

# **CITY OF RALEIGH ENVIRONMENTAL PROGRAMS**

**APRIL 2008**

## **DRINKING WATER**

The City of Raleigh's water and sewer system currently serves the needs of approximately 174,280 metered residential and business customers in Raleigh, Garner, Rolesville, Wake Forest, Knightdale, Wendell and Zebulon.

The City maintains 2,066 miles of water distribution and transmission mains. In 2007, the E.M. Johnson Water Treatment Facility pumped an average of 50.81 million gallons of water a day and an average of 1.28 million gallons per day at the G.G. Hill Water Treatment Plant located in Wake Forest. According to test results, each drop of this water far exceeded all federal and state standards for drinking water.

Two of the major water quality impurities that are monitored in drinking water are trihalomethanes (THMs) and arsenic. THMs are produced when chlorine reacts with organic material in the water. The City of Raleigh uses ammonia to lower THMs levels in the drinking water.

THMs levels in the City of Raleigh's drinking water consistently are far below the federal and state limits of 80 parts per billion. Raleigh's drinking water tests found less than 45 parts per billion of total THMs in 2007.

The federal and state limits on arsenic in drinking water currently are 10 parts per billion. Tests performed on City drinking water samples showed no detection of arsenic in the drinking water in 2007.

The City uses ozone as the primary disinfectant in the treatment process. Ozone, a form of oxygen, is generated by sending electricity through a column of liquid oxygen. The resulting ozone is then bubbled through columns of water. As the ozone reacts, it oxidizes in the water. This breaks down organic materials and kills pathogens.

The City of Raleigh vigilantly and proactively protects water quality in Falls Lake, the primary source of drinking water for over 435,000 people. The City has pledged \$1.5 million over a three-year period to begin a land conservation initiative to protect water quality in Falls Lake. This initiative is the Upper Neuse Clean Water Initiative (UNCWI).

UNCWI's objective is to preserve source water quality within the Falls Lake watershed by identifying, prioritizing, and placing undeveloped lands under conservation protection.

Through a Memorandum of Agreement (MOA) with the Conservation Trust of North Carolina (CTNC), a substantial portion of the City's first year's funding produced a comprehensive land preservation plan. UNCWI has identified land parcels in the Falls

Lake watershed to be acquired for water quality protection by fee-simple purchase or through the acquisition of conservation easements.

The City of Raleigh, as part of National Drinking Water Week, hosts WaterFest annually in May at either the Neuse River Wastewater Treatment Plant or the E.M. Johnson Water Treatment Plant. The 2008 WaterFest will be held the first week of May at the E.M. Johnson Plant on Falls of Neuse Road in north Raleigh. WaterFest is an annual celebration of water as a precious resource through hands-on educational activities, water games, exhibits and demonstrations. All Wake County school teachers and students in kindergarten through eighth grade are invited to attend. Students learn about the water cycle, drinking water treatment, wastewater treatment, reuse water, laboratory practices, water conservation, and watershed protection. The general public is also invited to participate in WaterFest.

## **WATER CONSERVATION**

The City of Raleigh strongly encourages conservation of its finished water. The City's Water Conservation Task Force (WCTF) reviewed the City's water conservation plan and developed recommendations to improve the plan based on experiences gained from the 2002 and 2005 droughts. The task force produced a water conservation recommendation that requires alternate-day irrigation throughout the year, and Stages 1 and 2 water conservation rules to be implemented by the City as needed during a drought or other water supply shortages. The WCTF presented its final report and recommendations to the City Council in May 2006. The recommendations were approved and adopted as a City ordinance. The water conservation rules apply to customers in Raleigh and in the towns that receive water from the Capital City: Garner, Rolesville, Wake Forest, Knightdale, Wendell and Zebulon.

During the period from August 2007 to March 2008, Raleigh and other parts of the Triangle were in an exceptional drought, the worst drought category status. To conserve water, City Manager J. Russell Allen authorized implementation of the City's Stage 1 water restrictions on Aug. 28, 2007. Stage 1 restrictions generally provide for designated irrigation one day per week for those using automatic or non-automatic irrigation systems and garden hose attached sprinklers. Water customers may water on two designated days a week if they are physically holding a garden hose. During the eight-week period the City was under the Stage 1 rules, water use dropped by 19 percent.

As the drought conditions continued, the City Council approved amended Stage 1 water restrictions to go into effect on Oct. 23, 2007. These rules prohibited lawn and landscape irrigation except by hand held hose or low volume drip irrigation. Customers also could not wash their vehicles except at commercial car wash facilities. Furthermore, the City stopped issuing permits that allowed for the watering of new lawns for 45 days. As a result of the amended Stage 1 water rules, water use dropped by 24 percent in the Raleigh service area.

Still the drought worsened, prompting the City Council to impose Stage 2 water restrictions effective Feb. 15. These restrictions prohibit the use of public water for irrigation, among other things.

On April 5 of this year, Falls Lake refilled to the full pool elevation of 251.50 feet because of rain events. This brought the water supply volume to 100%. Two days later on April 7, the City returned to the Stage 1 water restrictions.

When combined, all of the mandatory water use restrictions – Stage 1, amended Stage 1 and Stage 2 – resulted in a 42 percent reduction in water use when they were in place.

Here are some other water conservation practices under taken by the City of Raleigh as a result of the drought:

- The City installed low-flow water devices in restrooms at municipal government buildings;
- The City purchased 5,000 low flow shower heads and faucet aerators for citizens with low and moderate incomes. The city has encouraged all residents and businesses to install the devices;
- The City installed rain barrels at various city government locations to capture runoff from building roofs. The runoff is used to irrigate landscape areas. The city is selling rain barrels to citizens and encouraging their use;
- In an experiment that has proven to be a success, the City Fire Department's Fire Station No. 8 on Western Boulevard is using 250-gallon rain barrels to capture runoff that is used to wash fire vehicles. The practice is planned to be instituted at other fire stations in the city; and,
- The City indefinitely suspended hose washing and power washing of hard surfaces except to maintain sanitary conditions.

### **DEMPSEY E. BENTON WATER TREATMENT PLANT**

The City of Raleigh, joined by officials from Wake County and neighboring towns that receive water from the Capital City, broke ground April 11, 2007 to formally begin construction of the Dempsey E. Benton Water Treatment Plant. The new water treatment plant will be the third water treatment facility in Raleigh's 216-year history.

The Dempsey E. Benton Water Treatment Plant will be located on 55 acres at Lake Benson, off of N.C. 50 at Buffaloe Road south of Garner. Construction of the \$90.5 million plant is scheduled to be complete in February 2010. The new plant is named for Dempsey E. Benton, who served as Raleigh's city manager from 1983-2000.

The Dempsey E. Benton Water Treatment Plant will allow the City of Raleigh to meet the area's future water needs by providing additional water system reliability and capacity. The City will continue to operate the E.M. Johnson Water Treatment Plant in north Raleigh after the Dempsey E. Benton plant opens. Having two water treatment plants presents the City with two advantages:

- The Dempsey E. Benton Water Treatment Plant at Lake Benson will supply the City with additional water capacity from the Swift Creek watershed to accommodate continued growth in the City's water customer base. The additional water capacity also will be helpful in the event of severe droughts, such as those the Raleigh area experienced in 2002, 2005 and 2007. The Swift Creek watershed contains Lake Benson, a 500-acre reservoir, and Lake Wheeler, a 650-acre reservoir. The new water treatment plant will treat up to 20 million gallons a day from these Swift Creek reservoirs. The current water treatment capacity of the E.M. Johnson Water Treatment Plant is 86 million gallons a day from Falls Lake, currently the City's sole source for drinking water; and,
- Constructing an additional water treatment plant will provide more water system reliability in case of adverse weather conditions or other emergencies.

Construction of the Dempsey E. Benton Water Treatment Plant prompts the City's return to using Lake Benson and Lake Wheeler as supply sources for drinking water. The City stopped using the lakes in 1987 when it closed the E.B. Bain Water Treatment Plant, Raleigh's first water treatment plant, in favor of expanding the newer E.M. Johnson plant at Falls Lake. The City and other local government entities in the Swift Creek Water Supply Watershed have worked in a formal partnership to protect the two lakes and maintain their water quality so that they again can be used for drinking water supply as the area grew.

The new Dempsey E. Benton Water Treatment Plant and the E.M. Johnson Water Treatment Plant are expected to meet the area's water needs through 2018. To accommodate water needs beyond 2018, the City of Raleigh plans to expand the Johnson plant to its maximum capacity of 120 million gallons of water per day and build the Little River Reservoir in eastern Wake County.

## **WASTEWATER**

The City of Raleigh has significantly reduced nitrogen and phosphorus levels in treated wastewater that is discharged into the Neuse River from the City's Neuse River Wastewater Treatment Plant.

