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October 2011

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HUMAN SIDE: CONTINUOUS
IMPROVEMENT IN HENDERSON, NEV.

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KLEEN-VUE SYSTEM

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BETTER MOUSETRAPS:
SPINCAST EPOXY COATING

PAGE 32

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PAGE 40

Christopher Murphy
Superintendent
Great Neck, N.Y.





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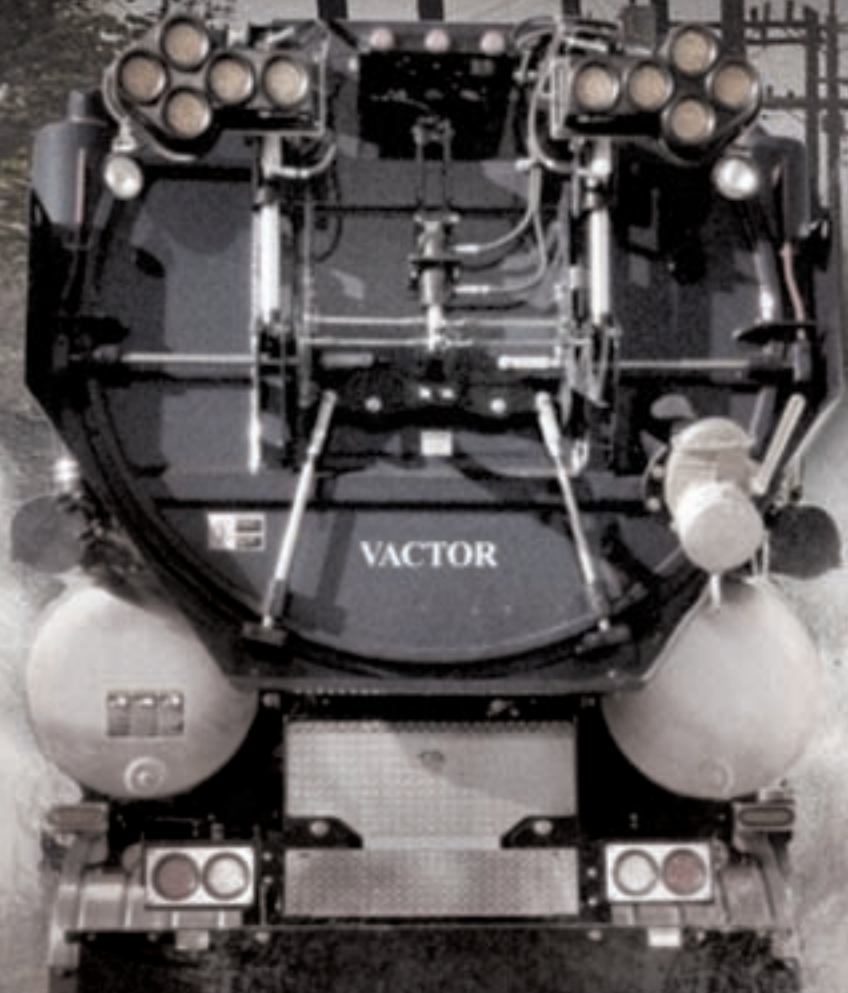
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INSIDE:

CLEANING AND MAINTENANCE STRATEGIES



COVER:

More than half the sewer lines in the Great Neck (N.Y.) Water Pollution Control District are nearly a century old. But like a spry senior citizen who keeps trim by working out daily, they seem younger, thanks to a maintenance team led by superintendent Christopher Murphy. (Photography by Darren Levine)



COMING IN NOVEMBER 2011

Special Issue: Location and Leak Detection

- ◆ Water: Leak detection and repair in Port Angeles, Wash.
- ◆ Storm: Exemplary watershed management in Lake County, Ill.
- ◆ Sewer: System maintenance and life extension in Orange County, Calif.
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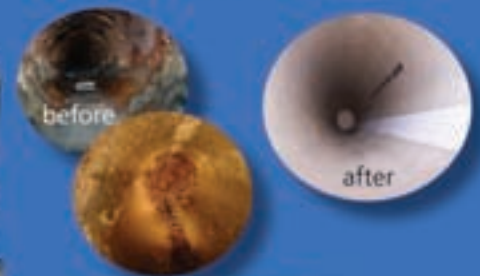
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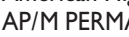








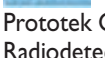



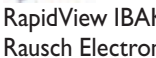
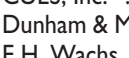



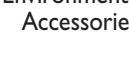




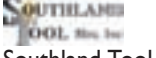

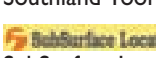
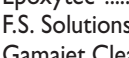



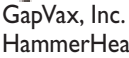
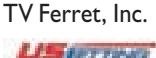

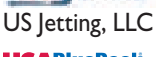
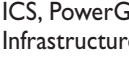





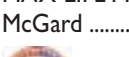


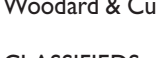







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Published monthly by:

 COLE publishing

1720 Maple Lake Dam Rd.,
PO Box 220, Three Lakes WI 54562

www.mswmag.com

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EDITORIAL CORRESPONDENCE: Send to Editor, *Municipal Sewer & Water*, P.O. Box 220, Three Lakes, WI, 54562 or email editor@mswmag.com.

REPRINTS AND BACK ISSUES: Visit www.mswmag.com for options and pricing. To order reprints, call Jeff Lane at 800-257-7222 (715-546-3346) or email jeffl@colepublishing.com. To order back issues, call Nicole at 800-257-7222 (715-546-3346) or email nicolel@colepublishing.com.

CIRCULATION: 2010 average circulation was 37,808 copies per month (U.S. and international distribution).



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MORE THAN A HUNK OF METAL

The right nozzle can make an enormous difference in the performance of a big-ticket cleaning truck and the health of a collection system

It hardly seems right: You spend \$200,000 or \$300,000 for a combination cleaning truck. And then how much you get out of it depends on the \$100, \$300 or \$500 nozzle you put on the end of the hose.

Yes, it's true: Use the wrong nozzle, or a worn-out nozzle, and a great deal of that truck's cleaning capability and power may be wasted. You may be doing little more than spraying water into a pipe.

Do you doubt it? Ask Duane Johnson, Pumper & Cleaner Expo presenter and vice president of Affordable Pipeline Services in San Diego, Calif. He recalls accompanying a city crew and its brand-new combination truck in an unsuccessful effort to clean grout from a line. Johnson suggested switching to a high-speed rotating nozzle.

Upon deploying the nozzle, the operator looked at the pressure gauge, went into a panic, and hit the truck's kill switch. He said the truck should not be operating at such a high pressure at the engine rpm he was using.

Upon questioning, it turned out that the truck had never developed adequate pressure before because the crew had been using, for the past eight years, a single basic cleaning nozzle that had a useful life expectancy of six months. "I guarantee that crew never really cleaned a stick of pipe," Johnson says. "They had been driving that truck all over town and never really cleaned a thing."

Choosing wisely

This case, while extreme, illustrates that nozzles are incredibly important in pipe cleaning. One of this month's *MSW* feature stories tells of a community that understands this. The village of Great Neck, N.Y., applies a variety of

cleaning nozzles in its strategy for keeping its sewer clean and flowing freely.

As in so many endeavors, it's a case of the right tool for the job. There are separate types of nozzles for knocking debris off pipe walls, for flushing debris out of lines, for moving heavy volumes of debris in big pipes, for cutting roots, for blasting through grease clogs, for chewing up hard obstructions, and more.

Beyond that, nozzles themselves come with different degrees of sophistication.

Nozzle technology has improved greatly in recent years — modern nozzles are much more

Nozzle technology has improved greatly in recent years — modern nozzles are much more than just hunks of metal with holes. They are designed by engineers to suit specific purposes and to meet specific standards of performance and service life.

than just hunks of metal with holes. They are designed by engineers to suit specific purposes and to meet specific standards of performance and service life.

Three tiers

At the most basic level, there are three kinds of nozzles. Tier 1 nozzles consist of a steel housing with orifices drilled out in different locations and sizes and at different angles. "The issue with these nozzles is that they have a flat inner surface," says Johnson. "So all the cleaning energy we haven't lost in the hose comes into the nozzle, hits the flat surface, and has to redirect and come out."

There are places where Tier 1 nozzles will work just fine, and places where they are completely inadequate. They are the least expensive as a class, but they also deliver the least performance, and their useful lives are relatively short.



FROM THE EDITOR

Ted J. Rulseh

Tier 2 nozzles are designed for longer life and better performance. They have durable inserts that users can remove and replace while the main nozzle body remains intact. Some of these nozzles use long-lasting titanium or ceramic inserts and include flow straighteners that improve fluid mechanics by reducing turbulence.

Tier 3 nozzles are the next evolution. They include features such as internal ceramic discs and controlled rotation, but most important, they direct flow more efficiently so that energy loss through the nozzle is greatly reduced. As a result, these nozzles operate at higher capacity and clean more effectively. They cost the most, but they can make a difference in performance and productivity that far outweighs the difference in price.

The whole package

Of course, the right nozzles will not solve every problem. An effective cleaning program requires the right set of nozzles, on a well-maintained cleaning truck, operated by a thoroughly trained and experienced crew, deployed according to a sound strategy. A good training resource for cleaning teams is the *Jetter Code of Practice Manual*, published by NASSCO.

In the end, it all comes down to return on investment: Getting the most cleaning punch for the dollar. Often, says Johnson, municipalities pay big money for a truck and then are reluctant to spend money on nozzles.

He asks: "Why would you spend \$350,000 on a truck and then use a \$60 nozzle?" To do so looks like the ultimate in false economy. ♦

Comments on this column or about any article in this publication may be directed to editor Ted J. Rulseh, 877/953-3301; editor@mswmag.com.

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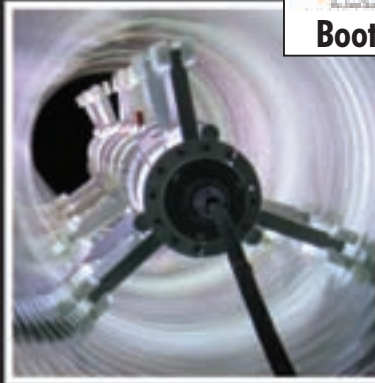
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FOCUS: WATER

PEDAL TO THE METAL

The Leominster maintenance team includes, from left, back row, assistant director of Public Works Ray Racine, pipe installer Chuck Bergeron, director of Public Works Pat LaPointe, and foreman Rick Bachand; front row, laborer Shaun Booth and truck driver John Besette. (Photography by Ed Collier)

The city of Leominster meets regulatory deadlines with a four-point plan to protect its watershed, manage water sources, improve treatment and upgrade distribution

By Peter Kenter

The City of Leominster (pronounced “Leminster”) Department of Public Works has been working for more than a decade on systemwide improvements to its infrastructure while keeping water rates low.

However, the city took a double whammy in 2006: upcoming federal water regulations and a state consent order. The department has kept pace on a grueling schedule by forging alliances with public and private entities and taking advantage of its own resources in a demonstration of traditional New England self-reliance.

The city of 41,000 is about 40 miles northwest of Boston and 10 miles south of the New Hampshire border. Its water system pro-

duces an average of 4.2 mgd and a maximum of 6.9 mgd, distributed through more than 179 miles of water mains.

The city owns four water treatment facilities, operated, managed and maintained by Veolia Water North America since 1996. The department operates the water distribution system. Veolia had operated the wastewater treatment plant since 1983, one of the oldest such contracts in the country.

Double deadlines

The twin regulatory deadlines accelerated the city’s action plan for its water system. Leominster financed an extensive study of the system in the mid-1990s and embarked on a systemwide, four-pronged approach to secure a safe

water supply at a reasonable cost, targeting watershed areas, reservoirs, water treatment systems and the distribution system all at once.

The years from 1997 to 2006 involved significant capital improvements, including dam and spillway modifications and upgrades to treatment plants, storage tanks and pumping stations. The department also inspected, cleaned and painted the system’s four water storage tanks. Water mains were being replaced at about two miles per year, a dig-and-replace process that began in the early ‘80s.

“The city has existed for almost 300 years, and our water department began operations in 1873,” says Pat LaPointe, director of the Department of Public Works. “The original water mains were



PROFILE:
Department of Public Works, City of Leominster, Mass.

INCORPORATED:
1740

POPULATION SERVED:
41,000

CUSTOMER ACCOUNTS:
11,825

AREA SERVED:
29.8 square miles

DEPARTMENT STAFF:
14

INFRASTRUCTURE:
179 miles of water mains

ANNUAL BUDGET:
\$4.9 million water,
\$3.7 million sewer (2012)

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Leominster Public Works director Pat LaPointe (right) talks with assistant director Ray Racine on a job site for a project involving road reconstruction and water, sewer and drainage improvements.

“Suddenly, it became crunch time as we had to work to meet all of these deadlines at once, while continuing work on our overall system improvement plan. Rather than look at it as a problem, we looked at the consent order as a friend.”

Pat LaPointe

largely the wooden pipes you see in places like Boston, but about 20 years later, the best product on the market was cast iron. A lot of cast iron was installed from the early 1900s to 1960, so we have about 60 percent cast iron, and the rest is cement-lined ductile iron.”

Better raw water

With state assistance, the city purchased and protected 925 acres of watershed land, helping to secure the quality of its raw water sources. At the end of 2005, the department had made significant upgrades while holding water rates in check. The clock was reset in 2006.

January of that year saw the introduction of the U.S. EPA’s Long Term 2 Enhanced Surface Water Treatment Rule (LT2) and the Stage 2 Disinfectants and Disinfection By-Products Rule (Stage 2 DBPR). The city must comply with the new, stricter federal regulations by October 2013.

That July, the city was hit with an administrative consent order (ACO) issued by the Massachusetts Department of Environmental Protection (DEP). It required updates to the city’s Watershed Resource Protection Plan, Emergency Response Plan and Water Quality Master Plan. It also required upgrades to its Fall Brook and Notown water treatment plants, upgrades to the Southeast Corner Wellfield, and construction of a new filtration plant at its Distributing Reservoir, all to be completed by the end of 2011.

The city ran into another wrinkle in the fourth quarter of 2006 when it exceeded federal regulations for total trihalomethanes (TTHMs), hitting roughly 81 parts per billion (ppb) versus a maximum allowable level of 80 ppb.

“The regulatory limit was



Leominster Public Works director Pat LaPointe.

DO-IT-YOURSELF

Faced with challenges, employees of the Leominster Department of Public Works often take on the work themselves, helping to keep city water rates low. “The workers here surprise me every day,” says Pat LaPointe, DPW director. “We have some very bright young people here, plus others who have been with the department for 30 years, and so have amassed a lot of knowledge of the system.”

When the city’s Smith Pond Dam began to fail in 2004, threatening flooding of a second dam, the city received a bid for \$250,000 to rebuild it. Department employees took the task on themselves and, with an emergency permit from the Massachusetts Department of Conservation and Recreation Office of Dam Safety, deconstructed the dam for \$8,500. “They took the dam apart and used the granite blocks to improve the spillway,” says LaPointe.

