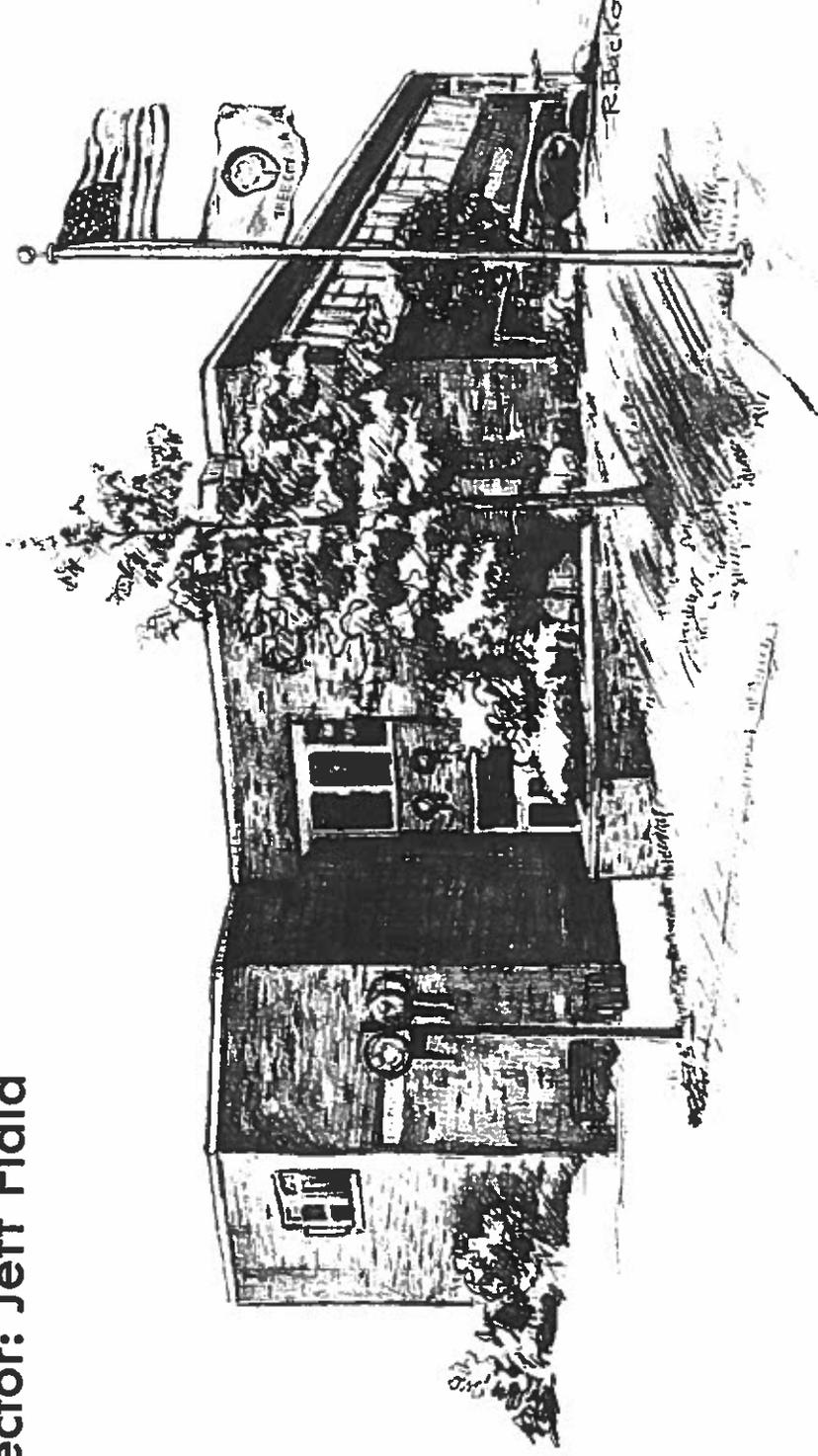


# RECREATION DEPARTMENT

## ANNUAL REPORT 2014

**Director: Randy Lewis**  
**Assistant Director: Jeff Fiala**





# RECREATION DEPARTMENT CON.



## Special Events

- Easter Egg Hunt
- Memorial Day coordination
- Fourth of July participation
- Senior Afternoon at the Races
- Baseball Days
- Progressive Field
- Halloween Party
- Christmas Party





# RECREATION DEPARTMENT CONT.

## **BASKETBALL**

167 participants in instructional program  
Summer Basketball camp 24

## **SOCCER**

185 participants in spring league  
75 participants in fall league

## **SWIMMING**

29 participants on swim team  
138 participants in swimming lessons

## **SOFTBALL**

106 participants in summer rec. league with  
the addition of Garfield Hts. to our program

## **BASEBALL**

419 participants in summer rec. league

## **FLAG**

## **FOOTBALL**

33 participants in fall league

## **SUMMER**

## **CAMP**

117 participants in our summer program

# RECREATION DEPARTMENT CONT.



## **Fast Facts & Activities**

- The Recreation Department maintains over 27 acres of property along with the baseball fields at various locations.
- In 2014, over 66,000 people utilized Ellenwood Center with permitted functions; this does not include open gym, or special events/activities.
- More than 30,000 individuals utilized the pavilion with permitted functions (does not include the open to the public uses).
- The Senior Citizen Van provided trips for over 2,700 residents, averaging almost 18 trips a day, and logging over 22,375 miles in 2014.
- The Ellenwood Center was open for activities on 322 of 365 days in 2014, almost 90% of the year.

# RECREATION DEPARTMENT CONT.



## Senior Programming

**Senior Van Service** - Our Senior van travels over a thousand miles a month to serve nearly 300 seniors. The van transports to doctors' visits, shopping trips, personal and business appointments and hospital visits.

**Senior Line Dancing** - nearly 20 seniors gather each Monday morning to enjoy some exercise and to socialize. This year the group expanded to Thursday evenings to serve seniors who are still working.