The City has a history of implementing new scientific measures to further enhance the quality of water it returns to the Neuse River. One of the most effective is the installation of denitrification facilities at the City's largest wastewater treatment plant. For example, nitrogen levels in treated wastewater in 2007 were reduced by 82 percent compared to levels recorded in 1995. (This is important because the North Carolina Division of Water Quality uses 1995 as a benchmark for nitrogen reductions required in state rules that went into effect in 2003.) The state rules are designed to reduce the amount of nitrogen in the Neuse River estuary by at least 30 percent. Specifically, under the new rules, Raleigh's wastewater treatment plant was required to decrease nitrogen by at least 49 percent.

Based on the 2007 nitrogen levels, the City has more than complied with the 49 percent threshold. In fact, the City began complying with the rules well before they went into effect in 2003. According to the state Division of Water Quality, high levels of nitrogen -- a natural element in sewage, fertilizer and animal waste -- contribute to the growth of unhealthy algae blooms in the Neuse estuary, causing fish kills. With an investment of \$15 million, the City is doing more than its share to reduce nutrient levels in the Neuse River estuary.

Under state rules, municipalities and other dischargers of phosphorus cannot exceed a total phosphorus level of 2 parts per million during any quarterly period. The City of Raleigh's annual average in 2006 was well below the state's quarterly limit. To remove phosphorus and control odor, the City uses ferrous sulfate and aluminum sulfate in the wastewater treatment process.

All three of the wastewater treatment plants operated by the City of Raleigh meet permit requirements under the federal Clean Water Act. Those facilities are the Neuse River Wastewater Treatment Plant in Raleigh, the Smith Creek Wastewater Treatment Plant in Wake Forest and the Little Creek Wastewater Treatment Plant in Zebulon.

## **GREASE PROHIBITION**

In 1999, the Raleigh City Council approved an ordinance that makes it against the law to put grease into drains that flow into the sewer system. The grease prohibition is just one element in a comprehensive effort on the part of the City to prevent and

minimize sewer overflows. The City of Raleigh has a public information program to educate the citizens of Raleigh that pouring grease down the drain is against the law.

The “spokesperson” and mascot for the campaign is “Neusie.” Neusie is a fish who lives in the Neuse River. Neusie wants the citizens of Raleigh to change their ways because putting grease and other things that don’t belong in the sewer system causes:

- Unsanitary and expensive back-ups into your home; and,
- Overflows that pollute the streams and tributaries of the Neuse River -- Neusie’s home.

The City of Raleigh offers a single \$50 cash reward to the first person who reports a confirmed sanitary sewer overflow to the City.

## **SANITARY SEWER COLLECTION SYSTEM**

The City maintains approximately 2,300 miles of sanitary sewer collection system to collect wastewater from residential, commercial and industrial customers. Wastewater is transmitted to the City’s wastewater treatment plants for treatment and disposal or reuse.

The sanitary sewer collection system has 116 sewer pump stations that are continuously monitored by a computer-controlled radio monitoring system and equipped with state-of-the-art emergency generators. The City’s sewer system maintenance staff is equipped with state-of-the-art equipment to perform preventive maintenance on the system and to resolve problems when blockages and sewer overflows occur. Sewer overflows occur primarily because of customer abuse and acts of nature. In 1999, the City implemented a progressive maintenance and system rehabilitation/replacement program that has resulted in Raleigh experiencing well below the national average number of sewer overflows for a system its size. For example, the City experienced 48 sanitary sewer overflows in 2007; the national average number of overflows for a system the size of Raleigh’s is 160 a year. The City, in fact, has fallen below the national average the past eight years.

For more information, call the City of Raleigh Public Utilities Department at 857-4540.

## **RESIDUALS, BIOSOLIDS**

Residuals from the water treatment process and biosolids generated in the wastewater treatment process are used as a compost, fertilizer or soil conditioner rather than disposed of in the landfill. The City of Raleigh’s reuse of the residuals and biosolids saves much needed disposal space at the landfill.

The City has a contract with an independent contractor who removes residuals from the wastewater treatment process for composting. More than 65,000 tons of biosolids are generated each year at the City’s wastewater treatment plant. Some of these biosolids are processed as a lime stabilized soil amendment and used to adjust the alkalinity and add nutrients to the soils at privately owned farms. Currently, land application activities on City-owned land have been halted. However, the City does have a land application program in place for off-site areas, including privately-owned farmland in Duplin and Sampson counties. When the on-site application program is resumed, biosolids stabilized as fertilizer will be used to grow crops such as corn, hay, soybeans and wheat --- all of which will be sold as livestock feed. The City also is exploring opportunities to sell agricultural products for alternative fuel production. The biosolids also are used to make a fertilizer product known as Raleigh-Plus, which is available for sale to the general public.

In 2006, the National Biosolids Partnership (NBP) recognized the City of Raleigh Public Utilities Department as the fourteenth wastewater agency in the nation, and the first in North Carolina, the southeast United States and USEPA Region 4, to be certified and admitted to the partnership's environmental management system (EMS) for biosolids program. The City of Raleigh Public Utilities Department is one of 90 wastewater agencies currently participating in the NBP EMS program and one of over 16,000 wastewater agencies in the nation. As the fourteenth wastewater agency certified and admitted into the NBP EMS program, the City of Raleigh Public Utilities Department achievement recognizes that the agency has been independently verified as having an effective biosolids environmental management system. The City of Raleigh Public Utilities Department's biosolids EMS was independently verified on Dec. 19, 2006 by the audit firm, KEMA-Registered Quality, Inc., to conform to the NBP's EMS guidance. The NBP's EMS program was successfully re-verified by an independent third party auditor on Dec. 24, 2007, resulting in platinum certification and reaffirming the City's commitment to environmental stewardship.

The City won a regional award from the federal Environmental Protection Agency in 1995 for beneficial use of biosolids.

Contact the City of Raleigh Public Utilities Department at 857-4540 for more information.

## **REUSE WATER**

Reuse water is a result of advanced treatment of wastewater at both the City's wastewater and water treatment plants. Reuse water is wastewater that has been treated to meet stringent reuse water quality standards. Although reuse water quality is maintained at a high level, it is not intended for human consumption. The City is currently the largest consumer of recycled wastewater which occurs at the City's Neuse River Wastewater Treatment plant and the Wrenn Road spray irrigation facility located in the Garner service area. These facilities use this treated wastewater to assimilate nutrients while growing agricultural crops and forest products.

The City of Raleigh Public Utilities Department offers high quality reuse water to citizens for irrigation purposes and other non-potable needs. The reuse water is available in bulk to customers. They can get the reuse water at the City's Neuse River Wastewater Treatment Plant, located at 8500 Battle Bridge Road in Raleigh; the Smith Creek Wastewater Treatment Plant at 8505 Ligon Mill Road in Wake Forest; the Little Creek Wastewater Treatment Plant at 1419 N.C. 39 South in Zebulon; or the E.M. Johnson Water Treatment Plant at 10301 Falls of Neuse Road in Raleigh. Customers must undergo training from the City before they can haul the reuse water from the plant.

Reuse water is made available for bulk pickup by truck drivers following training in accordance with North Carolina Division of Water Quality (DWQ) permit requirements. The trucks used to transport the reuse water are inspected. City staff conducts training classes and truck inspections. Attendees must schedule their classes at least 48 hours in advance by contacting Marti Gibson of the Public Utilities Department at 662-5700. After the driver training session, the tanker trucks are inspected and proper signage applied. The truck driver may then load the truck with reuse water.

There is no limit to the amount of reuse water that will be made available to customers. Customers may haul and apply as much as they want provided it is used properly. The high quality reuse water is available to citizens Monday through Friday at the four listed plants. People interested in receiving bulk reuse water can any of the plants for distribution schedule and availability.

Reuse water has been approved by the State of North Carolina for the following applications:

- Landscape irrigation of residential lawns, golf courses, parks, landscape areas, and other public, industrial, or commercial grounds;
- Street sweeping;
- Vehicle washing at construction sites and automatic car washes with drains to the sanitary sewer. No steam cleaning, engine or parts washing;
- Sewer line flushing;
- Decorative ponds and fountains that do NOT have a drain to surface waters; Customers must display permanent weatherproof signage;
- General construction purposes such as soil compaction, dust control, concrete mixing and asphalt reclamation;
- General power washing for buildings, equipment and automobiles when dual barrier disinfection is provided; and,
- Pesticide and fertilizer application.

