaning method, CMSD SSOs significantly reduced as shown in the graph below.



2012 – 9 months of Cleaning

Since NPS began cleaning CMSD sewer system in 2006, CMSD experienced a total of 35 SSOs in a five and half year period or an average of 5 SSOs per year, which is much less than the average 9.6 per year when the City maintained the system. The following was the number of SSOs per 100 miles of sewers statewide (source: http://www.waterboards.ca.gov/water_issues/programs/sso/#compliance_rpts).

Year	Statewide SSOs per 100 miles
2009	5.3
2010	7.4
2011	19.7
2012	4.28

Year	Region 8 SSOs per 100 miles
2011	0.8
2012	1.3

By 2011 the California Water Resources Control Board began identifying SSOs per miles of sewer by regions. CMSD is in Region 8, Santa Ana Regional Water Quality Control Board. The above table identifies the number of SSOs per 100 miles of sewers in Region 8.

The following was CMSD costs to clean the system, which includes the cost of NPS and CMSD's hot spot crew. NPS cost significantly reduced after 2008/09 because the heavy cleaning was complete and CMSD's cleaning procedures at the time required NPS to clean one-third of the system every year.

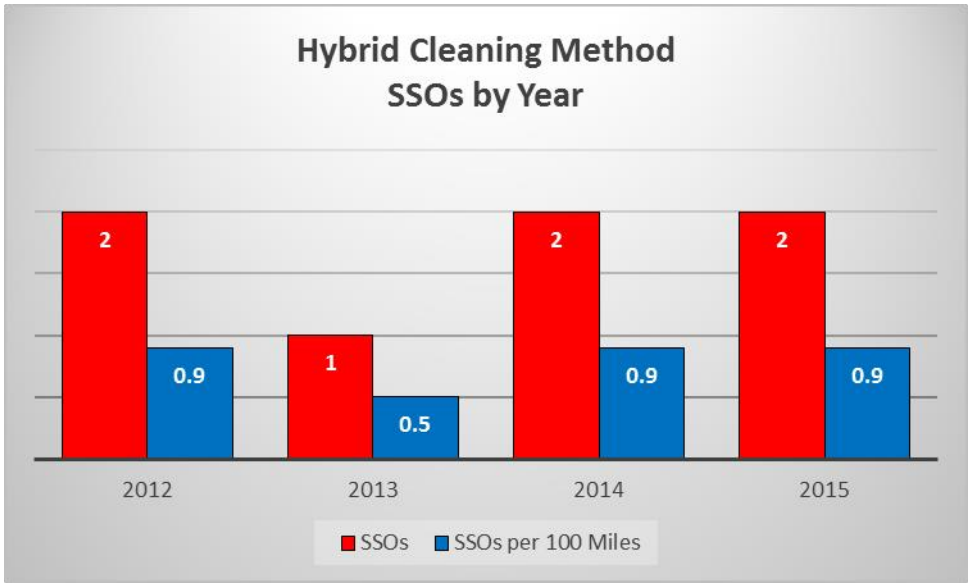
Year	NPS	CMSD Hot Spot	Total
2008/09	$ 479,074	$ 30,563	**$ 509,637**
2009/10	$ 162,785	$ 31,035	**$ 193,820**
2010/11	$ 154,090	$ 32,521	**$ 186,611**
2011/12	$ 269,806	$ 13,329	**$ 283,135**
2012/13	$ 127,150	$ 14,012	**$ 141,162**

In 2010/11 CMSD had 94 hots spots that required 258 hours to clean. By 2012/13 the hot spot location was reduced to 37 because of improvements made to pipeline, which decreased the amount of cleaning hours to 78; however, CMSD acquired a new sewer combination cleaning truck (see below), so cost slightly increased as a result.

HYBRID CLEANING METHOD

In October 2012 CMSD purchased a new 12 cubic yard sewer combination cleaning truck and hired an additional wastewater maintenance worker. The hybrid approach is having NPS and CMSD's cleaning the sewer system and CMSD continued cleaning hot spot locations. The hybrid approached proved to be very effective to reducing the number of SSOs as demonstrated in the chart below.

