

Section 10: Water/Wastewater

The Water/Wastewater Element of the McKinney Comprehensive Plan provides for a link between the 2004 Comprehensive Plan and the approved Water Distribution System Master Plan developed by Alan Plummer Associates, Inc. and the approved Wastewater Collection System Master Plan.

In conjunction with the 2012-2013 Impact Fee Update process, the Water Distribution System Master Plan and Wastewater Collection System Master Plan were updated in 2013 by Birkhoff, Hendricks, & Carter, LLP. Future updates of these plans are anticipated as growth continues and conditions change.

The future land use plan provides the projections of land uses and population on which the water and wastewater master plans are based. The master plans use this information to model the utility infrastructure needs for the community at various levels of development. This modeling determines the type, amount and size of improvements needed to provide water and sewer, including cost estimates for Capital Improvements Plan (CIP) projects, for the City of McKinney as it develops.

10.1 Land Use And Population Methodology

In order to determine the ultimate type, amount and size of improvements, the water and wastewater master plans present plans for the water distribution and wastewater collection systems to serve the City of McKinney at build-out. The build-out condition is determined using a combination of existing development, existing zoning and future land use designations.

In addition to providing for adequate water and wastewater systems at build-out, it is important to examine the systems at intervals to ensure adequate utility systems during the short-term, high growth period, and to make modifications needed due to changing conditions that arise as the City continues to grow. Population projections for these intervals were produced from projections of singlefamily and multi-family housing units.

It is critical that the City anticipate long term facility needs in order to properly size utility improvements. By requiring the construction of ultimate sized water and wastewater lines, the City is providing the necessary city services that are critical to public health, safety and welfare, and that allow for continued development.

10.2 Water Distribution System Master Plan

The Water Distribution System Master Plan presents a plan for the development of the water distribution system to serve the City of McKinney at build-out conditions. The City's proposed ultimate water distribution service area consists of approximately 75,016 acres or 117 square miles. The planning area includes McKinney's existing city limits and ETJ, the Town of New Hope and a portion of the City of Weston. The ultimate water distribution service area will include these areas outside the ultimate city limits of McKinney because, due to their location, the provision of water is easier for the City of McKinney than for an outside provider.

The City's existing Certificate of Convenience and Necessity (CCN) service area does not extend to the projected ultimate city limits. Water service outside the City's CCN service area is currently provided by North Collin Water Supply Corporation

In order to determine the ultimate type, amount, and size of improvements, the water and wastewater master plans present plans for the water distribution and wastewater collection systems to serve the City of McKinney at build-out.

in future north/northeast McKinney, Danville Water Supply Corporation (acquired by the City of McKinney in October 2011) in future northwest McKinney and Milligan Water Supply Corporation in future southeast McKinney. If and when the City desires to expand its water system within its current or future city limits, but outside its current CCN, negotiations would be required with the water supply corporation to adjust the CCN boundaries.

Objectives of the Water Distribution System Master Plan

- Development of a water distribution system capable of supplying the City of McKinney at build-out.
- Development of planning and budget level construction costs associated with the prescribed short and long-range actions necessary through a 10-year CIP and Impact Fee Program.

Analysis and design of the proposed water distribution system is based on the maximum water demand anticipated and the distribution of that demand according to the projected future land use in McKinney.

Projected Water Use

The design of the water distribution system is based on various rates of water use, which are generally referred to as water demand. Water demand rates are generally expressed in million gallons per day (MGD). The three water demand rates most used are defined as follows:

- Maximum Daily Demand: This is the total amount of water used during the day of heaviest consumption in any given year. The high service pumps must be capable of pumping at least this amount of water, and water must be supplied to the pumps at this rate.
- Maximum Hourly Demand: This is the amount of water drawn from the system during the period of maximum water usage on the day of maximum demand. This rate is generally of a short duration, no more than a couple of hours, and is most economically provided for by the use of elevated storage in addition to water supplied to the system by pumps. The distribution system, including storage and pumping capacity, must be able to satisfy this demand.
- Minimum Hourly Demand: This is the rate that water is drawn from the distribution system during the hour of minimum demand on the day of maximum demand. This demand rate is used in the water distribution analysis to determine the adequacies of the system to replenish elevated storage. In other words, after the water distribution system has used up its stored water supply for the peak usage period, how well does it replenish the water stored in elevated and ground storage tanks?

To a great degree, the projected water usage is a function of demand. This demand is expressed in number of gallons consumed per capita per day. Metroplex cities can range from less than 150 gallons per day to nearly 325 gallons per person per day average. Various areas in McKinney reflect this regional trend, with some areas showing 125 gallons and other areas showing consumption of 270 gallons per person per day.