In addition to bulk reuse water, the City of Raleigh's Little Creek Wastewater Treatment Plant located in the Zebulon service area produces reuse water and distributes this water to several customers, including Five County Stadium for irrigating the Carolina Mudcats' baseball field and common areas and for chiller water for U.S. Foods' distribution warehouse. The City of Raleigh also has completed a reuse water master plan that identifies reuse water markets within the City's service area and identifies possible methods to serve these areas. The first phase of the master plan extends reuse water mains from the Neuse River Wastewater Treatment Plant to areas in east and central Raleigh with a new elevated storage tank in east Raleigh on Sunnybrook Road. Identified users include the Time Warner Cable Music Pavilion at Walnut Creek (formerly the Walnut Creek Amphitheater), Walnut Creek Softball Complex, Raleigh Country Club golf course, and the new Centennial Campus golf course. This phase is currently under design and is expected to be in service by December 2009.

## **UTILITY SYSTEM MERGERS**

In 2001, the City of Raleigh took ownership and operation of the water and sanitary sewer system in the Town of Garner. On Jan. 1, 2002, the City took ownership and operation of the water and sanitary sewer system in the Town of Rolesville. Effective July 1, 2005, the City took ownership and operation of the water and sanitary sewer system in the Town of Wake Forest. Also, the Town of Knightdale merged its water and sanitary sewer system with Raleigh's system beginning on May 1, 2006. The towns of Wendell and Zebulon merged their water and sewer systems with Raleigh's system effective Oct. 1, 2006. All planned utility system mergers are now complete.

For more information, contact the City of Raleigh Public Utilities Department at 857-4540.

## **STORMWATER**

The City of Raleigh administers several programs to manage both the quantity and quality of stormwater runoff. Stormwater is rain that is not absorbed into the earth but instead enters storm drainage structures, pipe systems and open drainage channels on public and private property in the Capital City. Stormwater can carry harmful pollutants, cause flooding, erode topsoil and stream banks, and destroy habitats.

Helping to fund the City's programs to manage stormwater is a stormwater utility fee that the City implemented on March 1, 2004. The monthly fee provides a continuing source of revenue for costly projects of critical importance to water quality, erosion and flooding. Before the stormwater fee was implemented, Raleigh's stormwater programs had been supported entirely by general revenue funds.

The stormwater utility fee was implemented to provide funding to meet increased service demands of the public, regulatory requirements, and a backlog of stormwater infrastructure projects to maintain and upgrade the drainage system. The project backlog is estimated to cost \$141 million over the next 10 years.

Additionally, requirements from federal and state regulatory agencies are dictating improvements to reduce pollutants in Raleigh's streams. While Raleigh has been proactive with improvements to reduce water quality impacts, it is estimated these mandates will cost millions of dollars in the coming years.

Raleigh's stormwater infrastructure is aging in many parts of the city, and the useful life of many facilities is coming to an end. In order to maintain this infrastructure and prolong the useful life of these facilities, it was recognized that additional funding was necessary for maintenance of drainage systems, particularly those on City streets.

- Stormwater Utility Fee: Rate Calculations and Fee Structure. The stormwater utility fee is calculated based on the amount of impervious surface on a developed parcel. Impervious surface is any hard surface that does not readily absorb water and impedes the natural infiltration of water into the soil. Common examples include roofs, driveways, parking areas, sidewalks, patios, decks, tennis courts, concrete or asphalt streets, and compacted gravel surfaces. The stormwater utility fee for single-family residences and townhouses ranges from \$1.60 per month to \$6.80 per month. Other multifamily properties and commercial and industrial properties in Raleigh also are assessed the fee, which is \$4 per month for each 2,260 square feet of impervious surface on a property. For more information about stormwater utility fee, contact the Stormwater Management Division of the City's Public Works Department at 890-3940.
- Stormwater Management Advisory Commission: As part of establishing the stormwater utility fee, the Raleigh City Council created the Stormwater Management Advisory Commission to review City stormwater management policies and programs and recommend any changes to address stormwater concerns created by or affecting existing or new development. The 10-member commission advises the City Council on matters related to funding of the Stormwater Capital Improvement Program, program policies and petition projects. The commission meets on the first Thursday of the month to address policy issues as directed by the City Council. For more information about the Stormwater Management Advisory Commission, contact Danny Bowden, the City's Stormwater Program manager, at 890-3940 or email [Danny.Bowden@ci.raleigh.nc.us](mailto:Danny.Bowden@ci.raleigh.nc.us).
- Stormwater Regulator Program: In recent years, the City of Raleigh has implemented significant regulations to manage stormwater impacts from new development. Effective May 3, 2006 an ordinance took effect that restricts development in Raleigh's floodplain. Under the ordinance, new construction in these environmentally sensitive areas is limited to no more than 50 percent of the designated floodway fringe, which is the outermost portion of a floodplain or the area outside the floodway. The ordinance does contain some exceptions, such as

new development that will not cause flood levels to rise. These exceptions must be approved by the City's floodplain administrator. The City had already restricted new development in innermost areas of a floodplain, referred to as the floodway. In May 2001, the Raleigh City Council adopted new regulations, commonly referred to as the Stormwater Control and Watercourse Buffer Regulations. These rules require new development to capture pollutants before they enter streams, and limit stormwater runoff rates to pre-developed conditions for regulatory design storm events. The regulations were enacted to protect the Neuse River and local streams from pollution, flooding and accelerated stream bank erosion. In conjunction with these rules, other erosion and sediment control requirements are helping minimize the impacts of new development on Raleigh's streams and lakes. Currently, permits are required for any development activities that disturb more than 12,000 square feet (approximately 1/4 of an acre), or are located in a floodplain or water supply watershed. City staff members review development plans and perform site inspections to ensure that soil erosion, floodplain and stormwater management requirements are followed. Under the program, more than 15,000 inspections are typically conducted annually on more than 1,200 projects.

- Drainage Assistance Program: In order to assist citizens with existing stormwater concerns, the City of Raleigh has established a drainage assistance policy. Under the policy, the City will provide technical design and cost-sharing assistance, if the owner is willing to provide necessary easements and share in the cost of the repairs. More than \$600,000 is spent annually on the program. Seventeen (17) projects were approved in 2007 to alleviate flooding of buildings and stream erosion on private property. To report drainage problems, citizens should contact the City's Stormwater Management Division at 890-3940.
- Stream Restoration: Another way the City of Raleigh is addressing existing stream impacts from urbanization is through restoration of streams that are actively eroding or have been adversely impacted by runoff from development. For example, construction was completed in April 2007 on the Mapleridge Road stream daylighting project that involved excavating a 66-inch drainage culvert and reconstructing a 30-foot-wide stream channel. The purpose of the City-funded project was to restore a stream that was piped and buried years ago to accommodate a residential subdivision. The \$1.1 million project is expected to relieve significant flooding of adjacent homes and Mapleridge Road itself. Also, water quality and wildlife benefits derived from the 600 feet of new stream are eligible for mitigation credits from the U.S. Army Corps of Engineers. Stream restoration projects in Chavis and Kentwood parks have been completed in Raleigh as part of a cooperative effort between the City and the State's Ecosystem Enhancement Program (EEP). The projects, which cost more than \$1 million, stabilized eroding stream banks and provided much improved water quality and habitat for wildlife in the streams and banks.
- Watershed Studies: In order to proactively manage the impacts of stormwater, the City of Raleigh has been preparing drainage basin studies for each of Raleigh's larger watersheds. The studies identify existing and future flooding, erosion, and water quality concerns and potential solutions or preventive measures. Fifteen (15) basin studies are complete. Currently under way is a comprehensive study of the Walnut Creek watershed. The City will begin additional studies of Crabtree Creek and other tributaries to the Neuse River this year.

