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Construction Bulletin

June 18, 2012

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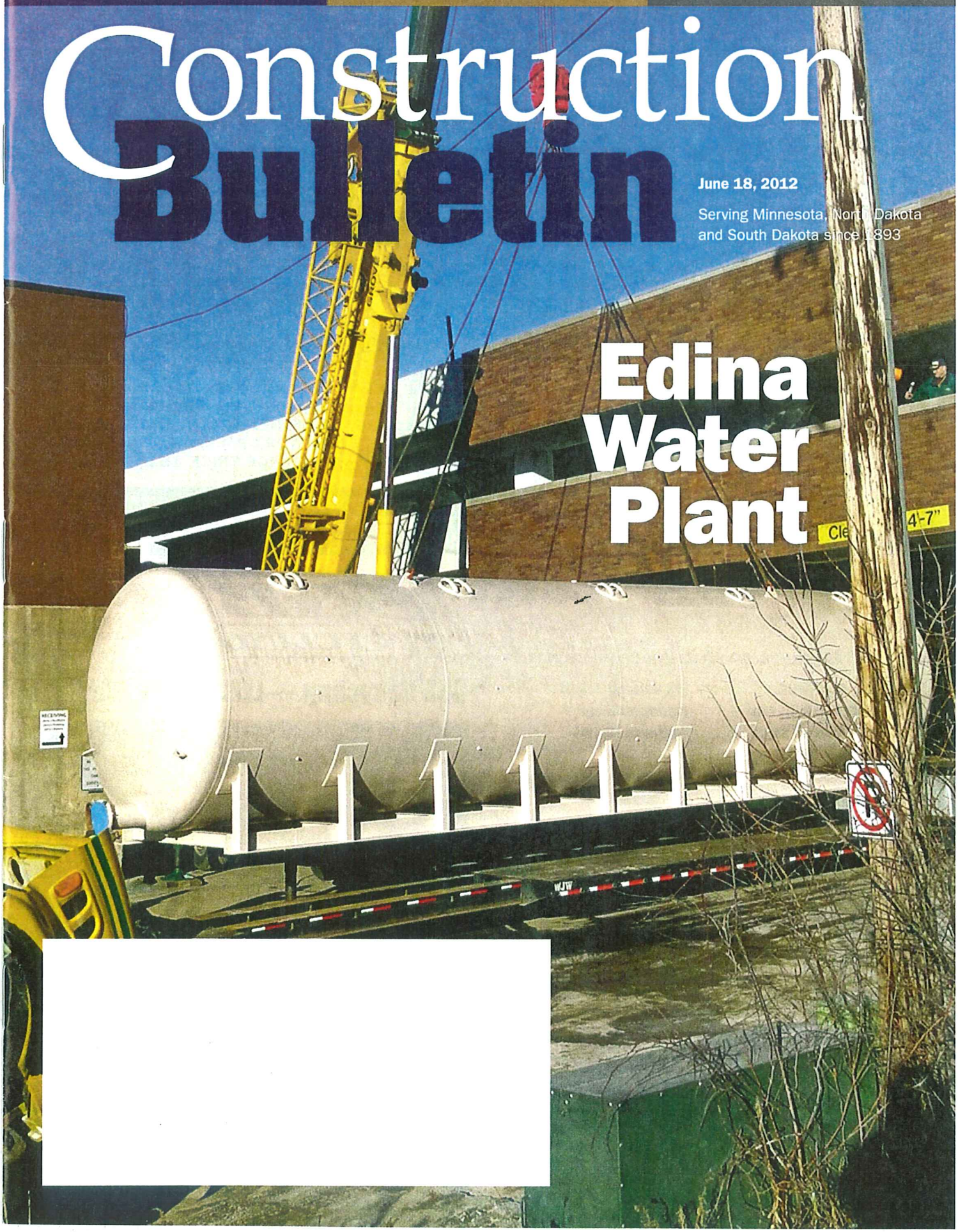

