

CHAPTER 18: ENVIRONMENTAL QUALITY

Protecting and enhancing environmental quality is a critical livability issue. How the City chooses to grow and develop can significantly affect the quality and sustainability of our environment – in both positive and negative ways.

Tarrant County is located in the Cross Timbers and Prairies ecological area of Texas. Historically the area was open prairie with scattered post oak and live oak stands. Much of this original landcover has been lost to development that has not always resulted in the most desirable outcomes for the city. However, improved strategies and techniques for accommodating future growth and development—many described throughout this Comprehensive Plan—can work together to build more desirable and sustainable neighborhoods, ensure robust economic opportunity, and create long-term value for current and future citizens.

This chapter is intended to consolidate the many environmental challenges and opportunities facing the City, and to identify the management practices that will most effectively address these issues. The topics covered in this chapter include sustainable development; air quality; water quality and water supply; wastewater; storm water quality and quantity (drainage); endangered species; energy conservation; and natural habitats; brownfields; and solid waste.

EXISTING CONDITIONS AND TRENDS

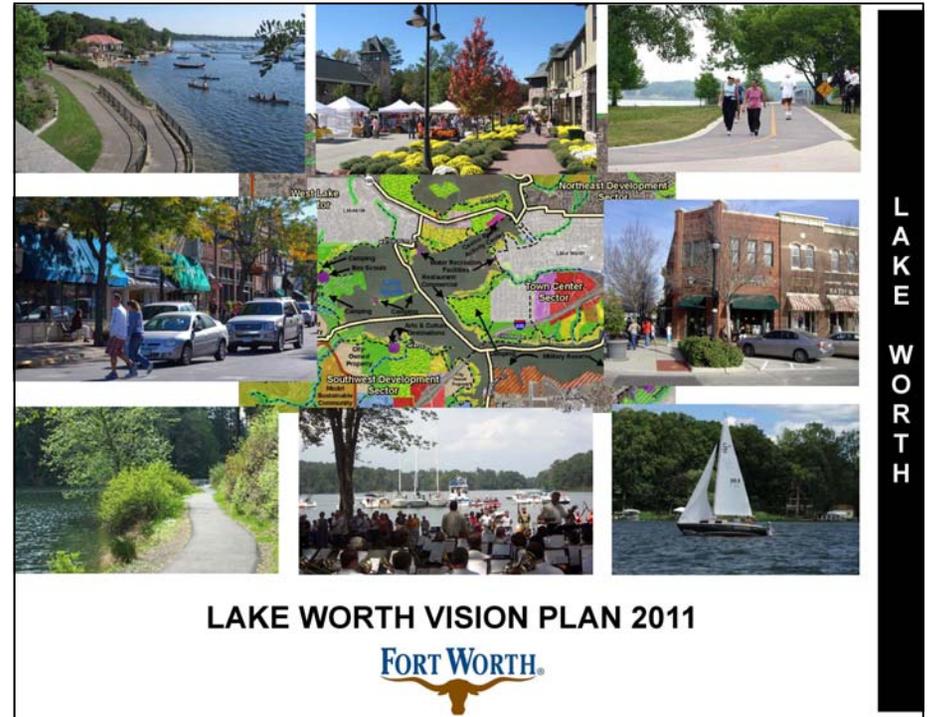
To effectively plan for the future, the City must know its current status. By assessing current environmental conditions, a baseline can be established against which the importance and impact of future decisions can be measured.

Sustainable Development

In recent years, a new, more integrated approach to economic growth, community development, and environmental planning has emerged — sustainable development. Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs. This approach promotes development characterized by more efficient resource use and energy consumption, and reduced negative environmental impacts. As population increases and land and resources become more scarce and expensive, building towards a sustainable future becomes ever more important. Recognizing their responsibility for promoting sustainable growth, community competitiveness, and enhanced livability within their own jurisdictions, many cities now have instituted programs to address these issues. Some include incentives to use native and adapted vegetation to reduce water consumption, using more energy-efficient building designs to lower the demand on power sources, and using construction materials that are reusable or created from recycled material.

As the nation's fastest growing large city, Fort Worth faces the challenge of providing adequate infrastructure and resources for that growing population — all while maintaining or improving quality of life for current and future residents. City leaders are working to address these growing pains by ensuring that Fort Worth infrastructure and developments are sustainable — reducing impacts on resources

Lake Worth Vision Plan



The Lake Worth Vision Plan promotes sustainable development practices throughout the Lake Worth watershed, including conservation of riparian buffers; protection of water quality through better management of floodplain and supporting open space; and development of Low-Impact sustainable neighborhoods and mixed-use town centers. The plan was adopted by the City Council in 2011. (Source: Planning and Development Department, 2011.)

from a project's construction to the end of its useful life. Building smarter and planning effectively can reduce traffic congestion, increase available open space, improve access to public transportation, make city streets more pedestrian- and bike-friendly, ensure adequate water resources, and reduce energy consumption.

The City of Fort Worth established a Sustainability Task Force to implement a comprehensive Sustainability Action Plan for the City. In 2010, a resolution adopting the Sustainability Task Force's recommendations was adopted by the City Council. This Action Plan improves coordination of environmental, development, and energy-related policies and actions within local government and at a community scale. Involved stakeholders include the Fort Worth Transportation Authority, area universities, school districts, and public utility partners. The Sustainability Action Plan provides a road map for improving sustainable development practices implementing more efficient city operations, and educating residents, employees, and businesses on effective measures to reduce waste, control costs, and improve environmental and livability outcomes.

In November 2008, a Lake Worth Vision Workshop was organized by the City as an opportunity for stakeholders to express their vision for the future of a crucial drinking water supply reservoir-Lake Worth-and its surrounding area. The workshop engaged a consultant panel with expertise in master planning, waterfront development, sustainable design, watershed management, and conservation planning. The panel's recommendations promote sustainable development practices throughout the Lake Worth watershed, including conservation of riparian buffers; protection of water quality through better management of floodplain and supporting open space; and development of Low-Impact sustainable neighborhoods and mixed-use town centers. The resulting Lake Worth Vision Plan was adopted by the City Council in 2011.

Energy Conservation

Since 1970, Texas has nearly doubled both its population and its annual energy consumption. Texas ranks second in population, behind California, but according to the U.S. Department of Energy, Energy Information Administration, in 2009 Texas ranked first among states in electricity consumption. In 2008, Texas ranked first in consumption of electricity, petroleum, natural gas, and coal according to the Department of Energy. Texans used 11.9 quadrillion Btu (Quads) or 11.5 percent of all U.S. energy consumption.

Although Texas' total annual energy consumption per capita has dropped from its 1980 peak of 636.6 million British thermal units (M-Btu) to 579.01M-Btu in 2000, residential consumption has shown a steady rise. In 1960, each Texan was using 38.32M-Btu in their homes annually, but by 2000 that usage had nearly doubled to 74.59M-Btu annually. By contrast, California's per capita residential energy usage in 2000 was 43.02M-Btu.

Most electricity is still generated using fossil fuels (coal and natural gas), and the Texas Commission on Environmental Quality (TCEQ) has identified the electric industry as a major stationary source of air pollution in the state. See the following section on Air Quality for more on the effects and sources of such air pollution.

Urban Heat Island Strategies



Green roof with herb and vegetable garden at the Omni Hotel, Fort Worth. The garden provides fresh produce to the Hotel's Cast Iron restaurant.

In Downtown Fort Worth, the recently-constructed Omni Hotel has a green roof in three areas totaling more than one acre. Drainage from the planting beds runs to area drains hidden under the soil and pavers. (Source: *Planning and Development Department, 2011.*)

Botanical Research Institute of Texas



The Botanical Research Institute of Texas (BRIT) recently moved into their new facility located on the grounds of the Fort Worth Botanic Gardens. The facility will seek the first LEED Platinum rating in Tarrant County and has also been selected as a pilot project for the Sustainable Sites Initiative, an interdisciplinary effort of the American Society of Landscape Architects, the Lady Bird Johnson Wildflower Center and the United States Botanic Garden. The living roof has been designed to reintroduce plants native to the Fort Worth prairie back into the urban setting. In addition to its living roof, the BRIT facility also features solar panels, geothermal heating and cooling, and a variety of sustainable stormwater management techniques (Source: *Planning and Development Department, 2011.*)

A phenomenon called the “urban heat island effect” is another contributing factor to the formation of air pollution and the high level of electricity consumption. In the summer, urbanized areas can be up to 10° F warmer than the surrounding countryside. The displacement of trees and shrubs by roadways, parking lots, and buildings eliminates the cooling effects of shade and evapotranspiration. Evapotranspiration occurs when plants secrete or transpire water through their leaves. The water draws heat as it evaporates, cooling the air in the process. According to the Lawrence Berkeley National Laboratory, a single mature and properly watered tree with a crown diameter of 30 feet can evapotranspire up to 40 gallons of water in a day, removing a n amount of heat equivalent to that produced in four hours by a small electric space heater.

Although plants cool the air, buildings and roads often increase ambient air temperature. Typical building and paving materials are quite efficient at absorbing solar radiation rather than reflecting it back into the atmosphere, causing both surface and ambient air temperature to rise, leading to increased ozone formation. The darker the material is, the greater these increases in temperature. In the sun, black surfaces can become up to 70°F hotter than the most reflective white surfaces. If the surface is a roof, the absorbed heat also increases the structure’s indoor temperature, increasing the demand for electricity to cool the structure to a comfortable level.