- Lake Preservation. The basin studies also identify lakes for protection under the City's Lake Preservation Program. Lakes that provide significant public water quality and flood control benefits are prioritized for acquisition or preservation through easements. The City's first major lake preservation effort was Beamon Lake in the Brentwood neighborhood. Construction to repair the dam and restore the lake was completed in the spring of 2005. Funding for additional lake preservation projects is included in the City's five-year Capital Improvement Plan. These projects are for Upper Longview, White Oak, Carolina Pines, Lower Longview, Northshore, Greystone, Brockton and Brentwood Today lakes and a constructed wetland in Fletcher Park. The Fletcher Park program will cost approximately \$500,000, with funds mainly coming from state and federal grants. An amendment that incorporates lake preservation in the City's Comprehensive Plan was approved in early 2007. Also, water quality studies have been completed that identify 103 lakes in Raleigh that are slated for inclusion in the City's lake preservation program.
- Stormwater Drainage System Inventory: In the fall 1999, the City began a 20-year program to inventory public and private stormwater drainage facilities within the 175-square-mile jurisdiction of the City. These include rivers, streams, and underground pipes. Results of the inventory project will help the City produce digital maps that identify the locations and conditions of the drainage system. These maps play a vital role in meeting the City's stormwater management objectives. Inventory work is nearing completion on six major watersheds. Consultants have been hired to help the City expedite completion of an inventory of drainage systems citywide. Currently, the consultants are doing an inventory in the Big Branch watershed. They will next do the Mine Creek watershed. This project will assist the City with its clean water initiatives and other stormwater projects.
- Water Quality Program: The City of Raleigh maintains a broad water quality-monitoring program. Monitoring activities range from weekly ambient water quality testing to specific monitoring of the performance of water quality controls, such as the "packaged wetlands" that were installed at the City's Solid Waste Services parking lot in 2000. Water quality monitoring also is used to identify improper or illicit discharges to streams or the storm drain system. Citizens may call the City's Stormwater Pollution Hotline, 890-3940, to report improper discharges or dumping of pollutants into the storm drainage system. The City's Stormwater Management Division received 216 water quality complaints in 2007, 137 of which were illicit discharges that were eliminated. The City collected \$3,750 in illicit discharge fines in 2007 that were distributed to the Wake County Public School System. Public awareness is an important part of the City of Raleigh's stormwater management programs. The City works to involve and educate its citizens through television advertisements, flyers, and special events such as Waterfest, an annual water education festival sponsored by the City. Raleigh is a founding member of the Clean Water Education Partnership. It is through this partnership that Triangle communities collectively fund television and radio educational messages. The Stormwater Management Division also has conducted stormwater management workshops for teachers, other educators and City of Raleigh employees. In addition, the City has developed volunteer programs to promote stream stewardship and recognize citizen groups for their efforts to protect water quality in the City. These programs include Adopt-a-

Stream storm drain marking and monitoring. Citizens interested in joining these programs should call 890-3940.

- Stormwater Projects: The Stormwater Management Division currently has 77 stormwater projects under design or construction. These projects include upgrades to drainage infrastructure, such as pipes and culverts to alleviate flooding to roads and buildings. Projects involving lake upgrades and stream restoration also are included in the program. Water quality improvement projects, such as creating wetlands and improving water quality at City facilities, are in progress. The 10-year Capital Improvement Program to improve and study stormwater facility needs across Raleigh -- beginning in 2007 -- is estimated at \$141,303,000. A revenue bond program totaling \$46.9 million began this year to accelerate the construction of many of these stormwater improvements.
- Street Stormwater Maintenance Program: The stormwater facility maintenance program for streets has been upgraded to increase the level of service for maintaining the drainage system on City streets. This proactive program will assist in preventing flooding and pipe/catch basin failures. This work will save dollars by identifying problems early so major capital investments for failed drainage systems are not needed. Early identification of problems and repairs will result in less money spent on the drainage system. The current program cost is approximately \$2.5 million and is funded by the stormwater utility fee. The Street Maintenance Division of the City of Raleigh Public Works Department is responsible for the operation of the stormwater drainage maintenance program. The division has 45 employees who use equipment such as flushers to clean catch basins and street sweeping machines. Contact the City's Street Maintenance Division of the Public Works Department at 831-6446 to report problems with drainage systems on City streets that need maintenance for items such as broken or clogged catch basins.
- Sedimentation and Erosion Control: The City of Raleigh is in the process of upgrading its sedimentation and erosion control enforcement program to improve its effectiveness and consistency. Currently, the City has nine inspectors and a supervisor who inspect construction sites for compliance with the City's soil erosion control ordinance. The staff attempts to inspect all permitted land-disturbing activity in Raleigh at least once every two weeks. Additionally, seven stormwater engineers review erosion-control plans. Generally, the initial review of grading and soil erosion plans occurs within two weeks after submittal, which is substantially less than the 30-day review period allowed under State law. Raleigh's sedimentation and erosion control programs are the oldest of any city in North Carolina and generally exceed the state's standards. The City's rules require the installation of erosion control devices for any land-disturbing activity of 12,000 square feet or greater. Whenever a land-disturbing permit is issued, it requires an erosion control plan designed by a licensed professional trained in erosion control design. The City inspects the installations, such as silt fences or sediment basins, to assure they comply with Raleigh's regulations. Land-disturbing permits generally are not required for sites of less than 12,000 square feet. However, the City has experienced an increase in violations associated with these smaller sites. In order to address smaller sites, the City currently provides a letter recommending installation of sediment control practices for single-family housing construction. In addition, the City is conducting a study of sediment

control on smaller sites to determine the magnitude of the problem and possible solutions.

For more information, contact the Stormwater Management Division of the City of Raleigh Public Works Department at 890-3940.

## **OPEN-SPACE ACQUISITION, TREE PRESERVATION/PLANTINGS**

To better serve a growing population and to protect the environment, the City of Raleigh has made tremendous strides in acquiring property for open space, planting new trees and preserving existing trees.

Since 2003, the City has acquired 1,035 additional acres of open space for its nationally acclaimed parks and greenway system. In all, the City's Parks and Recreation Department manages 8,829 acres of open space -- 5,464 acres of parks and 3,365 in greenway acreage.

Furthermore, major park improvements have been made, thanks in large part to bond issues approved by Raleigh voters in 1987, 1995, 2000 and 2003. The 2003 \$47.25 million bond referendum and other available funds are being used to develop new greenway trails, acquire future parkland, upgrade existing park and recreational facilities, expand capacity of current facilities, and construct new facilities and redevelop existing ones.

In October 2007, Raleigh residents approved an \$88.6 million bond referendum for parks and greenway improvements. This bond program includes:

- \$16.1 million for the completion of projects that Raleigh voters approved in the 2003 parks and greenway referendum;
- \$16 million for greenway development;
- \$15 million for park land acquisition;
- \$4.9 million to expand the capacity of current facilities; and,
- \$36.6 million for new facility development.

In addition, the City of Raleigh and Wake County are in the process of identifying joint funding opportunities for acquisition of parks, greenways, conservation easements and open-space corridors. These acquisitions will enable various real-estate interests to be preserved substantially in their natural state. Preservation of greenway and open-space corridors adjacent to rivers and tributaries will provide a natural area for surface water runoff collection and filtration prior to reaching the water courses. Acquisition of these property interests will also enable preservation and promotion of vegetated areas, as well as provide a natural habitat for wildlife.

The City of Raleigh and Wake County have purchased Randleigh Farm, a large tract of farm property located on Auburn- Knightdale Road at Battle Bridge Road. (See section below on Randleigh Farm for more details.)

Preserving and maintaining trees also is a priority for the City of Oaks. A comprehensive tree conservation ordinance took effect on May 1, 2005. The ordinance establishes standards for preserving trees on lots that are 2 acres or larger, occupied or vacant.

Key provisions of the tree conservation ordinance are:

- Tree removal on regulated lots is limited to 15 trees in any 12-month period. Prohibited is the removal or disturbance of trees 10 inches in diameter breast height or larger that are within protected buffers;
- The removal or clearing of more than 15 trees, including timber harvests, requires submitting a tree conservation plan with the City and obtaining a City tree conservation permit;
- Tree conservation areas must be established on regulated properties that are being subdivided, developed or built on; and,
- The removal or disturbance of trees within established tree conservation areas is prohibited; and,
- All properties less than 2 acres are exempt from the ordinance.

The City hired two additional forestry specialists to implement and enforce the tree conservation ordinance. Before the regulations went into effect, the City conducted two seminars about the ordinance for land-use planners, developers and forestry/tree specialists. Six additional seminars were conducted after the ordinance became effective. Additionally, a user manual about the tree conservation ordinance is available online by visiting the City's website at [www.raleighnc.gov](http://www.raleighnc.gov).

The City's Tree Conservation Task Force was reconvened and has recommended changes to the tree conservation ordinance. The City Council's Comprehensive Planning Committee was directed to review the proposed amendments and make recommendations to the full council. A copy of the proposed changes can be obtained from the City Clerk's Office on the second floor of the Avery C. Upchurch Government Complex, 222 W. Hargett St.

In addition to preserving trees, the City of Raleigh encourages planting new trees. In the fall of 2003, the City launched a substantial program expansion for planting street trees. The Raleigh NeighborWoods program is a cooperative effort between the City and its residents. City funds and contributions from citizens are used to pay for the new trees. The NeighborWoods program has planted more than 5,000 residential street trees and 2,918 trees on thoroughfares. Because of the drought, the City has temporarily suspended the NeighborWoods program and all other City tree planting activities. Tree plantings will resume when the City lifts Stage 1 mandatory watering restrictions. The next best opportunity to plant trees will be in October. The City's Urban Forestry Division is sending tree watering tips to NeighborWoods program participants who did plantings prior to the drought.