Engineers with the department are carrying out GIS mapping of the entire sewer and water system and verifying all of the available information being scanned into the system under the existing department budget.

A 20-inch water main from the city’s Notown Water Treatment Plant was upgraded with a 30-inch main. The department is now planning to use the original main as a sleeve for a new HDPE pipe and repurpose it as a residuals main. This will allow the city to meet future discharge regulations the U.S. EPA may propose.

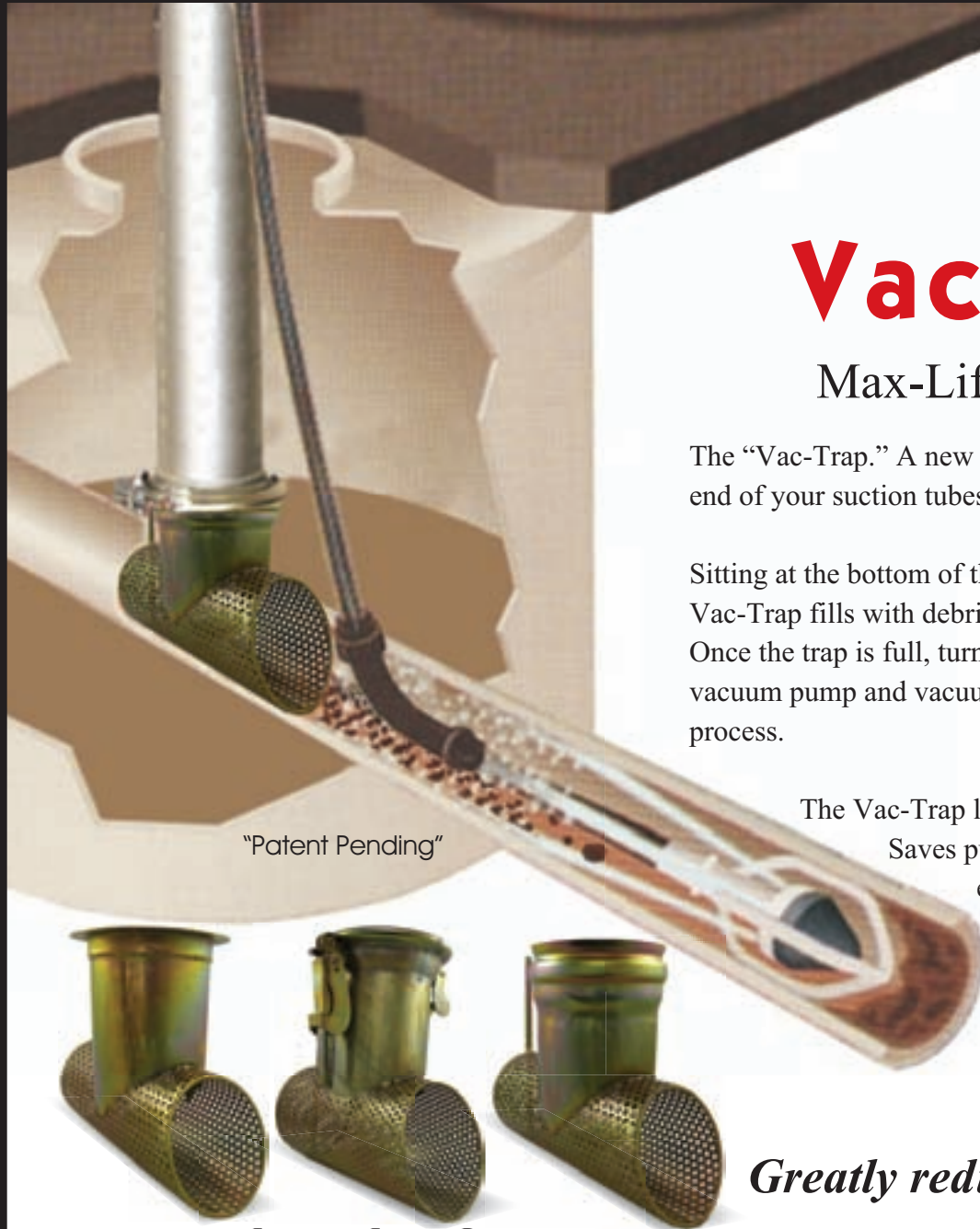
After a rainy summer in 2009, the reservoir at the same plant had turned slightly stagnant. “We did a stratification study with the DEP, and the suggested solution was to place a feeder line higher up on the intake pipe, so if the water didn’t turn over, we could access the cleaner water,” says LaPointe. “Instead, we hired a diver locally and had them install an extra length to the pipe at a cost of \$3,000.

“The department benefits from people here who think outside the box.”

(continued)

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exceeded at our Notown treatment facility because we were fixing the Simonds Pond dam, and the water behind the cofferdam became more difficult for the older plant to treat,” notes LaPointe. The city asked that the associated consent order be rolled into the larger ACO.

Crunch time

“Suddenly, it became crunch time as we had to work to meet all of these deadlines at once, while continuing work on our overall system improvement plan,” says LaPointe. “Rather than look at it as a problem, we looked at the consent order as a friend. The work may have to be completed on a tight schedule, but it’s necessary work. It also depoliticizes the process of getting water rates to match the

work that needs to be done.”

The department began to reassess the overall water strategy, enlisting the aid of long-time private collaborators: the engineering firm Woodard & Curran and operator Veolia Water.

“We took a hard look at everything that needed to be done, looking at the system as a whole,” says LaPointe. “To help achieve watershed protection and protect the quality of the water, for example, we hired a forester to develop a forestry management plan. Part of that plan involved removing trees damaged by severe ice storms and harvesting the hardwoods for lumber and turning other wood into fuel pellets and mulch. If there was a way to offset costs, we would try to find it.”

Integral to the process was the financial oversight of Roger Brooks, business manager with the DPW. “From my perspective, the plan had to be comprehensive,” he says. “If you look at water as a resource, you have to include watershed protection, treatment, transmission and distribution to commercial and residential customers. Improving the quality of water is looked at as something negative

opment. “We have a pretty good record of what was done after the mid-1980s, but we needed to go back to old annual reports to see what sort of repairs were performed on the mains before that,” he says.

“Right now we’re in the second-oldest part of the city, having completed the oldest part. The biggest problem we’re seeing is heavy tuberculation, with 6-inch



Truck driver John Bessette, equipment operator Mike Russo and laborer Shaun Booth prepare a job site for replacement of an outdated drainage pipe.



The City of Leominster is active in tracing the full history of the Water Department. (Photo courtesy of the City of Leominster)



An old piece of wooden pipe that the city Public Works Department keeps on display in the office.

when it involves an increase in cost, even though U.S. tap water is about the best bargain in town. The endgame is keeping rates reasonable while making improvements. It’s a balancing act.”

The department opted to continue its water main replacement program, targeting two miles of pipe replacement each year, focused first on the oldest lines in established neighborhoods, particularly segments marked by main breaks and customer complaints.

Digging through records

LaPointe made extensive use of town records to assemble a history of distribution system devel-

lines reduced to 2- or 3-inch capacity. Compounded with cast-iron house services from the curb, it makes the reduced capacity problem worse.”

The project relies largely on dig-and-replace. Old lines are replaced by cement-lined ductile iron. Residential lines are replaced with copper to the property line. The work is done by water department staff and contractors. Whenever possible, in-house staff does the work at rates about half the price of contractors. “Our guys go to classes to get their water licenses, and they’re very good at the work they do,” says LaPointe.

Old and new

Meanwhile, water plants and other facilities needed attention. In 2006, the city shut down its Fall Brook Treatment Plant when elevated manganese from the raw source discolored the water.

“The water quality wasn’t satisfactory and the color was of concern to customers,” notes LaPointe.

“We worked with Woodard & Curran to devise a low-cost solution by extending the potassium permanganate and hydroxide feed line to a point further upstream in the intake pipe to provide improved contact times. No more complaints.”

The ACO required the city to build a new filtration plant at its Distributing Reservoir — until recently, that source of supply had operated under a state-issued filtration waiver. The cost of the 2.0 mgd plant was estimated at about \$10 million. However, under special state legislation that allowed Leominster to enter into the original contract with Veolia Water, the city was free to offer Veolia a design-build contract.

“In traditional bids, we don’t always get the best contractor, but the one offering the lowest initial bid,” says Brooks. “We were able to work with Veolia on a list of preferred contractors and allowed them to accept tenders on the work. The final costs for the plant came in at \$6.7 million, so we saved money, met the regulatory criteria, and had a functional building, ready for any future upgrades.”

Automation saves

The filtration plant was planned with automation and remote monitoring in mind. The same thinking applied to a temporary chlorination system at the Southeast Corner Wellfield, improvements to the Fall Brook, and upgrades at several water tanks. The new systems are tied into the city’s SCADA system, which includes wastewater operations.

“We’re planning for the future here,” says LaPointe. “Anything that reduces site visits will reduce long-term operating costs.”

The department also used a creative approach to meeting TTHM guidelines, breaking down its goals into phases, first blending the Notown water with compliant water from its Fallbrook plant to help bring citywide averages into compliance with Stage 1 DBPR.

“However, at that point we still hadn’t completed the upgrades to the Notown plant, which will be required to meet Stage 2 DBPR requirements by 2013,” says LaPointe. “That will require us to meet the 80 ppb threshold at each individual location. We tried to add a coagulant at Notown, but higher feed rates negatively affected our filters, so we looked at clarification to help remove organic compounds at Notown.”

Accessing funds

Grants and low-interest loans from federal and state sources have become important to the department. The city received a low-interest state revolving loan of \$19.2 million for completion of multiple projects in the consent order. A portion of the funding qualified for American Recovery and Reinvestment Act assistance, which provided principal forgiveness on the loan.

The city also received a \$7,500 capital improvement grant from the DEP to provide a long-term planning document for future capital improvements to the water system. State government officials work closely with the city to help position loan and grant applications.

“We were alerted by people at the state government, for example, that we could access a Housing

“We’re planning for the future here. Anything that reduces site visits will reduce long-term operating costs.”

Pat LaPointe

and Urban Development grant by making the project fit the requirements, because it led to an improvement to service for affordable housing,” says Brooks. “A little creativity ultimately benefits the ratepayers.”

In the near future, the department is considering trenchless technologies to rehabilitate and replace waterlines, especially where they cross Route 2, a busy thoroughfare. “Closing Route 2 would be impossible,” says LaPointe. “We’d like to line those mains, but we tried a cured-in-place process on one of the more difficult crossings last year and it didn’t work as well as the process did on some of our sewer lines. We’re also considering directional drilling and pipe bursting.”

The department is also looking at the purchase of an in-house camera system to inspect sewer lines. As it heads for the ACO finish line at the end of the year, Leominster is well under way on construction of major



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“The city council holds the purse strings, but they’ve been very supportive of the department in its upgrades. This is a collaborative effort by all parties and it’s been very successful.”

Robert S. Little, P.E.

upgrades to the Notown plant and the Southeast Corner Wellfield and is working on modifications to the Monoosnoc Hill Tank Distribution System.

Effective partnership

“The secret behind the extraordinary progress in Leominster is the close relationship between the city administration, the department, its engineers, its operators and the regulators,” says Robert S. Little, P.E., senior project manager at Woodard & Curran.

“The DEP is allowed by statute to take a certain amount of time to review and approve design plans and permit applications, but they’ve turned things around very quickly and helped Leominster to frame projects in such a way as to access state and federal grants, programs and funds. The city council

holds the purse strings, but they’ve been very supportive of the department in its upgrades. This is a collaborative effort by all parties and it’s been very successful.

“Even while rapidly performing capital upgrades and maintaining regulatory compliance, water rates in Leominster are lower than in 75 percent of the state. That’s the true measure of a well-managed system.” ♦

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TURNING BACK TIME

Libertyville Township's award-winning stormwater program efforts return selected high-value properties to presettlement conditions

By *Scottie Dayton*

The Des Plaines River originates in Libertyville, Ill., and eventually reaches the mighty Mississippi. Flooding is common along the corridor, and some responsibility for protecting those properties falls to Libertyville Township supervisor Kathleen O'Connor.

O'Connor inherited an amazing legacy. In 1985, Mike Graham, then supervisor, saw how development would lead to problems with groundwater recharge and stormwater. That year, voters approved a \$22.6 million bond referendum to limit development on more than

1,500 acres by buying parcels or protecting them with conservation easements.

The 14 separate parcels, almost encircling the township, became the Open Space District, the first in the state. Two sites, Oak Openings and Liberty Prairie, are so ecologically significant that they are classified as Illinois Nature Preserves, the state's highest protection status.

Working on an extremely thin budget and in cooperation with other government entities and conservation groups, the township has seen impressive results that please property owners. For

its efforts, the township received the 2010 Community of the Year Stormwater Award from the Lake County Stormwater Management Commission.

Coordinated efforts

The township surrounds the villages of Libertyville and Green Oaks and portions of Mettawa, Mundelein, Lake Bluff, Lake Forest, North Chicago, Waukegan, and Vernon Hills, but it is responsible

only for unincorporated areas.

"Creating a stormwater management plan was challenging because much of the work is done by the Libertyville Township Road District," says O'Connor. "Our stormwater flows downstream in ditches. We're responsible for maintaining the drainage system in the unincorporated areas. Our stormwater program is a collaborative effort between the township and the road district."

(continued)

Libertyville Township supervisor Kathleen O'Connor (second from left), in the blossoming Liberty Prairie Nature Reserve, an area of the Bull Creek/Bulls Brook Watershed that she helps to protect with colleagues like (from left) township open spaces field manager Chris Slago, senior ecologist Vince Mosca of Hey & Associates, and outreach manager Susan Surroz of the Liberty Prairie Conservancy. (Photography by Brian Morowczynski)



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“Anything we do to improve runoff in the Des Plaines River Watershed decreases the volume reaching the river. In a way, we’re helping people all the way to the Mississippi River with flood control.”

Chris Slago

Motorola employees clear buckthorn from Bulls Brook as part of the company’s Global Day of Service program. (Photo courtesy of the Libertyville Township)

Because the road district maintains the six detention basins and 60 miles of drainage ditches with culverts, including subdivisions with underground storage systems, O’Connor partnered with highway commissioner Bill Morgan to make better use of resources and figure out ways to comply with unfunded stormwater mandates.

Morgan has one full-time and one seasonal employee, O’Connor’s office has seven employees, and the Libertyville Township Open Space District has two seasonal employees.

The township contracts with Gewalt Hamilton Associates, an engineering firm in Vernon Hills, to maintain its MS4 website, track control measures, submit the annual report to the U.S. EPA, inspect the 17 outfalls, update the outfall inventory maps, test upstream and downstream water quality, inspect detention basins and recommend maintenance. The township budgets \$6,000 annually for the service.