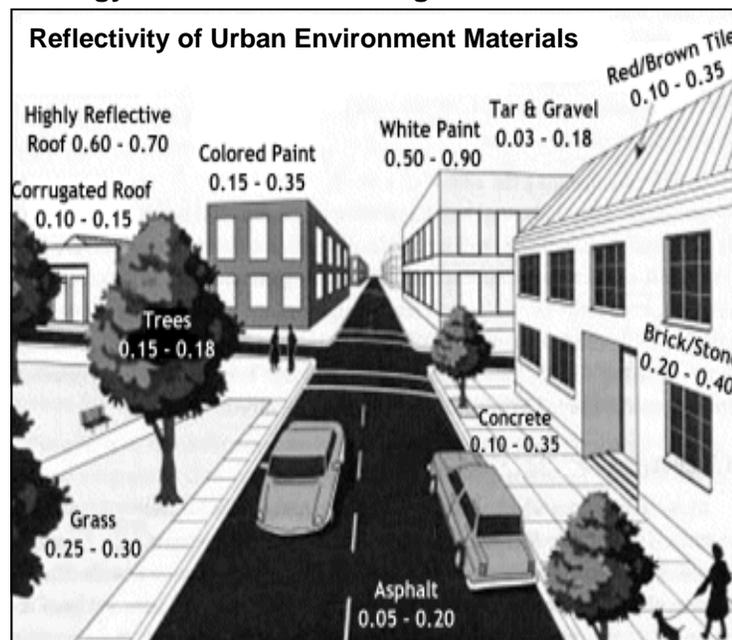
The resulting trend increases demand on power plants, increasing emissions and leading to increased pollution levels. Ultimately, heat islands reduce a city’s livability by decreasing urban ventilation and increasing the risk of heat-related illness. Urban heat islands have some far-reaching effects as well. NASA scientists at the Goddard Space Flight Center have recently confirmed that urban heat islands cause destabilization of the atmosphere, leading to greatly increased rainfall in areas downwind of large cities. The City’s conservation initiatives work to reduce these urban heat island effects and improve our overall environmental quality.

In 2001, the Texas Legislature adopted energy efficiency performance standards to encourage the construction of more energy efficient buildings. The Legislature stated that an effective building energy code is essential to “reducing the air pollutant emissions that are affecting the health of residents of this state; moderating future peak electric power demand; assuring the reliability of the electrical power grid; and controlling energy costs for residents and businesses in this state.” Municipalities were mandated to administer and enforce these codes within their jurisdictions. The City adopted these codes, with amendments, in December 2001, as the Fort Worth Energy Code, and charged the City’s Building Official with their enforcement.

To achieve further energy efficiency in the residential, commercial, and industrial construction sectors, the State Energy Conservation Office determined in 2010 that the 2009 International Residential Code and the International Energy Conservation Code would achieve greater results and adopted these codes. The City of Fort Worth adopted the 2009 International Energy Conservation Code and International Residential Code in 2011.

Another initiative adopted by the Legislature is known as Texas Senate Bill 5 (SB5), the Texas Emission Reduction Plan (TERP). The legislation requires ambitious,

Energy Conservation Through Choice of Materials



Reflective (or high albedo) and emissive roofs bounce incoming solar radiation back into the atmosphere, reducing heat transfer through the building envelope. This effectively cools building interiors, reducing electricity demand for air conditioning. Light colored paving materials also reflect solar radiation and reduce surface and ambient air temperatures. (Source: U.S. Environmental Protection Agency, 2009.)

fundamental changes in energy use to help the state comply with the Federal Clean Air Act. The bill contains new energy efficiency measures that are designed to decrease energy consumption. These energy efficiency measures are intended to assist in reducing air emissions from electricity generation plants. SB5 adds Chapter 388 to the Texas Health and Safety Code. These provisions require political subdivisions in non-attainment areas to institute the following:

- Implement energy efficiency measures that are deemed cost-effective.
- Establish a goal to reduce electricity consumption by five percent each year for a five-year period beginning in January 2002, as measured against the baseline year of 2001.
- Annually report to the State their efforts and progress at meeting the requirements under Section 388.005.

In 2007, the 80th Texas Legislature passed Senate Bill 12 (SB 12), which extended the timeline set in SB5 to meet annual energy consumption reduction goals. The SB12 legislation requires jurisdictions to establish a goal to make the five percent reductions in electricity consumption each year for six years, effective September 1, 2007.

As required by SB5 and SB12, the City currently implements cost-effective energy efficiency measures and annually reports its progress to the State Energy Conservation Office (SECO). Moreover, the City of Fort Worth is committed to reducing electricity consumption, both as a cost control measure and a contribution to improving air quality and public health.

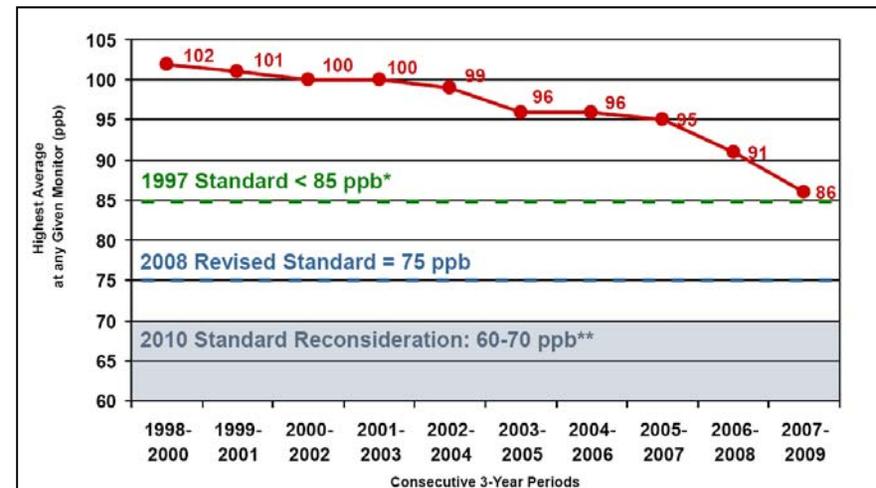
Air Quality

Air pollution is a problem facing most major metropolitan areas. In the Metroplex, the primary form of air pollution is ground level ozone. The American Lung Association (ALA) State of the Air: 2011 Report ranked Dallas/Fort Worth as the 12th most ozone-polluted metropolitan area in the country. It was the ninth consecutive year that the ALA gave the region a grade of “F” for ozone air quality. However, the report also shows an improving trend with 21.5 fewer air pollution days than in 1996.

Ozone is a colorless, odorless gas that is present both in the upper atmosphere and at ground level. The ozone that is present in the upper atmosphere protects the earth from harmful ultraviolet radiation. Ozone that is present at ground level is the chief component of smog. Ground level ozone is formed when pollutants react chemically in the presence of sunlight. Ground level ozone can affect health in a number of ways, including irritation of the respiratory system, reduction of lung function, aggravation of asthma, and inflammation or damage to the lining of the lungs. In addition to causing health problems by damaging lungs, ground-level ozone is responsible for \$1-2 billion in reduced crop production in the United States each year, as well as hastening the deterioration of electronic devices and materials such as rubber, plastics, outdoor paints, photographic papers, and fabrics.

There are two major pollutants that cause the formation of ground level ozone: volatile organic compounds (VOCs) and nitrogen oxides (NOx). Estimates projected

2009 Ozone Season Update 8-Hour Ozone Historical Trends



According to the US EPA National Ambient Air Quality Standards, attainment is reached when, at each monitor, the three-year average of the annual fourth-highest daily maximum 8-hour average ozone concentration is less than 85 ppb. (Source: NCTCOG, 2010.)

Care for Cowtown Air



Care for Cowtown Air is a program administered by the City of Fort Worth Transportation and Public Works Department. The program helps to improve air quality by offering incentives to City employees who participate in ozone-reducing activities during the season of ozone concern, May through October. Ozone-reducing activities include bringing a lunch to work, walking to work or to lunch, or commuting to work by bus, bike, or carpool. (Source: TPW—Environmental Services Division, 2011.)

from implementation of federal, state, and local emission reduction initiatives show that in North Central Texas in 2009, eleven percent of these pollutants came from area sources (including landfills, wild fires, unpaved roads, solvent use, and product storage); fifteen percent of these pollutants came from point sources (industrial and non-industrial stationary equipment or processes); 27 percent from non-road mobile sources (including aircraft, trains, lawn and garden equipment, and construction equipment); and 46 percent from on-road sources (vehicles).

In 1998, the U.S. Environmental Protection Agency (EPA) classified the counties of Collin, Dallas, Denton and Tarrant as an area of serious non-attainment under the federal one-hour ozone standard. As part of that designation, pollution levels in the area were not to exceed the federal one-hour ozone standard more than three days during any three-year monitoring period. EPA also required the four-county area to prepare and implement a State Implementation Plan (SIP), which included initiatives to help reduce ozone-forming emissions in the future. In the monitoring period from 1997 to 1999, the region exceeded the federal one-hour standard 26 times, which could have caused the EPA to downgrade the region to severe non-attainment.

However, on April 15, 2004, EPA made its final designation for an eight-hour ozone non-attainment area comprising Collin, Dallas, Denton, Tarrant, Ellis, Johnson, Kaufman, Parker, and Rockwall counties. The nine-county designation became effective on June 15, 2004. EPA created the eight-hour ozone standard in July 1997, based on information demonstrating that the one-hour standard was inadequate for protecting public health. Ozone can affect human health at lower levels, and over longer exposure times than one hour. The eight-hour standard is much more difficult to attain. Under the one-hour standard, any hourly average of 125 parts per billion (ppb) or higher of ozone at any regional air monitor is an exceedance. Under the eight-hour standard, any eight-hour average of 85 ppb or higher of ozone is an exceedance. In 2006, the nine-county region exceeded the eight-hour standard 31 times compared to 44 times in 2005.

