## BACKGROUND

Public utility services are provided to the residents of the City of Harrington including electric, natural gas, water, telephone/cable, and sanitary. The City of Harrington provides treated domestic water to its residents from four supply wells and maintains water storage towers and a water distribution system for its service area. The City has implemented major changes to the wastewater system and no longer treats its wastewater. Wastewater is now transmitted to the County's regional treatment facility. The following sections describe the water and wastewater systems the City maintains and includes recommendations for improvements to these to be implemented over the next five year planning phase covered in this Comp Plan Update.

## WATER SYSTEM

The City's water distribution system consists of pipes of various materials and diameters, ranging from 2-inches to 12-inches in diameter. Fire hydrants are located throughout the system for fire protection. Older portions of the City's water distribution system are often piped with galvanized steel pipe with diameters of 2- and 4-inches. These pipes are part of the original system and do not meet current State of Delaware Fire Marshal requirements for new construction. New water mains, when installed, are a minimum 6-inch diameter. As shown on Exhibit 1, the majority of the under-sized network is located on the west side of the City's original center. The small-diameter water mains have served their purpose for over 50 years and are now of questionable structural integrity. Old galvanized steel is susceptible to leaks due to corrosion and pitting. Water mains are upgraded as funding becomes available. Water mains along Clark Street and East Street were upgraded in 2004. New water service interconnections were added to the Fairgrounds complex and to commercial properties on the east side of US Route 13.

## WATER SUPPLY

The City's water supply comes from the Frederica aquifer formation (a deep, confined sand horizon which is naturally protected from surface contamination). Harrington withdrawals water from four DNREC-permitted water supply wells to meet the needs of its domestic service area. Water from each well is treated with chlorine for disinfection. The City also maintains one above ground water storage tank.

| Well ID | Permit No. | Aquifer | Depth below Ground Surface (ft) | Capacity (gpm) |
|---|---|---|---|---|
| Well No. 2 | 10197 | Frederica | 240 | 150 |
| Well No. 3 | 10196 | Frederica | 240 | 210 |
| Well No. 4 | 156225 | Frederica | 240 | 450 |

Well No. 1 is not in service and is not currently included is the City's allocation permit. This well produces 210 GPM and is only used on an emergency basis.

### Existing Well Capacity

The total current water production capacity from all wells is approximately 1,166,400 gpd. However, the City's Water Allocation Permit limits the amount of water withdrawal to 700,000 gpd. Peak water demand recorded during the summer drought of 2002 was approximately 700,000 gpd. The City of Harrington is conducting a hydraulic modeling analysis to determine the need and location of new wells to meet existing and future/projected water demands. The City intends to meet the Source Water Protection Ordinance requirements and Water Allocation requirements when improvements are implemented.

**Population Growth**

According to the 2010 United States Census, the population of the City of Harrington was 3,562 persons. However, the 2007 United States Census Estimate projected a 2007 population for the City of 3,330. Much of the country, including Delaware, experienced strong development related growth during the first few years of 21st century. However, that growth appears to have fallen off significantly in recent years.

County and City Census Projections, below, includes 2010 United States Census populations for the City of Harrington. The table also includes Delaware State Planning population Consortium projections for Kent County.

| **County and City Census Projections** | | | | |
|---|---|---|---|---|
| | **Per Capita Recorded** | **Per Capita Projected** | | |
| **Year:** | **2010** | **2020** | **2030** | **2040** |
| **Kent County*** | 162,310 | 181,790 | 196,330 | 212,030 |
| Annual % Change | n/a | +1.2% | +0.8% | +.8% |
| **Harrington** | 3,562 | 3812 | 4,079 | 4,364 |
| Annual % Change | n/a | +0.7% | +0.7% | +0.7% |

Delaware Population Consortium Annual Population Projections, October 28, 2010, Version 2010.0, details of which are available at the internet website:
http://stateplanning.delaware.gov/information/dpc_projections.shtml

The per capita data provided in Table 1 for the 2010 population of the City of Harrington was based on the 2010 United States Census. The estimated population of 3,812 represents an annual increase of 0.7% per year from 2010 to 2020.

The City of Harrington population projections for 2030 and 2040 are based on a level growth rate of 0.7% per year. These projections provide an annual population increase of approximately 27 people per year for the City of Harrington. It is anticipated that this population growth trend can generally be applied to the entire City of Harrington service area.