Master plan

The township’s goal is to restore and maintain the Open Space District to presettlement conditions. Communities initially stabilized stream banks or took fields out of production without addressing flow problems, and so flooding swept away their accomplishments every year.

The Lake County Stormwater Management Commission helped people to realize that restoration had to start at the headwaters. One example is the Atkinson Road flood basin project along the Upper North Branch Chicago River Watershed. During heavy rains, runoff from development flowed over an 80-acre field overgrown with invasive buckthorn, washed across the road, and flooded backyards on the other side.

The village of Green Oaks used township property to create a flood basin in the southeast corner of the field. “We helped Green

HAPPY TRAILS

Moving a three-quarter mile segment of a 1.75-mile hiking-biking trail out of an Illinois nature preserve and into a buffer alongside it was part of Libertyville Township’s overall watershed management plan.

To stretch resources, the township supervisor’s office partnered with the Lake County Forest Preserve District, Illinois Nature Preserve Commission, and Liberty Prairie Conservancy to lay out the new trail and plan its construction.

“We had constructed only one other trail, so the Forest Preserve District offered advice and documents on protocol,” says township supervisor Kathleen O’Connor. “Working together also ensured that our segment was consistent with the 39-mile regional loop to which it belongs.” The 10-foot-wide gravel trail also crossed two small creeks, each spanned by a 25-foot-long boardwalk.

Oaks explain to residents why it was important to remove buckthorn,” says Chris Slago, Open Space manager. “Homeowners saw woods, not an invasive species, and they were concerned that cutting it down would ruin wildlife habitat.”

The 20- to 25-foot-tall trees with up to 10-inch trunks created an impenetrable layer. The dense shade and a toxin released by the buckthorn killed forest floor plants and contributed to erosion. In town meetings, Slago and Green Oaks staff convinced residents that healthy properties have diverse flora that encourages wildlife.

Since the buckthorn was removed, many homeowners have

said how pleased they are with the results. Heavy rains now leave a foot of water in the drainage ditch behind their properties, and Atkinson Road is dry.

“It probably was one of the most dramatic flood-control projects on our property,” says Slago. “Anything we do to improve runoff in the Des Plaines River Watershed decreases the volume reaching the river. In a way, we’re helping people all the way to the Mississippi River with flood control.”

Sound management

Another success story is the staff’s participation in the creation of the Bull Creek-Bull’s Brook

(continued)

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POPULATION:
53,139

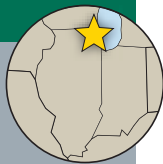
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EMPLOYEES:
9

ANNUAL RAINFALL:
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INFRASTRUCTURE:
60 miles of drainage ditches,
six detention basins,
17 outfalls

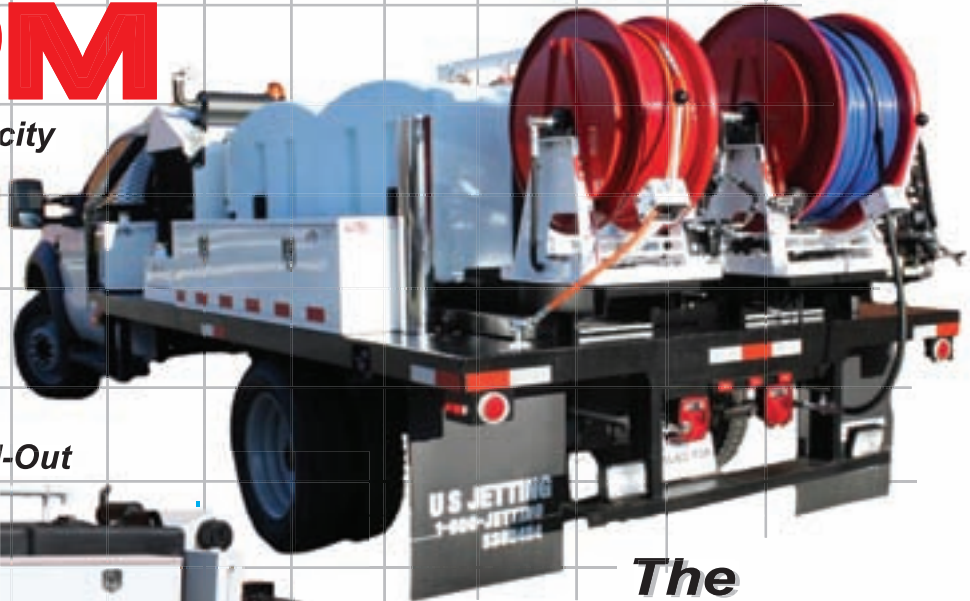
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From left, township open spaces field manager Chris Slago, outreach manager Susan Surroz of the Liberty Prairie Conservancy, senior ecologist Vince Mosca of Hey & Associates, and Libertyville Township supervisor Kathleen O'Connor walk through an area of the Bull Creek/Bulls Brook Watershed. The township earned the 2010 Community of the Year award from the Lake County Stormwater Management Commission.

Council. That council developed the Bull Creek-Bull's Brook Watershed-Based Plan, which identifies one goal as protecting and improving the watershed's natural resources.

The watershed drains 8,970 acres from west to east before discharging into the Des Plaines River. The management plan identifies how to prevent flood damage, improve water quality, and enhance natural resources and recreational opportunities through wetland mitigation banks, riparian buffers and grass waterways.

Unique to the watershed is the 5,800-acre Liberty Prairie Reserve, in which 3,200 acres are permanently protected from further development. The 8.5-acre Sedge Meadow Wetland restoration gave another example of how properly managed open spaces should look



The village of Green Oaks used township property to create a flood basin in an 80-acre field overgrown with invasive buckthorn. (Photo courtesy of Libertyville Township)

and the environmental and recreational benefits they provide.

Liberty Prairie Conservancy helped the staff obtain grants and linked Slago with botanists and ecologists. They learned from soil cores that up to three feet of sediment had washed down from a field, covering what used to be a

sedge meadow.

"We excavated the soil and put it back on the hill," says Slago. "Besides seeding the area, many volunteers planted grass plugs. It was really neat when long-dormant seeds germinated."

The township's efforts are aided by private and corporate



Susan Surroz and Chris Slago review a headwaters conceptual plan for work within the Bull Creek/Bulls Brook Watershed during a Libertyville Township board meeting.



Kathleen O'Connor has worked to implement plans for preservation of the Bull Creek/Bulls Brook Watershed, including the formation of its namesake council.

contributions and by donations of restoration supplies from HSBC Bank, Recreational Equipment Inc. (REI), Motorola, and Mariani, a Lake Bluff landscaping company. The Sedge Meadow project also involved wetland enhancement, stabilizing 1,000 feet of Bull Creek, increasing and naturalizing an adjacent buffer area, and studying the possible removal of the Casey Road Dam, which creates an artificial lake near the restoration site.

Friendly fire

Besides the dam, a farm north of Casey Road has a situation common in many Midwest fields —

“Partnering with the Lake County Forest Preserve District, the Conservancy and the county has enabled our small staff to do an unbelievable job of identifying future projects.”

Kathleen O’Connor

drain tiles that funnel water to creeks. As the tile lines fail from age, surface flow deposits silt in wetland areas. The sediment chokes native plants and encourages invasive species such as phragmites (reeds), cattails and purple loosestrife.

The township received a Watershed Management Board 50/50 matching grant to design a plan that addressed surface flow problems. “After high water flows from fields, invasive species are our second biggest challenge,” says Slago. “Phragmite roots grow deep and strong. They are so difficult to control that the most effective eradication method is to combine herbicides with prescribed burns over two to three seasons. One burn is not enough.”

Although replacing the drain tiles would be easier, that would push the water downstream faster and exacerbate stream bank erosion. The management plan calls for the staff to disable the remaining functional tiles, eradicate the phragmites, and plant native species to prevent erosion and recharge the groundwater.

Prescribed burning in open spaces is a management tool. The staff burns newly converted prairies once per year and established prairies on a three-year rotation. Too wet, too dry, or too windy conditions affect the rotation. Such weather prevented the rotational burn of one 22.5-acre wetland mitigation bank for four years. “We finally did the prescribed burn late last April,” says O’Connor. “Residents were excited because they were seeing land management occurring in their backyards.”

Healthy balance

One way the township balances the feel of an agricultural community with preservation is by leasing its land to alfalfa and row crop farmers. “We also lease two properties to riding stables,” says O’Connor. “The leases generate some revenue that we stretch through our partnership with the Liberty Prairie Conservancy, which explores grant opportunities on our behalf.” The money supports the township’s restoration and maintenance efforts.

Another source of income for restoration maintenance is the unused funds from the Open Space Referendum. Special state legislation allowed the township to keep the money rather than return it to the taxpayers. “It worked out well, because otherwise the town fund would have to absorb the cost of these projects,” O’Connor says.

The township still has some stormwater surface flow problems on fallow fields. The Watershed Management Board grant will enable seeding of those acres with ground cover until they can be included in a restoration project. It also will fund a conceptual plan to address severe erosion problems in the Bull Creek North headwaters.

Another grant from the Lake County Storm-

water Management Commission will enable Gewalt Hamilton to do a flood-control study along a road, where runoff has plagued homeowners for years.

A major issue for O’Connor is balancing the number of new projects with managing the ones already in place. “Our present goal is to restore the land to a certain level, then look at what should come next,” she says. “Partnering with the Lake County Forest Preserve District, the conservancy and the county has enabled our small staff to do an unbelievable job of identifying future projects.

“We’ve made a ton of headway restoring much of what we own. It’s exciting because the program gives people a glimpse of what the land may have looked like before Europeans arrived and what it could continue to look like through proper management.” ♦

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2011 Expo



DESTINATION INDY

The 2012 Pumper & Cleaner Environmental Expo will deliver the best the industry has to offer, all wrapped up in a convenient new package

By *Jim Kneiszel*

It will never be more convenient to attend the Pumper & Cleaner Environmental Expo than in 2012, when the biggest trade show for the environmental services industry moves to Indianapolis.

The renovated and expanded Indiana Convention Center will host the 32nd annual Expo Feb. 27-March 1, providing a simple-to-navigate exhibit space connected through skywalks to several modern hotels. Indiana, known as The Crossroads of America, is easy to reach by car, and the Circle City, as it's called, offers a state-of-the-art airport a short cab- or express bus-ride from downtown.

With 250 restaurants and clubs,

and a large shopping mall connected to the complex of hotels serving the Expo, everything is within easy, climate-controlled reach. In fact, Expo attendees who stay in 4,700 interconnected hotel rooms will be a leisurely two- to three-minute walk from the exhibits.

"Visitors will walk back and forth to the exhibit hall, restaurants and shopping. And they'll be able to do that without ever taking their jackets along," says Bob Kendall, owner of COLE Inc., the Expo sponsor. "This convenience will help create more networking opportunities than ever before at the Expo."

The quality of the new facili-

ties will be matched by the exhibit and education offerings. The Expo will feature approximately 500 exhibitors who use this lofty stage to introduce the latest technologies in the wastewater industry to nearly 10,000 contractors from almost 50 countries. And interest in Expo Education Day continues to grow, with participants getting the cutting-edge training they crave.

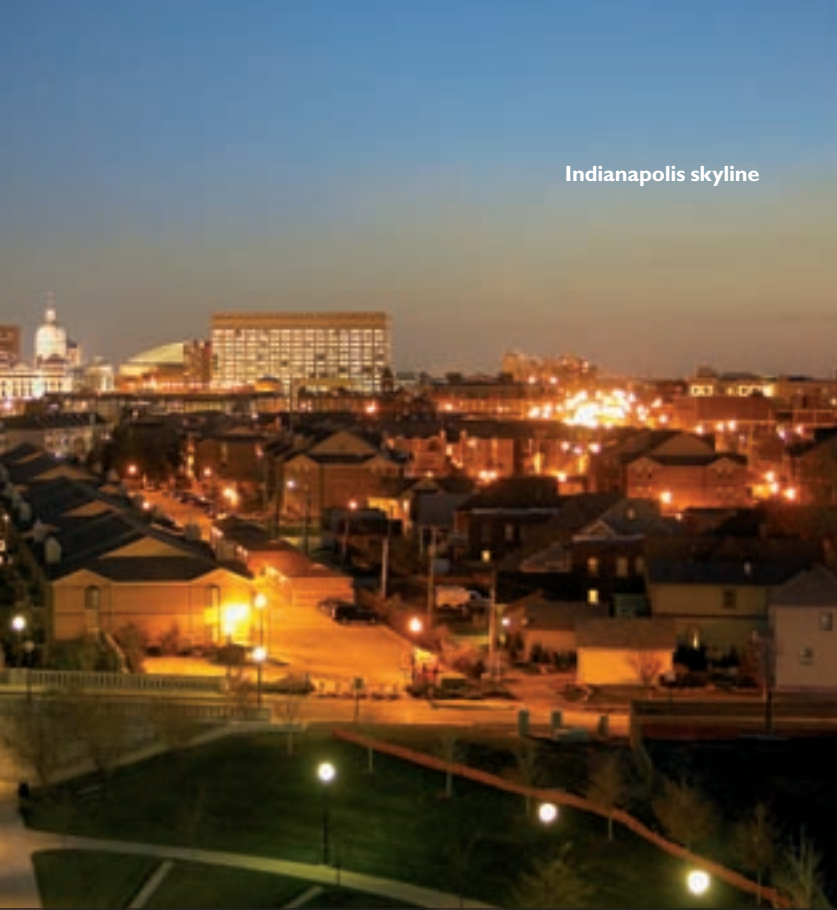
Education Day kicks off Expo week with 40 seminars on Monday, Feb. 27, in new meeting rooms adjacent to the exhibit hall, with another 35 seminars planned for Tuesday and Wednesday. The doors to the hall swing open Tuesday through Thursday,

Feb. 28-March 1. Hours for the exhibits are 9 a.m.-5 p.m. Tuesday and Wednesday and 9 a.m.-2 p.m. Thursday.

Network and learn

Several popular Expo events will continue as the show moves to Indy, according to Julie Gensler, Expo coordinator for COLE. The Expo will continue to offer fantastic networking opportunities, including roundtable discussions that were popular in 2011. An Industry Appreciation Night event is being planned for Tuesday, Feb. 28. The popular COLE Pub truck, which offers refreshments and a place for attendees to relax and unwind, will be moving into

Indianapolis skyline



before Pumper & Cleaner, Indianapolis will host the 2012 Super Bowl. Just after the Expo, the NCAA Final Four tips off at the Lucas Oil Stadium.

“The NFL chose Indianapolis for a reason,” says Kendall, referring to the hotel, restaurant and entertainment infrastructure that has exploded in recent years to make Indy a world-class destination. With everything so handy, Kendall says folks who drive to the Expo will be able to park their cars and walk everywhere. And those who fly to Indy can cab it to their hotel and forget about needing to rent a car to get around.

“Once you’re there, you can stay there,” Kendall says. “Rental cars will not be necessary, which will save attendees a lot of money.”

