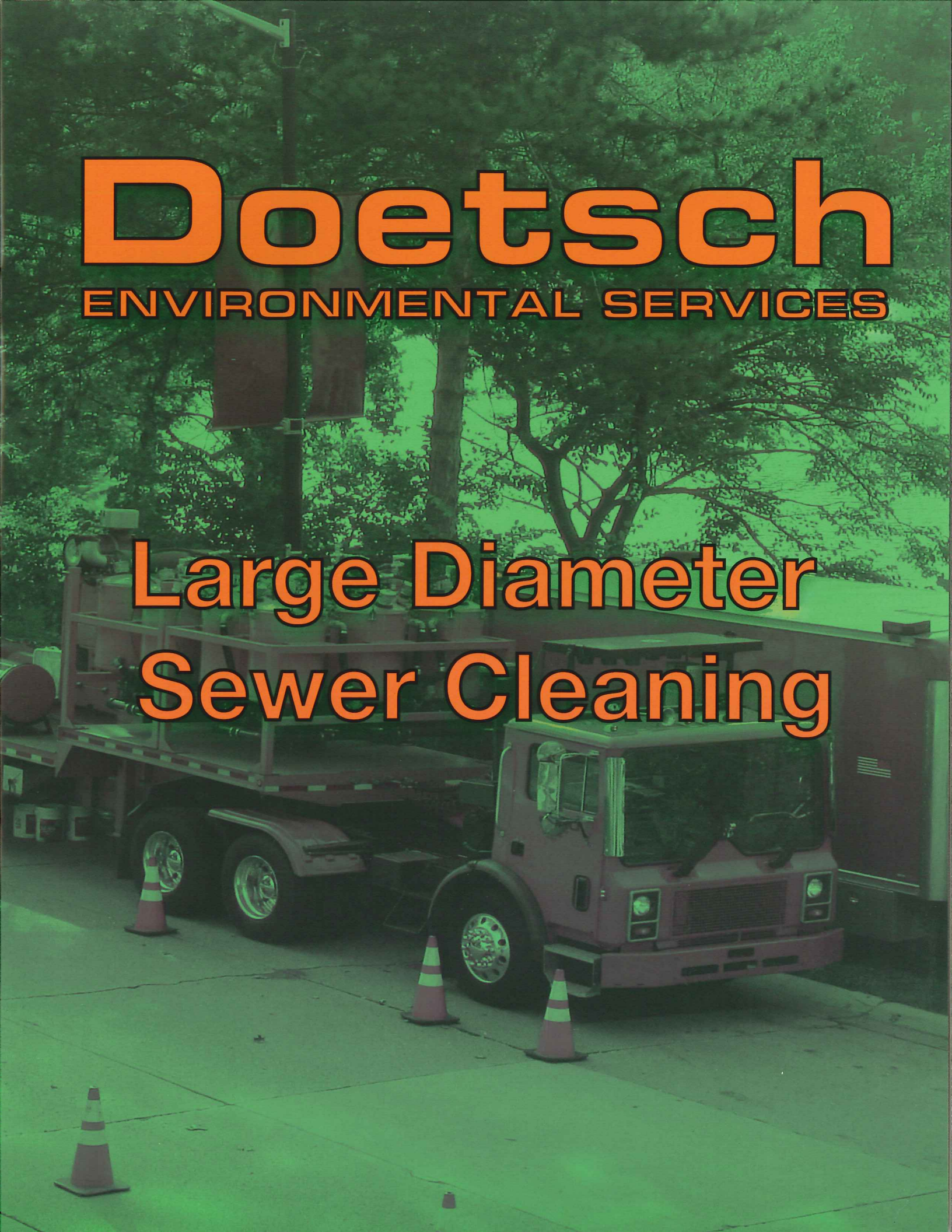


Doetsch

ENVIRONMENTAL SERVICES

Large Diameter Sewer Cleaning



What is Large Diameter Sewer Cleaning?

Large diameter sewer cleaning is the cleaning of sewers that are typically greater than 30 inches in diameter. Large diameter sewers, also known as interceptors and collection systems, were installed and mythically perceived to be self cleaning because of their size and flow capabilities. Most of these large installations were a combined system of sanitary waste water and storm water. These have been systematically separated, so sanitary flow is directed towards a waste water treatment facility and the storm water will usually drain directly to a riparian waterway. Because of the dual purpose of the sewers, ever present dedicated sanitary sewers, most systems still have previous years of storm debris deposits (sand, rock, gravel) laying in the bottom of the pipes along with the sanitary debris. This base of foreign material, along with construction debris, pipe pieces, car parts, bicycles, discarded clothes and any other item a person can drop into a sewer, inhabits the confines of our modern day sewer systems.

Large diameter sewers are often a depository for unwanted materials that create small blockages over time. Added to these blockages caused by foreign debris are the natural blockages that occur, such as tree roots, mineral deposits and broken pipe pieces from deterioration or other means of failure. Together these can combine for blockages that will slowly reduce a system's capacity to the point that sewer overflows are inevitable.