**Senior Chair Aerobics** – nearly 60 seniors have fun shaping up with this low impact exercise class.

**Senior Movie Wednesdays** – 20 seniors gather bi-monthly to enjoy some popcorn and movies from present and past.



# RECREATION DEPARTMENT CONT.

## Senior Programming Cont.

**Craft Class** – Once a month about 15 seniors get together to create a craft of the month.

**WII Bowling** – Several dozen senior residents have enjoyed participating in our newly-organized WII bowling league this past year at Ellenwood. One senior is currently holding a 241 pin average! Plans are underway to begin play with WII Golf or WII Baseball in the coming year.

**Tax Preparation** – We scheduled over 100 appointments for free AARP tax preparation services offered at Ellenwood.

**Senior Bus Trips** - The seniors group goes on 6 to 8 trips a year with a portion of the trip being subsidized by the city. The go to Indians games, plays, historical sites and many other trips.

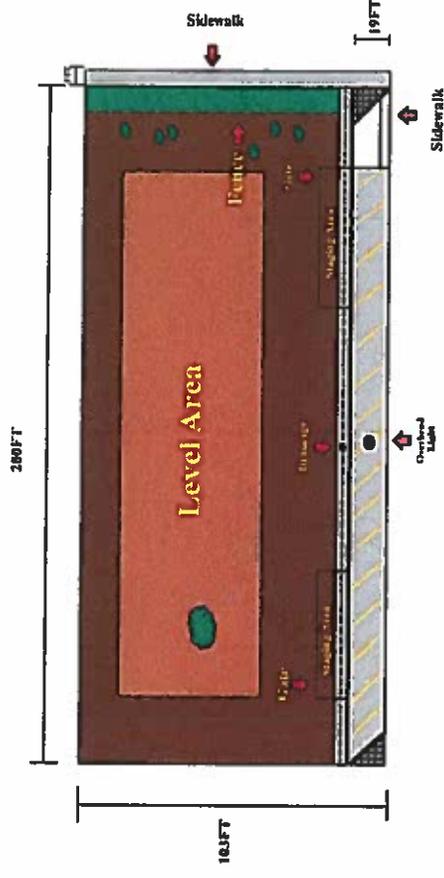
**Senior afternoon at the Races** – A special event for all city seniors was well attended. The seniors all had a great time cheering on their horses for prizes.



# 2014-2015 Improvements

- Interstate Park went through some significant improvements in 2014.
- The old tennis court asphalt was removed. It will be replaced with green space in the spring of 2015.
- New fencing and landscaping was completed at the site.
- Worked with World Changers – they painted fences and removed graffiti from the parks. Painted the ball field fence and swing sets at Ellenwood.
- We have procured a grant for a new senior van which will be purchased in 2015.
- We are working on plans for a dog park (Bark Park) which will be located at Taft Park.

Bedford Bark Park







# **DIVISION OF PUBLIC WORKS 2014 ANNUAL REPORT**

**SUBMITTED BY:  
CLINT E. BELLAR SERVICE DIRECTOR**



## **INTRODUCTION**

*The Public Works Department is comprised of four divisions (Service, Water, Waste Water, and Cemetery) which are basically responsible for the administration and maintenance of roadways, sign installation and repair, snow and ice control, brush and leaf programs, Public Works buildings and property maintenance, storm and sanitary sewer maintenance and repair, waste water treatment, cemetery maintenance, water billing, collections, mains, meters, hydrants, valve maintenance and repairs, all City vehicle maintenance and repair, and the monitoring of all services contracted out.*

*The department's 2014 full-time personnel was 37 at year end.*

*In addition to the primary responsibilities outlined above and in the annual report, the Public Works Department aids, assists and constructs improvements for other City departments. Public Works manpower, equipment and materials are also utilized to support the daily and/or emergency requests from other departments.*

*Numerous inquiries and requests received from residents, City Council and City staff personnel are responded to according to their priority, with Council requests being given first consideration. Any request which would present a hazard is addressed immediately. Other requests, of a less urgent nature are scheduled as time, personnel, equipment and weather permit. Supervisory and labor personnel meet frequently with residents to advise or make recommendations to help resolve their concerns. Public Works Department personnel are instructed to respond to the public with respect and courtesy.*

*The following report is intended to provide a more in-depth outline and description of the Public Works Departments yearly performance.*

***ACCOMPLISHMENTS FOR 2014***

1. Extensive in-house street repairs.
2. Phase 2 of Broadway water main project completed.
3. Waste Water – EQ Basin improvements finished.
4. Waste Water – ElectricPhase/Voltage Meter \$18,250.00
5. Waste Water – Primary Tank improvements, Valve replacements, Rotary Distributer Arm, Sludge Well repair \$219,900.00
6. Waste Water – Pump Station improvements started in 2014, pump replacement, roofing, controls, telemetry, valves, wet well cleaning, six pump stations involved. \$675,000.00

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***NO EQUIPMENT OR MAJOR PURCHASES FOR 2014***

**2014 PUBLIC WORKS DEPARTMENT**

Clint E. Bellar, DIRECTOR

Kathie Chapman, ADM. SECRETARY

**SERVICE DEPARTMENT**  
Shawn Francis, SUPT. OF PUBLIC WORKS

CREW LEADERS

William Darr  
Grayling Ross  
Ray Mahle

CARPENTER

Dan Kramer

ARBORIST

Joe Vitu

EQUIPMENT OPERATORS

Matt Gaborko  
Frank Spagnoli  
Jason Vespucci

EQUIPMENT MECHANICS

Rick Gromovsky (Shop Foreman)  
Frank Horney  
Bryan Olschansky

MAINTENANCE WORKER

Ed Kearney  
Dennis Favazzo  
Nick Schaefer  
Jason Piscura  
Mike Fiorilli  
Andrew Janezic

**WASTE WATER TREATMENT PLANT**

Jason Milani, SUPERINTENDENT  
Jon Turk, ASST. SUPERINTENDENT

LAB TECHNICIAN

Todd Assad

MAINT. MECHANICS

Rick Soltis  
Kurt Pausch

PLANT OPERATOR

Wayne Schultz  
Jeff Peters

PLANT MAINT. WORKER

Jeff Boehm  
Travis Neely  
Dan Jansky

**WATER DEPARTMENT**

Terry Devlin, SUPERINTENDENT

CREW LEADER

BILLING CLERKS

Lynda Yarish  
Joanie Law

MAINTENANCE WORKER

John Sokolowski  
Frank Graci  
Bob Depew

METER READERS

3 Part Time

EQUIPMENT OPERATOR

**CEMETERY**

EQUIPMENT OPERATOR

Scott Spencer

### **ROAD MAINTENANCE PROGRAM**

Accomplishments in the 2014 Road Maintenance Program were completed through the utilization of city forces and equipment. No streets were done by contract for asphaltic overlays, chip and seal coating, and concrete repairs. Included in the street maintenance program are apron repairs, guardrail repairs, paint striping, curb repair, berm repair, cold patching, street sweeping, and debris removal. Due to budget cuts, no street work that is normally done by contract was performed.