In another tree preservation effort prior to the drought, the City of Raleigh worked with Trees Across Raleigh, a volunteer group, to plant approximately 7,114 trees in City parks since the inception of the partnership. In the fall 2007, the partnership excavated root collars and placed mulch around approximately 500 trees in Biltmore Hills Park. This past March, the City and Trees Across Raleigh teamed up with Service Raleigh at N.C. State University to do a root invigoration project for mature trees in Pullen Park.

For more information about open-space acquisition, parks and greenway improvements and the Raleigh NeighborWoods program, contact the City of Raleigh Parks and Recreation Department at 890-3285. Information about the City's tree conservation ordinance can be obtained by contacting the City Inspections Department at 516-2495.

## **RANDLEIGH FARM**

In March 2005, the City of Raleigh and Wake County purchased Randleigh Farm, a 420-acre tract located in eastern Wake County, nine miles from downtown Raleigh and adjacent to the sensitive waters of the Neuse River. The Wake County Public School System (WCPSS) has joined the City of Raleigh and Wake County in a partnership to develop the site.

Four silos in a grove of oak trees will be maintained on Randleigh Farm to remind residents, not only of North Carolina's proud and prominent agricultural history, but of the nearly three decades that this very land was dedicated to nurturing champion cattle. In 1966, North Carolina State University purchased these 420 acres in eastern Wake County to serve as a home for the prize-winning Randleigh Dairy herd that had been graciously donated to the university by entrepreneur William R. Kenan, Jr. For the next 27 years, the Randleigh Dairy Farm was the site of then innovative milking and waste-management practices. The herd was moved from the site in 1993. Since then, the large pasture has generated a bountiful hay crop.

The immediate goal of the partnership involving the City, Wake County and WCPSS is to develop the Randleigh Farm as a model site that encourages:

- public and private partnership;
- preserves open space;
- protects the Neuse River;
- promotes resource recycling;
- encourages public education on the environment;
- provides for greenway access, and;
- encourages sustainable development.

The long-term goal is to develop Randleigh Farm as a model of sustainable development. A sustainable development strives to simultaneously improve environmental quality, economic vitality, and social conditions.

Here are some planned features of the Randleigh Farm development project:

- **Open space** will accommodate pedestrian and bicycle traffic, passive recreation, active water quality protection, and a habitat for native biodiversity.
- **A mixed-use urban center** containing a government office park, homes, schools and businesses will blend components of multi-income lifestyles at work, at school and at play.
- **Two public schools** -- elementary and middle -- whose green, state-of-the art buildings and grounds will integrate best management practices in water, energy, and waste management.
- **The Freshwater Ecological Center** will serve as a public visitor and education center, offering the opportunity to learn about the interdependent ecology of the Neuse River Watershed basin.
- **A 105-acre Piedmont Meadow** will produce coastal hay, grain crops, ornamental grasses and native meadow plants, demonstrating the use of reclaimed water and biosolids.
- **Residences, offices and businesses** will model conservation practices of energy

materials, landscapes and stormwater. Re-use water will be available for non-potable needs.

## **RECYCLING**

The City of Raleigh's recycling programs divert household waste from the garbage cart to the recycling bin, thereby reducing the fees the City of Raleigh must pay for landfill disposal. Recycling also saves a variety of resources, including water, energy, minerals and trees; and it helps reduce pollution.

By reducing air and water pollution and saving energy, recycling offers an important environmental benefit: It reduces emissions of greenhouse gases, such as carbon dioxide, methane, nitrous oxide and chlorofluorocarbons, that contribute to global climate change. Recycling and composting reduce greenhouse gas by:

- decreasing the energy needed to make products from raw materials;
- reducing emissions from incinerators and landfills, which are the largest source of methane gas emissions in the United States;
- slowing the harvest of trees, thereby maintaining the carbon dioxide storage benefit provided by forests.

Since its inception in Fiscal Year 1989-90, the City of Raleigh's recycling program year has recycled at least 231,006 tons of materials.

Approximately 62 percent of Raleigh households participated in recycling a total of 19,276 tons in Fiscal Year 2006-07. (Recycling tonnage figures for FY '07-08 will not be available until after the fiscal year ends on June 30). The recycling tonnage from FY '06-07 represented a savings of 342,271 BTUs of energy, enough to power approximately 3,254 homes for one year. By recycling nearly 13,754 tons of paper in the last fiscal year, Raleigh residents saved 157,389 trees. In addition, the City of Raleigh's recycling efforts reduced overall greenhouse gas emissions of sulfur dioxide by 544 tons. Sulfur dioxide is a pollutant that causes acid rain.

In 2005, the City changed its recycling curbside service from every other week to every week, providing residents with 26 additional collections each year. Weekly curbside service is provided to residencies receiving regular garbage collection. In addition, the City offers multi-family recycling service to apartment, condominium and townhouse complexes in Raleigh. About 69 percent of the multi-family complexes in the Capital City are participating in the program.

The City had been collecting the following materials at the curb for recycling: newspapers and all inserts; magazines and catalogs; white paper, including junk mail; glass food and beverage containers; aluminum cans; metal food cans; and plastic drink bottles. These same items -- along with old cell phones, corrugated cardboard, paperboard, SBS board, and ink jet and toner cartridges -- also were accepted at the City's six drop-off recycling centers. In March 2006, old cell phones were added to the list of materials accepted at the recycling drop-off centers.

On July 1, 2006, a new contract with Sonoco Inc. took effect and the City added seven new materials to its recycling programs: all plastic bottles, corrugated cardboard, paperboard, gable top containers, aseptic drink boxes, aluminum foil and plastic beverage rings, such as six-pack rings. Residents are now able to recycle 14 different products at the curbside. Also accepting these 14 different products are the City's multi-family and drop-off recycling programs. The added materials increased the City's recycling tonnage by 11 percent last fiscal year.

The City of Raleigh, in partnership with Wake County, offers residents a way to recycle computers and related peripheral equipment. Residents can call the City's Solid

Waste Services at 831-6890 to have computers, copiers, fax machines and telephone equipment picked up at the curbside to be recycled. City crews take the equipment to a 40-cubic-yard collection container at the Solid Waste Services Department's main location. When the container is full, it is hauled to Wake County's Multi-Material Facility. Wake County contracts with a private company to recycle computers and other electronic equipment.

In the fall of 2002, Raleigh initiated the *Recycling in the Parks* program as a pilot using a State grant. Recycling containers made from 95-percent post consumer recycled plastic were purchased and placed in picnic areas and along jogging trails in five parks located in Raleigh. The program has since expanded to 31 parks throughout the Capital City. Residents using these parks have easy access for recycling aluminum cans, plastic drink bottles and glass drink bottles while away from home.

The City of Raleigh joined the Rechargeable Battery Recycling Cooperation in February 2003. The *Charge Up To Recycle* program allows residents to drop off rechargeable batteries for recycling at any of the City's 27 fire stations and at several City administrative offices.

Spent ink jet and toner cartridge recycling were added to the City's recycling drop-off program in December 2004. Each drop-off center has receptacles to collect and recycle these cartridges from residents and small businesses. A total of 2,312 cartridges weighing 1,295 pounds was collected in Fiscal Year 2006-07.

In an effort to keep usable items out of landfills, the City's Solid Waste Services Department operates a Swap Shop for residents at the Yard Waste Center at 900 N. New Hope Road. The purpose of the Swap Shop is to encourage waste reduction through reuse. The goal is to divert good, useable items away from the waste stream and conserve valuable landfill space. Residents looking to discard items in working, useable condition can donate them to the Swap Shop, which accepts items such as small appliances, garden tools and cookware. Residents in need of such items can visit the Swap Shop and, if the items are available, take them. The Swap Shop is open to Raleigh residents only. The shop's hours are 7 a.m. to 4 p.m. Monday through Saturday.

In 2006, Solid Waste Services implemented Downtown Raleigh Recycles!, a recycling collection program for establishments in the Central Business District. Curbside recycling service is available every Monday, Wednesday and Friday to approximately 138 customers. Recycling containers are provided to businesses for free through a grant from the N.C. Division of Pollution Prevention and Environmental Assistance. Recyclable materials include white paper, corrugated cardboard, chipboard, plastic bottles, glass food and beverage containers, metal food and beverage containers, magazines and catalogs. Participating businesses are recognized via window decals and newspaper advertising. In September, the one-year anniversary of the initiative, the City of Raleigh facilitated focus groups with current recyclers to use their input to increase participation and tonnage.

Whenever possible -- according to a management policy -- the City of Raleigh purchases recycled products, including recycled paper. City employees participate in in-house programs to recycle products, including office paper, newspapers, magazines, aluminum cans, plastic bottles, rechargeable batteries, and ink jet and toner cartridges. Furthermore, the City's Vehicle Fleet Services recycles motor oil, antifreeze, scrap metal, hydraulic fluids, solvents and batteries for use in City vehicles. Retread tires also are placed on many City vehicles.