With the eight-hour designation, the Dallas-Fort Worth (DFW) region's classification level changed from serious to moderate. The Clean Air Act specifies that the maximum period for attainment for a moderate area is six years from the effective date of designation, which gave the DFW region an attainment date of June 15, 2010. The region's classification had been high because of the failure to meet the one-hour standard in the past. The DFW region is now classified at a lower level based on the difference between the one-hour and eight-hour standard definitions and also on eight-hour ozone design values.

In 2007, the North Central Texas Council of Governments' (NCTCOG) Regional Transportation Council adopted Mobility 2030, the Metropolitan Transportation Plan. This plan focuses on improving transportation conditions through sustainable initiatives. Further, it is committed to ensuring that the region's transportation efforts are consistent with its air quality objectives by supporting local initiatives for town centers, mixed use growth centers, transit-oriented development, infill/brownfield development, and pedestrian-oriented streetscape projects. It has objectives to complement rail investments with investments in park-and-ride, bicycle, and pedestrian facilities, and to reduce the growth in vehicle miles traveled per person.



An important component of the State Implementation Plan (SIP) is AirCheck Texas, the Motor Vehicle Emission Inspection and Maintenance Program that went into effect on May 1, 2002, in Collin, Dallas, Denton, and Tarrant counties. (Source: *Environmental Management Department, 2009.*)



An "Air Pollution Watch" will be issued for a day predicted to be a public health risk. TCEQ issues an "Air Pollution Warning" if air pollution actually reaches unhealthy levels based on monitor readings. Ozone levels are represented by various colors in the warnings to easily convey the severity of air pollution. For example, purple indicates a very unhealthy level of ozone, while orange indicates that levels are unhealthy for sensitive groups. (Source: *Environmental Management Department, 2009.*)

Implementation of Mobility 2030 could significantly reduce VOC and NOx emissions in the region. More information on traffic congestion and transportation improvements can be found in Chapter 11: Transportation. The development of pedestrian and transit-oriented mixed-use growth centers described in Chapter 4: Land Use is consistent with Mobility 2030. Mobility 2035, an update to the Mobility 2030 plan is completed but pending federal approval. The Mobility 2035 plan retains the sustainable development initiatives of the 2030 plan, while acknowledging a reduced level of federal and state funding available for transportation projects.

In response to citizen concerns regarding the effect of urban natural gas drilling in the Barnett Shale (a natural gas bearing geologic formation beneath Fort Worth and surrounding areas), the City of Fort Worth hired a consultant in 2010 to perform a Fort Worth Air Quality Study. The study was intended to quantify the volume and mass of emissions from natural gas operations during all phases of natural gas drilling, production, and pipeline operations, and to assess air quality impacts to the community. Of particular interest were Hazardous Air Pollutants including benzene, and ozone precursors. Questions to be answered included:

- What quantity of emissions is coming off of the sites on a volume and mass basis?
- Do the sites comply with applicable regulatory limits?
- What effect do these emissions have on ambient air quality at the fence line?
- Are the City's setbacks for wells, tanks and compressors adequate to protect public health?

The study area was limited to the City of Fort Worth corporate boundaries. The final report was submitted to the City on July 15, 2011.

Gas Wells

The Barnett Shale formation is a large natural gas reserve that stretches underground across a 17-county area. It contains an estimated 30 trillion cubic feet of natural gas and is located approximately 1.5 miles below the surface. In recent years, advances in drilling technology have made it possible for energy companies to extract large amounts of natural gas from the Barnett Shale. Almost 2,000 gas wells are currently permitted within the Fort Worth city limits.

The drilling and production of gas wells within Fort Worth is regulated primarily by the Texas Railroad Commission and the City's Gas Drilling Ordinance (#18449-02-2009, as updated). The state and City regulations are intended to protect the health, safety, and general welfare of the public. These regulations minimize the potential negative impact to surface property and mineral rights owners, protect the quality of the environment, and encourage the orderly production of available mineral resources. Additionally, the City's regulations govern notice requirements, well setbacks, noise levels, delivery hours, truck traffic, fencing, landscaping, and technical regulations in conformance with the Railroad Commission rules.

The City's gas drilling ordinance allows gas wells to be located in any zoning district in the city through a permitting process. The regulations require that all gas wells be

Gas Wells



There are nearly 2,000 gas wells within the Fort Worth city limits. (Source: Planning and Development Department, 2011.)



Typical storage tanks associated with gas wells. (Source: Planning and Development Department, 2011.)

located greater than 600 feet from any protected use, including churches, schools, residences, public buildings, hospitals, and public parks. A waiver of these regulations can be granted by the City Council or by all protected use property owners within 600 feet of the well. Gas well sites may be located on City-owned property, including public parks, only with the consent of the City Council.

Water Quality and Supply

The Water Department provides retail water service to the citizens and businesses of Fort Worth. In 2010, there were approximately 228,400 retail water accounts. The City also provides wholesale water service to 30 customers, which are generally neighboring municipalities or water supply entities located adjacent to Fort Worth. Water usage by wholesale customers generally accounts for approximately 30% of total water usage. In 2005, the City completed a Water Master Plan, which developed a plan to meet retail and wholesale supply and distribution needs through 2025. The City is anticipating an update to the existing Water Master Plan by 2015.

Fort Worth's raw water supply is provided by the Tarrant Regional Water District (TRWD) under a long-term contract, subject to availability and capacity of the TRWD system. Water sources include the West Fork of the Trinity River (Lake Worth, Eagle Mountain Lake and Lake Bridgeport), the Clear Fork of the Trinity River (through releases from Lake Benbrook), Richland Chambers Reservoir, and Cedar Creek Reservoir. Presently, TRWD has an adequate raw water supply for Fort Worth beyond the horizon of 2020, assuming identified capital projects, such as the Cedar Creek wetlands filtration project, are constructed. The total current water treatment capability of the Fort Worth water system is approximately 485 million gallons per day (MGD). The historical peak day demand, which occurred in 2006, was 350 MGD. The projected average-day demand for the year 2020 is 310 MGD, with the maximum-day demand for the year 2020 presently projected to be 629 MGD.

There are currently four Fort Worth potable water treatment facilities: North Holly, South Holly, Rolling Hills, and Eagle Mountain Water Treatment Plants. In 2003, the City completed upgrades to the North and South Holly and Rolling Hills water treatment plants, which provided additional capacity and improved water quality. In addition, the City has recently completed the expansion of the Eagle Mountain Water Treatment Plant, which increased the total capacity from 70 MGD to 105 MGD. Construction of a fifth plant, the Westside water treatment plant, is under construction and is planned to be completed by the spring of 2012. The initial capacity of the Westside plant is 12 MGD, and the ultimate capacity for the future is 35 MGD.

The Water Department has invested significant capital to incorporate ozone at Eagle Mountain and Rolling Hills Water treatment Plants, with North and South Holly being the only plants not using ozone for primary disinfection and taste and odor control. To address taste and odor control at North and South Holly, construction of ozone treatment facilities has started at North and South Holly treatment plants. The project is anticipated to be completed by the fall of 2012.

The City has also taken steps to help ensure the security of Fort Worth's water supply

Village Creek Wastewater Treatment Plant



The City is implementing more sustainable practices at the Village Creek Wastewater Treatment Plant, including reclaiming treated wastewater for reuse, generating electric power on-site for plant operations using methane gas byproducts as fuel, and updating building systems and processes to be more energy efficient. (Source: Water Department, 2009.)

by completing a vulnerability assessment study in 2003 and constructing numerous security related projects identified within the vulnerability assessment.

The City has also initiated several water conservation efforts that include the SmartFlush Toilet Retrofit Program, which provides free ultra-high efficiency toilets for qualifying residential and commercial customers. The newest conservation initiative is SmartWater Audits. These comprehensive water use audits for industrial, commercial, and institutional customers evaluate facility-wide water use and identify opportunities for greater water efficiency. Also, the Water Department developed a reuse water program for non-domestic uses, including but not limited to: industrial uses, irrigation of golf courses, cemeteries, playing fields, parks, and nonresidential landscaped areas. As part of this plan, the Water Department secured funds from the American Recovery and Reinvestment Act (ARRA) to design and construct a series of water lines and a pump station to distribute reuse water in the eastern portion of the City. With a capacity of 12 MGD, this system will serve DFW Airport and the cities of Arlington and Euless.

In addition to providing potable water to citizens and businesses, the City provides a system for wastewater collection and treatment. In 1999, the City completed a Wastewater Master Plan to address the needs of the city as it continues to grow. Currently, the City is updating the 1999 Wastewater Master Plan. Anticipated completion date for the new plan is summer 2011.

