INFRASTRUCTURE

Pipestoneôs infrastructure is the foundation for the Cityôs future growth and development. The term infrastructure refers to the basic facilities, equipment, and installation needed for the functioning of a City; such facilities would include streets, water, sewer, electricity, gas, etc. (Although streets are a part of the infrastructure, they are addressed in greater detail under the transportation section.) Conformance to high standards of economy and service should be encouraged in every aspect of the infrastructure system whether private or public.

Water System

The original water distribution system in Pipestone was constructed in the late 1880ôs, but was abandoned around 1920 when additional wells and high and low storage tank systems were erected. A Revised Water Supply and Distribution Plan was done in 1998 and can be found at City Hall. The following is a brief description of the existing water system. The system is divided into four categories (supply, storage, treatment, and distribution).

Supply

The water supply in Pipestone is served by a series of four wells varying in depth from 400 to 500 feet. All of the wells in the City have been in use for a number of years. The most recently constructed well was built in 1965.

Well #1 is located inside the water department building on 2nd Street Northeast. It was constructed in 1919 containing a 12ò shallow cased, 500 foot deep well. Water is pumped directly into the ground storage tank at a rate of 370 gallons per minute (gpm). This particular well is controlled by telemetry. It should also be noted that the water department building houses a diesel powered generator that is used when necessary.

Well #2, constructed in 1924, is located approximately 300 feet east of the water department building. The 12ò shallow cased well is 500 feet deep. This well is also controlled by telemetry and has a pumping rate of 341 gpm. The water pumped from well #2 is stored in the ground storage tank.

Well #3 has been abandoned for more than 20 years. It has been properly sealed and presents no environmental threats.

Well #4, constructed in 1938, is located on the north side of Minnesota West Technical and Community College. The station contains a 10ò shallow cased well that is 430 feet deep. The water pumped from this well is controlled manually and enters directly into the system at a rate of 110 gpm.

Well #5 is the most recently drilled well in the City (1965). The structure lies north of the airport, immediately west of T.H. 75. The station has a 12ò deep cased well that drops to a depth of 500 feet. The well is controlled by telemetry and pumps directly into the system at a rate of 341 gpm.

The Minnesota Dept. of Health (MDH) works with local communities to safeguard their public water supply. MDH is in the process of completing Wellhead Protection Plans for the City of Pipestone. When these plans are complete the City should be vigilant in implementing their recommendations for source water protection.

Storage

Currently existing in the City are two elevated storage tanks and one ground storage tank. The three tanks combined have a capacity of 1,250,000 gallons. The oldest of the three tanks is located directly under the abandoned concrete water tower on 2nd Street Northeast. The 500,000 gallon ground storage tank was constructed in 1920. Repairs have been relatively infrequent taking place in 1932, 1957, and 1990.

Adjacent to the hospital, at the intersection of 9th Street and 5th Avenue Southwest, is an elevated storage tank with an ellipsoidal (legged) design. The 250,000 gallon structure was constructed in the mid 1950ôs and has since had the inside of the tank welded and epoxied (1980). The outside of the tank was repainted in 1985.

The newest storage tank is located in the southeastern section of the City, adjacent to the industrial park. The hyra-pillar designed tower, with a capacity of 500,000 gallons, was constructed in 1970. Repairs have since been made in 1981 when the inside was welded and epoxied and the outside spot painted.

Control of the storage system is fairly straightforward. The ground storage tank receives water directly from the wells on demand. High service pumps in the pump station put the water into the system. The hospital and industrial park towers feed and pressurize the system simultaneously. When the water elevation in the towers reach a predetermined level, the sensor, which is connected by telemetry to well #5 and the high service pumps, sends a signal to start the pumps. The high service pumps in the pump station and well #5 then pump simultaneously to refill the towers.

Treatment

The City of Pipestone is fortunate to have access to an adequate, uncontaminated supply of water. At present, the City has no centralized filtration or other treatment or purification plant. However, some rudimentary water treatment is provided at various locations throughout the system. Chlorination and fluoridation are provided at the pump station within the water department building (well #1) and at wells #4 and #5. Also added into the system is orthophosphate (a sequestering agent) at wells #1, #2, and #4.

Distribution

Overall, the water distribution system consists of 34.15 miles (180,300 feet) of water main varying in size from 1.25ò to 12ò. A breakdown of the number of feet per line (Table I-1) shows that the system is characterized by a large number of 4ò mains. This is fairly common for older neighborhoods in most communities. The majority of the pipes are cast iron, with the newer ones (post 1960) being ductile iron, polyvinylchloride (PVC) or asbestos cement (AC). The condition and flow characteristics are virtually unknown, however, the unlined, cast iron pipes are assumed to have poor characteristics and the PVC and AC, fair to good characteristics.