Edina Water Plant

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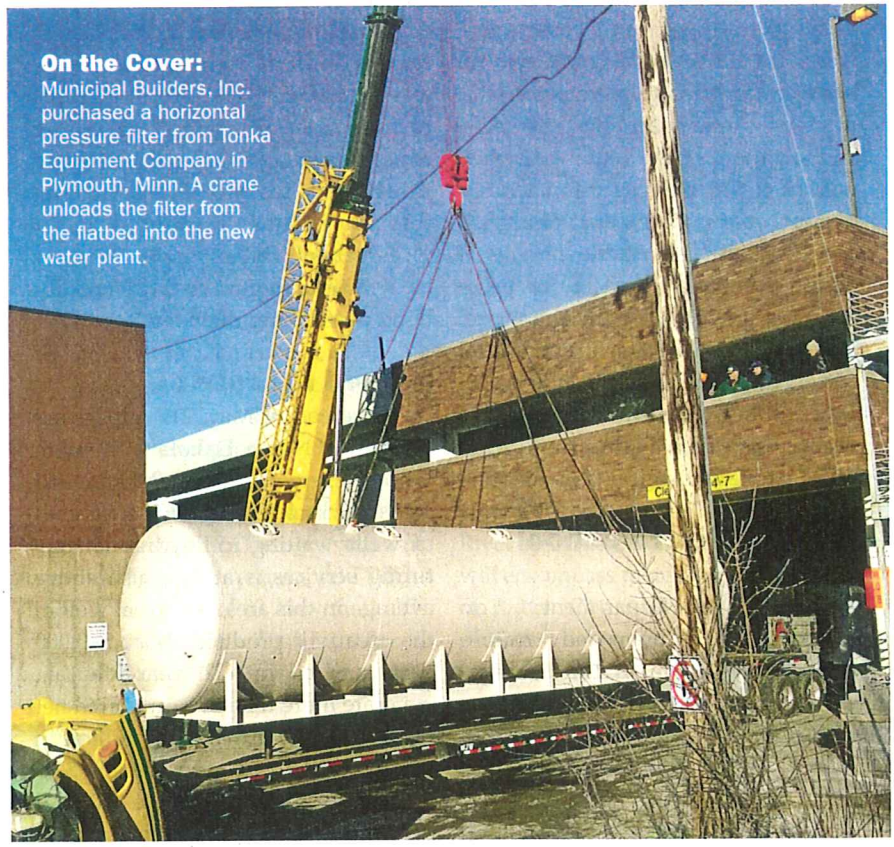


On the Cover: Municipal Builders, Inc. purchased a horizontal pressure filter from Tonka Equipment Company in Plymouth, Minn. A crane unloads the filter from the flatbed into the new water plant.

PHOTO COURTESY OF MUNICIPAL BUILDERS, INC.

features

departments

Water Plant Built In a Garage

A suburb cleared space from a city-owned parking garage to install its latest water plant.

By Ivy Chang

As with many suburbs across the country, Edina, a Minneapolis first-ring suburb, needed a new water plant to replace an aging plant that closed and a plant that is closed temporarily to remove vinyl chloride, a harmful chemical from plastic, in the well. That left four water plants operating that were not enough to serve Edina residents.

The city had extra space in a parking garage where, on the first floor, the police department kept impounded vehicles. Officials decided the site was the right venue for a new water plant with current technology to replace the closed plant and help the second plant to remove vinyl chloride from the water.

City engineers selected AECOM Minneapolis, the local office of an international professional services firm, to provide design and engineering for a water plant. The plant's goal was to improve water quality and have more water within the city that's clean, drinkable and useable, said Chris Sluiter, project manager for Municipal Builders Inc., general contractor to the city. "The chemical levels in Edina's water system are safe and this plant will help improve the quality more."

◀◀ After clearing the garage space, Municipal Builders built Soundblox interior walls for the blower room and high service pump room.

Built in a parking garage

The project began in the existing parking garage, which had shared space with a supermarket and other tenants, in June. After city officials determined logistics for all tenants, Municipal Builders began clearing the space for renovation. Two floors of parking stalls sit above the first level where AECOM designed the space for water plant equipment.

"The existing structure was to remain, we didn't have to demolish anything but the inside had to be redone—block walls, concrete floors and tanks had to be poured within the bottom level," said Sluiter. "All the equipment had to be brought in using no cranes or sky hooks because the plant is at the bottom of the three-floor structure.