### **REJUVENATING PROJECT**

Each year the streets that were paved the previous year are sprayed with pavement rejuvenator to put oils back into the asphalt and extend the life of the street. For 2014, this work was not done do to budget restraints.

### **CRACKSEAL PROGRAM**

The crackseal program proposes to extend the life expectancy of the roadways by sealing out water, ice, and other materials which penetrate voids in the pavement.

The Service Department performed crack sealing on all of the in-house road repairs in 2014.

### **CHIP AND SEAL**

No chip and seal work performed in 2014

### **STREET MAINTENANCE MAN HOURS 2014**

Street Repair (Curbs,aprons,berms,asphalt,)	3800 hours
Guardrail Repair	48 hours
Paint Striping	637 hours
Clean Debris	24 hours
Cold Patch	1408 hours
Street Sweeper	396 hours
Repair Brick streets	-0- hours
Trenching road ditches	-0- hours
Sidewalk Repair	72 hours
Sink Hole Repair	224 hours

## **SNOW AND ICE CONTROL**

The cost of snow and ice control is a large share of the street maintenance budget, and at the end of the year there is little to show for all the man-hours and equipment usage. However, this service provides safe passage for pedestrians and motorists.

For the 2014 winter season we joined ODOT's bid for the purchase of Rock Salt.

In many ways the public take snow and ice control for granted inasmuch as their tax dollars provide funds. However, city personnel work long tedious hours to provide and improve this service and are extremely proud of the job done. This department is aware that a good snow and ice control program is important to the City's public relations and economic well-being.

Responding to snow and ice emergencies is a team effort between the Police and Public Works Department. The police notify a crew leader when conditions warrant mobilization of snow removal crews, in turn, the crew leader contacts the appropriate number of personnel to handle the situation.

A typical snow removal crew consists of seven people, five drivers for the large trucks, one driver for a one ton truck, and crew leader or supervisor to monitor the operations and log the time that each street is plowed or salted.

### **SNOW AND ICE REMOVAL MAN HOURS 2014**

**1166 Regular Hours**

**1112 Overtime Hours**

**STORM AND SANITARY SEWERS**

This program addresses maintenance of the City's infrastructure of the storm and sanitary sewer systems. Both systems are on a five year maintenance program. The maintenance program includes cleaning and root cutting with our sewer jet, T.V. inspection of house laterals when warranted, and smoke or dye testing to keep storm water out of our sanitary sewers and vice versa. All catch basins are cleaned once yearly with our vac-all and the ones that are collapsed or deteriorated are rebuilt.

Both systems must be kept free of blockage in order to insure free flow of water and proper drainage. Most blockages result due to silt settlement, detergent/grease buildup, debris, litter, leaves, etc. Blockages are cleared by utilizing our sewer jet, which breaks up the material by forcing high pressure water through the pipe and washing it out. Other blockages may be the result of a pipe separation, break or deterioration. These blockages require repair, replacement and/or reconstruction of the damaged structure.

Man hours not included in the sewer programs are hours worked opening blocked house sewers. These hours are included in the miscellaneous/shop. The two employees that for the most part work on the house sewers are the sign dept. employees.

2014 HOUSE SEWERS – 768 total, approximately 1/2 to 1 hour per sewer call.  
AFTER HOURS SEWER CALLS – 56 hours overtime.

**STORM AND SANITARY MAN HOURS 2014**

Sewer Crew	1759 hours
Sewer Jet	202 hours
Vac-all (catch basin cleaning)	64 hours
Smoke/Dye test/T.V.	263 hours
Catch Basin Repair	499 hours
Sewer Repair	1219 hours
Repair Manhole Risers/covers	40 hours
Scupper repair	-0- hours
Storm water Training	19 hours
Sewer Camera Training	8 hours
Powers Road Pump Station	115 hours

### *Sanitary Sewer Repairs*

During 2014 the Service Department dug and repaired 27 residential sanitary sewer lines in the treelawn areas to help keep the number of sewer calls per year down. Most of these were root problems. Once our side is dug and repaired the property owner is then notified to make any repairs on their side, if repairs are not completed we will no longer service that sewer.





**LANDSCAPING - PARKS/PUBLIC LANDS**

These hours include maintenance such as hedge trimming, grass cutting, treelawn repair from plow damage and tree removal, sidewalk snow removal, and sidewalk repairs. Also included is planting of flowers throughout the city, leaf collection, stump removal, chipper service, and the installation and removal of Christmas Decorations, which have improvements every year.

**LANDSCAPING - PARKS/PUBLIC LANDS MAN HOURS 2014**

Landscape/Plant Flowers/Bricks at Commons etc.	1487 hours
Stumper/Chip removal	371 hours
Tree Removal	1158 hours
Chipper Service	715 hours
Leaf Collection	2108 hours
Clean Downtown/Sidewalks	213 hours
Mailbox Repair	8 hours
Christmas lights	1630 hours
Install Bike Racks	-0- hours
Tree Lawn Repair	534 hours
Street Dance/Produce Market/Bedford Falls/etc.	252 hours
Repair Square	60 hours
Downtown Lighting Repair	24 hours
Tree Pruning	150 hours
Park Bench Refinishing	6 hours
Rockside Road Planter Removal	8 hours
Fence Repair	8 hours
Banners	89 hours
Water Flowers	194 hours

**MISCELLANEOUS / SHOP**

Our miscellaneous items include, Sign Department Duties, Vehicle Maintenance Personnel. The Sign Department duties include replacement of signs due to accidents and deterioration, all house sewers, removal of debris from our roadways, graffiti removal, etc.

