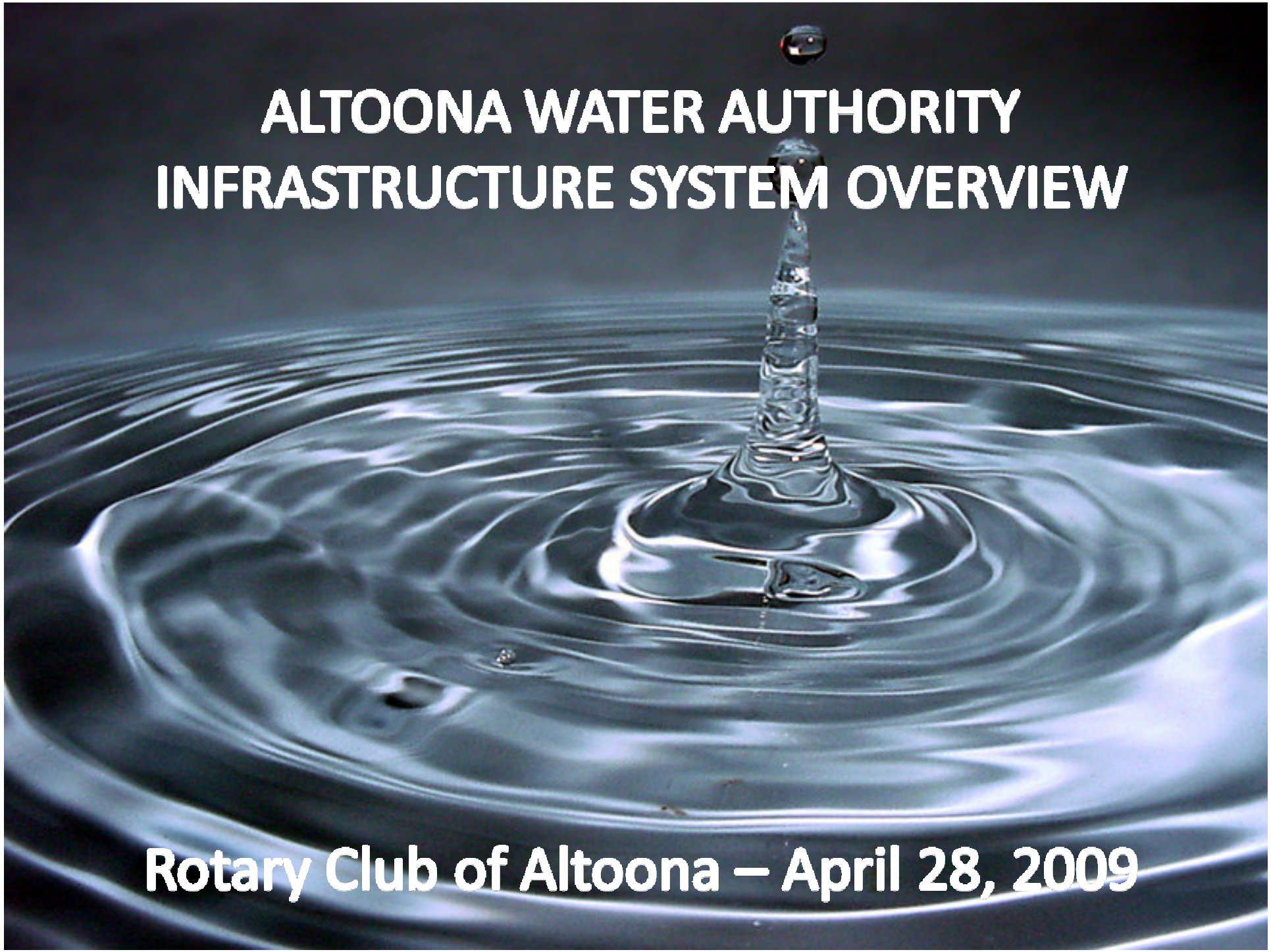

ALTOONA WATER AUTHORITY
INFRASTRUCTURE SYSTEM OVERVIEW
Rotary Club of Altoona – April 28, 2009

REPRESENTATIVES

- Mark Perry, General Manager - Altoona Water Authority

- Mark Glenn, P.E., President - Gwin, Dobson & Foreman, Inc., Authority Consulting Engineers