"We pushed all supplies through the large doors or holes in the walls. For a new plant, working conditions lacked enough space. We couldn't dig below the existing floors so tanks had to be installed in place and had to be of a certain size. Some tanks weren't too difficult to fit in their spaces, but the larger backwash tanks fit within 18 inches of the ceiling," Sluiter said.

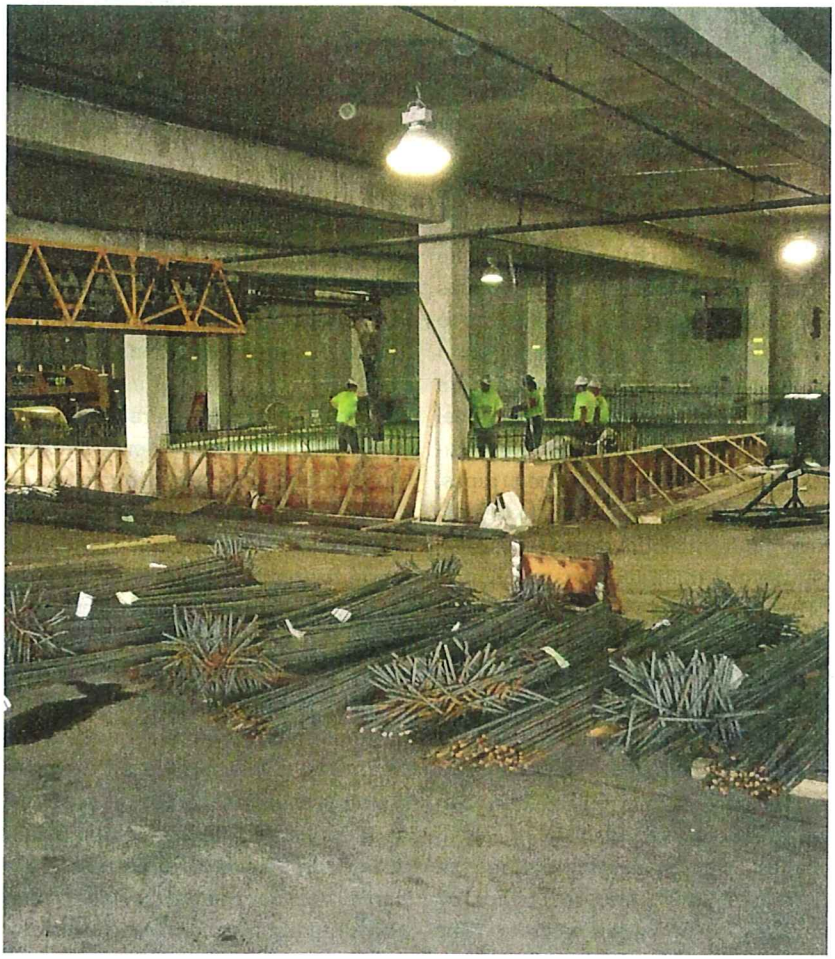
Clearing out space

When the project began, Municipal Builders removed the ceiling and fire retardant materials from the existing space. Walls dividing various rooms were built before purchasing all the equipment that was brought to the plant. Workers moved in various tanks while electrical and plumbing lines were replaced under the floor. About 30 percent of the existing concrete floor was removed, re-poured to higher elevations to match the divided rooms, and replaced in the entrance and large room as part of the new construction to cover electrical and plumbing lines, said Sluiter.

Multiple trades subcontractors worked alongside electricians and plumbers at the same time Municipal Builders installed the backwash tanks on the existing floor in the large room.