Fire Demand

Water usage for fire demand is also a vital consideration in the design of a water supply and distribution system. Fire demand varies greatly from normal usage in that an extremely large quantity of water is required from a single demand point in a very short time. The quantity of water used for fires is almost negligible when compared to other annual usage categories, but because of the extreme rate of usage during an emergency situation, fire demands frequently govern design.

The Insurance Services Office (ISO) recommends that a system the size of Pipestoneôs be capable of delivering a fire demand of 500 gpm to 3,500 gpm for varying durations, depending on the rate of demand. Recent experience with many commercial and industrial users has shown that 2,000 gpm is usually a sufficient flow rate to operate their sprinkler systems. Residential areas require a flow rate of 500 gpm to 1,500 gpm, dependent upon the housing spacing. Available fire flows were checked at various locations in the system for both the existing system and the saturation design system.

Future Needs

Apart from occasional fire flow shortfalls, the water distribution system in the City of Pipestone is adequate and serves its population well. To insure that the system maintains the quality and efficiency it has in the past, the City should consider some basic recommendations for future use.

As previously stated, the City has been blessed with adequate supply sources. Nevertheless, a good storage system is needed to help buffer the supply system from having to provide for long periods of time during abnormal flows. Secondly, it serves to pressurize the system in an even, constant fashion.

When assessing storage needs, two basic rules of thumb can be used to determine storage adequacy.

1. Minimum storage shall be at least 40 gallons per capita.

2. The municipal water supply should have a minimum water storage capacity equal to the average daily water usage.

It is necessary to maintain these standards in order to provide adequate fire flow demand, stabilize system pressure, and provide emergency storage in case of failures occurring in the municipal wells or during power outages. Currently, the City falls comfortably within these guidelines with no apparent problems.

According to population projections, Pipestone is expected to receive little to no population growth over the next decade. If these estimates are accurate, one would be safe to assume that the water supply and storage will be sufficient for some time to come.

Concerning water distribution, present day standards mandate a minimum of 6ò mains for looped residential system segments, and an 8ò minimum for unlooped mains of any significant length. There are currently areas in the City that are unlooped. These dead end lines should be looped to increase system pressure and overall quality. As growth occurs, it is important that the proper lateral mains be installed and proper trunk service be provided. It would also be beneficial to replace any main under 6ò in diameter to increase water flows. Current regulations do not allow for mains under 6ò to be installed when new lines are added. The overall quality of the system would significantly improve if the smaller mains were upgraded when possible.

The telemetry system was updated in 1992. Recirculating pumps have been installed in both water towers and both water towers were repainted in 2000. When the upgrading of meters is complete, the billing system will be reviewed.

Near Term Improvements (Water System)

Larger mains should be installed in several areas to provide proper fire protection. The following improvements are recommended:

* 12-inch water main along 2nd Street S from 8th Avenue SW to 3rd Avenue SE, up 3rd Avenue SE to 2nd Street NE.

* Interconnections between 4-inch and 8-inch water mains on 2nd Avenue SW.

* 8-inch water mains along the following Streets/Avenues:
  3rd Avenue SE from 2nd Street SE to 4th Street SE
  3rd Street SE from 3rd Avenue SE to 1st Avenue SE
  1st Street SE from 3rd Avenue SE to 4th Avenue SE
  Hiawatha Avenue from 3rd Street SE to 4th Street SE and from 4th Street SE to 8th Avenue SE
  7th Street SE from Hiawatha Avenue to 1st Street SE
  8th Street SW from Hiawatha Avenue to 1st Street SW
  2nd Avenue SW from 9th Street SW to 10th Street SW and
  3rd Street SE from 2nd Avenue SW to 3rd Avenue SW

* The existing 4-inch water mains should be replaced with larger piping whenever possible (where water main breaks occur or street repairs occur).

Ultimate System Improvements

Ultimately (after year 2020) seven (7) wells will be added to provide the maximum day demands for the study area at saturation. Wells will be added to the system as required to meet increasing water demands.

The existing emergency generator at the Booster Station was installed in 1969. This generator is a vital component of the Cityôs water system. The generator currently is in excellent operating condition and should be reconditioned or replaced if operation of the generator becomes questionable.

No additional storage will be required; however, the 0.5 MG tower in the Industrial Park will need painting within the next decade.

Several additional areas in the existing distribution system need to have the existing 4-inch water mains replaced with larger water mains to provide sufficient fire protection.