2012 Sewer Combination Cleaning Truck



Notes: 2012 – 3 months (Oct-Dec) of hybrid cleaning
2015 - 9 months (Jan-Sept) of hybrid cleaning

Comparing the hybrid cleaning method to Statewide SSOs per 100 miles of sewers demonstrates the method can keep SSOs below statewide average, but when compared to Region 8, CMSD is meeting normal standards as shown below.

Year	Statewide SSOs per 100 Miles	Region 8 SSOs per 100 miles
2013	4.38	0.87
2014	4.39	0.85

In 2013/14 CMSD revised its cleaning method to cleaning half the system every year. That year, CMSD's cleaning crew cleaned 331,887 feet of sewer pipes while NPS cleaned 385,649 feet. The cost to the hybrid approach increased in 2014/15 because CMSD changed its cleaning method again by cleaning the entire system in one year. CMSD cleaning crew cleaned 502,183 feet of sewer pipes and NPS cleaned 685,409 feet.

Upfront costs for CMSD is high due to capital expenses for acquiring new equipment. However, CMSD's hourly rate is below NPS hourly rate. CMSD's hourly rate includes salaries and benefits for two employees as well as replacement and maintenance cost for the equipment.

Year	NPS	CMSD Hybrid	Total
2013/14	$ 126,660	$130,122	**$ 256,782**
2014/15	$ 196,242	$201,989	**$ 398,140**

	Hourly Rate
CMSD	$181.00
NPS	$300.00

On August 13, 2015, the City of Newport Beach Finance Committee received a report from city staff regarding the operation of its Wastewater Division. One of the considerations was outsourcing the maintenance function to a private contractor. The City found the hourly rate from private contractors to be much higher than the City's hourly rate. In fact, CMSD's hourly rate is lower than the City of Newport Beach as demonstrated below.
(source:
http://ecms.newportbeachca.gov/Web/0,0,0,0,0/edoc/828466/Finance%20Committee%20Agenda%20-%20August%2013,%202015.pdf)

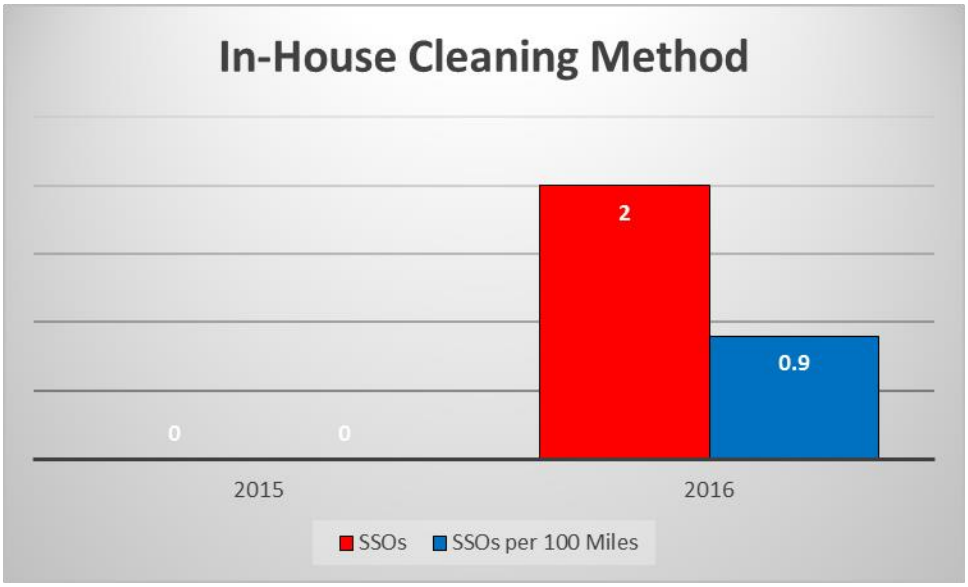
Agency	Hourly Rate
CNB	$187.30
Propipe	$250.00
NPS	$300.00
Downstream	$342.00

In 2015 CMSD hired Empire Pipe Cleaning and Equipment, Inc. to clean 1,600 feet of pipe near South Coast Plaza. The cost was $2,250 or $300.00 an hour.