The Vehicle Maintenance Personnel are responsible for the maintenance and repair of all city owned vehicles.

The hours also include many projects completed for other departments with public works employees.

**MISCELLANEOUS / SHOP MAN HOURS 2014**

Equipment Repair	5568 hours
Body Shop	-0- hours
Sign Department/carpentry	2135 hours
Compost Facility	135 hours
Assist Water Dept.	360 hours
Haul Debris from Service Yard	136 hours
Shop Repairs/Cleaning	938 hours
Equipment Cleaning	552 hours
Assist Recreation	85 hours
Work at City Hall	12 hours
Storm Clean up	-0- hours
Misc. Work Orders	206 hours
Asst Waste Water – Construct New Bldg.	179 hours
Prep for Parades	38 hours
Traffic Control	16 hours
Haul Snow	177 hours
Assist Building/Court Dept.	18 hours
Assist Police Dept.	10 hours
Safety Training	72 hours
Assist Fire Dept	74 hours
Seal Coat parking lots	-0- hours
Household hazardous waste round-up	57 hours
Train Depot Repairs	14 hours
Salt Shed Repair	16 hours
Repairs at City Owned Homes	89 hours
CPR Training	48 hours
Salt Delivery/pushing	84 hours

**CEMETERY REPORT 2014**

**MONTHLY TOTALS**

January	3,775.00	July	6,500.00
February	5,500.00	August	3,095.00
March	3,775.00	September	5,260.00
April	5,650.00	October	9,275.00
May	2,395.00	November	5,775.00
June	4,210.00	December	3,450.00

**TOTAL \$55,465.00**

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Sale of Lots/Adults	21,450.00
Sale of Lots/Infants	
Opening/Closing-Adults	15,625.00
Opening/closing-Infants	
Cremations	4,500.00
Memorial Foundations	5,350.00
Tents	1,400.00
Miscellaneous	7,140.00

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Number of Burials	39
Cremations	20
Foundations	38
Sale of Lots	38

Cemetery Man Hours      3982 regular hours      117 hours overtime



# Water Department

In 2014 The City of Bedford water department had no violation. We maintained our sampling requirements by the E.P.A. The water department will continue sampling throughout the city in 2015.

During the 2014 year the water department had 33 water main breaks. A stainless steel repair band was used 28 times to repair the problem. We cut out sections of pipe between (4ft and 12ft) 6 different times, totaling about 46 feet of new ductile iron pipe installed. We also dug up and cut out 4 six inch mainline valves and 3 eight inch mainline valves and replaced them with new mainline valves. We also dug up 25 residential service boxes, we had to cut the service lines and replace with copper and new curb stops 13 times. We also had 7 service line leaks that we repaired because of damage or had leaks on the lines. The other 5 were to reset the boxes so they could be shut off at the street.



Stainless steel repair band

The water department cut out five 4" shut off valves and replaced them with new valves, so we could replace or repair the broken fire hydrants. We also replaced a total of 18 new fire hydrants throughout the city, and repaired another 6 hydrants with new parts so they would work properly. Thanks to all the hard work from the water department and help from the service department we have fixed all the water breaks and most of the roadways.

Fabrizi Construction and Paving finished the water line replacement on Broadway Ave. They replaced 2 six inch cast iron water mains with a new twelve inch ductile iron water main. They also put in a new eight inch water main on Old Broadway. 2,084 feet of new ductile iron pipe was installed on this project between the Union, Taylor and Broadway intersection and the Union, Mitchell and Broadway intersection.

The City also contracted Underground Utilities to come out and sound check the entire city. Fifty miles of water main, mainline valves and fire hydrants were all sound checked for water leaks. They found 5 hydrants leaking 3 water main leaks, and 1 mainline valve leaking. They also found 4 service line leaks, two of them were leaking a combined 60 GALLONS per minute and probably would not have ever been found because they were going right into the storm drains.



John Sokolowski obtained his Backflow and Cross Connection certification in 2014 and now oversees the city backflow program. John should be sitting for his Class 1 Water Distribution test in the spring of 2015. I will be continuing my education required by the O.E.P.A. to renew my Class 2 Distribution license as well as my backflow certification. Our laborers, John Sokolowski Frank Graci and Bob Depew are working hard every day to keep our city water mains, fire hydrants and line valves working properly. In 2014 we also replaced 120 (5/8) residential water meters 3 one inch meters and 4 two inch meters.

The Water Department has a multitude of responsibilities. Each day we perform several different duties that consist of the following.

INVENTORY	24 HOURS
WATER MAIN FLOW TEST	20 HOURS
REPAIR WATER MAIN BREAKS	1,320 HOURS
REPLACE RESIDENTIAL WATER METERS	240 HOURS
REPLACE COMMERCIAL WATER METERS	40 HOURS
LOCATE CURB STOPS (to shut water off at street)	100 HOURS
LOCATE WATER MAINS AND SERVICE LINES	200 HOURS
CONTINUING EDUCATION	240 HOURS
FINAL READINGS FOR BILLING	80 HOURS
SERVICE LINE AND CURB STOP REPAIR	200 HOURS
DELINQUENT MONTHLY SHUT OFFS	650 HOURS
READ MONTHLY ACCOUNTS	384 HOURS
METER REREADS HIGH & LOW WATER USAGE	500 HOURS
SPECIAL PURPOSE BACTERIAL SAMPLING	100 HOURS
MONTHLY REPORT TO THE E.P.A.	48 HOURS
DAILY CHLORINE SAMPLES	92 HOURS
INSTALL /REPAIR/REBUILD FIRE HYDRANTS	220 HOURS
CONSUMER CONFIDENCE REPORT	24 HOURS
TIME WITH CONTRACTORS	250 HOURS
BACK FLOW NOTIFICATION AND INSPECTION	400 HOURS

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**In conclusion the water department will continue working hard for our residents to give them the best service possible. We will also continue to provide the safest water possible, and will continue to educate ourselves and our residents.**

**Terry Devlin Jr.**

**Water Superintendent**



## **Wastewater Treatment Plant Annual Report, 2014**

Jason M. Milani, Plant Supt.