Those who want to venture out further will find that other attractions are a short cab ride away, including fabled Indianapolis Motor Speedway, the eclectic Broad Ripple Village neighborhood or the Children’s Museum of Indianapolis, billed as the world’s biggest children’s museum, to name a few.



The main event

Setting aside the many options for entertainment, Kendall says there remains one over-arching reason for environmental services contractors to head to the Expo.

“We continue to offer the premier showcase for the best products the industry has to offer,” he says. “The hands-on exhibits, networking and learning opportunities make this a *can’t miss* event for industry professionals.”

Early registration for the Expo costs just \$50 per person (until Jan. 20, 2012). At-the-door full registration is \$70 (\$50 for exhibits only). **To learn more, go to www.pumpershow.com or call 866/933-2653.** ♦

“Visitors will walk back and forth to the exhibit hall, restaurants and shopping. And they’ll be able to do that without ever taking their jackets along.”

Bob Kendall

the exhibit hall for the first time.

And the Roe-D-Hoe competition, sponsored by the National Onsite Wastewater Recycling Association, will continue to attract top-notch machinery operators looking to win cash prizes for their skills, Gensler says.

New for 2012, the National Association of Wastewater Transporters is planning a series of events aimed at sparking friendly competition among pumpers, portable sanitation contractors and drain cleaners in attendance.

Tracks of Education Day seminars are being presented by:

- National Onsite Wastewater Recycling Association
- National Association of Sewer Service Companies
- National Environmental Health Association
- National Association of Wastewater Transporters
- Portable Sanitation Association International
- Southern Sections Collection Systems Committee

- Northwest Michigan Onsite Wastewater Task Force

Another Education Day track of seminars will be presented by returning motivational speaker and business coach Scott Hunter. Additional seminars will be scheduled on Tuesday and Wednesday mornings, according to Gensler.

Accommodations

Expo lodging is plentiful within walking distance of the ICC. Hotels connected to the exhibit hall include several Marriott properties, the Westin, Hyatt Regency, Omni Severin and Crowne Plaza. Many more hotels are located only a block or two away, near the Indiana State Capitol, White River State Park and Monument Circle. Gensler recommends booking early by going to www.pumpershow.com and clicking on the “hotels & travel” tab.

Based on other events set for Indy in early 2012, there’s no doubt the city is up to the hospitality challenge of the Expo. Just

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The drag scraper is pulled through the pipe to clean the walls before epoxy lining. Note the chatter marks on the walls. (Photos courtesy of Triton Lining Technologies)

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Triton Lining Technologies
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APPLICATION:

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BENEFITS:

Eliminates corrosion and tuberculation, restores water quality, improves hydraulic efficiency

USER:

Marion (Ind.) Water Department

WRAPPED UP

A spincast epoxy-coating system restores pressure and flow in mains for a water department in northeast Indiana

By *Scottie Dayton*

“Our fire flows went from 300 to 400 gpm to 900 to 1,000 gpm. This summer, we’re doing a flushing program to help identify next year’s coating projects.”

David McCollum

Fire flows as low as 300 to 400 gpm and customer complaints of rusty water kept the Marion (Ind.) Water Department busy flushing the 4-inch cast-iron pipes. The process dropped the residual pressure so low that residents called to ask why their water was shut off — and the rust always returned.

For years, the city upgraded the mains in the downtown area by boring and installing 6- and 12-inch pipes, then connecting hydrants to them. One remaining original section was a 1,200-foot-long elbow with both ends connected to new pipe. The line

paralleled a state highway for a block, then turned and ran for three blocks, feeding two apartment buildings, a church, community center and four homes. City engineers estimated the cost to trench and replace it with 6-inch pipe at \$350,000.

“During previous upgrades, we spot-repaired some leaks and installed Inserta valves where needed,” says David McCollum, project specialist. “The tuberculation we saw in the removed sections reduced flows by 50 percent.”

In 2010, the city hired Gary Soroan, founder of Triton Lining Technologies, to clean and coat 2,500 feet of corroded pipe in

two residential neighborhoods for \$46,000. The spincast epoxy coating restored the host pipe’s pressure and flow. Soroan then rehabilitated the problematic elbow for \$21,600, completing the project in four days.

Preparations

Department workers excavated access points at fittings 400 to 500 feet apart, then poured a gravel bed into the downstream hole. They built a wet well from a 55-gallon drum, drilled holes near the bottom, then installed a pump. During pipe cleaning, the drum kept debris from entering the pump as it discharged water to the

sewer. The crews later buried the material when they backfilled the excavations.

The department set up a temporary non-potable waterline to customers and supplied them with cases of bottled water for drinking. "It was easier and faster that way," says McCollum. "We told them not to cook with or drink the water coming out of their taps."

Sorohan and the crew used pairs of clamped Christmas tree drag scrapers custom made in Great Britain to clean the encrustation and tuberculation.

"We don't hydroblast because that would also remove the graph-

itization," he says. "When the pipe is attacked from the inside, the stable graphite remains in place, but the metallic material has no structural integrity. We leave the graphitization for a smoother contour when spraying the coating."

The 75- to 100-year-old calcium tuberculation was the hardest Sorohan had ever cleaned. The crew initially took off some scraper arms to avoid removing too much material and plugging the hole. A winch pulled the tool through 12 or more times to clean some sections. Crews worked until dark, and the process took two-and-a-half days.

Blow dry and spincast

To remove tailings from the pipe, Sorohan's team dragged through squeegee plugs. Then they flushed the line using sponge pigs and water and dried it with additional sponge pigs. Because any moisture in the line would compromise the coating, department workers looked for weeping valves or service connections with their RIDGID SeeSnake push camera and CUES camera van. "We always found some leaks," says McCollum. "We'd close those valves or shut off the services, and Gary would dry the line again."

Once the pipe was cleared for lining, workers inserted an umbilical hose from the Triton lining rig into the pipe and pulled it to the exit pit. The umbilical carried hoses for the epoxy resin, activator, air and water. The airline powered the motor driving the rotating spray head.

Besides numerous sensors and monitors, the rig had a water jacket surrounding the resin and activator tanks, and a propane heater for the water that heated the components to 113 to 122 degrees F. Three hoses recirculated the water from the heater to the spray head to maintain an even resin temperature during the lining process.

In the exit pit, workers attached a static mixer to the spray head and actuated the pumps and air. "We expel the resin into a bucket until the mix ratio stabilizes," says Sorohan. "Then we engage the winch powering the hose drum and draw the spray head backward, coating the pipe in reverse."

A computer controlled the temperature of the epoxy and activator, pressures on each line, water temperatures, flow rates, mixing ratios, withdrawal speed and coating thickness (1.2 mm).

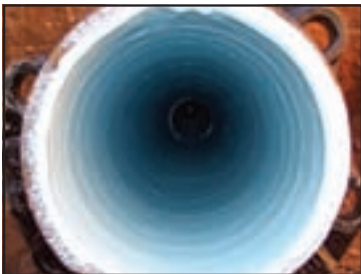
Winding down

The coating dried to the touch in three hours and cured overnight. The next morning, McCollum's crew inspected it for imperfections. Finding none, they flushed the line with water, then sanitized it with a 12 percent liquid chlorine solution. The charged pipe sat overnight, and then workers flushed it again and tested the water before returning it to service.

The seamless protective barrier eliminated corrosion and tuberculation, prevented their recurrence, restored water quality, ended customer complaints, and improved the C-factor (hydraulic efficiency) to optimal levels. "Our fire flows went from 300 to 400 gpm to 900 to 1,000 gpm," says McCollum. "This summer, we're doing a flushing program to help identify next year's coating projects." ♦



The tuberculation in the 4-inch cast-iron water main reduced flows by 50 percent.



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A winch system pulls pairs of clamped custom-made drag scrapers into the pipe to clean it. In Marion, Ind., the encrustation and tuberculation were so hard that it took 12 or more pulls to clean each section.



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TWO FOR ONE

Kleen-Vue system combines jetting and inspection in a single tool, allowing a general assessment of pipe condition during the cleaning process

By Erik Gunn

Waterjetters and cameras are basic tools for sewer inspection and cleaning. Manufacturers have taken a variety of approaches to combining those capabilities in the same system or tool, so that in essence both operations can be performed at the same time.

One such approach is represented by the Kleen-Vue combination jetting and inspection tool, created by German-based KEG GmbH and distributed in the United States by KEG Technologies.



The control unit for the Kleen-Vue camera includes a QWERTY keyboard for making notations on the video recording.

On July 14, company representatives demonstrated the Kleen-Vue system in St. Charles, Ill., for Dave Todd, assistant manager for the city's environmental services division. General sales manager Dan Story led the demonstration, assisted by Mike Lackey, sales manager for northern Illinois and eastern Wisconsin, and Guenter Schaarschmidt, designer of the unit.

Assisting with the tool's jetting functions was Mike Adler, a mechanic for Finkbiner Equipment Co. of Burr Ridge, Ill., a vendor for KEG Technologies, accompanied by Chad Cailteaux of Finkbiner's sales department.

Walk-around

The Kleen-Vue system consists of a camera/nozzle unit and a control system for the camera. The unit demonstrated included an optional remote component system for transmitting the camera image signal wirelessly using Wi-Fi technology. A simple series of pushbuttons control camera operation and recording.

The camera controls are mounted in a metal box that includes recording controls, a QWERTY keyboard for entering inspection data, and a port for an



The Kleen-Vue camera and jetter system. (Photography by Erik Gunn)

SD memory card that stores the data. The control box and monitor are supported on a pole typically mounted near the control panel of the combination truck or trailer jetter that supplies high-pressure water for the operation.

The Kleen-Vue unit itself measures 10 3/4 inches wide, 9 1/2 inches tall and 16 inches long and weighs 65 pounds. The upper part of the unit is a camera system. Identical forward- and backward-facing color cameras are equipped with automatic wiper blades to keep the lenses clean. Halogen lamps are mounted in both the forward and the rearward directions.

The lower part of the unit is the jetting component. The jetting nozzle is based on KEG's floor cleaner nozzle model, which is used to clean the bottoms of pipes.

The assembly rests on metal skids akin to sleigh runners. At the rear is a port for attaching a jetting hose. Nozzles are used both for hydrojetting and to propel the unit forward. Both the

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MANUFACTURER:

KEG GmbH; distributed in U.S. by KEG Technologies
866/595-0515
www.kegtechnologies.net

LOCATION OF DEMO:

St. Charles, Ill.

DEMONSTRATED BY:

For KEG Technologies, general sales manager Dan Story, sales manager Mike Lackey, designer Guenter Schaarschmidt; also Mike Adler, Finkbiner Equipment Co.; and David Todd, City of St. Charles

LIST PRICE:

\$90,000 (including components for transmitting image signal via Wi-Fi)

upper camera and lower jetting unit are housed inside a circular roller cage.

The primary power source is an enclosed generator turbine at the front of the jetting section. The turbine, powered by a portion of the jetting water, provides power to the camera system and recharges an onboard battery that can store about two minutes worth of power, allowing the camera to function when the jetter is not in

“It is not designed to replace a camera truck. It is designed to help a city get through their system much faster, keeping the camera truck for the smaller pipes where it’s absolutely needed all the time.”

Dan Story

use. “We actually take water and spin the turbine, and it generates all the power for the battery pack inside there,” Story said.

A white cap on the front of the camera unit identifies a wireless transmitter that sends data from the camera to a receiver via radio waves. The remote receiver is a metal box about the size of two paperback books side by side; its receiving node is also covered by a white cap.

In operation, the remote receiver is wired to a black Pelican Box containing receiving equipment. The box can be wired to the camera control box or to a Wi-Fi transmitter that then sends the camera image and related data to the control box wirelessly. This allows the remote receiver to be placed in the sewer, where it receives a stronger signal from the Kleen-Vue unit.

The Kleen-Vue fits in pipe as small as 12 inches. For larger pipe, attached spacers lift the camera section so as to center it in the pipe. Story says the device has been tested in pipes up to 72 inches, and he believes it could function in larger pipes, as well.

Operation

Demonstration participants met



Guenter Schaarschmidt sets a support bracket to hold the pole that positions the wireless receiver at the bottom of the manhole. Behind him is the Wi-Fi transmitter, which will send the camera signal back to the Wi-Fi receiver mounted on the truck.

in a residential neighborhood at Glen Boulevard and Birch Lane in St. Charles. There, Todd opened a city manhole. About 150 to 200 feet away, Story and Schaarschmidt opened a second manhole.

Schaarschmidt erected a tripod on which the Wi-Fi transmitter was mounted. The radio receiving unit was mounted to a series of 6-foot and one 3-foot fiberglass poles. Story and Schaarschmidt lowered the receiver into the second manhole, supporting it with a simple metal brace that straddled the manhole. The receiver’s wire was connected to the Pelican Box, in turn connected to the Wi-Fi transmitter.

Back at the first manhole, the KEG representatives attached the



Dan Story (left) and Guenter Schaarschmidt position the pole inside a collar that holds the pole for the wireless receiver.

Kleen-Vue unit to a jetter hose from the front of a Vacall combination truck. For the demonstration, the camera control unit was temporarily mounted on a standard pickup truck, rather than on the combination truck. Story carefully lowered the unit into the 24-foot-deep manhole, bringing it to rest on its skids in the sewer line trough at the bottom.

Because of the depth of the manhole, to help position the unit properly, one team member used a mirror to reflect sunlight down on to it, while another held an electric light to further illuminate



the space. A 90-degree turn in the line right at the base of the manhole made it more challenging to position the device in the line.

The recording process was activated with the touch of a button on the control box, and a red light indicated that the system was indeed recording. Using the jetter controls, Adler kicked the water pressure up to 1,950 psi and sent the device moving forward.

The camera sent back sharp, well-lit, color images that showed the interior of the line, including

several residential unit lateral connections it passed. The interior of the pipe surface was clearly visible. While the pipe was clean and in good repair, the quality of the images suggested that any damage to the line would have been easy to spot.

Although the camera view itself was static, its image had a wide enough angle so that the pipe immediately in its vicinity could be seen entirely. The wiper blades ran about every three seconds, helping to provide a constantly clean view. Schaarschmidt used the control panel to periodically shift from the front to the rear camera. The rear view was slightly obscured by water from the nozzle, but the obstruction was minimal.

The 8-inch monitor screen was shielded with a hood. To view the camera images on the screen in the field, the viewer had to lean into the hood to block out sunlight.

In about 10 minutes, the unit propelled forward to the next manhole, where Adler brought it to a stop when he saw the radio receiving unit ahead of it on the screen. With the jetter still running, Adler rewound the unit to bring it back to the first manhole.

The line inspected was only about six years old, according to Todd, and had very little debris. The debris visible on the bottom rapidly came clean as the unit moved through the line. The jetter and the camera both operated for the entire 10-minute journey

forward through the line and back to where it was first inserted.