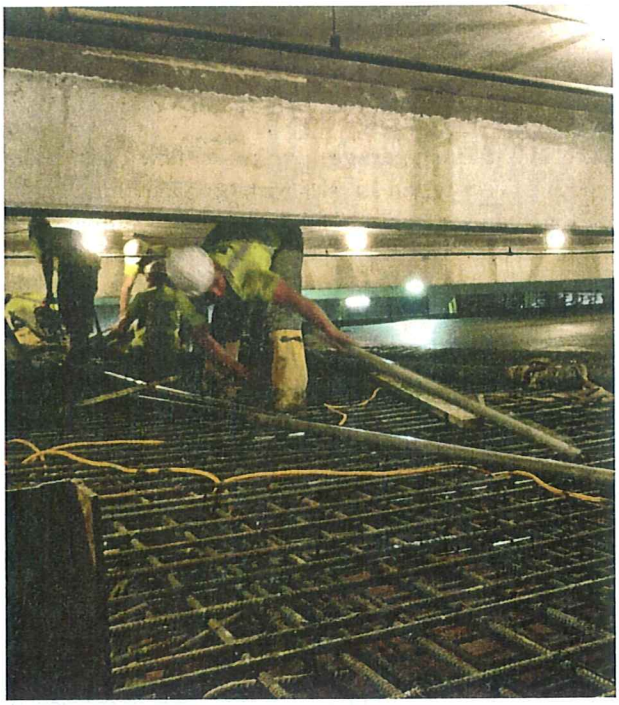
"After the floor was removed by the entrance and we finished installing the backwash tanks, we had to come back and pour the floor so we can put up walls and continue construction," said Sluiter.

"The engineer gave us a set of plans and specs to begin the project, but with this retrofit, design and specs change quickly. We had many design and process changes and the existing plumbing was a big challenge because of the unknown. Floors and rooms change, so many equipment and designs were not at this location before, and we built the rooms according to design," Sluiter emphasized. "The engineers did a good job with the designs; there's a lot of thought as to where everything is placed and to make sure each contractor is steps ahead of the next contractor."



▲▲ Workers poured concrete slabs for the backwash tanks.

Stainless steel strippers with pipes were installed in limited space on a mezzanine level.



Workers built and installed a cover slab for backwash tanks.

Design changes

AECOM did change some of the pipes used to connect various tanks and other mechanical equipment to obtain a better fit. Space on a second level to one side of the large room was designated for the stainless steel air stripper tanks, which were installed first along with their pipes. Municipal Builders used its hydraulic forklifts to raise the tanks to the second level with limited space to work. "The air strippers help to strip vinyl chloride from the water system as water comes in and is an extra step to assure cleaner, useable water. Each stripper weighs about 6,000 pounds," said Sluiter.

The mild winter in 2011 helped work proceed on or ahead of schedule as Municipal Builders moved two filter tanks into the space on January 9 in 50 degree weather. "The filter tanks arrived on site on flatbed trucks, unloaded with a crane outside, set on heavy-duty rollers, then were pulled in with a forklift," Sluiter said. "Workers pushed the rollers through the 16-foot door at the main entrance but the space was tight to get the tanks inside."

Once the tanks entered the main room, Municipal Builders set them on blocks and poured concrete supports under where they were to be installed. "Without having cranes and lifts inside to move the tanks, we placed the tanks in place and poured the supports under the tanks. That work took two weeks," said Sluiter. The empty filter tanks weigh 40,000 pounds each.