Large diameter sewers were often overlooked and subsequently forgotten about because an efficient method of cleaning did not exist. Previous methods were slow, laborious and often dangerous.

Utilizing 113 years and 5 generations of sewer cleaning experience, combined with custom-made, innovative and efficient tools and cleaning equipment, Doetsch Environmental Services has developed the premiere state-of-the-art system necessary for safe, efficient and responsible large diameter sewer cleaning.



Large diameter sewers are not just bigger; cleaning of these large diameter sewers requires a different process than when cleaning small diameter sewers.

Small diameter sewer cleaning or conventional cleaning equipment is very effective in small diameter lines. As the pipe graduates to large diameter size (greater than 36"), the cleaning objectives can become insurmountable using small diameter cleaning methods because the following obstacles are encountered:

- 1. Increased pipe flow**
- 2. Increased debris levels**
- 3. Controlling "blow by"**
- 4. Increased pipe segment lengths**
- 5. Increased manhole depths.**

The custom-built HyJector and the Grand Volumetric Recycler are to be used in unison to tackle these problems that plague all sewer cleaning operations.

- This method can be operated in all sewer conditions.**
- Sewer water is reclaimed and continually recycled.**
- Debris levels mandate the pre-determined length of reach to the extraction point.**
- Increased flows and pressures (250 GPM @ 3000 PSI) can efficiently dislodge debris and convey it to the extraction point.**
- Vacuum is continuous, so debris is constantly removed from the sewer.**
- "Blow by" is controlled by different proprietary methods, depending on the sewer conditions, these proprietary methods are all achievable without plugging the sewer.**
- All pipe cleanliness is verified with CCTV and/or sonar recordings.**



**108" pipe with
excess debris**



HyJector in 48" pipe

Pipe Quantity Debris Calculator

Debris Volume Per 100 Feet				Unit of Volume = Cubic Yard				
Pipe Size	Level of Debris							
	1/8	1/4	3/8	1/2	5/8	3/4	7/8	Full
8"	0.09	0.25	0.44	0.64	0.85	1.04	1.19	1.29
10"	0.14	0.39	0.69	1.01	1.32	1.62	1.87	2.02
12"	0.20	0.56	0.99	1.45	1.91	2.34	2.69	2.90
15"	0.32	0.88	1.55	2.27	2.98	3.65	4.21	4.54
18"	0.47	1.27	2.24	3.27	4.30	5.26	6.07	6.54
21"	0.64	1.74	3.05	4.45	5.85	7.16	8.26	8.90
24"	0.83	2.27	3.98	5.81	7.65	9.36	10.79	11.63
27"	1.06	2.87	5.04	7.36	9.68	11.84	13.66	14.72
30"	1.31	3.55	6.22	9.09	11.95	14.62	16.86	18.18
33"	1.58	4.30	7.53	10.99	14.46	17.69	20.41	21.99
36"	1.88	5.11	8.96	13.08	17.21	21.06	24.29	26.17
42"	2.57	6.96	12.2	17.81	23.42	28.66	33.06	35.63
48"	3.35	9.09	15.94	23.27	30.60	37.44	43.18	46.54
54"	4.24	11.51	20.17	29.45	38.72	47.38	54.65	58.40
60"	5.24	14.21	24.9	36.36	47.81	58.50	67.47	72.72
66"	6.34	17.20	30.13	43.99	57.85	70.79	81.64	87.99
72"	7.55	20.47	35.86	52.35	68.85	84.24	97.16	104.71
78"	8.86	24.02	42.09	61.45	80.80	98.87	114.03	122.90
84"	10.28	27.86	48.82	71.26	93.71	114.66	132.25	142.53
90"	11.80	31.98	56.04	81.81	107.57	131.63	151.81	163.62
96"	13.43	36.39	63.76	93.08	122.40	149.77	172.73	186.16
108"	16.99	46.06	80.7	117.80	154.91	189.55	218.62	235.61
126"	20.98	56.86	99.63	145.44	191.25	234.01	269.90	290.88

Theoretical Material Weight per Cubic Yard		Unit of Weight = Pound	
Earth, In Place	3000	Clay	2,160
Earth, Dry	2050	Clay and Water	1,750
Earth, Moist	2100	Clay and Sand	1,750
Earth and Gravel, Dry	2700	Clay, Damp	2,970
Earth and Gravel, Wet	3200	Gravel	1,600
Earth and Sand, Dry	2700	Gravel, In Place	3,000
Earth and Sand, Wet	3200	Gravel, Dry	2,650
River Mud	2400	Gravel, Wet	3,350

Quality Assurance / Quality Control

Doetsch Environmental Services is proud to offer our valued customers the highest quality service. This is achieved through safety, preparation, communication, knowledge, perseverance, responsiveness, adaptability, and quality consciousness. Our unique approach allows us to be flexible for all situations that will be encountered during the project duration.