Once the unit was back at the first manhole, Adler shut down the jetter water. Adler, Story, Lackey and Schaarschmidt used a roller chute — a pole equipped with a pulley wheel — to help create a track for reeling up the jetter hose, making retrieval of the unit from the manhole easier.

“The quality of the picture was good, and the wiper helps out a lot. It’s going to offer a lot of versatility to municipalities that can’t afford a dedicated camera truck.”

Dave Todd

Observer comments

The images produced by the sewer camera were clear and sharp. The camera lenses operate only in a straightforward (or rearward) position; there is no pan, tilt or zoom capability. The televised image from the sewer included date and time information but did not record the distance into the line.

Todd found the unit’s wireless technology impressive, especially considering the depth of the line inspected. “The quality of the picture was good, and the wiper helps out a lot,” he said.

He also saw potential savings in buying a unit with both jetting and televising capability. “That’s



Dan Story lowers the 65-pound Kleen-Vue unit into the manhole.

going to offer a lot of versatility to municipalities that can’t afford a dedicated camera truck,” he said.

Manufacturer comments

The standard SD memory card used with the system can hold about three hours of recording, according to Schaarschmidt. Story said that the system has been tested to transmit its signal at least 600 feet and that a recorded voice overlay for the inspection video can be made by attaching a microphone (not included).

Story said one person can operate the device if the camera control unit is positioned where the operator can also operate the jetter controls. “The idea is to have the control box where the

operator can see what’s going on,” he said. While the ability to run the unit without the expense of a dedicated camera truck is an important attribute, KEG does not regard the system primarily as a camera substitute.

“It is not designed to replace a camera truck,” he said. “It is designed to help a city get through their system much faster, keeping the camera truck for the smaller pipes where it’s absolutely needed all the time.” In larger pipes, the Kleen-Vue can be used routinely, “and only when they find a major problem, where they need to pan and tilt, do they bring the camera truck over to look at that particular pipe.”

In addition to the halogen lamps mounted on the camera, LED lamps can be attached for larger pipes. ♦



Screen captures from video taken during the demonstration. The right photo shows the view at the far end of the run; in the foreground is the unit that receives the wireless signal from the camera to transmit the images back to the monitor.



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FOCUS: SEWER

ALL ACCORDING TO PLAN

An arsenal of equipment that includes a smart nozzle assortment helps the Great Neck WPCD stay on top of a tight maintenance and inspection routine

By Erik Gunn

More than half the sewer lines in Great Neck, N.Y., are nearly a century old. But like a spry senior citizen who keeps trim by working out daily, they seem younger than they are.

The secret? “Constant vigilance,” as Harry Potter’s mentor and hunter of evil wizards Mad-Eye Moody might say. Or in the plainer words of Christopher Murphy, superintendent of the Great Neck Water Pollution Control District, “We have a very aggressive preventive maintenance program.”

For the last eight years, sewers in the district have been on a rigorous cleaning and inspection schedule. The program has cut sewer backups in the Long Island community. And that’s just one of several measures the district has taken to make sure its system is as clean and efficient as possible.

Getting on schedule

Located on the north shore of Long Island just east of the New York City borough of Queens, the district serves 15,000 residents of five Nassau County villages, along with some unincorporated territories.

The area is mostly residential, with a substantial number of restaurants and a few industrial customers. By 2014, the district will add another 10,000 residents, along with 19 miles of sewer line and five more pumping stations, from the village of Great Neck just north of the district’s existing boundaries. A treatment plant expansion will accommodate the additional load.

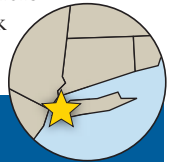
Attendant Tyler Olsson, left, and senior servicer Kenny Bunn use a Vactor 2100 combination truck to jet out a sewer line before rehabilitation. The city maintenance crew uses a wide range of tools to keep ahead of maintenance needs. (Photography by Darren Levine)



The Great Neck (N.Y.) team includes, from left, superintendent Christopher Murphy, service supervisor Joseph Urda, attendant Andrew Melillo, senior servicer Kenny Bunn, and attendant Tyler Olsson.

here we were averaging a backup maybe once a month. Now we've had one in the last three years. We're pretty proud of that."

With just nine employees, the district keeps its crews busy year-round. At maintenance time, crews jet out the designated sewer lines using a Vactor 2100 combination truck, purchased in 2008. Crews also inspect the manhole covers and manholes, including the bricks or block on the manhole walls. They check jetting debris for



"When I got here in 2003, we didn't really have any kind of formalized schedule for maintenance," Murphy says. "You can't run a 45-mile sewer system and five pump stations and not have some sort of

organized system."

A stickler for order and record-keeping, he decided to change that. So starting the next year, the district divided the system into 72 zones, each to undergo routine

maintenance every nine months. Within a few years, the results were dramatic.

"We saw the amount of problems basically dwindle to nothing," Murphy says. "When I first got

GREASE POLICE

As in many communities with a large restaurant industry, the Great Neck Water Pollution Control District on Long Island has its share of grease problems in its sewers. The district used to rely on restaurant owners to keep their own logs of when their traps were cleaned. A district inspector would check the logs a couple of times a year.

"More often than not, when we would come, we'd have a log that was written in the same handwriting with the same color pen," says Christopher Murphy, district superintendent. "You knew that what was supposed to have been done over the last six months had all been written down at the same time."

Great Neck decided to start a formal grease-trap program. First, student interns documented grease traps in the district, taking photos and listing every trap, sink and drain, along with the restaurant's average daily customer traffic and its basic menu categories.

Drawing on plumbing codes from New York State and other places around the country, one intern — a college computer science major who knew the database program Microsoft Access — helped the district devise a complex algorithm to calculate for every restaurant how big a trap it really needed. Restaurants were required to install such traps.

Then the district passed a regulation requiring each restaurant to hire a contractor to clean its traps monthly and to document the work with a receipt. Contractors had to furnish the district with bills of lading for each

load, ensuring its proper disposal. "I don't want that grease going into a manhole on Tuesday night at 11 p.m.," Murphy says.

There was a lot of pushback from restaurants, but the district pressed ahead, sending restaurants monthly reminders about the new requirement. "We did that for about a year until a large number of the restaurants were on board, and then we sent a final notice," Murphy says. Then enforcement began, including violation notices and fines for noncompliance.

"Now basically everyone's in compliance," he says. "We saw a tremendous difference in the amount of grease going into the system. Lines that we were cleaning every couple of weeks are on nine-month schedules now."

The district's residents benefit. "What we said is, if you're going to be doing business in our district, you're going to have to abide by the sewer ordinance, and we're not going to use taxpayer money to clean up after you," Murphy says. "It's a cost of doing business, just like everything else. And it's been extremely successful. Now the program is basically on autopilot."

PROFILE:

Great Neck (N.Y.) Water Pollution Control District, N.Y.

POPULATION SERVED:
15,000

SERVICE AREA:
Northwestern Nassau
County, Long Island

INFRASTRUCTURE:
45 miles of sewer mains;
five pumping stations

EMPLOYEES:
9

ANNUAL BUDGET:
\$4.26 million

WEBSITE:
www.gnwpcd.net



Team members like senior servicer **Kenny Bunn**, left, and attendant **Tyler Olsson** use a variety of jetting nozzles on the district's Vactor truck to clean pipes effectively in varying applications.

grease and grit and apply grease-cutting foam in lines where they find grease. And they do some community relations work for the district when residents gather to watch.

"We have very visual vehicles, and residents are always curious to see what our crews are doing," Murphy says. Automated scheduling helps keep the maintenance program on track. Each month, the district generates an 11- by 17-inch booklet highlighting in yellow all the line segments due for maintenance. If crews don't get to a zone in that particular month, it comes back on the next month's list — this time highlighted in red, and red zones get first priority.

Ramping up TV

Along with systematic maintenance, the district became much more aggressive with CCTV inspection. In 2004 the district purchased a Saturn III camera and Badger wheeled transporter from Aries Industries. District employees have trained with Aries to handle routine repairs for the units, reducing downtime and expense.

The goal is to inspect the entire system on a two-year cycle, but when cleaning results are unusual, crews bring in the camera for a special look. Based on the results, they may change the line's cleaning schedule from the standard nine months — more or less frequent cleanings depending on the line condition. "We're fine-tuning each pipe," Murphy says.

CCTV operators use ITpipes software, from Infrastructure Technologies to note pertinent find-



By 2014, the district will add another 10,000 residents, along with 19 miles of sewer line and five more pump stations from the Village of Great Neck, just to the north. This treatment plant expansion will handle the additional load.

ings. For example, they grade infiltration problems on a scale from 1 to 4 and highlight specific problems such as root intrusion or chronic grease and grit accumulation. Infiltration problems graded 2 or higher go on a list for repairs.

"We can plan not only for repairs that have to be done, but also for capital expenditures in the future," Murphy says. "If I have an offset joint or a small hairline crack that isn't an issue now, I'm not going to wait until it becomes an issue. I can plan in the next two years when I'm going to repair that, or put it in next year's budget for replacement. Over time, we'll be able to structure our capital repair plan right down to the tee

because we now have full control of what gets done when it gets done. We'll be a lot more efficient."

Nozzle know-how

With its heavy reliance on jetting, Great Neck has assembled an arsenal of nozzles, mostly models from Enz USA. "One of the things we like about the Enz nozzles is that they have interchangeable ceramic tips," says Murphy. "The ceramic is incredibly hard, so it lasts a long time, and as they start getting worn, we can just replace them."

Changing nozzle tips also allows crews to deliver adequate pressure to the pipe wall even when using the district's older 1995 jetting truck that delivers 40 gpm. "So it gives



The district's CCTV trailer is a key item in the maintenance arsenal. Aries Industries supplies the inspection equipment.

us a lot of flexibility," Murphy says.

For pump station wet wells and manholes, the district relies on the RGS Radial Rotating Nozzle. Instead of shooting water out the end, it sprays circumferentially. As it is lowered into the manhole, it cleans the sides from top to bottom. "It puts all of its force to the side," Murphy says. "You can stand there and hold the hose and it just spins and

"If I have an offset joint or a small hairline crack that isn't an issue now, I'm not going to wait until it becomes an issue. I can plan in the next two years when I'm going to repair that, or put it in next year's budget for replacement."

Christopher Murphy

shoots out sideways. We lower that down into the manhole and strip all the debris off."

A similar standby model is the Bulldog, a spinning nozzle that jets water straight out the sides as well as to the front and back. "If we have any recent grease accumulation, that will knock it right off," says Murphy.

Another, the Chain Scraper Nozzle, includes a series of interchangeable chains and cutting cables that spin during operation. It can be used to ream out grease or cut up invading roots. A special series of retractable skids help center the nozzle even in pipes that are not uniformly round.

The Ejector nozzle works a bit like the motor in a jet-style personal watercraft. It's especially useful in large lines that may be partly full, such as 24- to 30-inch trunk lines. The design allows the unit to use water already in the line along with the jetter's water.

"An 80 gpm truck with this nozzle can have a flushing capacity of basically 200 to 300 gpm," says Murphy. "So we can get everything out of that pipe and apply the same amount of pressure as if we were doing just a regular pipe."

Then there is The Flounder. Unlike the typical cylindrical nozzle, this unit is flat, like the fish it's named for. "It rides along the bottom of the pipe

and puts the majority of its force at an angle to the bottom of the pipe," says Murphy. "You can plow a tremendous amount of grit as you're pulling back."

This model is especially useful in irregular pipe where grit and other debris accumulate in dips at the bottom. And with the combination truck's vacuum hose at hand, "we're plowing the grit back with the nozzle and then sucking it out as soon as we get it."

Manhole rehab

More than 50 percent of the lines in the existing Great Neck system date back to before 1915 and are made of clay pipe with joints every three feet. Manholes date back to the 1930s and before and have brick chimneys. Though well made, they have exceeded their life expectancy. And that's where one newly acquired tool comes in.

Great Neck bought a trailer-mounted manhole rehabilitation unit

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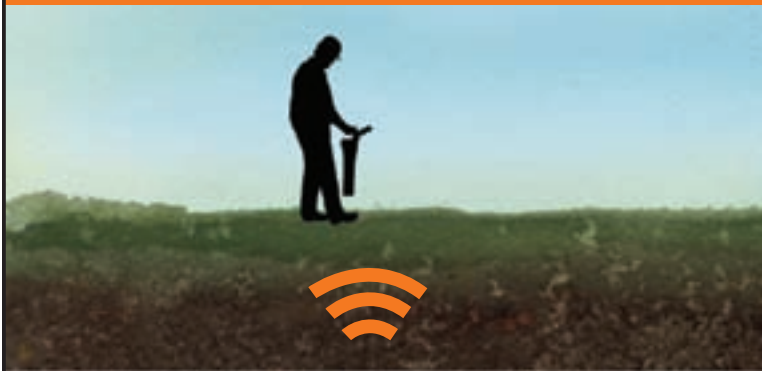
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"We want people to know where their money's going. We try to run this district as we would a business. There's a lot of ways we can trim costs and show people where their money's going. That will make them confident in what's going on."

Christopher Murphy

from AP/M PERMAFORM that uses a centrifugal mechanism to spray structural mortar or grout on the inside of a manhole as it descends from the street level to the bottom.

"We'll be able to coat the inside of a manhole from the street level," says Murphy. That will reduce the length of time needed for confined-space entry. "When we're done with the walls, we'll go down and trowel the bottom of the manhole and the top by the frame, and we'll have a watertight, structurally rehabbed manhole."

Murphy expects to be able to rehabilitate a manhole for much less than the cost of hiring a contractor at \$500 to \$1,000 per manhole. "We have a couple thousand manholes, so that can be quite a savings," he says.

Great Neck also plans to acquire its own cured-in-place pipe lining system. Murphy sees huge savings there, too: Instead of paying \$50 to \$90 a foot for repairs, "we're going to be buying the liner for considerably less."

UV curing

Once the system is on hand, Murphy plans to schedule the worst lines — the ones crews have given an I&I Grade 4 — for immediate lining. Lines given Grade 3 and 2 will be scheduled next, followed by those in the heaviest groundwater areas, "where we know that if we have a break and we have to dig, it's going to be an expensive repair," Murphy says. Deep lines 20 to 30 feet down will be flagged after that.

For its CIPP technology, the district chose fiberglass liners impregnated with resin and cured using UV light (Reline America).

For Murphy, the sewer business runs in the family. After a career with the Long Island Water Authority years ago, his father retired to Maine, only to wind up working again as superintendent for a water and sewer district there. Murphy learned the science and

math of the business at his dad's side, took training and got a license in Maine, then moved back to Long Island, working a variety of jobs in the field, including as a consultant.

He also got a college degree in business management. In running the district, he focuses on finding savings wherever he can and offering as much information as possible to ratepayers.

"We want people to know where their money's going," he says. "We try to run this district as we would a business. There's a lot of ways we can trim costs and show people where their money's going. That will make them confident in what's going on." ♦

WATCH THEM IN ACTION
To learn more about Great Neck Water Pollution Control District, view the video at www.mswmag.com.