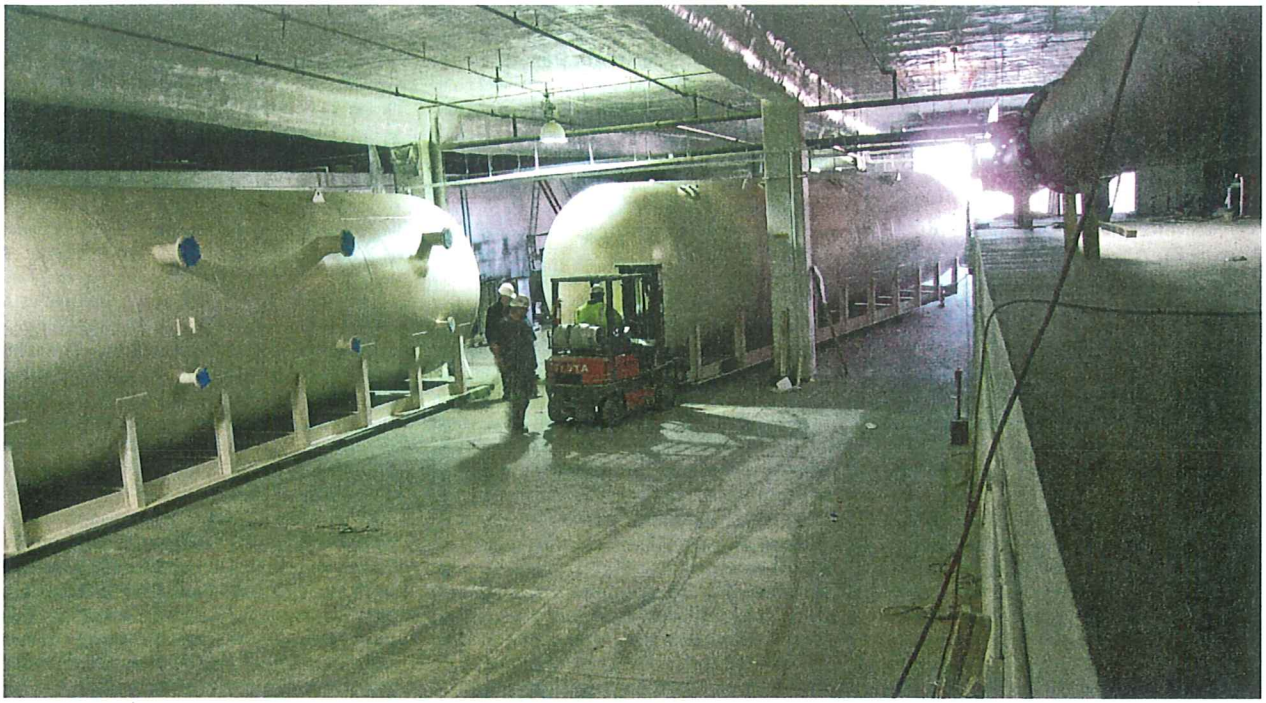
Pumps, motors, pipes

Workers installed pumps and motors in position around the filter tanks and connected the equipment with ductile iron flange pipes to determine placement accuracy. "With flange pipes, the connections have to be within one-eighth inch accuracy or the pipes won't fit. The hot and cold water pipes are made of copper and the chemical tank pipes are made of PVC because of the corrosive nature of PVC when chemicals flow through them," said Sluiter.

In this water plant, all duct work is galvanized except in the chemical room where the ducts are stainless steel to support the caustic environment of chemicals. Municipal Builders' subcontractor used a soundproof material, called Soundblox, to build approximately 2,700 square feet of walls for the pump room and mechanical room to keep noise levels at a minimum.

"Soundblox are regular concrete blocks with insulation inside each block," said Sluiter.

Contractors used larger diameter pipes in most of the plant that had to be ordered as workers were installing them. "We didn't order all



Municipal Builders used a loader to pull the pressure filter tank into position as workers pushed it through the large entrance.

the equipment together; instead we ordered the pieces according to the room in which they were installed or for a specific process line. For example, once the filter tanks were installed, we order the materials based upon field verification, then order the parts at one time," said Sluiter.

New water mains

Contractors installed new polyethylene water main pipes, 16 inches in diameter, for both incoming and outgoing pipes. Incoming water from four different wells containing water from aquifers enters the plant from the street through pipes on the side of the plant.

"After cleaning, water leaves this plant and goes into the city distribution system through connections at the street in front of the plant. From the street, water is flowed to homes in this area. In some municipalities, water flows into a water tower that will determine when to distribute the water. This plant takes water directly to the system," Sluiter explained.

More process pipes are in the water plant than any other equipment. "We've been working on water plants long enough to know what type of materials we need that works and we work with our suppliers to devise the best method of installing all the equipment. Like most pipe systems, the fewer joints within the system, the fewer chances of leaks," Sluiter said.

Connected to computers

When all tanks and pipes are connected and operating, the new system will hook up to existing computers that monitor the water cleaning process with one person working on the computer, if necessary. The Public Works Department can control communications at another remote site, which was updated, to check on the mechanical process from the panel in this plant's control room.

Municipal Builders brought in most of its construction equipment from its office in Andover, about 30 miles northwest of Minneapolis.

"We brought in a small forklift, a hydraulic forklift, mechanical hoists and many hand tools. The only rental equipment was the scissor lift," said Sluiter.

When completed, the water plant handles incoming water through media within the pressure filters, then flows through effluent pipes to the air strippers to remove vinyl chloride before it's dumped by gravity into the clear well. The clear water enters high service pumps that forces water through effluent pipes where post chlorine and fluoride are added before it leaves the plant.

Sluiter said the $5.6-million project will be completed by June 30, 2012, to provide 4,400 gallons of water a minute to residents on the north end of Edina. ■