Sanitary Sewer

Pipestoneôs original sewer collection system was constructed in the 1940ôs and expanded upon to the present system. Today, the system consists of approximately 350 manholes and 32 miles (168,960 feet) of mains ranging in size from 6ò to 36ò. Sanitary sewer service is generally available to all parts of the City, however, there are a few remaining structures that continue to use septic tanks on the outskirts of the community. Sanitary sewer lines range in depth from 3 feet to over 20 feet with an average depth of approximately 9 feet. The older lines are constructed of vitrified clay, new lines of PVC plastic.

Five primary lift stations currently serve the City of Pipestone. Two stations are located in the northwest area; one to serve the Pipestone National Monument area, and a second to serve residential homes in the DeVries Addition. Two stations are also located in the northeast area; one to serve the Technical College area, and a second to serve the northeastern part of the City. A fifth lift station is used to serve the industrial park area. The following descriptions provide a more detailed description of the existing lift stations in Pipestone.

Main Lift Station

One main lift station exists in Pipestone. The building, located in the northwestern section of the City on 2nd Street NW, was constructed in 1989. The structure houses 3, two-speed pumps (Fairbanks Morse). Also, there exists a diesel powered, standby generator. The main lift station receives effluent from all existing lines in the City. At this point, the sewage is pumped through force main lines to the storage ponds located west of the City.

Primary Lift Stations

DeVries Lift was constructed in 1977. The station is powered by two, 5 H.P. Hydro-matic pumps. No significant repairs have taken place since construction. Monument Lift was

constructed in 1973. This facility uses two, 3 H.P. ABS pumps. New pumps and a control panel are planned for construction in the spring of 1991. The construction date of North Hiawatha Lift is unknown, however, two, 5 H.P. Flygt pumps replaced the existing pumps in 1980. This site is in need of a new control panel and should be considered in the near future. The construction date of 4th Street NE Lift is unknown. Two, 10 H.P. Flygt pumps were installed in 1987, along with a consolidated electric control panel. Industrial Park Lift Station was construction in 1968. The lift pump was rebuilt in 1998.

Secondary Lift Stations

There are two secondary lift stations in Pipestone. One is located at the Brady residence on 4th Avenue NW on the 300 block. The station consists of one, 1/2 H.P. pump. Construction date is unknown. A second station is located at S & S Truck Repair on East Highway 30. The station consists of one, 1/2 H.P. pump. The facility was constructed in 1988.

Sewage Ponds

Prior to August 1989, the Cityôs sewage was treated by a sewage treatment plant located on the west side of the City. The facility has since been replaced by a sewage pond system. The effluent from the entire collection system is directed toward the main lift station where force main lines then advance the sewage to the four pond system located along Highway 30, approximately 1 1/4 miles west of the City. The system is regulated by controlling the amount of sewage flowing into the delegated pond or ponds. By controlling the water flow between the ponds, the sewage water is able to naturally ñpurifyò itself, at which point, it is emptied into Pipestone Creek.

Infiltration/Inflow

Infiltration/Inflow exists to some degree in all sanitary sewer systems. Infiltration is a result of either groundwater entering the sanitary sewer system through leaking pipes and manholes or rainfall percolating through the ground and entering the sewer system through sumps, foundation drains, and poorly constructed service connections.

Infiltration/Inflow can have a number of effects on a sewer system. Grit can be carried into the system, dilution can hinder treatment, and overloading can damage process equipment. Extensive inflow can quickly exceed the capacity of the sewer system causing backup of wastewater in basements. Infiltration/inflow should be a concern to the City of Pipestone. Elimination of excess infiltration/inflow in addition to saving tax dollars, can lower power costs, eliminate excessive grit from the system, reduce the threat of basement flooding, and eliminate the need for bypassing.

An effective way to test for infiltration/inflow is by introducing smoke into the system. If any leaks are present within the test area, the smoke will seep through, thus exposing the flawed areas. The City used this process for the first time in 1985 and found it to be highly beneficial. It would be in the best interest of the City to continue a regular maintenance schedule for smoke testing in order to identify problems before they have a chance to mushroom.

As mentioned previously, there are a few structures located at various sites on the outskirts of the community that operate on individual septic systems. It should be noted that future regulations concerning septic systems are currently being revised at all levels of the government in order to protect the environment; particularly protection from ground water contamination. In an effort to comply with the foreseen regulations, the City should consider expanding sanitary sewer service to include these structures.

Storm Sewer Collection System

The storm sewer collection system is an important utility and should not be neglected in the planning of the community. Poor or improper storm drainage not only results in flood damage, but is a critical determinant of the quality of the neighborhood. Those neighborhoods without adequate drainage will eventually develop irregular overgrown ditches, eroded sideslopes, and streets usually in need of repair due to excess moisture beneath the road surface.