AUTHORITY OVERVIEW

- Mission Statement: "*Our Mission is to insure that we have a clean, safe reliable water supply and that wastewater is collected and treated in a manner that preserves the public's health and protects the natural environment*."
- The Authority was created by the City of Altoona in 1946 for the purpose of financing capital improvement projects. The Authority assumed operational responsibility of the water system from the City in 1981 and of the wastewater system in 1986.
- The Altoona Water Authority is the largest dual operating authority (water and wastewater) between Pittsburgh and Harrisburg.
- The Authority has constructed over 40 major capital improvement projects over the last 25 years to comply with federally mandated drinking water and dam safety regulations at a cost approaching $200 million.
- Name officially changed to "ALTOONA WATER AUTHORITY" in 2009

AUTHORITY PERSONNEL

- Board of Directors
  - Maurice Lawruk - Chairman
  - Patrick Dumm - Vice Chairman
  - William Geis - Secretary
  - James Ruggery - Treasurer
  - Thomas Martin - Assistant Secretary
- Operations
  - Mark Perry - General Manager
  - Mike Sinisi, P.E. - Authority Engineer
  - Gina DeRubeis - Controller
- Consultants
  - Mark Glenn, P.E., Gwin, Dobson & Foreman, Inc., Consulting Engineers
  - Alan Krier, Esq., Jubelirer, Krier, Carothers & Halpern, Solicitors
  - Fiore Fedeli Snyder, Accountants/Auditors

AUTHORITY WORK FORCE

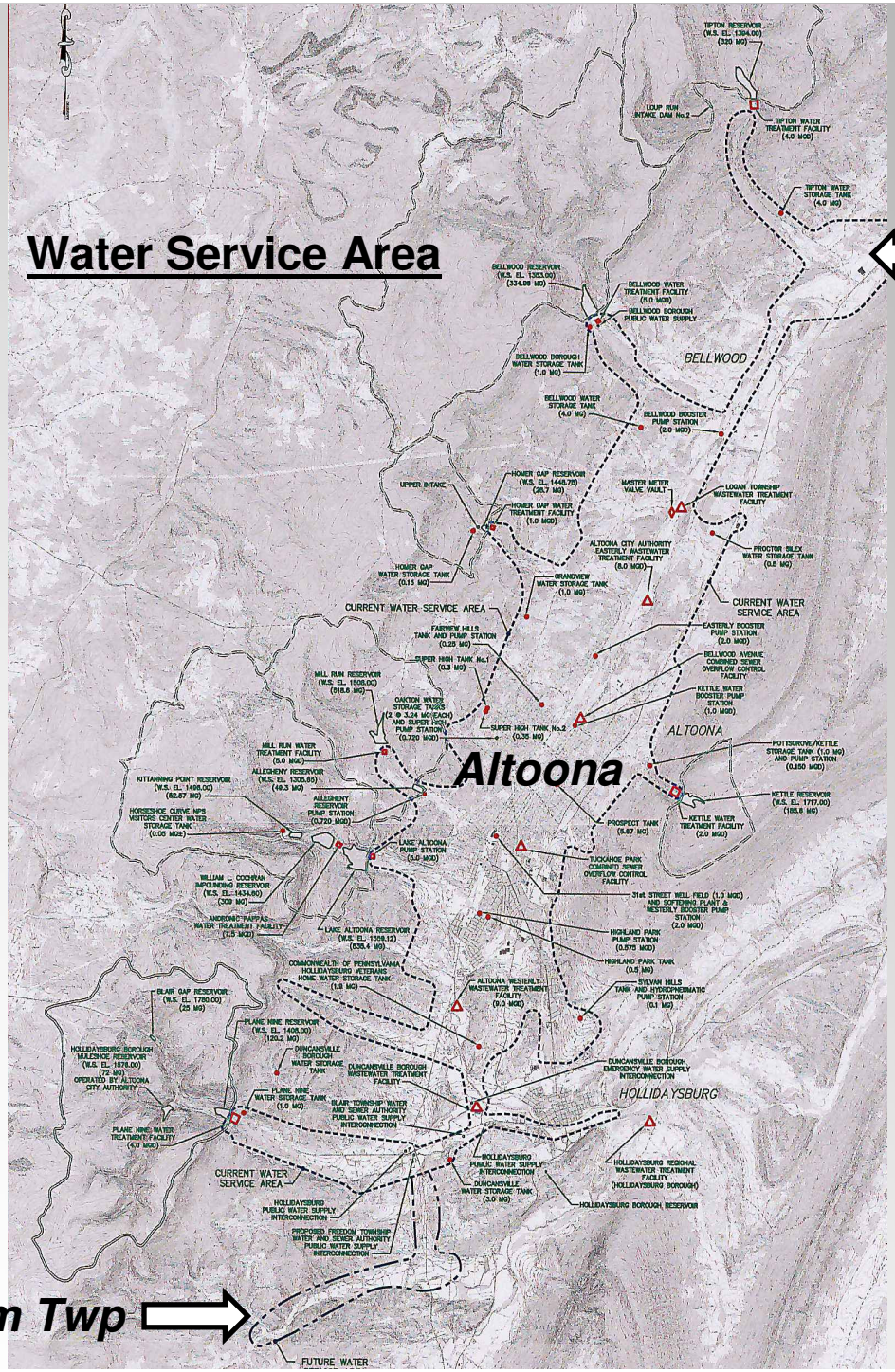
Responsibility/Duty	Number of Employees
Billing/Collection	10
Administration (Water Division)	12
Administration (Wastewater Division)	4
Wastewater Plants	19
Sewer Maintenance	12
Water Treatment/Distribution	21
Meter Division	7
Water Maintenance	48
Total	133