Analysis and design of the proposed water distribution system is based on the maximum water demand anticipated and the distribution of that demand according to the projected future land use in McKinney. Specifics on the water distribution system are found in the Water Distribution System Master Plan.

Water Conservation

According to the 2011 Texas State Water Plan for Region C, the population is projected to increase 94% by 2060, and municipal water demand is projected to increase 89% by 2060. Even with the projected water savings from conservation, the water supply from existing sources is projected to meet only 43% of the projected water demand. The population of the City of McKinney is projected to increase by over 170% during the same period, and Collin County as a whole is experiencing similar growth. To address this situation, the North Texas Municipal Water District is taking steps to provide for future water demand.

The City of McKinney adopted the North Texas Municipal Water District's Model Water Conservation Plan in 2004 and as amended in 2014 that works to:

- Reduce water consumption from the levels that would prevail without conservation efforts.
- Reduce the loss and waste of water.
- Improve efficiency in the use of water.
- Encourage efficient outdoor water use.
- Document the level of recycling and reuse in the water supply.
- Extend the life of current water supplies by reducing the rate of growth in demand.

The following strategies have been implemented to further reduce per capita water usage.

- Increased education: By educating the citizens and business owners of McKinney on water conservation methods, a reduction in the amount of water used can be realized. This education takes place in the schools, through the use of public advertising on billboards, on the City's cable channel or through direct mailings.
- Increased regulation of landscape irrigation to reduce wasteful watering practices: Property owners are only allowed to irrigate landscapes twice per week, between the hours of 6 pm and 10 am, and between the months of April 1 through October 31. All irrigation systems are required to have evapotranspiration (ET) smart controllers with rain and freeze sensors and are required to pass an inspection.
- Adjust water bill rate structure: McKinney has adopted a multiple tier rate system, which means heavy users of water pay higher rates.

More work can be done to reduce the per capita water usage, including, but not limited to the following measures:

- Require use of well-adapted and/or native shrubs, trees and grass: The use of drought-tolerant and heat-tolerant plants will reduce the need for constant watering.

*The population of the
City of McKinney is
projected to increase by
over 170% by the year
2060, and Collin
County as a whole is
experiencing similar
growth.*

10.3 Wastewater Collection System Master Plan

The Wastewater Collection System Master Plan identifies and prioritizes improvements required to accommodate the projected growth of the City of McKinney. The wastewater collection system includes all the pipes and pump stations necessary to collect and transmit domestic, commercial and industrial wastewater for treatment. Wastewater from the City of McKinney flows through two existing large diameter sewer interceptors to the Wilson Creek Regional Wastewater Treatment Plant, a

regional wastewater treatment plant operated by the North Texas Municipal Water District (NTMWD).

Objectives of the Wastewater Collection System Master Plan

The Wastewater Collection System Master Plan has three objectives. These are:

- Development of a systematic and comprehensive plan for future development and growth.
- Development of planning and budget level construction costs associated with the prescribed short and long-range actions necessary through a CIP and Impact Fee Program.
- Provide a quantitative condition assessment utilizing temporary and permanent wastewater flow meters with respect to infiltration and inflow. Infiltration and inflow is water that enters the wastewater collection system through pipe joints, manhole walls, defective pipes and manhole covers.

As with the Water

Distribution System Master

Plan, the population projec-

tions within the planning

areas are an important ele-

ment in the analysis of the

wastewater collection sys-

tem. These projections are

based on the future land use

plan module diagram, and

include projections for 2012,

2022 and build-out.

As with the Water Distribution System Master Plan, the population projections within the planning areas are an important element in the analysis of the wastewater collection system. These projections are based on the future land use plan module diagram, and include projections for 2012, 2022 and build-out.

The Texas Commission on Environmental Quality (TCEQ) requires that municipal wastewater collection systems be designed for the peak two-hour flow.

A key component in developing the wastewater collection system master plan is analyzing the flow throughout the wastewater system. Both historical and current wastewater flows in the City of McKinney must be analyzed to accurately evaluate the collection system. The various flow data gathered aids in calibrating and verifying the computer model that is used to assess the adequacy of the existing collection system and then size the future system.

Inflow and infiltration (I/I) is a significant source in identifying a deteriorating or faulty wastewater collection system. To better characterize inflow and infiltration, it can be stated that inflow occurs during and immediately after a rainfall event and infiltration occurs after an event and tends to sustain itself for a longer period of time depending upon the condition of the wastewater collection system. While a majority of wastewater systems are designed to handle some excess inflow and infiltration, the primary goal of any municipality should be to eliminate I/I to the best of their ability.