Currently, the City provides service to 211,883 wastewater accounts generally located within the city limits. The City also provides wholesale service to 23 wastewater customers outside the city limits. Fort Worth uses three major wastewater treatment plants, which provide 98 percent of the wastewater service:

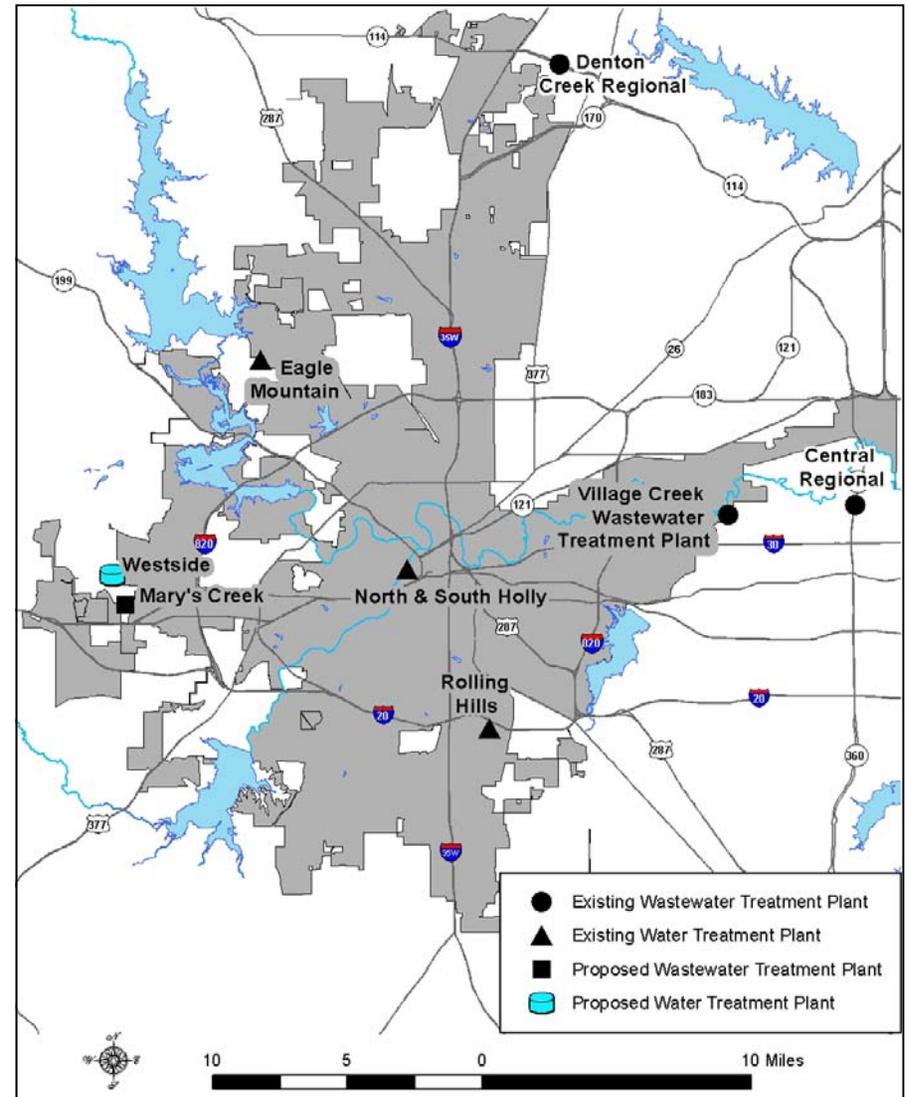
- Village Creek Wastewater Treatment Plant, (owned and operated by the City of Fort Worth).
- Denton Creek Regional Wastewater System, (owned and operated by the Trinity River Authority, TRA).
- Central Regional Wastewater System, (owned and operated by the TRA).

Wastewater is treated by these plants to meet stringent water quality standards contained in federal and state permits, and then discharged to the Trinity River and its tributaries. In 2003, the City completed rehabilitation and capacity improvement projects in the wastewater collection system to eliminate sanitary sewer overflows and backups. To promote better water quality for our environment, the City added and will continue to add projects to upgrade and improve the existing sanitary sewer system.

The Texas Commission on Environmental Quality has taken a stronger stance on sanitary sewer overflows and will be fining utilities that, in its determination, are not responding to the infrastructure needs of their collection system. To promote better water quality for our environment, the City plans to aggressively reduce existing sanitary sewer overflows by committing in excess of \$200 million over ten years.

The City is implementing more sustainable practices at the Village Creek Wastewater Treatment Plant, including generating electric power on-site for plant operations,

Water Treatment and Wastewater Treatment Facilities



The City of Fort Worth uses four plants to treat raw water to meet federal and state drinking water standards before it is delivered into the distribution system. The majority of wastewater generated within Fort Worth is treated at the Village Creek wastewater treatment plant, with the remainder treated at Denton Creek and Central Regional Wastewater Treatment Plants. (Source: Environmental Management Department, 2009.)

using methane gas byproducts as fuel, updating building systems and processes to be more energy efficient, and reclaiming treated wastewater for reuse. The Water Department has developed an \$85 million capital plan to be implemented over the next 15 years to develop a water reuse program for the area. Water reuse, developed in response to depleting water resources, uses wastewater that has been treated to an acceptable standard for non-domestic use, such as irrigation of golf courses, cemeteries, playing fields, parks, and nonresidential landscaped areas.

Storm Water Management

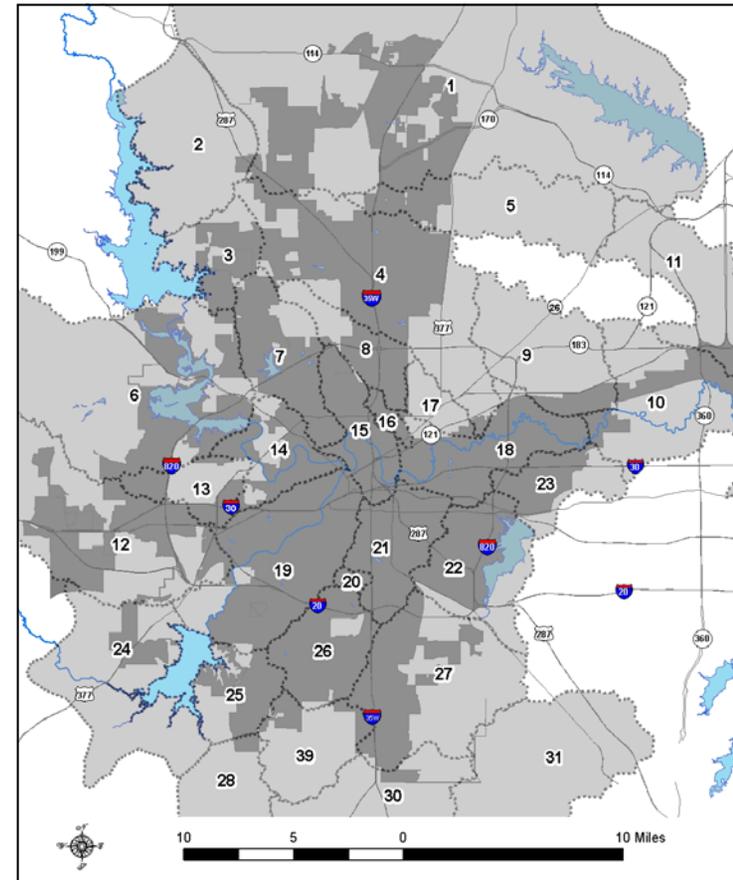
A problem facing many urbanized areas is the effect of storm water runoff in transporting nonpoint source pollution. Nonpoint source pollution is created when water runs over land and picks up sediment, debris, and other pollutants along the way, eventually depositing this material into lakes, rivers, and streams. Because urbanized areas have a high percentage of impervious surfaces, water has fewer places to infiltrate the soil and it is quickly channeled into water bodies, along with the pollutants it picks up.

In December 1996, the City was issued a National Pollutant Discharge Elimination System (NPDES) permit by the U.S. Environmental Protection Agency (EPA) to discharge from the City's municipal separate storm water sewer system into waters of the United States. This permit was renewed in 2006 by the Texas Commission on Environmental Quality (TCEQ) as a Texas Pollution Discharge Elimination System (TPDES) permit. A major provision of this permit was the minimization of nonpoint source pollution in areas of new development and significant redevelopment, and the City developed planning procedures to address these issues.

In addition to preventing pollutants from entering storm water runoff, the City is concerned with improving existing drainage and preventing future flooding and erosion associated with development. Storm water runoff is not subject to man-made boundaries like neighborhoods, council districts, or sectors. What happens in one part of the city can affect other areas downstream. For this reason, issues pertaining to storm water and drainage must be addressed on a watershed basis. This is particularly important since Fort Worth has grown substantially within the last 20 years and continued growth is expected over the next 20 years.

In November 2002, 55 local governments kicked off a regional effort to more effectively manage storm water impacts through the *integrated* Storm Water Management (iSWM) program. The iSWM initiative, coordinated by NCTCOG, will help the region achieve environmental goals, foster partnerships with state & federal agencies, and provide guidelines for comprehensive storm water management. The iSWM design manual was released by NCTCOG in January 2006. In March 2006, the City of Fort Worth adopted the iSWM manual, together with a Local Criteria section, as the 2006 Fort Worth *Storm Water Management Design Manual*. This manual provides the most current storm water management techniques that are applicable to site planning and construction. Extensive future capital improvement projects, however, will be required to bring the numerous existing undersized storm drain systems and open channels up to current standards. To upgrade these deficient drainage systems, the Fort Worth City Council adopted a Storm Water Utility in

Watershed Boundaries



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|------------------------------------|------------------------------------|--------------------------|
| 1. Grapevine Lake Dam | 12. Mary's Creek | 23. Lower Village Creek |
| 2. Unnamed | 13. King's Branch | 24. Unnamed |
| 3. East of Eagle Mountain Lake | 14. West Fork Above Clear Fork | 25. Unnamed |
| 4. Big Fossil Creek | 15. West Fork Above Sycamore Creek | 26. Upper Sycamore Creek |
| 5. Upper Big Bear | 16. Dry Branch | 27. Middle Village Creek |
| 6. Lake Worth Dam | 17. Lower Little Fossil Creek | 28. Unnamed |
| 7. Marine Creek | 18. West Fork Above Fossil Creek | 30. Upper Village Creek |
| 8. Upper Little Fossil Creek | 19. Clear Fork Above Trinity River | 31. Walnut Creek |
| 9. Walker Branch | 20. Sycamore Tributary | 39. Deer Creek |
| 10. West Fork Above Mountain Creek | 21. Lower Sycamore Creek | |
| 11. Lower Big Bear | 22. Lake Arlington Dam | |

It is important to consider watershed boundaries when examining runoff patterns and water quality issues because water does not flow according to political boundaries; what happens in one part of the region can affect other areas downstream. (Source: Planning and Development Department, 2009.)