The City also recycles yard waste collected from residents, such as leaves, grass clippings, and tree and shrub trimmings. The City has recycled approximately 458,673

tons of yard waste since Fiscal Year 1992-93, including 38,486 tons last fiscal year. Recycled yard waste -- wood chips, mulch and compost -- are sold to the public at the City's Yard Waste Center.

The City of Raleigh encourages backyard composting, provides free brochures on the subject and periodically sells compost bins to citizens. The City has sold a total of 6,569 compost bins since it began promoting backyard composting, including 295 bins last fiscal year. Composting converts grass leaves and table scraps into a rich humus or soil amendment for lawns, gardens and potting soils. Home composting can save residents money by reducing the need to irrigate and fertilize. It saves the City money by conserving much needed disposal space at the landfill.

In another recycling effort, the City of Raleigh operates a methane gas recovery system at the City's now-closed Wilder's Grove Landfill. The methane gas is sold to Ajinomoto USA Inc., which uses it to power the company's steam boilers. Also, to encourage the reuse of the closed landfill property and to preserve the environment, the City and Wake County have used grant funding to establish a wildlife habitat at the site. Wildflowers, fruit trees and grape vines have been planted at the landfill. In addition, workers have installed birdhouses, bat houses and butterfly houses.

For more information about the City's recycling program, call City of Raleigh Recycling at 831-6890. The City's Yard Waste Center can be reached at 250-2728.

## **RECYCLING: CONVENTION CENTER CONSTRUCTION**

In an effort to be environmentally sensitive and to keep usable materials out of the landfill, contractors for Raleigh's new downtown convention center are recycling debris generated by construction of the facility.

Skanska Barnhill Joint Venture, the City of Raleigh's construction manager at risk for the convention center project, contracted with D.H. Griffin Wrecking Co. in the fall of 2004 to demolish four buildings on the new convention center construction site on Salisbury Street, just west of the existing center. As part of the agreement, D.H. Griffin recycled debris from the demolition that had an estimated value of \$8,000. The materials were recycled at D.H. Griffin's recycling facility in the Capital City.

According to information provided by Skanska Barnhill, demolition of the four buildings produced 239 tons of debris. Of that, 198 tons -- or 83 percent -- were recycled by D.H. Griffin. The remaining 41 tons were non-recyclable materials. The 198 tons of recycled materials consisted of 135 tons of junk metal and steel and 63 tons of concrete, block and brick.

Also, Skanska Barnhill has implemented a construction waste management program at the new convention center site. The program collects and separates discarded construction materials for recycling purposes. The program has recycled more than 2,800 tons of debris. Approximately, 86 percent of the debris generated at the convention center construction site has been recycled and kept out of the landfill, further protecting the environment.

The recycling of building materials is part of the City of Raleigh's application for registration and certification of the new convention center building as a Leadership in Energy and Environmental Design (LEED) project with the United States Green Building Council. LEED certification distinguishes projects that have demonstrated a commitment to sustainability by meeting the highest performance standards in making the structures environmentally friendly. The process includes promoting an energy efficient building design and designating the convention center as being smoke-free for visitors and

employees, in addition to recycling building materials. The new convention center is scheduled to open in the fall of 2008.

Demolition of the old Raleigh Convention and Conference Center (RCCC) on Feb. 19, 2006 also yielded a large amount of recyclable debris. Holder Construction Co., the City's construction manager at risk for the new underground parking garage that is being built on the former RCCC site, was responsible for arranging for the recycling of debris from the demolition. The recycled materials consisted of 420 square feet of carpet, 485 tons of metal structural steel, 60 plumbing fixtures, 38 bleachers and other types of seating, 16 trash cans, five freezer/coolers, one escalator, and eight windows, doors and frames.

For more information, contact the Construction Management Division of the City of Raleigh Public Works Department at 807-5575.

## **BROWNFIELDS**

Brownfields are abandoned, idled, or under-used industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination

In 2001, the federal Environmental Protection Agency (EPA) gave the City of Raleigh a \$1 million grant to capitalize a Brownfield Revolving Loan Fund. Developers borrow money from the fund to clean up a brownfield and redevelop the property. This funding also offers the opportunity for non-profit agencies to participate in the program and receive up to 30 percent loan forgiveness; and municipal borrowers to receive up to 20 percent loan forgiveness.

In October 2004, the EPA awarded the City a Brownfields Assessment Grant in the amount of \$400,000 for phase I and phase II assessments of potentially contaminated property within the Development Zone. The grant is also used to establish cleanup and redevelopment strategies for assessed properties.

In 2006, the City identified candidate brownfield properties and conducted a review to identify which of the properties would be assessed by the City's environmental consultants, Hart & Hickman. There are several phases to the assessment process, including Phase I and Phase II assessments, followed by remediation and redevelopment planning. A phase I environmental site assessment (ESA) refers to inspecting the property and reviewing historical information and environmental records to determine if a property is likely to be contaminated. A Phase II assessment refers to collecting samples of soil and ground water to determine if the property is contaminated. The remediation and redevelopment planning step identifies cleanup methods and feasible redevelopment strategies for the properties.

Several sites have been assessed using EPA grant dollars. These sites include 301 Hillsborough St.; 500 E. Davie St.; 4 parcels at 500 Fayetteville St.; 615 Fayetteville St.; 10 W. South St.; the former 15 Lenoir St.; 600, 602, 616, and 820 S. Salisbury St.; and 1420 Garner Road.

- The City's "Convention Center Parking Lots" (CC Lots) site is comprised of several individual parcels totaling approximately 3 acres of commercial property in downtown Raleigh. The specific parcels are located at 615 Fayetteville St., 10 W. South S.; and 600, 602 and 616 S. Salisbury Street. Most of the parcels had historical operations of potential concern, such as gasoline service stations, automotive sales and service facilities, and dry cleaning and laundry facilities.

- A phase II site assessment identified petroleum, solvent, and metal impacts to soil and/or ground water at the site. The petroleum impacts are believed to be associated with the presence of 14 fuel underground storage tanks across the site.
- An Analysis of Brownfield Cleanup Alternatives (ABCA) was approved by the EPA for the CC Lots site. Based on the ABCA approved by the EPA, 616 S. Salisbury St. was remediated in September 2007, and 10 W. South St. was remediated this past February.
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- 500 East Davie St., a City-owned commercial site, is a 0.83-acre property near downtown Raleigh that was originally developed in 1930. The site vicinity was used for a variety of operations, including vehicle maintenance services, laundry and dry cleaning, and church-related uses.
  - The results of the phase I environmental site assessment indicated an underground storage tank was located at one time in front of the building beneath the sidewalk along East Davie Street. The phase II ESA results found a modest impact to site soil and ground water from petroleum hydrocarbon compounds. In addition, there appears to be modest impact from petroleum hydrocarbon compounds to the soils below the warehouse slab.
  - The recommended cleanup activities include properly closing the underground storage tank and removing the sump sediment. Limited excavation and disposal of soil contaminated with petroleum hydrocarbons in localized areas under the concrete slab may be required. This site is scheduled for cleanup in May.

The City was successful in getting revolving loan funds for the cleanup of assessed City-owned properties into what is considered a more permanent brownfields program that can be utilized for brownfield cleanup even after the formal EPA grant closes out. Both the \$1 million Brownfield Cleanup Revolving Loan Fund and the \$400,000 Assessment Grant are set to close out on Sept. 30.

For more information about City's brownfields program, contact the City of Raleigh Planning Department at 516-2626.

### **ALTERNATIVE FUEL VEHICLE PROGRAM**

The City of Raleigh is one of the founding members of the Triangle Clean Cities Coalition. The coalition is a group of more than 40 stakeholders in six counties: Wake, Durham, Orange, Johnston, Chatham and Franklin. The group's mission is to encourage and accelerate the use of alternative fuel vehicles in the Triangle by creating partnerships to develop a market and supporting infrastructure for alternative fuel vehicles

In 2001, the Triangle Clean Cities Coalition became the 80<sup>th</sup> region in the country to be recognized as part of the national Clean Cities program.

Alternative fuel vehicles help reduce automobile emissions and improve air quality. The City of Raleigh has used alternative fuel vehicles in its fleet of automobiles for the past eight years. In the current fiscal year, the City has acquired 29 alternative fuel vehicles, giving the City a total of 320 alternative fuel vehicles among its fleet. The majority of these are flex fuel vehicles that use both regular unleaded fuels and alternative fuels, such as ethanol (E85 blend). The City also has automobiles that are powered by compressed natural gas (CNG) or electricity. The City has acquired 16 hybrid compact sedans and sport utility vehicles (SUVs) this fiscal year, bringing the

City's total number of hybrid vehicles to 32. Additionally, the City has been operating at least 75 percent of its diesel fleet -- or 186 trash collection trucks, recycling trucks and street dump trucks -- on biodiesel fuel (B20) since January 2002. B20 is a domestically produced renewable fuel derived from vegetable oil that significantly reduces harmful elements of diesel exhaust, such as carbon monoxide.