WATER SYSTEM HISTORY

- Historically, the present water surface water sources were formerly two separate systems, known as the Blair Gap and the City of Altoona Systems.
- The dams and reservoirs identified with the former City of Altoona system were constructed from the 1870's to the 1950's.
- Dams and reservoirs associated with the City of Altoona system include: William L. Cochran Impounding Dam, Lake Altoona, Kittanning Point, Allegheny Reservoir, Mill Run, and Homer Gap.
- The Pennsylvania Railroad designed and constructed the Blair Gap reservoir complex from 1880-1920. This system serviced the extensive railroad manufacturing and repair facilities in Altoona.
- Reservoirs associated with the old Blair Gap system include: Blair Gap, Plane Nine, Kettle, Bellwood, Muleshoe (Hollidaysburg Boro) and Tipton.

WATER SYSTEM OVERVIEW

- The Authority serves a population of approximately 70,000 residents in Blair County, PA. The system extends from Tyrone Borough and Bald Eagle Mountain to the north to Hollidaysburg Borough and Cresson Mountain to the south.
- The Altoona Water Authority is the largest publicly owned water system between Pittsburgh and Harrisburg.
- Operates twelve (12) water supply reservoirs serving sixty percent of Blair County residents with drinking water.
- The Authority currently supplies water to all or a portion of the following municipalities: City of Altoona, Hollidaysburg Borough, Bellwood Borough, Tyrone Borough, Duncansville Borough, Allegheny Township, Blair Township, Frankstown Township, Freedom Township, Juniata Township, Logan Township, Snyder Township, and Antis Township.