MORE INFO:

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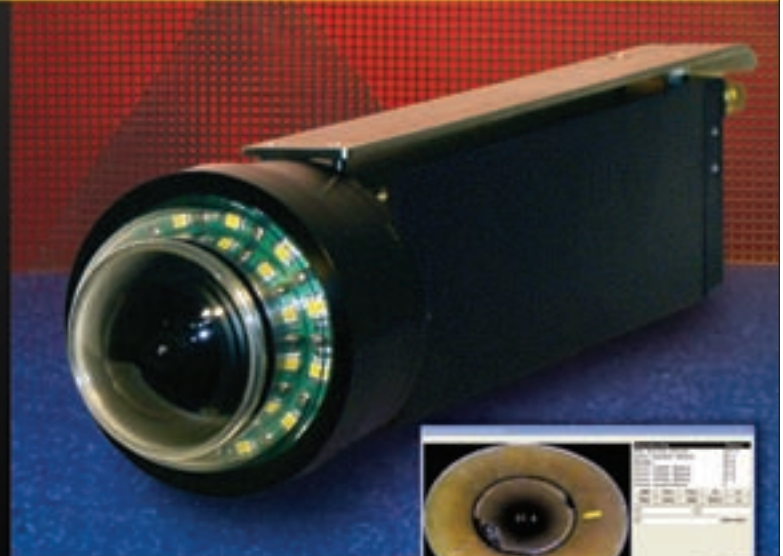
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CLEANING AND MAINTENANCE EQUIPMENT

By Briana Jones

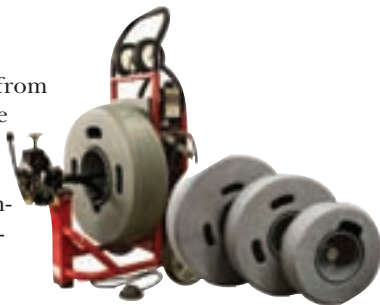
Trailer-mounted jetters

Max Flow trailer-mounted jetters from Amazing Machinery are available with a single jetter hose for large lines or dual jetter hose for large and small lines. The single-hose system operates with 1/2-inch hose while the dual jetter operates with 3/8- to 1/2-inch hose. All models are equipped with a rear-mounted 12V electric jetter hose reel. The jetters include curbside-mounted jetting controls, water fill tube and fender-mounted toolbox, heavy-duty trailer, compact design, and large water supply tank. **800/504-7435; www.amazingmachinery.com.**



New reels

The **DMI 75** upright drain machine from Duracable Manufacturing is available with 18-, 23- or 27-inch hose reels. It operates in both horizontal and vertical positions and the 22 1/2-inch-wide frame fits through narrow doorways. Options include built-in stair climber, built-in toolbox, adjustable handle, standard safety air foot pedal, and power cable feed and return. **800/247-4081; www.duracable.com.**



Enhanced vacuum truck

The **Guzzler NX** vacuum truck from Guzzler Mfg. has been redesigned to enhance productivity at lower cost. The cyclone and baghouses are configured together to maximize efficiency and reduce overall weight. An increased filter area and offline cleaning extend bag life while forcing carryover back to the debris tank. Seventy-two 70-inch bags provide a low 4:1 air-to-cloth ratio, keeping the system clean and filtered for reliable performance and high productivity.

The truck carries a Robuschi blower delivering 5,435 cfm with vacuum capability to 28 inches Hg. The blower, combined with simple air routing,



makes more air available at the hose inlet and so moves more material. The large blower lets users load more material at a lower engine rpm, conserving fuel and reducing noise. The truck has a tested operating sound level of 88.9 dB per SAE J1372 test. **815/672-3171; www.guzzler.com.**

Combo unit

The **Aquatech B-10** combination jet/vac truck from Hi-Vac Corp. features single-engine design for lower fuel and maintenance costs, rear-mounted hose reel, and 360-degree top-loading rotating boom.



The low center of gravity makes full loads more stable, while the self-cleaning tanks are corrosion- and abrasion-resistant. The air/vacuum system has an operating capacity of 2,700 cfm and a 204-inch water column. Options include extended boom, pneumatic foot control for one-man operation, and lockable vacuum tubes. An internal boom allows for pickup of materials above and below water. **740/374-2306; www.hi-vac.com.**

Closed-loop wash trailer

The **No Water Wasted** wash trailer from Hydro Tek makes it possible to wash with high-pressure hot water, recover that hot water, and filter it back into the bulk water tank for reuse. This keeps the unfiltered water from draining into waterways. The closed-loop, self-contained mobile wash system is powered by a gasoline or diesel engine on the hot-water pressure washer. No additional generator is needed. The recycle system vacuums up the wash water and sends it through several stages of filtration. Water reuse makes it well suited for drought areas or remote locations where access to water is limited. The trailer carries up to 400 gallons. **800/274-9376; www.hydrotek.us.**



Vacuum loader

The **LEDWELL LH-3300** vacuum loader from Ledwell & Son offers a 3,300-gallon carbon steel single-compartment tank that is ASME/DOT certified. The tank has a hydraulic-operated full-opening rear door with 6-inch air-operated rear discharge. Rear work lights and LED rear and side marker lights provide visibility at night. Options include high-pressure wash-down capacity, multicompartment capability, tri-axle body design and variable tank capacity. The package includes a DOT rear bumper with sealed aluminum taillight boxes. **888/533-9355; www.ledwell.com.**



Vacuum tank

The HTE 110-barrel (4,620-gallon) steel **vacuum tank** from Heritage Truck Equipment features 1/4-inch SA-36 steel walls with 5/16-inch flanged and dished heads, three full-reinforced baffles with crawl hole, and full-length double-leg sills with 2-inch, no-slip grooved rubber cushion. Other features include industrial-coated steel trays with hose tie downs, industrial-coated tank carriage, and rear-mounted dual oversized hose hangers.



The tank has a Fruitland RCF500 vacuum pump Eliminator package with integrated filter, 12-inch low-profile primary shut-off with 3-inch hose connection, and 10-gallon secondary moisture trap with 3-inch hose connection. It has top- and rear-access manways, heavy-duty oil field bumpers with storage compartments, stainless steel tray-mounted toolbox, epoxy-coated interior, heated valve collars, dual rear-center 4-inch load/discharge bronze level valve, and dual front-side 4-inch load/discharge level valves. The unit also includes an inspection port at the top of the tank, three rear 5-inch sight glasses, a 1-inch front-mounted sight tube, SeeLevel Annihilator tank volume indicator, tank access ladders, and strobe light package. **330/699-4491; www.heritagetruck.com.**

Complete vacuum truck

The tri-axle Mack **vacuum truck** from LMT comes complete with the ST package, which includes two brass lever valves with CAM fittings. Baffles on the 4,000-gallon unit are made of 1/4-inch carbon steel. The tank rests on full-length rails and has full-length removable hose trays, a rung-style ladder, 20-inch top hatch, and 12-inch hose hangers. The hose trays, lower-portion tank side and lower-portion tank rear can be treated with a polymer spray-on protective coating.



Standard components include a 3-inch load valve, 4-inch discharge valve, three 5-inch sight eyes, vacuum relief valve, pressure relief valve, and primary and secondary shut-off valves. Its full-light package consists of side markers, tail and back, a three-light cluster, and two rear-mounted work lights. Optional features include heavy-duty step bumper, 3-inch 400 cfm oil catch muffler, and 40 hp Curtis right-angle gearbox connected to a Juroop LC420 liquid-cooled pump with a full-cross frame pump stand. **800/545-0174; www.tanksandpumps.com.**

Sewer flusher

The 4,000-gallon two-compartment **aluminum tank** with front hoist and full-open rear door from Progress Tank is equipped for sewer flushing and liquid waste service. The unit carries a Robuschi RB-DV85 cfm



high-vacuum blower and Cat 3560 25 gpm/3,000 psi plunger pump. The hydraulic-driven pump packages allow both to operate independently or simultaneously on a continuous-duty basis. Additional options include air-operated inlet and discharge valves, heated collars, base wireless remote system to control pump engagement, valve operations, and emergency truck engine shutdown. The unit also includes heavy-duty oil field front and rear bumpers. **800/467-5600; www.progresstank.com.**

Jetter reels

Reelcraft's large-frame **jetter reels** are designed for various high-pressure applications that require the added strength and stability of a heavy-duty frame and spool assembly. They can accommodate up to 1,000 feet of 1-inch I.D. hose. Pressures range from 3,000 to 10,000 psi with a temperature range of 22 to 225 degrees F. Motor mounting options include right/left, front/back or direct drive. Options include hydraulic, pneumatic, 12V DC or 24V DC electric motor.



A direct-drive option eliminates a chain or sprocket and the related maintenance. The frame is constructed of industrial-grade tubular steel, and the spool has a welded wrapper and 3/16-inch spun heads. Hose pinch points have been reduced by incorporating an external hose mounting point so the hose makes a smooth transition onto the spool. Heavy-duty cast guide assembly aides in guiding the hose back onto the spool evenly. The assembly arm can be positioned out of the way and locked when reel is not in use. Components are individually powder-coated for maximum corrosion resistance. **800/444-3134; www.reelcraft.com.**

Trailer jetter

The **High Flow Ultimate Warrior** trailer jet from Spartan Tool delivers up to 4,000 psi/35 gpm for pipes up to 24 inches. It comes with 600-gallon water tanks and is fully compliant with all NATM standards. The full-body enclosure creates a quiet jetter and keeps key components warm, dry and out of the elements. The jetter comes with an 84 hp turbo-charged Kubota engine and Giant pump. **800/435-3866; www.spartan-tool.com.**



Easy maneuverability

The **Mud Dog 650** hydroexcavator from Super Products carries a 6.5-cubic-yard debris dump body and a 500-gallon freshwater tank. It is designed in response to the growing need for a smaller truck-mounted unit. A single-engine design reduces fuel and maintenance costs. The water system delivers up to 2,500 psi/10 gpm while the 8-inch positive displacement vacuum system provides airflow of 3,600 cfm/18 inches Hg. **800/837-9711; www.superproductscorp.com.**



(continued)

Extreme weather hydroexcavator

The **Supervac 6400** hydroexcavator from Supervac 2000 has a 3,000-gallon carbon steel debris tank, 6,400 cfm/27 inches Hg vacuum pump, double-wall insulated 1,250-gallon water tank, two cyclones and cartridge filter, 6,000 psi/10 gpm water pump and 26-foot-radius hydraulic boom. Other features include hydraulic door locks, insulated enclosure (less than 85 dBA), recirculation water pump, and 100-foot hose reel capacity. The system is designed to operate in extreme weather conditions. **866/839-5702; www.supervac2000.com.**



Single-compartment tank

The 3,000-gallon single-compartment **tank** with antisurge baffles from Truck Works has 20-inch manways, 20-inch rear cleanouts, primary moisture trap, 3- to 5-inch sight eyes, and full-length hose trays with drains. The tank has a diesel-powered vacuum system using a Masport HXL15WV pump and a 30 hp Kubota engine. Mounted on a roll-off skid undercarriage, it comes with front and rear rollers, front hook, rear platform and tie-downs. **602/233-3713; www.truckworksinc.com.**



High-pressure jetting

US Jetting 3040 high-pressure, high-flow **jetting units** produce 3,000 psi/40 gpm. Higher water pressure enables better root cutting and grease removal in sanitary sewer lines without mechanical cutters. The units clean storm drains up to 24 inches and are available on tandem-axle trailers or can be custom mounted on a truck chassis. Powered by a 99 hp Kubota turbocharged diesel, units are available with 650- or 750-gallon water tanks. Standard units are equipped with 500 feet of 3/4-inch hose mounted on a seven-position swivel reel. Trailer units can be pulled with a 3/4-ton pickup. A wide range of fixed or rotary nozzles is available. **800/538-8464; www.usjetting.com.**



Blasting nozzle

The **Antiblaster** nozzle 3D from USB – Sewer Equipment Corporation is designed for cleaning shallow sewer lines and lines close to homes. Made from tempered stainless steel, the nozzle uses Advanced Optimized 3-D Hydro Mechanics that allow water from a pressurized hose to be smoothly turned around the nozzle chamber and guided into the ceramic nozzle inserts by five axial CNC precision-machined channels, rather than tubes or grooves. The angle of jet incidence reduces the risk of blowing toilets. The unit



delivers a minimum of 30 gpm at a 3/4-inch hose connection and a maximum of 80 gpm at a 1-inch hose connection. The nozzle can be used with recycled water. **866/408-2814; www.usbsec.com.**

Two-engine truck

The **Vac-Con** combination truck features a two-engine design where the chassis engine runs the vacuum and auxiliary engine runs the independent water system. The three-stage centrifugal compressor offers fast loading and power. The automatic vacuum breaker shut-off system increases operator safety and prevents overfilling of the tank.



The Corten steel debris tank is rust- and corrosion-resistant. Hydraulic door locks and grabber allow for easy unloading of liquids and solids. The hydraulic boom rotates up to 270 degrees and telescopes from six to 10 feet. The truck includes a front-mounted control panel or optional Omnibus CAN system. A hydraulically operated front-mounted hose reel provides more maneuverability of the jet-rodding hose. Polyethylene water tanks hold 500 to 1,500 gallons. **888/491-5762; www.vac-con.com.**

Combination sewer cleaner

AllJetVac P Series combination sewer cleaners from Vacall use a positive displacement blower system powered by the chassis engine rather than a second engine, reducing fuel consumption, service time and emissions while holding down cost. Standard aluminum water tanks and optional galvanized debris tanks have 6-, 8-, 10- or 12-cubic-yard capacities; 1,000-, 1,200- and 1,500-gallon water tanks are available. The series has a front-mounted pivoting hose reel and 8-foot 6-inch extending boom with 180-degree rotation. Rear-mounted boom and hose reel design and fan blower models are available. **330/339-2211; www.vacallindustries.com.**



Increased vacuum performance

Designed for cleaning storm lines and sanitary sewers, the **Vactor 2100 Plus** from Vactor Manufacturing features increased vacuum performance and improvements to operator comfort and control, air routing and filtration efficiency, and fuel efficiency. The machine delivers enough power to clean larger storm lines and keep debris out of the ecosystem. An Integrated Smart Truck concept includes internal moni-



toring systems that enable the operator to monitor and troubleshoot flow and pressure, blower temperature and oil level, system idle and open vacuum relief.

The Jet Rodder water pump delivers maximum continuous flow and pressure with minimal wear. The standard multiflow system allows the operator to dial in the most effective pressure for the application while using less fuel. Additional features include an easy-load, fast-dump debris body, Modul-Flex design system, and positive displacement vacuum and fan platforms. **800/627-3171; www.vactor.com.**

Multistage sewer cleaner

The **All/Jet/Vac** combination sewer cleaner from Vacuum Sales offers a multistage vacuum filtration system, reducing maintenance and extending performance. It is available with positive displacement vacuum pumps that deliver 16 to 27 inches Hg.