For three years in a row, the City has received Mobile Source Emissions Reduction Grants, administered by the Division of Air Quality of the North Carolina Department of Environment and Natural Resources (DENR). The City used these grants to purchase alternative fuel vehicles and construct a CNG pumping station.

Emissions reductions associated with the use of CNG vehicles vary but range from 50 to 90 percent in hydrocarbons, 30 to 60 percent in nitrogen oxides, and 85 to 90 percent in carbon monoxide. Biodiesel fuel reduces emissions by 24 percent.

The use of CNG vehicles also reduces the formation of carbon dioxide, a major contributor to global warming, by 30 to 40 percent. Another advantage is that the cost of CNG is significantly less than the price of gasoline, meaning CNG-powered vehicles have lower operating costs than conventional vehicles. Electric vehicles also are cleaner, quieter and a more efficient alternative to conventional vehicles.

In April 2004, the City of Raleigh opened a CNG pumping station at 4120 New Bern Ave., site of the City's Heavy Equipment Depot. The station serves the general public as well as City vehicles. Only credit cards are accepted. The CNG pumping station has enabled the City to have greater self-sufficiency in fueling its alternative fuel vehicles. Furthermore, the station provides the City an opportunity to increase its use of alternative fuel vehicles, expand the use of CNG into other parts of the City's vehicle fleet, and promote and encourage the use of alternative fuel vehicles by citizens.

In March, the City of Raleigh was awarded a \$68,000 grant from DENR to convert the exhaust systems on 68 large diesel engine trucks to a new diesel oxidation catalyst muffler that will reduce emissions by as much as 30 percent. The conversion is expected to be completed by October.

In August, the City received a grant from the North Carolina Solar Center to purchase a 1,000-gallon mobile fuel tanker to dispense the E85 blend of ethanol. The grant will pay 80 percent of the tanker's purchase price. The City plans to acquire a second tanker when funding becomes available.

The City of Raleigh is taking steps to acquire more fuel-efficient vehicles to save energy and reduce emissions. Vehicle purchases are being re-evaluated by City departments to determine if smaller or less-equipped vehicles can perform adequately without higher maintenance costs. This has resulted in significant purchase price and fuel savings. Last fiscal year the City replaced 13 full-sized trucks with compact trucks and 2 full-sized SUVs with compact SUVs.

The City also continues to explore resources that will enable it to support existing alternative fuel programs and initiatives, and develop new projects.

## **OTHER AIR-QUALITY INITIATIVES**

In addition to the alternative fuel vehicle program, the City of Raleigh has undertaken other air-quality initiatives:

- In 2004, the City of Raleigh earned the "Best Workplaces for Commuters" designation from the U.S. Environmental Protection Agency. The honor recognized the City for environmental and commuter friendliness. "Best Workplaces for Commuters" is a voluntary partnership designated to

reduce traffic congestion and traffic-related pollution. The program recognizes employers that offer employees commuting options that discourage driving alone to work. These commuter benefits include subsidized transit fares, carpool matching, vanpooling programs, bicycle lockers, shower facilities, on-site fleet cars and an emergency ride home program for non-driving employees who need transportation home in case of an emergency. The goal of the City of Raleigh's participation in the "Best Workplaces for Commuters" program is to have City employees arrive at work safe, on time and ready to work. By taking advantage of the City's commuter benefits, employees are able to enjoy the quality of life they deserve. Furthermore, the City saves money by providing these benefits while helping the environment;

- More than 369 City of Raleigh employees participated in the SmartCommute Challenge held in 2006. With the Challenge, employees in Wake, Durham and Orange counties were encouraged to save fuel and decrease pollution by carpooling, vanpooling, riding a bicycle, walking, telecommuting or using mass transit. A total of 12,780 Triangle employees pledged to get to work by means other than driving solo in their automobiles;
- Through its GoPass program (formerly called the UPASS program), Capital Area Transit (CAT) provides free bus rides throughout the year to employees and/or students of the City of Raleigh, State of North Carolina, Wake County Government, North Carolina State University, and Meredith College. To get free bus rides, City and State government employees must show their GoPass; Meredith and N.C. State students and Wake County employees have to display valid and current employee or school identification badges or cards;
- The City is planning a major upgrade of its computerized traffic signal system. In 2006, Raleigh voters approved \$4 million for the project as part of a \$60 million transportation bond issue. The City's contribution to the \$28 million upgrade totals \$7 million; the remainder will come from the North Carolina Department of Transportation. The signal-system upgrade will allow for citywide signal coordination and improved air quality;
- In its first two years, the City's Telework Project had more than 70 participants. This year the program has grown to more than 100 participants. The Telework Project provides an option to the Best Workplaces for Commuters initiative and enables City employees to establish a primary work location outside of their regular workplaces on a full- or part-time basis. This benefits both the City and its employees by addressing air quality and business continuity issues. The objectives of the program are to increase productivity, reduce consumption of fuel and decrease air pollution, increase employee retention, reduce employee absenteeism and save the City money on moving employees out of crowded municipal offices to other locations. Telework Project participants have saved an estimated 6,285 gallons of fuel and reduced major pollutants emitted via vehicles by more than 5,400 tons;
- In 2006, the Raleigh City Council unanimously endorsed a work program designed to further improve air quality and energy consumption practices in the Capital City. The work program was a joint collaboration between

the City of Raleigh and Wake County senior staff members who participated in the School for Applied Leadership. The work program calls for modifying purchasing practices to encourage projects that positively affect air quality, modifying vehicle use practices, further changing City employees' and citizens' commuting and air-quality behavior, rethinking the City's service delivery methods and improving energy management (lighting, heating, cooling, etc) at public facilities. The City is working with Progress Energy to explore ways the City can reduce electric energy consumption and costs; and,

- The City's Vehicle Fleet Services Division is working with City departments that are interested in installing software in diesel vehicles that automatically cuts off the vehicle's engine after a certain period of idle time (3 to 5 minutes). This technology is currently used in CAT buses.

For more information about these air-quality initiatives, contact the City of Raleigh Public Affairs Department at 890-3100.

### **ENVIRONMENTAL ADVISORY BOARD**

In 2006, the Raleigh City Council created the Environmental Advisory Board to advise the council on environmental matters including fuel and energy efficiency, as well as matters relating to environmental education and awareness, environmental awards and recognition programs, environmental quality and safety, and the development and implementation of City environmental policy.

The seven-member, council-appointed board was directed to focus on three issues:

1. Five-Year Goal: Should the City of Raleigh consider having a goal of reducing the City's use of fossil fuels by 20% during the next five years? Assuming a 2% annual growth rate over five years, this could mean a 30% reduction in fossil fuels over five years.
2. Kyoto Protocols: What does committing to abide by the Kyoto Protocols mean and should the City of Raleigh consider making such a commitment?
3. Energy Efficiency: Consider recommendations relative to improved energy efficiency in buildings.

On April 17, the Environmental Advisory Board recommended the City Council adopt a goal of reducing the City's use of fossil fuels by 20% over five years. The council accepted the recommendation with a unanimous vote. City staff currently is compiling the City's baseline fuel report for FY 2007-2008 and reviewing various initiatives and projects for implementation in its effort to achieve the stated goal.

Additionally, the City Council on Aug. 7 accepted a recommendation from the Environmental Board to join an international organization that is committed to reducing greenhouse gas emissions worldwide and to endorse the U.S. Mayors Climate Protection Agreement.

The City of Raleigh will join the International Council for Local Environmental Initiatives (ICLEI)-Local Governments for Sustainability, an international association of local governments and national and regional local government organizations that has

made a commitment to sustainable development. The \$2,800 annual membership fee in ICLEI provides the City with access to software that will help the City conduct an emissions inventory. Once this inventory is complete, the City will establish goals and strategies for reducing greenhouse gas emissions.

City Council endorsement of the U.S. Mayors Climate Protection Agreement commits the City of Raleigh to join other communities in taking steps to meet or exceed Kyoto protocol targets for reducing global warming pollution.

### **“LED CITY” INITIATIVE**

In January, “LED City” Raleigh and Cree Inc. turned on 141 light fixtures in a municipal parking garage. These fixtures use a new energy-efficient lighting technology called light-emitting diodes (LEDs). They were installed on the third level of the parking garage at the Avery C. Upchurch Government Complex as part of the first LED City initiative between the City of Raleigh and Cree to save tax dollars and protect the environment.