Water Service Area
Tipton Area
Freedom Twp
Altoona
BELLWOOD
HOLLIDAYSBURG
CURRENT WATER SERVICE AREA
TIPTON RESERVOIR (W.S. EL. 1304.00) (329 MG)
TIPTON WATER TREATMENT FACILITY (4.0 MGD)
TIPTON WATER STORAGE TANK (4.0 MG)
BELLWOOD RESERVOIR (W.S. EL. 1353.00) (334.86 MG)
BELLWOOD WATER TREATMENT FACILITY (5.0 MGD)
BELLWOOD BOROUGH PUBLIC WATER SUPPLY
BELLWOOD BOROUGH WATER STORAGE TANK (1.0 MG)
BELLWOOD WATER STORAGE TANK (4.0 MG)
BELLWOOD BOOSTER PUMP STATION (2.0 MGD)
HOMER GAP RESERVOIR (W.S. EL. 1449.78) (28.7 MG)
HOMER GAP WATER TREATMENT FACILITY (1.0 MGD)
HOMER GAP WATER STORAGE TANK (0.15 MG)
GRANDVIEW WATER STORAGE TANK (1.0 MG)
MASTER METER VALVE VAULT
LOGAN TOWNSHIP WASTEWATER TREATMENT FACILITY
ALTOONA CITY AUTHORITY EASTERLY WASTEWATER TREATMENT FACILITY (8.0 MGD)
PROCTOR BLEX WATER STORAGE TANK (0.5 MG)
CURRENT WATER SERVICE AREA
FAIRVIEW HILLS TANK AND PUMP STATION (0.25 MG)
EASTERLY BOOSTER PUMP STATION (2.0 MGD)
SUPER HIGH TANK No.1 (0.3 MG)
BELLWOOD AVENUE COMBINED SEWER OVERFLOW CONTROL FACILITY
MILL RUN RESERVOIR (W.S. EL. 1508.00) (918.6 MG)
KETTLE WATER BOOSTER PUMP STATION (1.0 MGD)
OAKTON WATER STORAGE TANKS (2 @ 3.24 MG EACH) AND SUPER HIGH PUMP STATION (0.720 MGD)
SUPER HIGH TANK No.2 (0.35 MG)
MILL RUN WATER TREATMENT FACILITY (5.0 MGD)
POTTSGROVE/KETTLE STORAGE TANK (1.0 MG) AND PUMP STATION (0.150 MGD)
ALLEGHENY RESERVOIR (W.S. EL. 1305.85) (48.3 MG)
KITTANNING POINT RESERVOIR (W.S. EL. 1498.00) (52.67 MG)
ALLEGHENY RESERVOIR PUMP STATION (0.720 MGD)
KETTLE RESERVOIR (W.S. EL. 1717.00) (185.8 MG)
HORSESHOE CURVE NPS VISITORS CENTER WATER STORAGE TANK (0.05 MG±)
PROSPECT TANK (5.67 MG)
KETTLE WATER TREATMENT FACILITY (2.0 MGD)
LAKE ALTOONA PUMP STATION (3.0 MGD)
TUCKAHOE PARK COMBINED SEWER OVERFLOW CONTROL FACILITY
WILLIAM L. COCHRAN IMPOUNDING RESERVOIR (W.S. EL. 1434.80) (309 MG)
31st STREET WELL FIELD (1.0 MGD) AND SOFTENING PLANT & WESTERLY BOOSTER PUMP STATION (2.0 MGD)
ANDRONIC PAPPAS WATER TREATMENT FACILITY (7.5 MGD)
LAKE ALTOONA RESERVOIR (W.S. EL. 1308.12) (939.4 MG)
HIGHLAND PARK PUMP STATION (0.575 MGD)
HIGHLAND PARK TANK (0.5 MG)
COMMONWEALTH OF PENNSYLVANIA HOLLIDAYSBURG VETERANS HOME WATER STORAGE TANK (1.8 MG)
ALTOONA WESTERLY WASTEWATER TREATMENT FACILITY (9.0 MGD)
SYLVAN HILLS TANK AND HYDROPNEUMATIC PUMP STATION (0.1 MG)
BLAIR GAP RESERVOIR (W.S. EL. 1780.00) (25 MG)
PLANE NINE RESERVOIR (W.S. EL. 1405.00) (120.2 MG)
HOLLIDAYSBURG BOROUGH MULESHOE RESERVOIR (W.S. EL. 1575.00) (72 MG) OPERATED BY ALTOONA CITY AUTHORITY
DUNCANSVILLE BOROUGH WATER STORAGE TANK
DUNCANSVILLE BOROUGH WASTEWATER TREATMENT FACILITY
DUNCANSVILLE BOROUGH EMERGENCY WATER SUPPLY INTERCONNECTION
PLANE NINE WATER STORAGE TANK (1.0 MG)
BLAIR TOWNSHIP WATER AND SEWER AUTHORITY PUBLIC WATER SUPPLY INTERCONNECTION
PLANE NINE WATER TREATMENT FACILITY (4.0 MGD)
HOLLIDAYSBURG PUBLIC WATER SUPPLY INTERCONNECTION
DUNCANSVILLE WATER STORAGE TANK (3.0 MG)
HOLLIDAYSBURG REGIONAL WASTEWATER TREATMENT FACILITY (HOLLIDAYSBURG BOROUGH)
HOLLIDAYSBURG BOROUGH RESERVOIR
CURRENT WATER SERVICE AREA
HOLLIDAYSBURG PUBLIC WATER SUPPLY INTERCONNECTION
PROPOSED FREEDOM TOWNSHIP WATER AND SEWER AUTHORITY PUBLIC WATER SUPPLY INTERCONNECTION
FUTURE WATER

WATER SYSTEM CUSTOMERS

- Serves 22,986 customers throughout twelve municipalities in Blair County.
- The Authority maintains domestic, commercial, industrial, institutional and bulk sales account connections throughout the service area.
  - Metered Connections

Domestic	21,194
Commercial	1,547
Industrial	59
Institutional	186

- Bulk sales customers include Hollidaysburg Borough, Bellwood Borough, Freedom Township, Blair Township & Duncansville Borough (Emergency Basis)