IN-HOUSE CLEANING METHOD

With safety, efficiency, cost-effectiveness, and dependability as goals, CMSD's strategic goal to be below Region 8's average revealed that the SSOs could be categorized and examined for improvement in the areas of roots, grease, pump stations, pushed-in-roots, hot spots, and structural problems. Considering the importance of these six areas of concern, CMSD ultimately chose to bring services in-house where experienced personnel could be hired, trained, and equipped with the proper tools as experts in sanitary sewers. Expansion of the CMSD cleaning crew from two to four members gives CMSD an integrated approach to cleaning the sewer in conjunction with all of the other tasks that provide an efficient, cost-effective, dependable, and safe sewer system. This integrated approach allows efficient use of expensive equipment required by all of the tasks that address the six areas of concern. For example, sewer cleaning combination trucks are used for line cleaning but also for dealing with the problems caused by roots, grease, pump station breakdowns, pushed-in roots, hot spots, and structural problems**.** So, in October 2015, CMSD acquired a second sewer combination cleaning truck (6 cubic yard) and hired two additional wastewater maintenance workers because CMSD began cleaning the entire system using in-house staff and equipment. The additional staff allows for adequate staffing for being on "standby" during afterhours and the additional unit gives staff the necessary equipment to respond to emergencies in a timely manner, thus reduces the chances for large volume SSOs. So far, the results of having an in-house cleaning program is proving to be as effective as the hybrid approach as shown below.

2015 Sewer Combination Cleaning Truck and CMSD WMWs



Notes: 2015 3 months (Oct-Dec) in-house cleaning
2016 SSOs were last cleaned by contractor

The cost to have an in-house cleaning program that consist of two sewer combination cleaning trucks and four full-time wastewater maintenance workers is $394,240 or $298.77 an hour. The hourly rate for CMSD to have two four man units is equivalent to one two man unit in the private sector.

CONCLUSION

Hiring additional staff and equipment has greatly reduced the number of SSO occurrences in CMSD. In fact from January 8 to January 12, 2016 CMSD had 369 consecutive days without an SSO, which is the longest in CMSD's history. In-house cleaning is just as effective as private contractors, but as demonstrated above, the hourly rate is less which will help keep wastewater rates low (CMSD already has one of the lowest wastewater rates in Orange County). Other benefits to in-house cleaning that outweighs private contractors are described below.

- *Ownership* – In-house cleaning crews take ownership on the system they are cleaning. They want to be responsible for doing a good job and take pride in their quality of work. Contractors want to get the job done as fast as they can so they can move on to the next job, which is commonly called, "blow and go". The old saying for contractor's, "time is money."
- *Faster Response Time* – Having equipment stored at CMSD Corporate Yard means faster response time to SSOs and a better chance of preventing or diminishing the amount wastewater from entering waterways. For instance, NPS Yard is in Long Beach and they had a two hour window to respond to SSOs.

- *Quality of Work* – For private contractors it's about making a profit, which means the faster they clean the faster they can move on to the next job. Evidence of private contractor's quality of work was found soon after CMSD begin using its own staff to clean the sewer system. For instance, CMSD found debris and pieces of broken manholes in the system, contractors failed to notify CMSD about defects, heavy roots, grease or any other obstructions and the two SSOs in 2016 were last cleaned by a contractor. In-house cleaning crews will make sure the job is done right because they are not under pressure to complete their assignment expeditiously and move on to the next city to make a profit. In-house staff want to be held accountable for the performance and quality of work.
- *Knowledge of System* – Private contractors will use different operators for different jobs. They may not be familiar with the system and know where there are sags, heavy roots or FOG that may need additional attention to clean. In-house crews will know the system well because they are out in the field every day working on the system to ensure the community's health and environment are protected.