Pipestoneôs storm drainage system serves nearly the entire City. The system is comprised of a network of lines varying in size from 8ò to 36ò in diameter. The majority of the water collected in the drainage system is deposited into a drainage ditch on the west end of the City. Drainage ditches in the northeast and southeast sections of the City are used as well. There are approximately 130 manholes in the storm sewer system. Manholes in older parts of town are constructed of mortar and brick, while newer manholes are of precast concrete.

The storm sewer system has, for the most part, served the City adequately. Nonetheless, there are areas that periodically flood during heavy rainfalls. The primary area of concern, however, is at the intersection of the Burlington Northern Santa Fe tracks and Highway 30. The roadway leading under the railroad bridge is naturally low, which during heavy rainfall, causes the area to act as a natural collection point for water runoff. To handle the large volumes of water drained from this area, a 24ò line was installed. This, however, has not alleviated the problem. When reviewing the storm sewer collection map, one can see the 24ò line running east to west from the intersection of Highway 30 and the Burlington Northern Santa Fe tracks. This same 24ò line is connected with two, 12ò lines serving a portion of the southwestern section of the City. The water collected in this area then flows into the 20ò line located at the five and six hundred blocks on 4th Avenue SW. The 20ò line is unable to adequately handle the higher amounts of water entering from the 24ò line. Inevitably, the water is backed up and flooding occurs. To better control the flooding in this area, the 20ò sewer line should be upgraded to a 24ò or 36ò line. This would enable the higher volumes of water to pass through the pipes, thus creating less backup and flooding.

Flooding has also occurred during various occasions near the intersection of Highway 30 and 7th Avenue SW. The majority of runoff from the southwestern section of the City flows into the 24ò line at this intersection. Similar to the previous case, the size of the line is not large enough to adequately handle the amount of water that flows from the area. Flooding in this area could be most easily eliminated by increasing the size of the 24ò line along 7th Avenue SW to either 36ò

or 48ò. The larger pipe line would enable more water to flow than before, thus eliminating flooding and backup from occurring as it has previously.

There are other areas in the City, that during times of extremely heavy rainfall, have experienced basement flooding and water levels above the street gutters. However, such instances occur rather infrequently and for the most part, require no special attention.

Apart from the aforementioned cases, the overall storm sewer collection system is in relatively good condition and shows no pressing need for improvements. Nevertheless, the City should maintain high standards and plan for future expansion of the storm sewer as new development occurs. Such planned action will help prevent many unforeseen problems that may normally occur in areas not served by a storm sewer collection system.

Gas and Electric Utilities

The City of Pipestone is served by one natural gas company, Counterpoint Energy/Minnegasco, and two electric companies, Xcel Energy (formerly Northern States Power Co) and the Sioux Valley Energy Co-op. The rural electric cooperative, however, only provides service to small portion of the City.

The majority of the City is served by gas lines that are two inches or less in size. The largest line is 6 inches in size and runs along County Road 15 with two extensions; one on 5th Street SW and another on 2nd Street SW. Four inch lines are located at the north and south ends of the City, extending to the Technical College and Industrial Park.

The larger electrical distribution lines (115kv and 69kv) are located in the north sections of the City and serve the substation only. The 4kv lines are proportionately placed throughout the City. The majority of Pipestone, however, is served by 1-1/2kv lines.

The gas and electric systems in Pipestone are both served by private service providers. At present, the City has adequate service and is in no immediate need for significant improvements, repairs, and or expansion. As private utilities, the companies will be expected to provide acceptable service to the City and individual customers alike. It would be in their best interests to maintain high standards and address problems as needs arise.

INFRASTRUCTURE

Goal

It is the goal of the City of Pipestone to provide all residents with a quality living environment through the adequate supply and maintenance of the Cityôs infrastructure and services.

Strategies

- maximize the efficient provision of community-wide facilities and services in a cost-effective manner
- locate facilities and distribute services in an equitable manner, providing access to all residents
- encourage the development of facilities and services meeting the needs of present and future residents, including all age groups and special populations (elderly, handicapped, etc.)
- improve and maintain the availability of municipal water and sewer services to meet the needs of residents, business, and industry
- facilitate the efficient utilization of existing sewer and water lines; and discourage the extension thereof, into areas where assessments could not be levied or would have to be deferred for an extended period of time
- cooperate with energy providers in maintaining adequate and reliable sources of energy to meet present and future demands
- the City should encourage extending public utilities only to areas contiguous to the existing system as opposed to leap-frog extensions
- the adequacy and costs of public services should be considered and evaluated in every case where rezoning proposals or conditional use permits are being reviewed
- encourage the City to work with private utility agencies to provide underground service