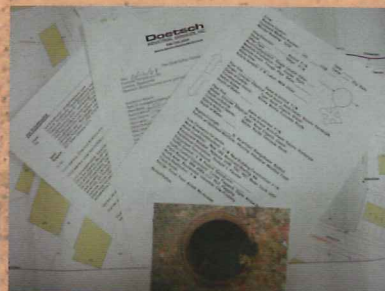


On Site Staging Areas

Supply Trailer



“In-House” Manufacturing



**Pre-Project Survey
Pre-Shift Safety Meeting
Daily Progress Reports
(electronically transmitted)**

The HyJector with the Grand Volumetric Recycler are designed to operate using reclaimed and recycled sewer water.

The continuous operation of the equipment allows for simultaneous decanting of water and debris depositing. The equipment separates sewer debris from water, dewateres the debris and augers into a holding hopper, all while the GVR is in continual operation. The onboard dewatering allows for far more solid debris to be hauled to the landfill, due to sludge dewatering and capture of water returned to the cleaning process. The efficient use of the HyJector and Grand Volumetric Recycler do not require bypass pumping; sewers can remain in operation.

- **No By-pass pumping**
- **No potable water**
- **Less public impact**
- **Environmentally responsible**





Water Recycling

Sewer water is reclaimed and continually recycled during the cleaning process.

Cleaning uses no potable water.

Water consumption can be in excess of 200,000 gallons per day for large diameter sewer cleaning.

If hydrant water is used, the waste water treatment plant will be tasked with treating this additional water, consuming precious fossil fuels.

Treated drinking water + additional wastewater treatment ≠ environmentally responsible sewer cleaning.

Even under drought conditions or water restrictions, this cleaning method is environmentally responsible! This method does not use potable water! It also does not add new water to the collection system that will need to be treated.



Sewer water



Debris packaged for the landfill

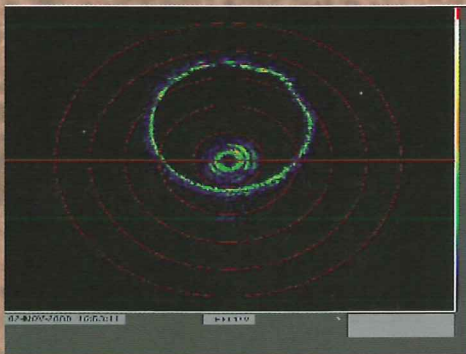
Remote Access

Interceptor manholes are often not directly accessible at the street level. These indirect access points may be located along river banks, ravines, wooded areas, developed land areas, crowded public spaces or terrain intolerable of heavy equipment. Interceptors are often constructed under roadways that will not allow for direct access with cleaning equipment. The tracked boom carrier and the tracked reel carrier were developed to access the limited access areas. The major equipment can be positioned hundreds of feet away from the working access point. The remote access equipment is fully operational when connected to the HyJector and Grand Volumetric Recycler with lengths of vacuum and pressure tube.

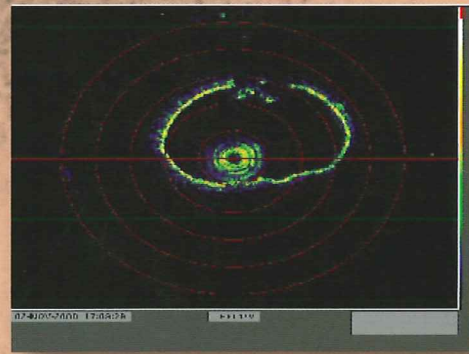


Task Verification

Video and/or sonar data of each segment will be recorded after the cleaning process is completed. If the water level is low, this is a rare opportunity to utilize only CCTV footage, whereas most times a combination video and sonar data is recorded. This CCTV methodology is unique because the camera is used to record the pipe above the water line and the sonar data is superimposed on the bottom half of the video screen. This gives a real time electronic image of what the camera cannot view under the water. This process verifies cleanliness and also supplies the necessary data to properly evaluate each pipe segment.



**Sonar Image
clean pipe**



**Sonar Image
pipe collapse**



**Combination CCTV
and Sonar**



CCTV



**Post cleaning
Note: old debris marks**

Benefits:

Sewers remain in operation during cleaning. No plugging or bypassing is necessary, which would cause backups and inconvenience to residents.

Elimination of long term road closures due to by-pass pipeline.

Efficiency of this process allows for quick movements along a roadway, which minimizes commuter impact.

Without using neighborhood hydrants, the complaints of "brown and contaminated" drinking water are eliminated. Costs of potential water main repairs after usage related stressing are also eliminated.

Operations continue responsibly under drought conditions and water restrictions.

Water supply hoses are not run across traffic lanes.

Post cleaning CCTV or sonar verification.

Less fossil fuels consumed.

Environmentally responsible and efficient in every aspect!





Doetsch Environmental Services is a 113-year-old family business. We offer you knowledge from our experienced staff and our five generations of family. The history and knowledge that we possess allows us to provide you with the most efficient, safe and quality job performance. Large Diameter Sewer Cleaning is the latest service offered to our valued customers. Doetsch Environmental Services offers a complete package of environmental services, which eliminates any need for countless phone calls, site walks and headaches associated with coordinating multiple contractors for your project. Only one call is required when Doetsch Environmental Services is on the job.