## WATER STORAGE

Water storage capacity is achieved through a 250,000 gallon 5-leg-style above ground water storage tank. The City continues to maintain this tank, having recently repainted the tank. The City requires additional water storage (500,000-gallon) to provide additional emergency and fire flow water capacity. The additional storage will also benefit the residents by improving pressure to areas on the west side of City during periods of high flows.


## WATER IMPROVEMENTS

The City understands that significant upgrades are required to both sustain their existing system and increase water availability for future users. In 2009, the City completed a hydraulic water model to evaluate the necessity for improvements to their system. The study revealed that the City needs to upgrade their system to include an additional well, an above ground water storage tank, piping replacement, and the addition of new piping to loop the existing potable water system. The City will review these needs and provide a mechanism to implement the additional facilities required to maintain and expand the potable water system. Projects that have already been identified include water main replacements on Liberty Street, S.R. 14 (westbound), and S.R. 13., installation of a new 500,000 gallon above ground water storage tank and installation of a new 350 gpm potable well. The City applied for a loan to pay for the water main replacement on Liberty, S.R. 13 and S.R. 14 and the new well through the Drinking Water State Revolving Fund. The loan request was for $2.24 million. Alternate funding options are being explored to fund the new above ground water storage tank.

In 2012, the City installed 1141 new water meters at all residential properties and 71 new water meters at commercial properties. This improvement will allow the City to not only accurately measure water usage but also the corresponding wastewater usage and develop fees accordingly.

## WASTEWATER SYSTEM

The City of Harrington wastewater service area includes residences and businesses within the municipal boundary of the City of Harrington, as well as the Town of Farmington, the Delaware State Fairgrounds, and select parcels located just outside of the city municipal boundary, all within Kent County. All residences and commercial facilities within the City of Harrington are required to be connected to the municipal sewer system. The Delaware State Fair includes

Midway Slots and Simulcast just outside of the City's municipal boundary. A map of the sewer service system is included as Exhibit 2. The State Fair and Town of Farmington are located immediately south of and directly adjoining the City of Harrington.

The City of Harrington Wastewater Treatment Plant is located south of Delaware Route 14 and east of US Route 13, within the City limits of Harrington. A facility location map is provided in Exhibit 2.

**System History**

As currently configured, the City's wastewater system has been in operation since 1981. A smaller wastewater treatment plant configuration existed prior to 1981 when the lagoon system was constructed. The wastewater treatment plant was taken out of service and closed in 2012.

The collection and conveyance system was constructed prior to and following construction of the wastewater treatment plant. Within the City of Harrington, collection and conveyance pipe network includes 8, 10, 12 and 15-inch gravity sewer mains. Seasonal high groundwater table regularly contributes water into the collection system. Inflow of storm water into the system is also a significant concern. Flow can increase quickly by a factor of 5 during significant storm events. Despite this condition, the gravity collection system is of adequate size to accommodate existing hydraulic loading, including inflow and infiltration (I & I), as calculated by the City Engineer. The City Engineer has conducted a partial I & I study to note specific areas where I & I is a problem that can be resolved through construction remediation. Note that the City is currently investigating remedial options to address I & I and is pursuing both grants and low interest loans to control the I & I problem in the City.

The City owns and operates six pump stations within the collection and conveyance system to provide service within the City of Harrington. These pump stations with their associated capacities are listed in the table below. The pump stations are in adequate condition but will likely require upgrades and maintenance in the foreseeable future.

| City of Harrington, Wastewater Pump Stations | | | | |
|---|---|---|---|---|
| **LOCATION** | **Peak Flow (gpm)** | **Pump Station Operating Point** | **Force Main Diameter** | **Length (feet)** |
| **N. Calvin Street** | 14 | 30 FT TDH @ 60 gpm | 2" | 50 |
| **Clark's Corner** | 43.5 | 70 FT TDH @ 60 gpm | 3"<br>4" | 45<br>2050 |
| **Mispillion Street** | 50 | 25 FT TDH @ 60 gpm | 2" | 40 |
| **Smith Avenue** | 30 | 25 FT TDH @ 60 gpm | 3" | 800 |
| **Second Avenue** | 37.5 | 30 FT TDH @ 60 gpm | 2"<br>4" | 36<br>810 |
| **WWTP Pump Station** | --- | 55 FT TDH @ 1100 gpm | 8" | 315 |

I & I issues have been investigated several times since 1996. Areas where I & I is a significant concern have been identified and are being addressed over time.