The water system delivers up to 3,000 psi/50 to 100 gpm. Options include a front-mounted hose reel, telescoping boom, nonrust aluminum tanks, rugged debris body, control panel, decant offload, and customized tail-gate designs. **800/547-7790; www.vacuumsalesinc.com.**

Pressure washer

The skid-style Honda engine-powered hot-water **pressure washer** from Water Cannon is customizable with ratings from 3,000 to 4,200 psi. Completely self-contained with a 15-gallon fuel tank and 12- or 15-volt battery encased in a marine-duty battery box, it requires no external power. The 12-volt unit includes a 20 amp charging system, while the 15-volt model includes a 2,400-watt generator.



Standard with all models is a rugged, low-profile, powder-coated frame designed for versatile installation. Schedule 80 coil heats water immediately using minimal fuel. The pressure washer comes with stainless steel coil wrap, burner hood and Beckett burners. A 3VX belt system with four laser-aligned belts offers balanced power transfer. Accessories include four color-coded spray nozzles and a color-coded chemical nozzle. **800/333-9274; www.watercannon.com.**

Combo units

RAMVAC 2600 and 3600 combination sewer cleaners from Sewer Equipment Co. of America are available as trailer-mounted or hooklift units. Features include 320-degree rotating boom and three-stage cyclonic filtration. The 2600 offers a 1,400 cfm blower mated to a 4-inch hose system and a triplex water pump that delivers 40 gpm/2,000 psi. The 3600 offers a 3,000 cfm blower mated to a 6-inch hose system and a triplex water pump that delivers 40 gpm/2,000 psi. **800/323-1604; www.sewerequipment.com.** ♦

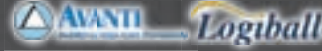


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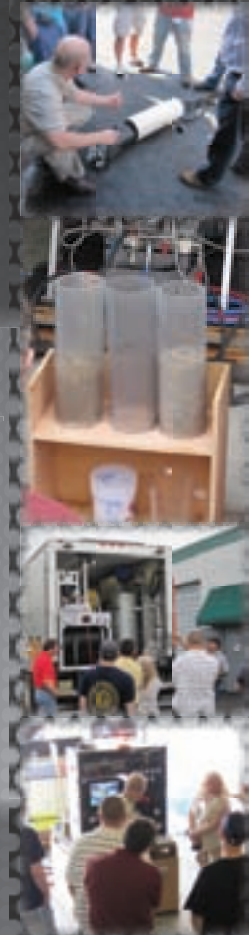
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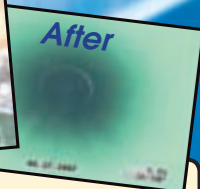
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MSW invites your national, state or local association to post notices and news items in this column. Send contributions to editor@mswmag.com.

CALENDAR

Oct. 4-6

National Rural Water Association H2OXPO, Louisville, Ky. Visit www.nrwa.org.

Oct. 15-19

Water Environment Federation WEFTEC 2011, Los Angeles Convention Center, Los Angeles. Visit www.weftec.org.

Oct. 20-23

American Society of Civil Engineers Annual Civil Engineering Conference, Memphis, Tenn. Visit www.asce.org.

Oct. 23-25

American Water Works Association International Forum on Stormwater Management in Urban Areas, Sherbrooke, Quebec, Canada. Visit www.awwa.org.

Oct. 31-Nov. 3

National Association of Flood and Stormwater Management Agencies Annual Meeting, St. Petersburg, Fla. Visit www.nafsma.org.

Nov. 7-10

American Water Resources Association Annual Water Resources Conference, Hyatt Regency, Albuquerque, N.M. Visit www.awra.org.

Dec. 7-9

Florida Stormwater Association Winter Conference, Hyatt Regency Tampa. Call 888/221-3124 or visit www.florida-stormwater.org.

PEOPLE/AWARDS

The **Chittenden County (Vt.) Regional Stormwater Education Program** received the Green Mountain Water Environment Association Stormwater Award for outstanding performance in education and its contribution to the stormwater field.

The **City of Spokane, Wash.**, received the PISCES Award from the U.S. EPA for successfully demonstrating innovative stormwater control strategies.

The **City of Rockville, Md.**, received the Smart, Green and Growing Sustainable Infrastructure/Innovation in Stormwater Management Award from the Maryland Department of Environment for creating a highly functional stormwater management facility while providing the community with an attractive recreational area.

Washington County, Minn., received an Award of Excellence from the Minnesota Recreation and Park Association for a stormwater project.

The **Florida Stormwater Association** announced these award recipients:

- St. John's County, Stormwater Program Excellence Award
- City of Hallandale Beach, Stormwater Program Outstanding Achievement Award
- Collier County, Stormwater Project Excellence Award
- City of Marathon, Stormwater Project City-Wide Outstanding Achievement Award

LEARNING OPPORTUNITIES

ASCE

The American Society of Civil Engineers has these courses:

- Oct. 13-14 – Pumping Systems Design for Civil Engineers, Charleston, S.C.

- Nov. 3-4 – Stormwater BMPs That Work: Effective Analysis, Design and Maintenance, Atlanta
- Nov. 17-18 – Pumping Systems Design for Civil Engineers, Syracuse, N.Y.
- Dec. 8-9 – Storm Sewer System Design Using SWMM, Nashville. Visit www.asce.org.

APWA

The American Public Works Association is offering these Audio/Web courses:

- Oct. 11 – How to be FEMA Ready When Disaster Hits
 - Oct. 27 – Liquid Usage in Winter Maintenance
 - Nov. 15 – How to Train Your Fleet
- Visit www.apwa.net.

AWWA

The American Water Works Association has a Stormwater Management for Engineers seminar in New Brunswick, N.J., Oct. 5-7. Visit www.awwa.org.

Wisconsin

The Department of Natural Resources is offering the following courses:

- Oct. 11-12 – Water System Operation Basics, Mt. Horeb
 - Oct. 12-15 – Water System Operation Basics, Plover
 - Oct. 19 – Regional Utility Management Training, Prairie du Chien
 - Oct. 20 – Regional Utility Management Training, Eau Claire
 - Oct. 24 – Regional Utility Management Training, Plover
 - Oct. 25 – Regional Utility Management Training, Ladysmith
- Visit www.dnr.state.wi.us.

The University of Wisconsin Department of Engineering-Professional Development is offering the following courses:

- Oct. 3-4 – Essentials of Hydraulics for Civil Engineers and Designers, Madison
- Dec. 5-6 – Municipal Engineering Fundamentals for Non-Engineers, Las Vegas

Visit www.epdweb.engr.wisc.edu. ♦



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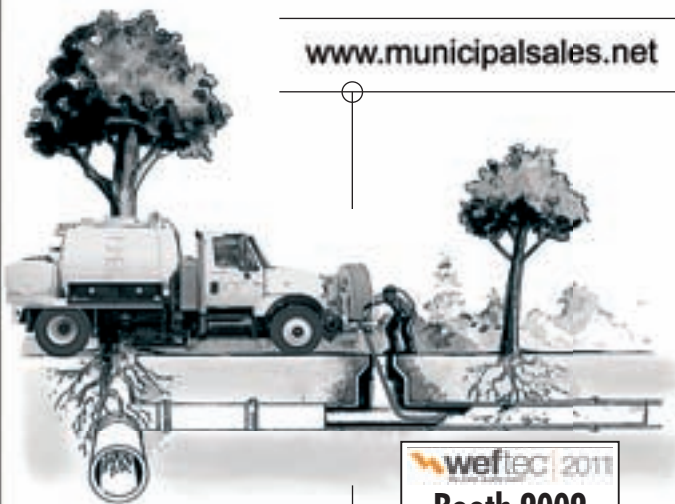
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Gorman-Rupp Names Knudsen Eastern District Manager-Engineered Systems

The Gorman-Rupp Co., Mansfield Division, named Eric Knudsen eastern district manager-engineered systems. He will cover Maine, Vermont, New Hampshire, New York, Massachusetts, Connecticut, Rhode Island, Delaware, Maryland, Pennsylvania, Virginia, West Virginia and North and South Carolina. Based out of Clifton Park, N.Y., Knudsen has 15 years experience in the municipal and industrial pump market.



Eric Knudsen

Wachs Water, Pipeline Inspection & Condition Form Alliance

Wachs Water Services and Pipeline Inspection & Condition Analysis Corp. (PICA) formed an alliance to develop and deploy specialized metallic pipeline inspection technologies through collaborative research and development, manufacturing and marketing.

RS Technik, Inland Pipe Form Licensing Agreement

RS Technik formed a licensing agreement with Inland Pipe Rehabilitation (IPR) for its RS BlueLine pipe rehabilitation system. The agreement gives IPR the rights to repair pressure pipelines throughout North America utilizing the proprietary trenchless system.

Walker Group Adds Two Locations

Walker Group Holdings, manufacturer of transportation tanks and storage vessels, opened Brenner Service Centers in Chicago and Baton Rouge, La.

Larson, Long Join Vanair

Blair Larson has joined Vanair as regional sales manager for the Western Region and Steve Long has joined the company as a service technician. Long brings 20 years experience to his position. Larson has an associate's degree in business from Indiana Wesleyan University and is pursuing his bachelor's degree.

Standex Electronics Publishes Sensor Catalog

The latest product catalog from Standex Electronics features its lineup of standard and custom fluid level, proximity, current and motion sensors. Technologies include magnetic, inductive, conductive and current sensing models in both standard and custom design. The 16-page catalog can be downloaded at www.standexelectronics.com.



Parkson Partners with Biowater

Parkson Corp. and Biowater Technology have formed a partnership that gives Parkson exclusive distribution rights for Biowater's existing and future fixed-film wastewater technologies in North America.

Techspray Adds Chemist, Lab Equipment

Techspray added chemist Lindsey Shehan and new cleaning equipment for benchmark testing, expanding the company's degreasing product research and development capabilities. Shehan, working in the company's Amarillo-based R&D lab, is responsible for tracking regulations, product testing and special projects. She has a bachelor's degree in chemistry from Texas A&M University and is a member of the Surface Mount Technology Association (SMTA).



Lindsey Shehan

Spartan Tool Launches Customer Service Website

Spartan Tool LLC launched a customer service website, www.spartantool.com. The site enables customers to purchase drain cable machines, waterjetters, inspection cameras and trenchless pipe removal systems as well as replacement parts for all products. It also features product videos and product manuals, including multi-language Spanish and French versions.

KEG Relocates to South Carolina

KEG Technologies Inc. moved their office and distribution center to Spartanburg, S.C. The larger facility provides more space for extensive product testing, classroom and video webinars, a repair shop and a live outdoor training area simulating actual pipe conditions. For more information email info@kegtechnologies.net. ♦

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Product Spotlight

Mainline Offers Adapt-a-Valve Lateral Inspection Chamber

By Ed Wodalski

The Adapt-a-Valve Inspection Chamber from Mainline Backflow Products can be used as an inspection chamber, as an extendable backwater valve to protect properties against municipal backsurges, or to pressure-test or isolate sewer laterals using the isolation gate. The body of the inspection chamber has a molded slot designed to accept the optional backwater valve gate or test/isolation gate.

Generally installed at the property line to service sewers and lateral connections, the chamber provides a full view to the bottom of the fitting. In the case of flushing issues or sewer backups, the chamber enables city crews to see the source of the problem without entering the home. "If the chamber is dry, the problem is between the chamber and building," says Gabe Coscarella, company president. "If there's water in the chamber, the blockage is on the city side. It's a way of establishing where the blockage is and who might be liable."

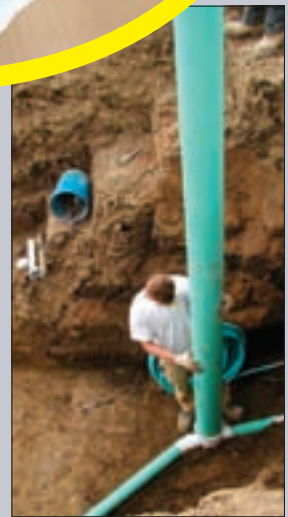
The chamber has an 8-inch riser and directional arrow embossed inside the fitting that can be used for color-coding to make sure there are no cross-connections between storm sewer and sanitary laterals. The larger riser enables crews to use equipment such as jetters or vacuum hoses to clean or flush lines.

The optional removable and re-insertable test/isolation gate attaches to a 3/4-inch pipe that extends up the riser. The gate protects building owners against backups or lets the city shut off service in the case of non-payment. Crews can use the gate to shut off sewers so nothing flows from the building while work is being done, or to isolate laterals when flushing manholes so as not to blow sewage back into the building.

"Basically, it's like a mini manhole, unlike a standard 4-inch property line cleanout that doesn't provide access for cities or protection for property owners," Coscarella says. The inspection chamber connects by way of a gasket to sewer and SDR35 pipe and is constructed to SDR26 specifications. Access to the chamber is provided by an airtight lid that can be color-coded to distinguish sanitary and storm lines, and can be locked to limit access. 877/734-8691; www.backwatervalve.com.



Adapt-a-Valve Inspection Chamber from Mainline Backflow Products



RIDGID Introduces One-Touch Digital Monitor

The one-touch SeeSnake CS-10 digital monitor from RIDGID can record still images and video. It features video and image playback and auto-log recording, which compresses files to help save memory on the USB thumb drive.

The monitor comes with SeeSnake HQ software and DVD burning or uploading to RIDGIDConnect. The 12.1-inch monitor has enhanced daylight readability and comes with an 18-volt lithium-ion battery. 800/769-7743; www.ridgid.com.



Super Products Introduces Mud Dog Hydroexcavator
The Mud Dog 1600 hydroexcavator from Super

Products LLC is designed to meet the excavation challenges inherent in oil field, mining and cold-weather applications. The unit has a 16-cubic-

yard debris body, 1,500-gallon water capacity and rear-mounted boom with 335-degree rotation and the ability to pivot down 25 degrees for eight feet of extra digging and access to hard-to-reach areas. The hydroexcavator delivers up to 18 gpm of water pressure at 3,000 psi in combination with an 8-inch positive displacement vacuum system that provides airflow of 5,800 cfm at 28 inches Hg. Features include single-engine design for lower fuel and maintenance costs and onboard boiler with 714,000 Btu/hour capacity. Winter recirculation, antifreeze and air-purge systems ensure performance in the harshest of climates, while the heated aluminum cabinet offers easy access and increased storage. Other features include a debris body that can tilt two feet for faster offloading and wash downs. 800/837-9711; www.superproductscorp.com.