2006. This utility collects and manages funds to reconstruct and upgrade the City's drainage systems, and to provide for operation and maintenance of the storm water system, including storm drains and drainage channels.

Major flooding in Tarrant County generally occurs as a result of heavy rainfall from frontal type storms, which are most frequent in the spring and summer months. While man-made reservoirs and levees have significantly altered flood flows, flooding persists in many areas. The City of Fort Worth participates in the National Flood Insurance Program (NFIP), and regulates development in floodplain areas in the city and other areas under its jurisdiction and control. The City has amended its Floodplain Ordinance to comply with the Federal Emergency Management Agency's (FEMA) new maps, standards, procedures, policies, and guidelines. However, most structure flooding in Fort Worth occurs along storm drain lines and minor streams which are not regulated by FEMA or the NFIP.

Endangered Species and Natural Habitat

In Tarrant County, the United States Fish and Wildlife Service has listed two endangered species of animals: the Interior Least Tern and the Whooping Crane. The Least Tern can be found in habitats along the Trinity River, which has broad sandbars and a barren shoreline in places. The Least Tern has declined in population due to the construction of reservoirs and channelization projects that exacerbate habitat flooding problems, water pollution, and increased vegetative growth in habitat areas.

The Whooping Crane has historically used the Dallas-Fort Worth area as part of its regular migratory route. Recently, there has only been one sighting in Tarrant County. These large birds frequent marsh areas, river bottoms, and prairie and croplands—areas away from development that have plenty of vegetation and water. According to the U. S. Fish and Wildlife Service, they are currently threatened by the destruction of wintering and breeding habitats, entanglement in human structures like power lines and fences, and poaching.

In addition to the federal listing, the Texas Parks and Wildlife Department (TPWD) has listed several additional species as threatened or endangered. The TPWD indicates that Peregrine Falcons, Bald Eagles, Shovelnose Sturgeons, Timber Rattlesnakes, Texas Horned Lizards, and two varieties of mollusks are threatened in Tarrant County. In addition, the TPWD lists Red and Gray Wolves as extirpated in the area, entirely removed from what was once their native habitat.

The Bald Eagle has been documented in recent years at Lake Worth, and has reportedly been seen near Lake Benbrook. The eagles like areas near river systems or large water bodies. They use tall trees located close to marshes or lakes to nest. In 1995, due to an increase in population, their classification was reduced from endangered to threatened by TPWD. Due to the increase in their population, Bald Eagles are currently considered neither endangered or threatened by the federal government.

Within the greater Fort Worth area, there are four primary north central Texas ecosystems: the Grand Prairie, Western Cross Timbers, Eastern Cross Timbers, and

Federally Endangered Species in Tarrant County



Interior Least Terns can be identified by their white body, light gray wings, yellow bill tipped with black, yellow legs, and white forehead patch.



The Whooping Crane is the tallest North American bird. Along with the Sandhill Crane it is one of only two crane species found in North America.

Texas Parks and Wildlife Threatened and Endangered Species in Tarrant County



Bald Eagle



Texas Horned Lizard



Peregrine Falcon



Shovelnose Sturgeon



Timber Rattlesnake

© Shedd Aquarium

the Trinity River Bottomland. The Grand Prairie typically consists of clay-based limestone soils. The soil cover can range from very thin, rocky, and dry on hilltops, to thicker covers on slope and bottom areas. The majority of the vegetation in this area is typically tall and mid grasses, with dispersed populations of wildflowers. Eastern and Western Cross Timbers are distinguished by their sandy or clay soil structures. The soil layer in these ecosystems is usually deeper and has more water-bearing potential than that of the Grand Prairie. Vegetation in these areas includes post oak, blackjack oak, tall and mid grasses, with small amounts of wildflowers. The Trinity River Bottomland is characterized by deep clay soils. Vegetation includes tall and mid grasses and a variety of flood plain trees, such as pecan, American elm, sugar hackberry, green ash, and cottonwood.

Brownfields

The Brownfields Economic Redevelopment Program is a component of the City's broader sustainable development initiatives. Brownfields are "real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant." Such contaminants typically are remnants of previous industrial uses of otherwise redevelopable land. The mission of the program is to encourage the redevelopment of economically distressed areas in Fort Worth through the integration of environmental assessment, remediation, and education. The program encompasses the entire city, but targets City Council Districts 2, 5, and 8. These districts have the highest minority populations in the city and are also the most economically disadvantaged. An inventory of Fort Worth's potential brownfield sites now tops 340 properties. Approximately 72 percent of the identified sites are located in the targeted council districts. The vast majority of the sites in the inventory are a fraction of an acre in size, further complicating their redevelopment potential.

The objectives of the Brownfields redevelopment program include reducing perceived and actual environmental problems associated with living and working in proximity to contaminated properties, reducing crime associated with abandoned buildings, increasing public awareness of issues associated with brownfields, and securing community involvement in remediation and redevelopment.

The Fort Worth Brownfields program began as a pilot in 1999 with a \$200,000 U.S. Environmental Protection Agency (EPA) assessment grant. A supplemental grant of \$200,000 was received two years later. In 2010, the City of Fort Worth was awarded another \$400,000 brownfields assessment grant by the EPA. The 2010 grant is being used to perform Phase I and II site assessments and to prepare cleanup plans for hazardous substances and petroleum contamination. Fort Worth also has a \$1 million brownfields cleanup revolving loan fund from the EPA, to be used to provide low interest loans for brownfields cleanup.

Solid Waste

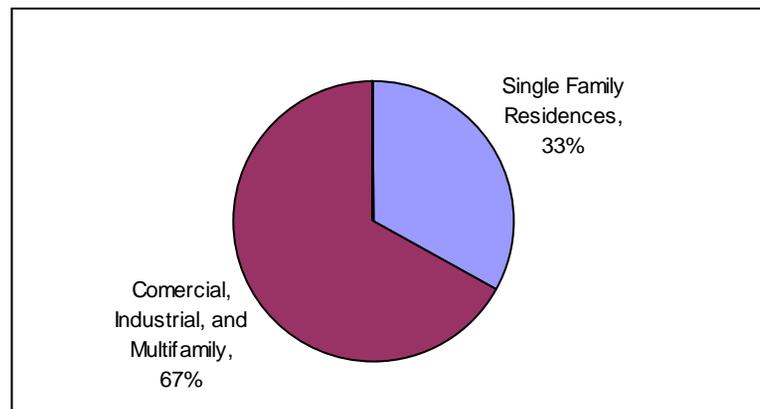
In FY2010, the City of Fort Worth collected over 295,500 tons of residential garbage, recycling, brush and bulky waste from an average of 195,500 households.

The North Central Texas Council of Governments (NCTCOG) projects that the total municipal solid waste stream for Fort Worth (which includes single-family



The Keep Fort Worth Beautiful Program educates citizens on methods to reduce the amount of solid waste disposal. (Source: City of Fort Worth, 2011.)

Sources of Solid Waste



Commercial and industrial uses create a higher percentage of waste than single-family uses. (Source: North Central Texas Council of Governments, 2011.)

collection facility, the Environmental Collection Center, in support of its Municipal Separate Storm Sewer System permit. In October 2010, following the elimination of the Environmental Management Department due to budget cuts, a new division of the City's Transportation and Public Works department-the Environmental Services Division-took over operations of the Environmental Collections Center (Other functions of the former Environmental Management Department were distributed to the Code Compliance and Transportation and Public Works Departments). The facility provides service to 42 municipalities, as well as unincorporated areas of Tarrant County, the Tarrant Regional Water District, and the Upper Trinity Regional Water District. Mobile collection units travel to collect household hazardous waste at neighborhood locations in Fort Worth, as well as in some serviced cities. In FY 2010, the Environmental Collection Center (ECC) collected and disposed of or recycled over 2,500,000 pounds of household hazardous waste from over 25,000 households. This is waste that otherwise might have ended up in the City's landfills or polluted its waterways.

GOALS AND OBJECTIVES

The Mayor and City Council adopted the following strategic goals related to environmental quality: 1) create and maintain a clean, attractive city, 2) improve mobility and air quality, and 3) promote orderly and sustainable development. The following goals and objectives help achieve the City Council's broader strategic goals while addressing current and future needs.

Sustainable Development

Improve sustainability of public and private development activities within Fort Worth and the Metroplex.

- Implement at least three initiatives identified in the Sustainability Action Plan in 2012.
- Implement at least three recommendations of the Lake Worth Vision Plan in 2012.
- Amend City ordinances to encourage Low Impact Development strategies by 2013.