There are 1,017 residential connections in the City of Harrington, 71 residential connections in Farmington, and seven (7) out-of-town residential connections. The domestic/commercial flow ratio is approximately 65/35.

**Condition of Facilities**
The collection and conveyance system is in need of repair. As noted above, I & I in the collection and conveyance system provides a persistent operational problem particularly with respect to elevated groundwater conditions and wet weather conditions.

**System Operation and Maintenance**

Due to persistent flow capacity concerns, the conveyance system is in need of significant renovations in order to accommodate continued development and growth, and address unnecessary treatment fees for I & I.

**Growth**

The impact of growth on the conveyance system is anticipated to be limited during the short term three to five year planning period, starting in 2010, with adequate capacity in the existing collection and conveyance system to accommodate planned population and development growth. Both commercial and residential growth in the service area will be strongly influenced by economic conditions. Current economic conditions are not conducive to growth in the short term but are anticipated to support growth over an extend term planning period.

Based on population projections discussed herein, population growth between the year 2010 and 2040, is anticipated by expand by approximately 802 persons. This represents a growth rate of 0.7% or approximately 22% over 30 years. The existing system could accommodate the hydraulic demand this grow rate, but if projects currently pending are fully built out, then the existing system cannot accommodate the growth.

## WASTEWATER IMPROVEMENTS

In 2009, the City of Harrington began exploring alternatives for its sanitary sewage impacts to address the need for reduced wastewater treatment plant discharge nutrient loadings. The options included wastewater treatment plant expansion, land application of treated effluent, conversion of the existing wastewater treatment facilities to a pump/transfer station with discharge to the Kent County wastewater treatment plant, and continue with current operating practices. The alternative that provided the most technically feasible, environmentally sound, and fiscally responsible option was the transfer of raw sewage to the County wastewater treatment plant by construction of a pump station and force main.

The project resulted in the construction of a force main that connects the City of Harrington sanitary sewer collection and conveyance system to the County collection and conveyance system, and the construction of a pump station on the grounds of the existing City wastewater treatment plant. The force main is approximately 10.5 miles in length and is located within the right-of-way of State highways. In 2012, the City and County entered into a 10-year User Agreement that details the terms and conditions of conveyance and treatment capabilities and the parties' responsibilities. The Agreement automatically renews annually unless specifically terminated by the City. The transmission system has an initial minimum capacity of 1 MGD for the City.

This project was completed in 2012 and as such the City no longer handles wastewater treatment. Currently, the plans to close the wastewater treatment plant and lagoons are being reviewed by the Department of Natural Resources and Environmental Control. The City will then be responsible for the maintenance of its pump stations and gravity sewer system.

The City was awarded two wastewater planning grants for two I&I studies; one $25,000 grant was used to study in the northwest quadrant of the City, and; one $25,000 grant was used to study the southwest quadrant. Based on these two studies and the problems that were identified, the City was awarded a $1,000,000 low interest loan in 2012 for I & I removal throughout the northwest and southwest portion of the City. This work will commence as soon as possible.

In addition, the City was awarded a $25,000 matching grant for a sewer capacity evaluation to identify areas where infilling and development may hydraulically stress small diameter collection sewers which may ultimately be needed to serve as interceptor lines. The evaluation examined existing interceptor sewers relative to their current capacities and the need for additional capacity. This study identified some deficiencies of existing infrastructure where improvements were recommended. It also identified some deficiencies when considering future, full build-out scenarios. The City is currently evaluating the recommendations and will use the results to plan for immediate and future upgrades.

**SUMMARY**

**Water**

In order to maintain its existing service and provide for future growth, the City applied for a loan through the Drinking Water State Revolving Fund for water main replacement on Liberty, S.R. 13 and S.R. 14 and a new well. The loan request was for $2.24 million. Alternate funding options are being explored to fund a new above ground water storage tank.

In 2012, the City installed 1141 new water meters at all residential properties and 71 new water meters at commercial properties. This improvement will allow the City to not only accurately measure water usage but also the corresponding wastewater usage and develop fees accordingly.

**Wastewater**

The City is in the process of implementing I&I remedies once viable funding is secured. In addition, it is planning on further I&I studies and sewer pipe upgrades.