Oldham Introduces Gas Detection Transmitter

The OLCT 200 fixed gas detection transmitter from Oldham is designed for use with multiple gas detection technologies, including electrochemical, catalytic bead, infrared and photoionization detection



sensors. The unit can simultaneously display two different gases. It can be configured for two-wire and three-wire 4-20 mA analog output, Modbus RTU digital output, HART communication and wireless communication. Optional onboard programmable relays can be configured with either a painted aluminum or stainless steel explosion-proof housing, or a cold climate heater. **800/338-3287; www.oldhamgas.com.**

Standard Equipment Offers Machine Evaluation, Rebuilding

Custom rebuilt jetters, combination sewer cleaners, sewer inspection cameras or any type of sewer maintenance equipment are available from Standard Equipment Co. Standard Equipment uses a two-step evaluation process. Each unit is evaluated in the field. Both body and chassis are inspected and refurbished to one of three levels based on customer specifications. **800/633-2997; www.standardequipment.com.**



Devcon Offers Abrasion Protection

DFense Blok wearing compound from ITW Devcon is an alumina ceramic bead-filled epoxy compound that, when used with DFense Blok Surface Wetting Agent, increases drop impact strength. It can be used in the repair, rebuilding and protection of pipe elbows, scrubbers, ash handling systems, cyclones, fan blades, pump boxes, float cells, screw conveyors, augers and other abrasion applications. Available in 30-pound pails, the product is mixed 2:1 and has a working time of 25 minutes at room temperature. A nonsagging compound, it can be applied by trowel at a thickness of 3/4 inch on vertical surfaces and 1/2 inch on overhead surfaces. It achieves functional cure in 4-5 hours and can withstand temperatures up to 300 degrees F. **800/933-8266; www.devcon.com.**

GapVax Introduces Industrial Vacuum

The XVT industrial vacuum from GapVax Inc. is designed to remove heavy sludges, such as drilling fluid, grease, septic and wastewater. The positive displacement blower can pressure offload up to 14 psi (rated 1,400 cfm and 28 inches Hg). The body is made of 1/4-inch ASTM A-572 Grade 50 steel with a payload option from 80 to 100 barrels and 40-degree dump angle. The filtration system has a 10-micron washable Dacron filter and requires no tools to access. The unit has a full-opening tailgate with dual-lift cylinder and field-adjustable locks for a complete seal. Options include hydroexcavation package, lift axle, integral water tank, safety lighting, storage compartments and heavy-duty rear bumper. **888/442-7829; www.gapvax.com.**



MAX-LIFE Introduces Grit Catcher

The Vac Trap grit catcher from MAX-LIFE Mfg. Corp. features a 6- to 24-inch throat for easier connection to vacuum tubes and a back stop-leg that prevents the device from becoming stuck in a pipe. The grit catcher connects to any combination vacuum cleaner tube. **888/873-6295; www.flexmax.com.**



Serious Thermal Introduces Ground-Thawing Machine

The Serious Toaster ground-thawing machine from Serious Thermal Products Ltd. thaws up to 1.6 inches deep per hour in a 2-foot by 10-foot area. Multiple units can be placed in a series or other configuration to accommodate larger applications. The unit is controlled by a solid-state electronic system and fueled by propane. Delivering 60,000 Btus, it produces no open flame and can be placed next to buildings and utility pedestals. Weighing 345 pounds, the units fit in a standard pickup bed and can be moved by two people. They can operate in temperatures down to -40 degrees F. **403/671-7393; www.seriousstoaster.com.**



Reelcraft Introduces Ultimate-Duty Jetter Reels

Ultimate-duty jetter hose reels from Reelcraft Industries Inc. hold up to 500 feet of 1 1/2-inch-diameter hose. Reels feature a carbon-steel, heavy-duty, fully welded spool and frame with heavy-duty bearings. The design offers the strength of a single piece of metal, superior bearing support and perfect alignment without the need for adjustment. **800/444-3134; www.reelcraft.com.**

Innovative Equipment Introduces Towable Mini-Excavator

TMX Towable Mini-Excavators from Innovative Equipment feature a quick-on and quick-off hitch system and zero-turn technology for access in tight locations. Available in gasoline or diesel models, the excavators can be towed by a 1/2-ton pickup, van or light-duty tow vehicle. No trailer is needed and no CDL license is required. Lockout hubs enable towing at up to 65 mph. Weighing 2,941 pounds, the excavator has an 8-foot digging depth, 6,600-pound digging force and 7-foot, 2-inch loading height with swing radius of 140 degrees. It also has a 72-inch, four-way blade system with 21 degrees of tilt. **715/359-3002; www.tmx-excavator.com.**



(continued)

TRU-Vu Offers Optically Bonded Monitors

Optically bonded monitors from TRU-Vu Monitors are designed for viewing LCD, LED and plasma displays on bright, sunny days. Optical bonding injects a clear, optical-grade resin into the gap between the LCD panel and protective outer glass, filling the air gap between the two and eliminating two reflective surfaces. An antireflective coating is applied to the outside of the protective glass, minimizing surface reflections by 98 percent. It also prevents the monitor's contrast ratio from deteriorating. **847/259-2344; www.tru-vumonitors.com.**



Aries Offers Pathfinder Camera Tractor

The Pathfinder XL inspection camera tractor from Aries Industries features a six-wheel steerable drive system, enabling it to maneuver over virtually any obstruction or offset joint. Tires range from 3 3/8 inches for relined 8-inch pipe to optional 10-inch tires with bolt-on gear-reduction side plates for 36-inch and larger pipe. The tractor also converts from wheeled to tread-track drive. Other features include tip-up connector with integral rear-viewing camera and LED lights, sealed and pressurized electronics cavities, on-screen diagnostics, brushless DC drive motors with temperature sensors and permanently lubricated drive gears. The transporter has a built-in 512 Hz sonde beacon for locating and optional auxiliary light. **800/234-7205; www.ariesindustries.com.**



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Bredel Offers Pumps for Abrasive Materials

Heavy-duty SPX hose pumps from Bredel are made for sludge handling, filter press/centrifuge feed and line and carbon slurries. Advanced hose technologies enable the unit to pump grit-filled sludge.



The pumps are virtually maintenance free with no seals to replace, no valves to clog and no rotors, stators or lobes to wear out. **800/282-8823; www.wmpg.com.**

CAS Introduces Remote Data Logger

The DT85M Series 3 data logger from CAS DataLoggers and dataTaker is designed for remote monitoring. The low-power device has an integrated cellular modem for advanced communication options. Its backlit LCD display shows channel data, alarms and system status, all navigable with the six-button keypad. The remote monitoring equipment has a temperature operating range of -22 degrees to 185 degrees F. The unit has 16 analog input channels, expandable to 320 channels and 960 analog points using optional CEM20 modules, as well as 12 flexible digital channels. **800/956-4437; www.dataloggerinc.com.**



SubSurface Instruments Introduces Magnetic Locator

The ML-3 magnetic locator from SubSurface Instruments Inc. is available in 40- and 55-inch models. Made of aircraft grade aluminum, the locator



is waterproof up to 75 feet. Readings can be heard underwater. The digitally tuned locator has an auto-zero feature that enables the user to cancel or compensate for ambient magnetic or magnetic gradient in soil. **920/347-1788; www.ssilocators.com.** ♦

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LENDING AN EAR

Active listening is the key to a continuous improvement initiative that is streamlining operations for a Nevada city's utility department

By Ken Wysocky

Faced with rapid growth in the last 15 years that sometimes strained internal systems and processes, officials at the Utility Services Department in Henderson, Nev., used a simple tool to achieve smoother, more efficient operations: listening hats.

Armed with input from industry peers and employees at all levels, the department, which manages water and sewer services for a large Las Vegas suburb, has boosted productivity and cut expenses by millions of dollars annually. It all stems from developing and maintaining a culture of continuous improvement that begins with feedback from employees in the trenches.

"I'm a big believer in human capital," says Dennis Porter, director of utility services. "You can develop all the continuous-improvement planning you want, but if employees aren't amenable to it, it makes it that much more difficult. We're blessed with a lot of talented folks.

"Getting people to think differently gets lost in the shuffle sometimes. The folks who have the most knowledge are down in the trenches. It's important to empower them to make changes. Once they know you're empowering them to make decisions about how to run things more effectively, they take it and run with it."

Kathleen Richards, a city public information officer, points out that the best ideas for improving efficiency and productivity usually percolate from the bottom up. "We're unique because we involved our field staff — the guys who are

in the field nine hours a day and have little interaction with management," she says.

"They took that feeling of empowerment back to their peers, which really increased employee buy-in. So many times you see strategic plans created by upper management and forced down to every one else. But the people who are closest to the real work are the ones who can suggest the best improvements."

Peers audit operations

The continuous-improvement initiatives grew out of a higher-level strategic planning effort begun about a decade ago. That plan led to two peer reviews by the American Water Works Association, which sends out a team of industry professionals for a weeklong review of operations. The team then recommends ways to improve.

"It's always good to have a third party look at how you operate," Porter says. "The review is like an operational audit, covering everything from finances to engineering. It's a good program and it's relatively inexpensive — in the neighborhood of \$35,000 to \$40,000."

The review revealed some chinks in the department's operational armor. In field operations, for instance, the review zeroed in on inadequate inventory control — how the department ordered, catalogued and organized parts and materials.

"Before the audit, when a work order would come in, we'd end up spending a lot of time running around for parts — a valve, a gasket or just about anything," Porter says. "So we reorganized our ware-

houses, and now we have a couple of guys in water and wastewater who maintain inventory-control programs. Now when, say, a main breaks, we have the right materials on hand to make repairs.

"We know exactly what parts and pieces we have, and we know when we're running low on inventory. We also know what parts our trucks are carrying. We easily saved tens of thousands of dollars annually, mainly in time. I know it sounds elementary, but we just weren't doing it efficiently. We were too busy just trying to keep up with growth in the city."

Picking brains

Employees were encouraged to suggest and act on improvement ideas. The department is divided into 12 sections, each representing a core business function. At the start of strategic planning,

gestions any time."

Employee ideas paid quick dividends. In one instance, a team of water operators suggested palletizing all materials needed for specific maintenance tasks ahead of time. That way, when a crew is scheduled to perform maintenance on a valve or other device, they have all the tools and replacement parts in one package before going to the job site.

"In some cases, materials are gathered weeks in advance, depending on what kind of work order it is," Porter says. "Before, the system was arguably less efficient. In general, people knew what was in their vehicles, but not like they do now. In addition, we now purchase vehicles that are better designed to manage parts and equipment. They carry shelving and toolboxes, versus throwing everything into the back of the

"When you start that process, everyone is sort of quiet. There's not a lot of feedback because they're not sure what you're trying to accomplish. But once they realize you're looking for feedback, they open up."

Dennis Porter

management met regularly with employees from all the sections, sometimes at 6 a.m. so the people wouldn't fall behind on work.

"When you start that process, everyone is sort of quiet," Porter says. "There's not a lot of feedback because they're not sure what you're trying to accomplish. But once they realize you're looking for feedback, they open up. We still schedule formal quarterly meetings with field operators, although they're free to make sug-

truck the way we did during the old days."

Shift in training

The continuous-improvement mindset extends to training and development. Concerned about a brain drain as Baby Boomers retire in numbers, management needed a structured succession program. The result was a program that gives people with leadership potential a chance to develop management skills and lets them actually walk

in a manager's shoes for a month to see how they like it.

Employees nominated by supervisors attend eight to 10 four-hour classes that cover topics such as understanding personalities and generational differences and dealing with criticism. Classes are held during work hours but are scheduled to minimize work disruption. Classes are limited to 20 employees representing office and field staff.

"The other good thing that comes out of the training is that everyone gets a better understanding of what their fellow employees do," Porter says.

Follow-through

What could other utilities learn from Henderson's experience? For one, be sure to have the time and

resources to act on employee suggestions. "If you don't follow through on things like strategic plans and suggestions for improvements, staff is going to look at you funny," Porter says. "In retrospect, we could have acted on some employee feedback sooner, but we had our hands full at the time and couldn't get things done. It was just a matter of not enough time and resources.

"Even now, we're careful. The way to get buy-in is to communicate results, and have good communication, period. You need to do what you say you're going to do, so don't bite off more than you can chew. We all have a tendency to do that at times, so you need to make sure your plan is realistic and achievable." ♦

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TAKING THE CHALLENGE

Annual Operations Challenge collection systems event now includes working with the NASSCO PACP program

By Ted DeBoda, P.E.



Founded in 1928, the Water Environment Federation (WEF) is a not-for-profit technical and educational organization with 36,000 individual members and 75 member associations representing water-quality professionals around the world. WEF and its member associations, such as the Chesapeake Water Environment Association (CWEA), work together to achieve WEF's mission to preserve and enhance the global water environment.

Part of that mission includes the Operations Challenge, held annually at WEFTEC, the WEF trade show and conference. The Operations Challenge skills competition, being held Oct. 17-18 at WEFTEC in Los Angeles, recognizes excellence and demonstrates the span of skills necessary for today's water-quality profession-

als. The event also exposes participants to emerging practices and products in a competitive, educational, and social atmosphere.

Popular event

Among the five required tasks in the Challenge is a collection systems event where teams repair a length of in-service 8-inch pipe. "The collection systems event is very popular among the competitors and audience because it is fast, has clear objectives, and remains suspenseful until the integrity of the repair is evaluated by a pressure test," says Steve Harrison, WEF project manager. "While the goal is to create a situation that is as realistic as possible, it is important to note that cutting SDR35 pipe with hand saws does not reflect current industry practice."

This year for the first time ever, WEF included the Pipeline Assess-

ment and Certification Program (PACP) content in the event, and PACP training will be available to WEFTEC attendees on Oct. 15 and 16.

"While PACP training is inserted into the event, that doesn't fundamentally alter the tradition of the repair scenario," says Harrison. "Instead, it provides an incentive for participants to obtain a professional credential that introduces them to pipe defect coding, but doesn't require the teams to make a capital investment in any new equipment. The complexity of the PACP content in the event will be increased in future years as the teams become more proficient."

Looking to expand

NASSCO tested the Operations Challenge waters during the New Jersey Water Environment Association Challenge event May

9-10 in Atlantic City. Thirteen teams tested their collection systems skills, including their PACP knowledge.

T.J. Johnson of Delta Systems Environmental is the national coordinator for the Ops Challenge collection systems event. "Including PACP is a win/win situation," he says. "The development of PACP material for use in this event has been beneficial to participants and WEF, since it involves material that is appropriate for collection system operators to know."

NASSCO plans to continue working with WEF in making the PACP portion of the event more realistic and challenging. For example, this year competitors must review photographs of observations made during a pipeline CCTV inspection and accurately describe the observations using PACP methods. In future competitions, we plan to move from descriptions to coding, and to replace still photographs with video.

The Operations Challenge includes the kind of hands-on experience that makes the work we do resonate with professionals in our industry. Another example of real-time experience is the Underground Technology Conference Rehab Zone, which hosts live demonstrations of emerging trenchless technologies. The show is slated for Jan. 24-26 in San Antonio, and sponsors will waive attendance fees for anyone registering for PACP training during the show. For more information on PACP class registration, visit www.nassco.org. ♦

Ted DeBoda is executive director of NASSCO. He can be reached at director@nassco.org. NASSCO is located at 11521 Cronridge Drive, Suite J, Owings Mills, MD 21117

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