Energy Conservation

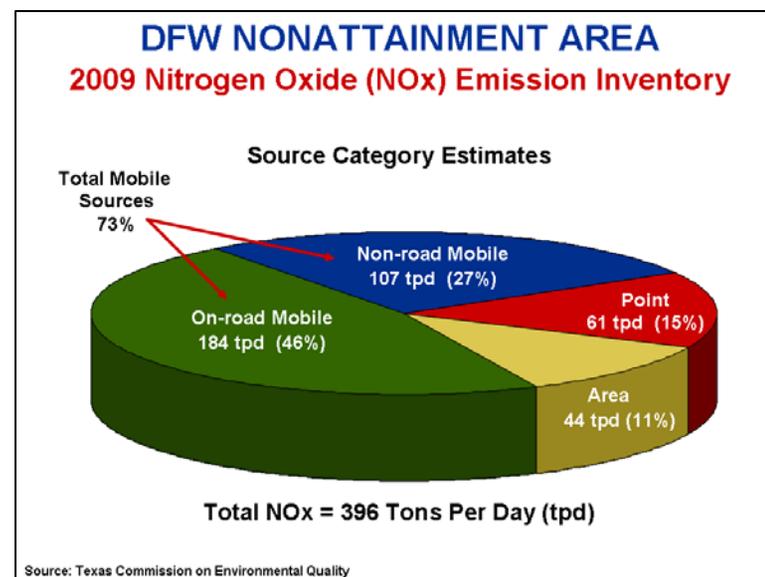
Reduce energy and water consumption at City-owned facilities.

- Reduce electricity consumption from a 2007 baseline by five-percent per year for six-years.
- Reduce natural gas consumption from a 2010 baseline by ten percent by 2020.

Air Quality

Improve Fort Worth's and the region's air quality through reduction of pollutants.

- Work in cooperation with TCEQ, NCTCOG, and other cities in the Dallas-Fort Worth Metroplex to bring the region into attainment for ozone.
- Comply with EPA mandates for the next monitoring period.
- Update the gas drilling ordinance in 2012.



Ground level ozone is formed when pollutants react chemically with sunlight. In the Dallas-Fort Worth area, the largest contributors of the pollutants are cars and trucks. (Source: North Central Texas Council of Governments, 2009.)

Water Quality, Water Supply, and Wastewater

Improve water quality and supply.

- Ensure 100% compliance with national water and wastewater treatment standards by having 0 wastewater permit violations and 0 Maximum Contaminant Level water violations annually.
- Plan for increasing water demands by implementing recommendations of the Region C State Water Plan (in conjunction with Tarrant Regional Water District).
- Increase the amount of reclaimed water use from 120 million gallons to 1 billion gallons by 2015.
- Reduce the five-year average potable water consumption from 195 to 186 gallons per capita per day by 2015.
- Complete a Greenprint study or similar watershed analysis in accordance with Lake Worth Vision Plan recommendations by 2013.

Storm Water Management

Maintain or improve current water quality by reducing the nonpoint source pollutant load entering creeks, reservoirs, and rivers from new development and redevelopment.

- Implement Lake Worth Vision Plan recommendations for low-impact developments.
- Regularly update policies and procedures to control water pollution caused by storm water runoff in order to comply with Fort Worth's Texas Pollutant Discharge Elimination System (TPDES) storm water permit.
- Reduce flooding through storm water system maintenance activities and drainage infrastructure capital improvements.
- By 2012, complete a detailed inventory of existing drainage structures in Fort Worth.

Brownfields

Redevelop abandoned industrial and commercial sites, or brownfields, to help reuse land in the central city.

- Continue identification of potential brownfields redevelopment candidates, focusing on the central city.
- Continue to perform environmental site assessments of selected project sites as grant funding is available, and encourage redevelopment of those sites.
- Continue developing Fort Worth's program — the demolition of regulated structures — to create a more economical way for local governments to demolish substandard nuisance structures containing asbestos, while protecting the environment and the public health. Maintain contact with the EPA and continue monitoring EPA's progress with testing their own alternative methods.

Solid Waste

Make Fort Worth cleaner and more attractive by enhancing solid waste services through a new collection program and provider contract implemented in spring 2003.

- Through curbside recycling, divert more than 22 percent of the residential waste stream from landfills in 2012.

Storm Water Management



The iSWM (Integrated Storm Water Management) program is coordinated by the North Central Texas Council of Governments. The program is designed to help the region achieve environmental goals, foster partnerships with state and federal agencies, and provide guidelines for comprehensive storm water management. (Source: North Central Texas Council of Governments, 2009.)

POLICIES AND STRATEGIES

The following policies and strategies will enable the City to achieve its environmental quality goals and objectives.

Sustainable Development Policies

- Increase the efficiency and cost-effectiveness of providing City services by promoting development in urban villages, transit-oriented developments, and mixed-use growth centers.
- Support innovative development projects that showcase low-impact development practices, conserve riparian buffers, and extend greenway networks with hike/bike trails.
- Promote sustainable development practices within the public and private sectors.
- Wherever possible, the City should set an example for private sector developers and builders by developing facilities that demonstrate the most effective technologies and techniques available to ensure public facilities are environmentally responsible, highly energy efficient, and take the most advantage of opportunities to co-locate activities and re-use land and structures.
- Promote and facilitate the redevelopment of brownfields.
- Encourage development and building practices that reduce environmental impacts.

Sustainable Development Strategies

- Implement a sustainable development online forum — an educational and networking resource that will inform the public about local opportunities and the benefits of sustainable development while increasing builder and developer participation.
- Promote the use of vegetation adapted to the local climate on City property and in parks. (There are areas where this is not an appropriate or desirable goal, such as in historically significant parks like Capps, or in special venues such as the Water Gardens and the Zoo.)

Energy Conservation Policies

- Pursue methods to reduce the impact of the urban heat island effect on Fort Worth.
- Promote energy efficiency and use of renewable energy.

Energy Conservation Strategies

- Reduce the amount of energy consumed throughout the city through administration, enforcement, and amendment of the Fort Worth Energy Code to require use of EnergyStar appliances at City facilities. EnergyStar appliances use less electricity and less water than conventional appliances.
- Reduce the reliance on electricity produced by fossil fuel by encouraging the use of renewable energy sources in new development and redevelopment.
- Educate employees on energy conservation in daily activities both at work and at home.

Air Quality Policies

- Encourage regional public transportation by working with other cities in the Metroplex to create efficient commuter rail, modern streetcar, light rail, bus service, and other types of mass transit.

Energy Conservation with Green Building



Public buildings can also be green. Austin (since 2000), Dallas (2003) and Houston (2005) now require new and replacement facilities to follow Leadership in Energy and Environmental Design (LEED) standards. (Above) Austin City Hall is a LEED Gold Building. (Source: City of Austin, Texas 2006.) (Below) Homewood Middle School in Homewood, Alabama is the country's first LEED Silver middle school. (Source: American Institute of Architects Alabama Chapter 2009.)



- Encourage development that reduces daily vehicle miles traveled for commuters through the creation of urban villages, transit-oriented development, and mixed-use growth centers.
- Encourage the development of industries with minimal air emissions, which will allow continued economic growth while the Metroplex is under strict federal emissions standards.
- Encourage development practices that help reduce the higher temperatures in urban areas that accelerate ground-level ozone formation (the urban heat island effect), such as planting shade trees and using appropriate highly reflective (high albedo) paving surfaces and roofing materials. Use City projects to demonstrate the effectiveness of these development practices.

Air Quality Strategies

- Reduce automobile emissions by using alternative-fueled and hybrid City vehicles, where appropriate.
- Encourage citizens, City employees, and contractors to follow ozone reduction practices throughout the year, and more so during the ozone season (May 1st through October 31st), particularly on Air Pollution Watch Days.
- Where possible, preserve mature trees and plant additional trees to help the air filtering process and to reduce the ambient outdoor temperature in summertime.
- Determine the feasibility of an idling restriction ordinance for all vehicles.
- Monitor energy consumption at City facilities to track conservation plan progress, and communicate results to City administrators, employees, and elected officials to maintain awareness.
- Research options to increase the reflectivity of City roofs and paved surfaces to reflect more solar radiation, thereby reducing air conditioning loads and urban heat island effects.
- Encourage planting and maintenance of native vegetation near buildings and along paved surfaces to directly shield them from the sun's rays, reducing urban heat island effects.

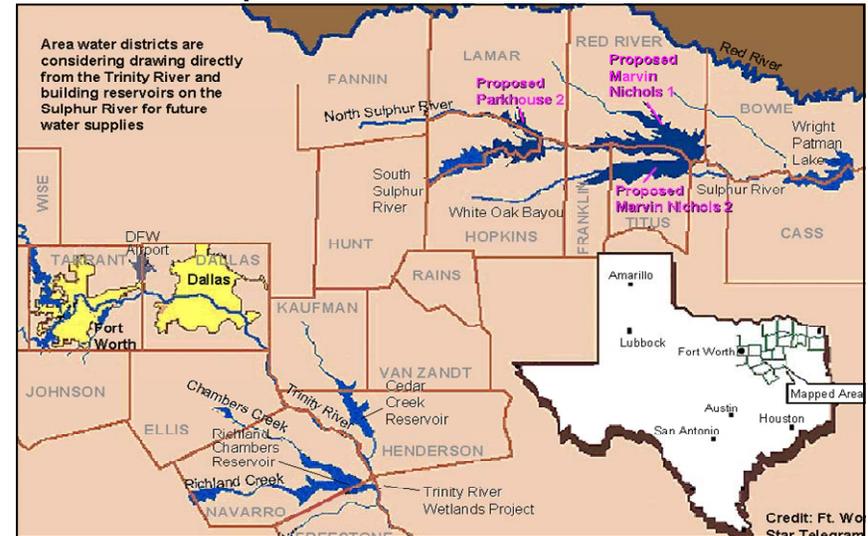
Water Quality, Water Supply, and Wastewater Policies

- Provide for handling wet weather flows in the sewer system in a cost-effective manner.
- Provide potable water in the service area as required by projected growth.
- Assure adequate raw water resources to meet projected demand.
- Provide water service in an effective manner while meeting all federal and state water quality standards.
- Pursue methods to reduce water consumption at City facilities.
- Promote water efficiency and water reuse.