The City is realizing savings in energy and maintenance costs from the pilot project. According to a “LED City” report by the City of Raleigh and Cree Inc., the LED fixtures are projected to produce electricity savings of 46,720 kilowatt-hours per year, or about 40 percent of the lighting energy load. This equates to \$2,803 of savings per year based on current energy rates. Progress Energy, Raleigh’s primary electric utility provider, worked with the City and Cree to validate the energy savings.

In addition to energy savings, the City and Cree also reported substantial savings in maintenance costs due to the longer life span of the LED fixtures. These savings are projected to be \$3,325 per year, the report said.

Cree Inc., based in the Triangle, produces LEDs that provide a new source of energy-efficient light that can serve as the foundation for cost-effective lighting solutions. Lighting Science Group Corporation of Dallas supplied the LED fixtures installed in the Upchurch Government Complex parking garage. Most of the fixtures are never turned off, keeping the garage’s third level lit 24 hours a day. The LED lights on the perimeter of the garage are on at night but turned off in the daytime when natural lighting is adequate.

The initial investment to install the LED fixtures in the municipal parking garage was \$42,300, according to the LED City report. Savings in maintenance and energy costs from the LED technology will yield a payback during year seven of the pilot project if these savings continue to increase yearly as expected, by approximately 3 percent. As for the LED fixtures that are turned off in the daytime, the City will continue to realize energy and maintenance for an additional five years, or up to 12 years after the fixtures were first installed.

Patrons also are impressed with the LED light fixtures in the Upchurch Government Complex parking garage. According to survey results released in March, the number of respondents who perceived the garage as “very safe” increased by 76 percent after the LED fixtures were installed in the garage. Furthermore, the proportion of respondents indicating the lighting quality in the parking garage is “excellent” increased from 24 percent prior to installation of the LED fixtures to 86 percent after installation. This supports industry research that the quality of light in the garage is greatly improved with the LED fixtures compared to more traditional lighting. Unlike other more common lighting technologies, LED light sources do not contain harmful lead or mercury, further protecting the environment.

The success of the LED pilot project in the Upchurch Government Complex parking garage coupled with rapid improvements in LED technology have prompted the City to put LED fixtures in its new underground parking garage on the south end of Fayetteville Street. The first phase of the underground garage will have 950 parking spaces when it is complete this May. The 544 LED fixtures that have been installed in this initial phase are projected to save the City more than \$75,000 in energy and maintenance costs in the first year alone. The savings will total more than \$700,000 over the lifetime of the fixtures. The second phase of the underground parking facility also will be lit by LED fixtures. The second phase, currently under construction, will contain 550 additional parking spaces.

The City of Raleigh this year will be undertaking pilot projects that will use LED light fixtures in two parking lots in City parks, in areas along Hillsborough Street and in areas around the new downtown convention center. Also to debut this year is the LED-lit Cree Shimmer Wall on the west face of the convention center and a decorative LED lighting of the House Creek Trail Bridge over the I-440 beltline.

The LED City initiative between the City of Raleigh and Cree serves as a model for other cities that are considering implementing energy-efficient infrastructures. In the past year, the LED City program has grown to include three other cities: Ann Arbor, Mich.; Austin, Texas; and Toronto.

## **PUBLIC NUISANCES**

All Raleigh residents have a responsibility to make sure their property is clean, safe and free of potential health hazards. The Raleigh City Code and North Carolina state statutes set out the procedures used to control and remove dangers to the public health, and to help ensure a clean, safe and healthy environment in the Capital City.

The Housing/Environmental Division of the City of Raleigh Inspection Department is responsible for enforcing public nuisance violations in Raleigh. Penalties are imposed against owners of property who allow these health and safety nuisances to exist on their property. Under an ordinance approved by the City Council that took effect on Jan. 1, 2007, a property owner who abates a nuisance when notified of its existence by the City will not be assessed any fees. However if the property owner has a second nuisance code violation within 12 months of the first violation, the City will assess the owner an administrative fee of \$100 for the second violation plus a minimum \$250 civil penalty.

Generally, the City of Raleigh will notify a property owner of a public nuisance violation by first-class mail and possibly posting a notice of violation at the location of the public nuisance. The owner will have 10 days from the mailing and/or posting of the notice to correct the violation.

Under City ordinance, public nuisances include, among others:

- Any area which serves as a breeding ground or harbor for rodents, harmful insects or other pests;
- A place of dense growth of weeds or grasses, other than ornamental grasses, that are over 8 inches high;
- A place of shrubs or other similar vegetation over 8 inches high when the vegetation encroaches on the sidewalk, parkway, curb or edge of the pavement of any abutting street;

- A place of vines including, but not limited to, honeysuckle or other similar vegetation that encroaches on the sidewalk, parkway, curb or edge of the pavement of any abutting street, or encroaches on adjoining property;
- A concentrated growth of kudzu, poison sumac, poison ivy, poison oak or other noxious vegetation that encroaches on any adjoining property with a dwelling or commercial building, or encroaches on the sidewalk, parkway, curb or edge of the pavement of any abutting street;
- Any collection of stagnant standing water where mosquitoes and other insects tend to breed;
- Any open place where there is a concentration of combustibles, such as mattresses, boxes, paper, automobile tires and tubes, trash, old clothes, rags or other items;
- Any concentration of building materials that are not suitable for construction, including concrete, steel or masonry;
- Any concentration of garbage, animal waste, yard waste or any putrescible matter of any kind which is not maintained for collection in accordance with the Solid Waste collection code. This does not apply to properly maintained compost piles used for agricultural or horticultural purposes;
- Any open space where junked refrigerators, appliances or household furniture is left, including open porches;
- Any junk or concentration of litter;
- Flooding caused by improper or inadequate drainage from private property that interferes with the use of any street, sidewalk, park or other City-owned property;
- Any condition including, but not limited to, stumps, brush, junk, litter or other materials that block or obstruct the natural flow of a stream, creek or a defined ditch or drain;
- Any collection of water that has no adequate natural drainage and is or likely will become a menace to public health;
- Any improperly operated stormwater retention or impoundment device;
- Any visual obstruction which might constitute a traffic hazard;
- Nuisance motor vehicles;
- Any concentration of firewood or logs that are not free of rot and decay;
- Any tree or tree limb or concentration of branches which have fallen or have been cut except in a heavily wooded lot or a maintained protective yard;
- Any unhealthy plant or tree which has not been removed or altered within 15 days of notice from the City; or
- Any other condition declared by the City Council to be a danger to the public health, safety, morals and general welfare of Raleigh residents.

In addition, City ordinances prohibit abandoned and nuisance vehicles. An abandoned motor vehicle is one that is:

- Left on any public street or highway in violation of a traffic or parking law;
- Left on any public street or highway longer than seven days;

- Left on property owned or operated by the City of Raleigh for longer than 24 hours; or,
- Left on private property without the consent of the property owner, occupant or tenant for longer than two hours

A nuisance motor vehicle is one which:

- Serves as a breeding ground or harbor for insects, rats or other pests;
- Is surrounded by heavy growth or weeds or other vegetation over eight inches high;
- Is being used to store combustibles, such as gasoline, oil or other explosive or flammable materials;
- Is a collection for garbage, waste or water;
- Is positioned in such a manner that it may fall, turn over or make an unsafe movement;
- Is considered unsafe due to jagged metal or broken glass; or,
- Any other vehicle that the City Council has specifically declared a health and safety hazard and a public nuisance.

The City of Raleigh Police Department is responsible for the removal of abandoned or nuisance vehicles from public streets or City-owned property. No notice to the vehicle owner is required. The Housing/Environmental Division of the City's Inspections Department is responsible for the removal of abandoned or nuisance vehicles from private property. The vehicle owner is notified of the violation by a notice affixed to the vehicle and by certified mail. If the violation is not corrected by the date set by the City (no sooner than seven days after the notice is affixed), the vehicle will be towed away at the owner's expense. To regain possession of the vehicle, the owner must pay storage fees owed to the towing company as well as towing charges. If payment is not made, the towing company will dispose of the vehicle.

City ordinance also prohibits the open storage of two or more vehicles that are:

- Unlicensed;
- Uninspected;
- Wrecked;
- Crushed; or
- Partially or totally dismantled

After preliminary inspection and notification of violation by the City, the vehicle owner is given a deadline to remove the vehicle. If the vehicle is not removed by the deadline, the City inspector may issue a civil citation against the owner with an initial fine of \$100 per vehicle. If the violation is not corrected after the initial citation is issued, the fine increases to \$500 per day until the matter is resolved.

For more information about public nuisances, contact the Housing/Environmental Division of the City of Raleigh Inspections Department at 807-5110.