### **Plant Flow:**

During the year of 2014 the Bedford Wastewater Treatment Plant treated a total flow of 827,473,000 gallons. Average daily flow for 2013 was 2.267 million gallons. This was an increase from 2013 (0.033MGD/day or 33,000 gallons per day).

### **Flow Control/ Equalization basin:**



**Plant Equalization basin**



**Flow control building and main trunk line**

The plant flow is controlled by a sluice gate prior to the equalization basin. The sluice gate receives a 4-20 milliamp signal from the plant flow meter and opens or shuts accordingly to maintain flow at a rate which is optimal for desired plant performance. When the gate closes, flow is diverted into the equalization basin. This wastewater is then pumped back into the plant when influent flows decrease. (usually during the nighttime). This is accomplished manually at operator discretion. When the equalization basin is emptied, the entire floor must be cleaned using fire hoses to move the residual sludge to the pump hopper chamber where it can be pumped back into the plant for

further treatment. When it is not convenient or practical to pump the sludge into the plant, one foot of wastewater is left in the tank to mask odors emanating from the residual sludge.

When the capacity of the equalization basin is exceeded (2.1 million gallons), it overflows into the plant outfall where it is merged with the final effluent.

Currently, any equalization basin overflow is now counted as a separate sample point and not considered in the final effluent samples.

In 2014 the plant equalization basin was upgraded with new submersible pumps and a rail system for more efficient removal.

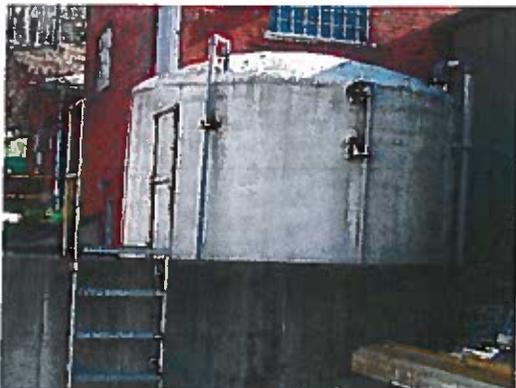
### **Preliminary Treatment:**

#### **Grit Chambers**

As wastewater flows into the headworks of the plant it is divided into two channels. Each channel is equipped with a coarse bar screen that filters out large objects.

The wastewater then flows into two grit removal channels where the velocity of the sewage is maintained at a rate where the inorganic particles (grit) are settled out. Grit is removed because its abrasive nature can damage pumps and other plant equipment. The accumulated grit is then drained into the grit storage bed. This is disposed of in a roll off box, and taken to a sanitary landfill.

### **Ferric Chloride:**



**Ferric Chloride Storage Tank**

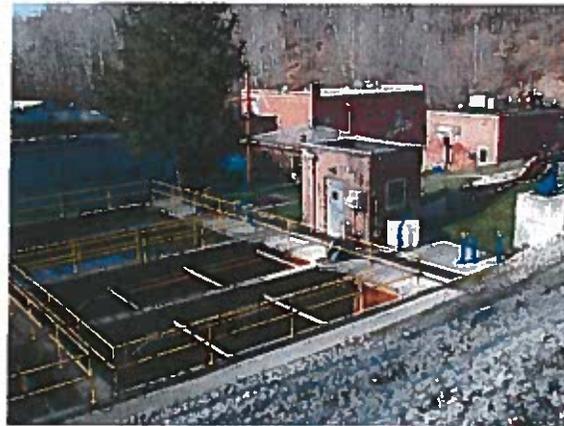


**Ferric Chloride addition to influent**

Ferric chloride is added to the plant influent at a point where the grit channels merge. This chemical precipitates suspended solids along with phosphorus. Ferric Chloride is the catalyst for phosphorus removal. The plant would not be able to remove the majority of the phosphorus without this addition. Since the initiation of both new oxidation towers to the plant process a further reduction in Ferric Chloride use has been realized. In 2009, with the issuance of a new discharge permit, the final effluent limitation for total phosphorus is now 0.7 mg/l, a decrease from the 1.0mg/l previous limit. This new, more stringent limitation means additional ferric chloride use is inevitable. Also, the Ohio EPA would like for all of the treatment plants in the Tinkers Creek basin to voluntarily reduce phosphorus discharge to below 0.2 mg/l which may be attainable with increased addition of Ferric Chloride.

## **Primary Treatment**

### ***Primary Settling:***



**Primary settling tanks**

Primary settling consists of six tanks with a total capacity of 327,000 gallons. Wastewater flows slowly through these tanks, while the solid matter is settled out and the floating matter is collected and skimmed off for removal. The solid matter (sludge) is collected in hoppers on the floor of the tanks through the means of a collector/skimmer

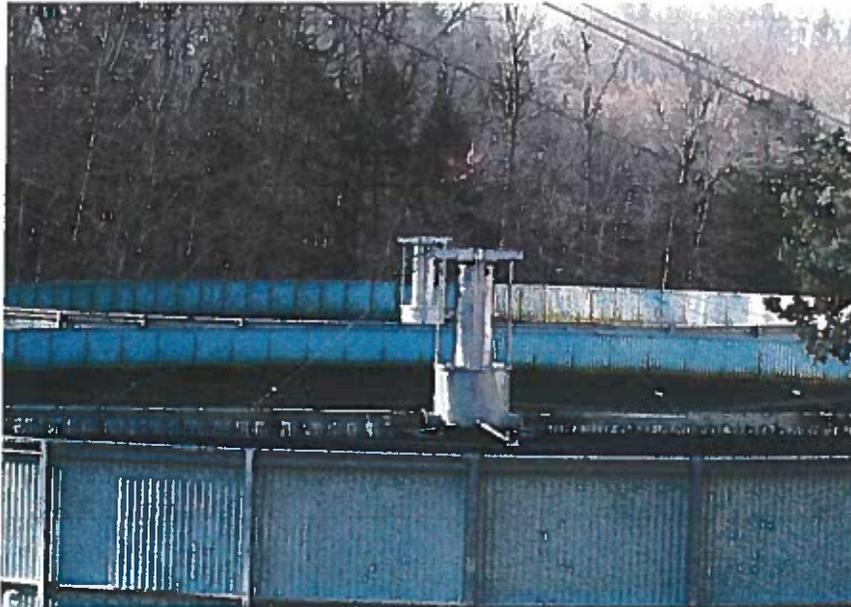
system. The sludge is then drawn off these tanks and flows to the sludge thickener. The remaining wastewater then continues into the secondary treatment process. A majority of the suspended solid matter in the wastewater is removed during this process. In 2014 two tanks were upgraded with new control valves.