Water Quality, Water Supply, and Wastewater Strategies

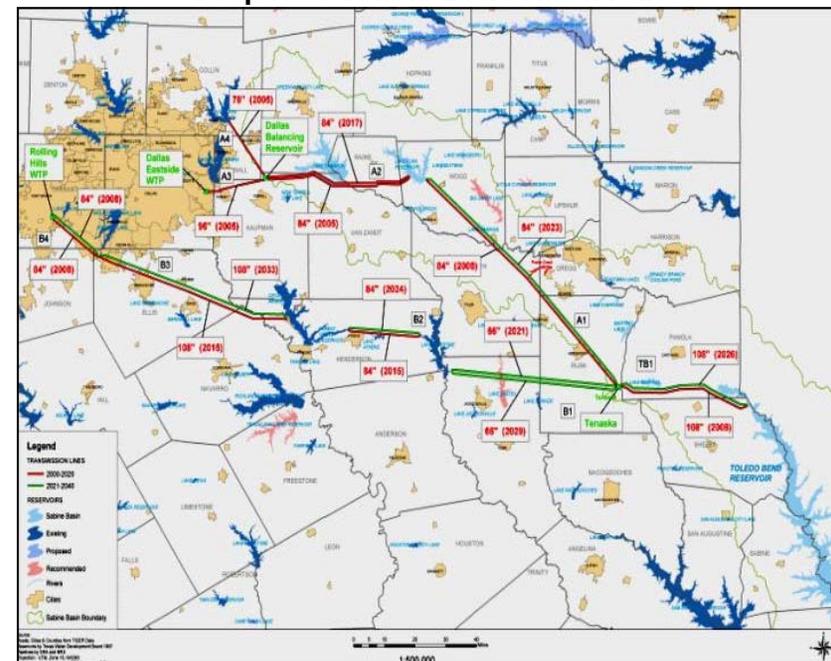
- Encourage the general public to implement recommended water conservation measures and comply with water conservation policy.
- Reduce the reliance on potable water use by encouraging the appropriate reuse and reclamation of water in new development and redevelopment.

Proposed Marvin Nichols Reservoir



The City is evaluating the feasibility of the Marvin Nichols Reservoir in northeast Texas and the Toledo Bend Reservoir in east Texas as future water sources for its citizens. (Sources: Fort Worth Star-Telegram, Water Department, 2009.)

Proposed Toledo Bend Reservoir



- Assess water use in City facilities to identify opportunities for conservation and to implement appropriate measures.

Storm Water Quality and Quantity (Drainage) Policies

- Minimize impervious land cover in areas of new development and significant redevelopment.
- Encourage redevelopment and infill in order to reduce the amount of new impervious surfaces outside Loop 820.
- Use natural areas to retain and filter storm water runoff.

Storm Water Quality and Quantity (Drainage) Strategies

- When feasible, develop linear parks with walking and biking trails along drainage ways as an effective means of filtering out water pollutants and connecting neighborhoods.
- Reduce erosion and improve ground cover along drainage channels through effective design, construction, and maintenance.
- Support innovative efforts that are cost- and environmentally-effective in addressing water quality issues associated with new development and extensive redevelopment.
- Identify and address potential concerns regarding nonpoint source pollution prevention requirements by providing information to developers and builders.
- Develop a detailed mitigation plan for increasing capacity and eliminating bottleneck conditions in areas presently subject to flooding.

Endangered Species and Natural Habitat Policies

- Protect riparian corridors as natural buffers to filter pollutants and conserve natural habitats.

Endangered Species and Natural Habitat Strategies

- Seek opportunities and encourage developers to use natural landscapes.
- Develop and implement a plan for the designation and protection of Wildwood Bottoms at Lake Worth as a nature sanctuary for American Bald Eagles and other species.
- Develop and implement an ecotourism plan that is focused on the natural attractions of Fort Worth.

Solid Waste Policy

- Pursue methods to minimize wastes, reduce recycling contaminants, increase the re-use or recycle of applicable wastes, and assure long term disposal capacity.

Solid Waste Strategies

- Allow a broad range of approved materials for recycling.
- Promote such programs as “Don’t Bag It” and backyard composting.
- Provide effective educational opportunities to inform citizens on how to better manage waste.
- Foster programs that facilitate recycling at commercial entities and multifamily complexes.

United States Green Building Council’s Leadership in Energy & Environmental Design



The U.S. Green Building Council (USGBC) is the nation’s foremost coalition of leaders from every sector of the building industry working to promote buildings that are environmentally responsible, profitable, and healthy places to live and work. The Leadership in Energy and Environmental Design (LEED) Green Building Rating System™ is the nationally accepted benchmark for the design, construction, and operation of high performance green buildings. Texas has 1,388 total LEED-registered buildings. The Tarrant County College Downtown Campus and former RadioShack Headquarters Campus (above right) is one of thirty-six LEED-registered projects in Fort Worth. *(Source: USGBC, 2011.)*

PROGRAMS AND PROJECTS

Energy Conservation Programs and Projects

- Facility Condition Assessment Reports (CARs) – The City performs annual assessments of its facilities to identify building envelope, lighting, HVAC, and plumbing system improvements, implementing many that positively impact the conservation of energy resources.
- Design Guidelines for New & Existing Facilities – The City has recently published major guideline revisions to more accurately communicate City efficiency and sustainability concerns to project architects, engineers and contractors. In addition, specific sustainability guidelines referencing the United States Green Building Council's *Leadership in Energy & Environmental Design* (USGBC/LEED) program have been added.
- Community Energy Strategic Plan (CESP) – The City's Municipal Energy Management (MEM) Plan will be updated and expanded into a CESP as part of a sustainability initiative. Assistance from the Department of Energy is planned in this effort with an application submitted to the CESP Academy. A rough draft of the MEM Plan utilizes a performance scorecard system to identify Energy Data Management, Energy Supply Management, Facility Energy Use, System & Equipment Efficiency, and Organizational Integrity Process. Plan adoption is anticipated in 2012.
- Traffic Signal Lamp Conversion – Completed in 2007, this project involved conversion of incandescent lamp signals to light-emitting diode (LED) lamp inserts. Both vehicular and pedestrian signals were included. With funding provided through a municipal equipment lease-purchase agreement, this nearly \$2M project helps the City avoid over \$500k in annual electricity costs.
- Energy Savings Performance Contract (ESPC) – The multi-phase ESPC involves implementation of several projects including lighting, HVAC, control, and water system improvements. Phases I through IV were completed between 2003 through 2010 with primary funding provided from a combination of leases and loans secured by the City. These four projects total nearly \$20M in construction costs and help the City avoid nearly \$2.3M in annual utility costs.
- ESPC Phase V – Due for completion in 2012, this project involves process improvement at the Fort Worth Water Department's Water Reclamation Facility. Measures include improvements to its supervisory control & data acquisition (SCADA) system, aeration basins, anaerobic digesters, gas turbines, fluid pumps, air blowers, and motors. Project funding is provided from project reserves and a municipal equipment lease-purchase agreement secured by the City. This project totals over \$31M in construction costs and is estimated to help the City avoid nearly \$2.4M in annual utility costs.
- ESPC Phase VI – Due for completion in 2012, this project includes two parts: Part A involves building improvements at the Fort Worth Water Department's Water Reclamation Facility; Part B involves facility benchmarking operations technician service contracts along with construction of LED parking and facility lighting, high-performance (LEED®) building, and solar renewable energy (water heating & photovoltaic-power) improvements. Project funding

Nashville Neighborhood Policing District No. 6



The newly constructed Nashville Neighborhood Policing District facility is the first city facility constructed to LEED Silver standards. (Source: TPW Department, 2011.)

for both parts is provided by the City's Energy Efficiency & Conservation Block Grant (EECBG) as secured through the federal Department of Energy. This project totals nearly \$5M in construction costs and is estimated to help the City avoid nearly \$385k in annual utility costs.

- Prototypical Fire Station – This project includes thorough assessments of energy impacts of various building systems to ensure resource use efficiency. Similar conservation impact assessments are pursued in the development of all projects. The City is currently in the process of applying for a LEED® certification from the USGBC for the Nashville facility.
- Future Projects – Future projects may include water metering, reuse, conservation, production, and treatment, as well as street lighting and electric vehicle facilities, in addition to more high-performance building work that incorporate energy-efficiency and renewable energy initiatives.