**West Oxidation Tower**



**Primary effluent pumps**



**East Oxidation Tower**

## **Secondary Treatment**

### *Oxidation Tower(s):*

2005 was the first full year of operation for the newly constructed oxidation towers. After becoming established with the proper colonies and population of nitrifiers and aerobic bacteria the towers perform as expected, especially in the area of ammonia nitrogen removal. This is due to the increased surface area of the two towers for establishing colonies of bacteria. Also, pumping capacity and recirculation rates have increased with the new design. This is a positive point since plant flows are increasing with each passing year, partly due to the fact of increased water usage at Ben Venue laboratories. Increased recirculation rates are a benefit as they allow more wastewater to be treated in times of increased plant flow. Secondary treatment capacity with the old system was approximately 3.5 MGD. Currently it stands at approximately 5.0 MGD.

The result is less diversion of wastewater to the plant equalization basin which sometimes result in overflows. The oxidation towers continued to perform well for the year 2014 with NH<sub>3</sub> ammonia and C.B.O.D. levels far below effluent limitations. There have, although been serious issues with the primary effluent pumps that feed the filters. Two of the three had to be rebuilt in 2010 and another in 2012. In 2012 efforts were taken to modify the influent flow to prevent cavitation of these pumps. Plant personnel designed and installed two baffles at the inlet to minimize turbulence in the chamber. In 2014 it seems as though these modifications have helped reduce the wear on these pumps.

### Final Clarifiers:

During this second stage of secondary treatment wastewater flows from the oxidation tower to the two final clarifiers where remaining suspended solids are settled and collected on the bottom of these tanks and then pumped to primary treatment for further processing.

#### Old Final Clarifier (installed in 1974)



#### New Final Clarifier (installed in 1990)



### Pump Station:

The pump station receives flow from the final clarifiers. This station is equipped with four Fairbanks-Morse vertical turbine pumps that pump the wastewater to the rapid sand filter. A level sensor that senses the level in the pump station and operates the pumps according to the flow rate entering the station controls the pumps. Any flow in excess of the capacity of the pumps is bypassed directly into the chlorine contact tanks. Also, leaves from the final clarifiers continue to be an issue, hindering pump performance.

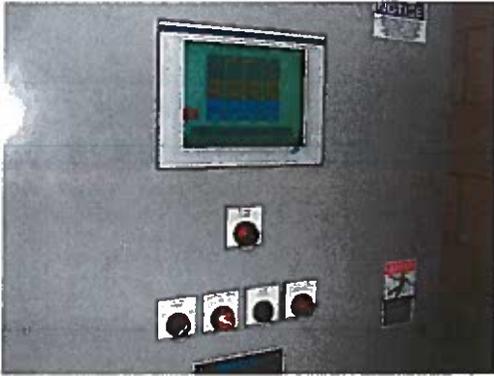
### Sand Filter Pump Station



## **Tertiary Treatment**

### **Rapid Sand filters:**

The Rapid Sand Filters were installed during 2002-2003 and were put into full operation in May, 2003. This process was part of a much-needed update to plant operations. Effluent quality has improved especially with the completion of the oxidation towers. The sand filters consist of four filter beds with 10 inches of sand media, underdrain system, clearwell and clearwell pumps for backwash purposes, mudwell and mudwell pumps to transfer backwash wastewater to the headworks of the plant, a chemical clean system, and fully automated controls for pumps, blowers valves and all other associated equipment.



**Sand Filter Control Panel**



**Sand Filter influent entering one cell**

### **Sand Filter Building showing influent piping from lift station**



In 2012 the CPU which controls the entire system was ruined during a power spike. This was ordered and replaced by myself. Insurance covered most of the cost.



**Sand filter influent showing screens, purchased for filtering debris, especially leaves which are a problem in autumn.**

The result of the sand filter installation is a definite improvement in effluent quality. Supporting data collected over the last year indicates a suspended solids removal efficiency of over 56% through the sand filters alone in 2014. This data was acquired in house using sample analysis of the influent flow to the sand filter versus the plant effluent flow. This data is enclosed in this report.

## **Disinfection**

### **Ultraviolet lighting**

The new Ultraviolet disinfection facility was implemented in 2012. This system does away with Chlorine gas disinfection which had been used previously. The system operated efficiently during the year and resulted in some of the lowest fecal coliform bacteria counts in the history of the treatment plant. This was obtained using only one bank of lights (the system is equipped with dual banks). The safety factor compared to chlorine gas is very significant. Plus, the costs associated with running the UV lighting compared to chlorine gas is slightly less.

In 2014 the UV disinfection system operated very well, maintaining effluent limitations for fecal coliform and the newly established parameter of E.coli.

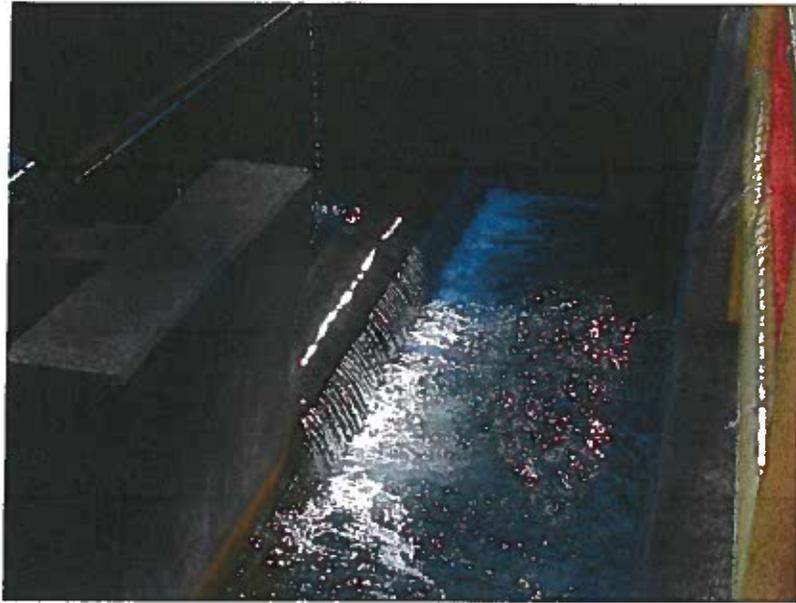
### **Defoamer**

A silicone based, food grade defoamer is fed to the plant effluent to reduce the foaming characteristics inherent in the effluent wastewater. The feed pump is controlled by a signal from the influent flow meter and is flow-proportional as well. The foaming problem was researched some years ago and the outside laboratories that performed testing for us were at a loss to explain the origin. Actually the plant effluent develops *more* foam the cleaner it gets and has always been a sign of a clean effluent.