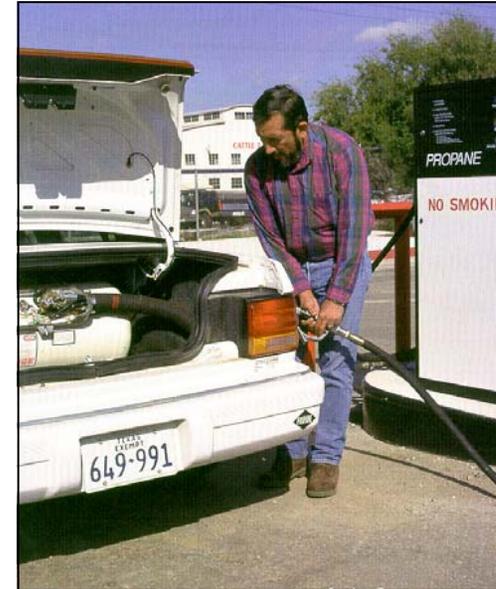
Air Quality Programs

- Air Monitoring Program – The Air Quality program assists the Environmental Protection Agency (EPA) and TCEQ with air monitoring. The program is also involved with creating an air quality plan for the Metroplex.
- Inspection Program – The Environmental Management Division of the Transportation/Public Works Department is responsible for enforcing the Clean Air Act within Fort Worth. Along with the EPA and TCEQ, this division helps with permitting, compliance inspections, complaint investigations, and enforcement.
- Public Education Program – The City of Fort Worth has several positions dedicated to providing outreach to schools, PTAs, faith-based groups, neighborhood associations, City staff, and other organizations.
- Care for Cowtown Air – During ozone season (May – October), the Environmental Management Department offers incentives, in the form of prizes, to City employees who participate in ozone reducing activities. Because of this effort, the City of Fort Worth was named by the U.S. EPA as one of the “Best Workplaces for Commuters.”
- Clean Air Fair and Bike Rally – The Environmental Management Division holds an annual air fair downtown to coincide with the start of the ozone season, as a means to educate the public on air pollution issues. To conclude the region's ozone season, the City hosts the Clean Air Bike Rally in October to promote alternative modes of transportation.
- Ozone-Forming Pollution Reduction programs – The City has committed to:
 1. Establish an Employee Transit Pass Program (E-Pass) and vehicle-miles traveled reduction study;
 2. Provide City employees with free parking at LaGrave Field; and
 3. Expand the Clean Vehicle Fleet Program, as the City Council deems appropriate.

Water Quality, Water Supply, and Wastewater Programs

- Integrated Wet Weather Management Program – To assess the condition of the Fort Worth wastewater collection system and implement rehabilitation projects in order to eliminate sanitary sewer overflows and backups. Under this

Use of Alternative Fuels



The use of alternative fuels, such as propane, is one way the City of Fort Worth is helping to reduce air pollution in the Dallas-Fort Worth Metroplex. (Source: City of Fort Worth, 2009.)

program, additional wet weather wastewater treatment capacity has been installed at the Village Creek Wastewater Treatment Plant.

Water Quality, Water Supply, and Drainage Programs and Projects

- The Tarrant Regional Water District supplies raw water for Fort Worth and is developing projects to divert water from the Trinity River to supplement the yield of Richland-Chambers Reservoir and Cedar Creek Lake in east Texas. Coupled with existing sources, the Trinity diversion projects will give the District adequate supplies to meet projected needs to the year 2020 and beyond. The District, in cooperation with the City, is studying other potential sources of water supply for the future, including Toledo Bend Lake, the proposed Marvin Nichols Reservoir, Brazos River Basin, and other possibilities.
- Watershed Studies – The City, in cooperation with NCTCOG, has begun identifying developing areas and determining strategies to avoid downstream flooding in areas already developed. Strategies will be suggested on a watershed basis because drainage and water movement are based on these natural boundaries.
- “Feasible Options” study – The City has a number of large, undersized storm drain systems which contribute to broad neighborhood flooding during heavy rains. Studies in Central Arlington Heights and the Forest Park-Berry area have produced engineering solutions costing at least \$25 million each. A joint review involving community input is now underway to develop feasible options to address flooding in these areas.
- The City has recently implemented modified design standards to reduce erosion and loss of vegetation along open channels.
- Funded by the Storm Water Utility, numerous drainage improvement projects are under design or in construction across the City, the majority of which address neighborhood flooding problems.
- Education – The Water Department and the Environmental Management Department have a variety of programs to educate the public on water resources and pollution prevention.
- Bioassessment Program – Evaluates the diversity and sensitivity of aquatic life found in selected city streams.
- Construction Inspection Program – Obtains compliance from construction sites that are regulated by TCEQ.
- The City’s program to develop an approved method for local governments to demolish substandard nuisance structures containing asbestos more economically, while at the same time protecting the environment and the public health, is on hold while the U.S. Environmental Protection Agency tests its own version of Fort Worth’s method.
- Household Hazardous Waste Collection Program – Collects hazardous household wastes year-round and disposes of them properly for Fort Worth residents and many surrounding communities. Along with a fixed facility, a mobile collection unit is in operation.
- Industrial Inspection Program – Obtains compliance from industrial facilities that are regulated by the EPA and TCEQ.

Storm Water Management



Due to undersized drainage systems built many years ago, a number of Fort Worth neighborhoods and roadways are subject to severe flooding in heavy rains. Over \$1 billion in drainage needs have been identified. In response to this need, the City Council implemented a storm water utility in 2006. The storm water utility collects a monthly user fee that pays for maintenance, improvements to the storm water drainage system, and other storm water program activities. This fee is similar to other utility fees for water, sewer, and garbage. (Source: *Transportation and Public Works Department, 2011.*)



- Power Washers Program – Limits detergents and other pollutants from being discharged into the City’s storm drain system.
- Spill Response Program – Involves the TPW and Fire Departments. Its purpose is to respond to spills that are discharging or threatening to discharge into the City’s municipal storm sewer system.
- Storm Drain Marking Program – Curb inlet markers containing a pollution prevention message advise citizens of the location of storm drains through markers. The program targets heavily trafficked locations with high visibility, areas with a past history of dumping or reported illicit discharge problems, and locations requested by citizens.
- Storm Sewer Outfall Screening – Conducts dry and wet weather field screening of water in storm sewer outfalls to monitor pollutants entering water bodies in the city.
- Storm Water Master Planning – In order to assess and prioritize drainage improvement needs across the City, a Storm Water Master Plan is being developed based on systematic studies of open channels, stream crossings and storm drain systems around the City. Mapping, hydraulic studies, economic evaluations, neighborhood input, and developing mitigation alternatives are all part of the planning process. Related activities include dam and detention basin evaluation, as well as condition assessment of the above-ground and underground portions of the drainage system.

Endangered Species and Natural Habitat Programs and Projects

- Outreach Program – Coordinated by the Parks and Community Services Department, this program provides an opportunity for neighborhoods, schools, and businesses to act in an advisory capacity for natural landscape enhancements.
- Landscape Restoration – The Parks and Community Services Department is coordinating landscape restorations of the Fort Worth Nature Center and Tandy Hills.

Brownfields Programs and Projects

- Brownfields Program – Funded through a grant from the U. S. Environmental Protection Agency, the Environmental Management Department is investigating potential brownfield sites and actively facilitating their redevelopment by providing environmental site assessments and cleanup loans. Examples include Evans and Rosedale, LaGrave Field, Ellis Pecan, and 4th and Elm.
- Municipal Setting Designation – The state law establishing municipal setting designations (MSDs) creates a means by which the scope of investigations and response actions addressing groundwater contamination may be limited by the Texas Commission on Environmental Quality, if the groundwater is prohibited for use as a potable water source by municipal ordinance or restrictive covenant. An MSD for a given site must be approved by the municipality in which the property is located. MSDs facilitate the redevelopment of brownfields sites by reducing the remediation time and costs. The City’s MSD program is administered by the Environment Management Department’s Brownfields Program.

Curbside Recycling Program



Fort Worth’s curbside recycling program prevented 22 percent of waste from going to land fills during 2009. (Source: Environmental Management Department, 2009.)

Solid Waste Programs

- Garbage Collection – The City provides a variable-rate based system for weekly garbage collection in carts. Customers pay for service based on the size of cart selected among 96-gallon, 64-gallon and 32-gallon cart options.
- Curbside Recycling – The City provides single stream recycling collection once per week in 64-gallon carts. Cost of recycling collection and processing is included in the cost of residential sanitation service.
- Yard Waste Pick-up – The City provides weekly yard waste (grass clippings and small brush) collection in paper yard bags, bundled limbs, up to 10 cubic yards of loose brush, and optional (for purchase) 96-gallon yard carts. Material is kept separate from other waste and is mulched for compost or other reuse.
- Bulky Item Waste Pick-up – The City provides a monthly, scheduled bulky item waste collection of up to 10 cubic yards of collected material at no extra charge.
- Drop-Off Stations – The City currently operates three permanent drop-off stations for resident use as an alternate means to dispose of bulky items and brush. The sites accept excess garbage and recycling as well. The City is also studying adding two additional drop-off sites.
- “Don’t Bag It” – The Solid Waste Services Division of the Code Compliance Department provides information on how to take care of lawns and yards without disposing of yard waste in the municipal waste stream.
- Education – Working with the Neighborhood Outreach education staff of the Planning and Development Department and organizations like Keep Fort Worth Beautiful, the City provides many options for educational opportunities, such as recycling, backyard composting, garbology for children, litter reduction, and “Don’t Bag It.” Public education efforts will be enhanced in 2011 with the hiring of a staff member with the Code Compliance Department dedicated to solid waste education initiatives.
- Dead Animal Pick-up – The City removes dead animals from public City-controlled rights-of-way and from residential units on a request basis.
- Illegal Dump Cleanup – The City created an illegal dump clean-up program in 1993 to help mitigate the effects of illegal dumping in Fort Worth. In FY 2010, the illegal dump cleanup section removed over 3,300 tons of illegally dumped material.
- Household Hazardous Waste Collection Program – Collects hazardous household wastes year-round and disposes of them properly for Fort Worth residents and many surrounding communities. Along with a fixed facility, mobile collection units are in operation throughout the year.

Capital Improvement Projects

The capital improvement projects that have been identified for the next 20 years are listed in Appendix D and Appendix E with estimated costs, completion dates, and potential funding sources. Projects are divided into three categories including drainage, water, and wastewater.