More research has concluded that *surfactants* contribute to this foaming issue. Surfactants are found in soaps and detergents and are extremely difficult to remove in this type of treatment process.



**Wastewater Treatment Plant Effluent entering Wood Creek**



### **Wastewater treatment plant effluent**

#### **Sludge Processing**

##### **Sludge Thickener:**

Raw sludge that is drawn off the primary clarifiers flows into the sludge thickener. The purpose of this process is to thicken the sludge as much as possible for pumping into the primary digester. The denser the sludge is the more efficiently the sludge processing system works. Sludge is inherently more dense during the colder months so less sludge is processed during that time of year, on average. The remaining wastewater overflows from the sludge thickener to the influent of the oxidation tower for further treatment. Sludge is pumped from the thickener periodically according to the level of the sludge blanket, which is checked daily. A plunger pump on an automatic timer is used for this purpose. The thickened sludge is pumped directly into the primary anaerobic digester via the digester recirculation pump.

During 2014 a constant influent flow was maintained into the sludge thickener which helped in maintaining an even sludge blanket.

### Anaerobic Digesters:

There are two anaerobic digesters at the plant, a 60 foot diameter primary unit that is heated and recirculated continuously and a 40 foot diameter secondary unit that is basically a holding tank. Thickened sludge is pumped into the primary digester at periodic intervals based on current solids loadings and mixes with the primary digested sludge. This primary digester is kept at a temperature range of 90 – 97 degrees fahrenheit for optimal proliferation of anaerobic bacteria. At this temperature range the bacteria break down the organic matter in the raw thickened sludge and produce methane gas. This methane gas is used to heat the digester boiler/heat exchanger unit which, in turn, heats the sludge passing through it as it is recirculated. If the sludge is not kept in the correct temperature range, methane will not be produced in enough quantity to heat the boiler that keeps the sludge at the desired temperature. Each system is therefore, dependent on the other. This boiler is now 60 years old and will soon need replacement. If the boiler fails and the sludge temperatures deviate from the desired range, volatile reduction will not occur and limitations will not be met. Currently the limitations for volatile reduction are set at 38% or greater. With the digesters operating more efficiently since they were cleaned in 2001 the volatile reduction averaged 61.48% in 2003. Volatile reduction for the year 2004 remained efficient at 56.97%. Volatile reduction in 2005 was 54.51%. Volatile reduction for 2007 was 57.18%. In 2008 that figure was 60.56% and in 2009, 59.37%. For the year 2010 the Volatile reduction was 58.50%. In 2011 the Volatile reduction was 55.45%. VR in 2012 averaged 56.75% VR in 2013 was 53.20%. In 2014 the volatile reduction in the digesters was 57.51%. Greater volatile reduction results in more volatile matter destroyed. The destroyed volatile matter is converted into H<sub>2</sub>O and can be removed from the secondary digester in the daily process of drawing off supernatant. Supernatant is the liquid above the sludge blanket left over as the sludge is allowed to settle in the secondary digester. Better volatile reduction results in better settling in the digester and thus, less sludge production, since the sludge is denser. 272.63 dry tons of sludge were removed from the plant in 2014. The Primary digester is slated for cleaning in 2015 with the addition of a new boiler/heat exchanger with a greater heating capacity.

Also in 2014, enzymes continued to be added to the primary digester by plant personnel. These enzymes aid in the biological process and contribute in the volatile reduction process.



**Secondary Anaerobic Digester**

**Belt Press:**

The Belt press receives digested sludge from the secondary digester via a progressing cavity type pump that can handle high solids loads. Typical solids content of the feed sludge to the belt press averages 2 – 3%. The sludge is mixed with a cationic polymer that separates the solids from the water and is agitated in a fine-screened drum to remove some of the liquid content. It then flows onto a porous belt and squeezed between two belts which travel between a system of variously sized rollers where additional liquid is removed until the sludge falls into an auger and is moved into a hopper and falls into a dump truck parked in the garage below. Total solids content of the sludge at this final stage averaged 26.8% in 2013. A total of 128 loads were removed in 2014 compared to 113 in 2013.

Total volatile content averaged 42.97% as opposed to 63.94% in the sludge prior to digestion.

**Laboratory:**

Various pollutants are analyzed in the plant laboratory according to the NPDES permit. These include Water temp., C.B.O.D., Suspended solids, Total phosphorus, NH<sub>3</sub> ammonia, Total Kjeldahl Nitrogen, Oil and Grease, Nitrate + Nitrite, Total chlorine residual, Dissolved oxygen content, Fecal coliform, and pH in the final effluent. Total phosphorus, NH<sub>3</sub> ammonia, C.B.O.D., Suspended solids, and water temp. in the raw wastewater. Stream sample analysis of the upstream and downstream of the plant effluent include Water Temp., Fecal coliform, NH<sub>3</sub> ammonia, C.B.O.D., pH, Dissolved oxygen content and Suspended solids content. Sludge analysis consists of Total phosphorus, NH<sub>3</sub> ammonia and Total Kjeldahl nitrogen. An outside laboratory is used to determine heavy metal content in the sludge and final effluent, as we are not equipped to do so.

In 2014 process control analysis were performed at regular intervals to determine the efficiency and removals in each treatment process. This data is included also.

**Maintenance:**

During 2014 plant personnel replaced or repaired equipment in the following areas:

- Replaced various motors.
- Rebuilt various pumps.
- Painted interiors of lift stations and buildings at the plant.
- Painted outdoor equipment at the plant.
- Completed interior of plant workshop.
- Completed 12 months of operating reports and submitted to Ohio EPA.
- Completed State and federal sludge disposal reports and submitted.
- Grit, screenings and grease were collected and disposed of off site.
- Continued to remove and unplug lift station pumps at heather road lift station. These pumps often clog and are repaired on an average of once per week. Some sort of retrofit

is desperately needed here. This is now planned for 2014. This upgraded is currently being instituted.

**Mercury:** Effluent low-level mercury analysis has been performed by an accredited and EPA approved laboratory for the past few years and the results are encouraging enough to believe that the 11.0 ng/l limitation is attainable.

We also sample randomly including lift station and plant influent as well as stream samples from various locations.

Ng/l = nanograms per liter which is equivalent to parts per *trillion*.

The city has received a variance of 11.0 ng/l and is currently meeting limitations.

In 2014 the Mercury limitation variance was reduced to 7.0 ng/l which is currently being met.

One interesting note – Mercury analysis performed on precipitation gathered at the plant were often above effluent limitations.

### **Lift Stations:**

The lift stations throughout the city convey wastewater to the treatment plant. Some of the larger capacity lift stations are in need of rehabilitation since the last upgrade occurred in 1987. The Archer road lift station was rehabbed and new pumps were installed in 2013.

The lift stations are currently being rehabilitated with new pumps, electronics and telemetry systems.

**The following are data from 2014 and also plant performance for the prior decade for comparison.**





City of Bedford WWTP Upstream Results 2014

	Temp	DO	pH	NH3	Hg	PO4	Fecal*	Toxicity			
Jan	6.7	12.8	8	0.024	0.563	0.04					
Feb	4.4	13.8	8.1	0.065	0.537	0.07					
Mar	3.3	13.5	8.2	0.082	1.49	0.11					
Apr	8	10.92	8.1	0.024	1.91	0.08					
May	9.4	10.4	8.1	0	2.49	0.29	1				
Jun	17.6	7.31	7.9	0.027	0.71	0.5	0				
Jul	21.5	8.28	7.9	0.014	ND	0.006	560				
Aug	20.5	7.8	8.3	0.17	3.62	0.14	14				
Sep	19	8.3	8.1	0.016	1.13	12	20				
Oct	13.7	10.2	8.3	0.013	0.5	0.07	20				
Nov	10.1	10.8	8.2	0.014	1.5	0.002					
Dec	11.8	11	8.4	0.055	0.786	0.12			8%		12%
* - started e coli testing in August											

Toxicity Legend (from left to right):  
 acute 48hr C. dubia  
 acute 96hr P. promelas  
 chronic 7day C. dubia  
 chronic 7day P. promelas

Yearly Flow and Precipitation Data

	Flow (total MG)	Flow (monthly average)	MGD	Prec. (total in.)	Prec. (monthly average)
1995	870.163	72.514	2.384	41.16	3.43
1996	1040.807	86.734	2.844	52.64	4.39
1997	924.167	77.014	2.532	42.96	3.58
1998	862.318	71.860	2.363	38.84	3.24
1999	850.658	70.888	2.331	42.64	3.55
2000	888.654	74.055	2.428	47.23	3.94
2001	844.290	70.358	2.313	34.71	2.89
2002	913.123	76.094	2.502	41.21	3.43
2003	1024.082	85.340	2.806	50.51	4.21
2004	1054.055	87.838	2.880	45.46	3.79
2005	1017.545	84.795	2.788	45.53	3.79
2006	1008.923	84.077	2.764	51.57	4.30
2007	949.386	79.116	2.601	47.73	3.98
2008	965.501	80.458	2.638	47.28	3.94
2009	878.698	73.225	2.407	41.61	3.47
2010	868.448	72.371	2.379	40.46	3.37
2011	974.553	81.213	2.670	64.37	5.36
2012	816.376	68.031	2.231	46.4	3.87
2013	824.147	68.679	2.258	39.75	3.31
2014	827.473	68.956	2.267	46.77	3.90
<b>Avg</b>	<b>920.168</b>	<b>76.681</b>	<b>2.519</b>	<b>45.44</b>	<b>3.79</b>

	Raw	Primary Removal	Tower In	Tower Removal	Final Tank In	Final Tank Removal	SF In	SF Removal	Final	R-F Removal
2014	SS	195.42	44.56	77.39%	77.26	86.61%	10.35	56.11%	4.54	97.68%
	% of total			-16.73%		34.24%		2.97%		
	CBOD	130.25	46.73	75.26%	11.56	58.44%	4.81	42.92%	2.74	97.89%
	% of total			27.00%		5.19%		1.58%		
	Phos	4.10	1.27	-139.90%	3.04	83.64%	0.50	39.05%	0.30	92.61%
	% of total			-43.24%		62.01%		4.74%		
	NH3	11.62	13.48	97.07%	0.39	49.24%			0.20	98.28%
	% of total			112.67%		1.67%				
	NO3/NO2		2.345		16.90				16.26	
	D.O.		7.77		9.74		9.38		8.61	
	pH	7.8	7.5		7.9		7.8		7.7	

## **SUMMARY**

*The field of modern public works, dealing as it must with complex material, structures, equipment, and supplies, is sometimes associated in the Public's mind with the routine, even dull side of City related affairs.*

*It is true that a well administered Public Works Program may not be particularly conspicuous to the general public. These tasks as accomplished day by day are so much a part of life and living that they are taken for granted. Only in their absence, only in the break in this continuity, are they suddenly missed and understood by those whom they serve. The professionals who make Public Works "work", pride themselves in the anonymity of their activities.*

*We professional Public Works Employees view the aspect of city life with which we deal as seldom dull. Fiscal crisis, labor relations, the workings of the political process, demands of new technology, natural perils from floods to snowstorms, increased ecological and environmental concerns, new personnel management techniques - - all demand a high standard of professionalism.*

*With this in mind, Public Works is seen in its true light as vital, interesting, demanding and deeply rooted with the human relations of the community.*