SERVICE AREA POPULATION

Municipality	Domestic Connections	Population Served	Total Population (2000 Census)	% Served
City of Altoona	17,473	49,523	49,523	100.0
Tyrone Borough	3	7	5,528	0.1
Allegheny Township	663	3,290	6,965	47.2
Antis Township	700	3,010	6,328	47.6
Bellwood Borough (Bulk)	0	2,016	2,016	100.0
Blair Township (Bulk)	0	2,075	4,587	45.2
Duncansville Borough	3	21	1,238	1.7
Frankstown Township	332	1,820	7,694	23.7
Freedom Township (Bulk)	0	650	3,261	20.0
Juniata Township	43	501	1,115	44.9
Logan Township	1,857	5,023	11,925	42.1
Snyder Township	274	684	3,358	20.3
Hollidaysburg Boro (Bulk)	0	5,368	5,368	100.0
Total	23,349	68,620	103,538	66.3

WATER SOURCES

- The Authority's water sources are comprised of seven reservoir systems and one well field.
- The seven reservoir systems are comprised of a total of twelve surface water sources that provide a combined storage volume of 2.8 billion gallons and a total net yield of 14.61 million gallons per day.
- The reservoir system accounts for 95% of the total source of supply to the Authority system.
- The well field located at 8th Avenue and 31st Street is capable of producing 1.0 million gallons per day; however due to high pumping costs, the source has been reserved for emergency use only.

Kittanning Point Reservoir

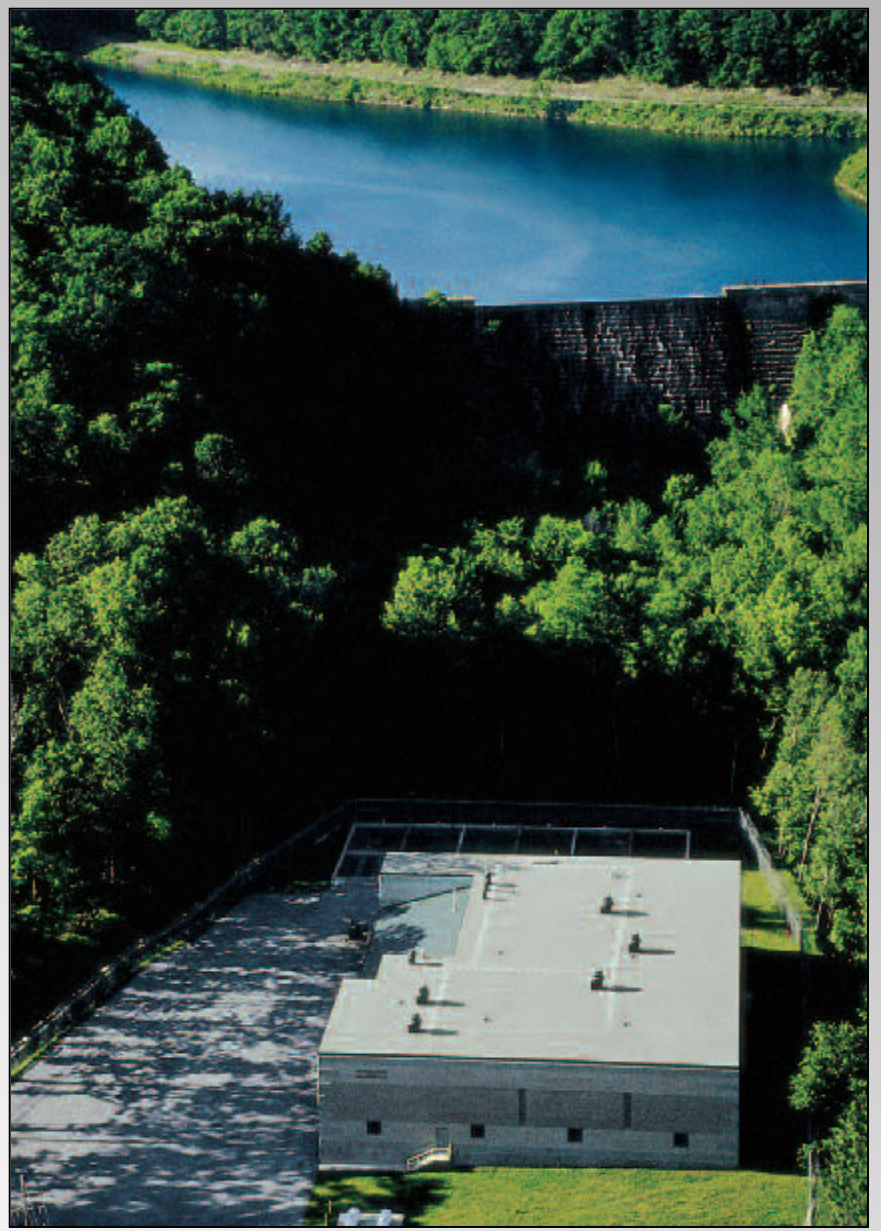
William L. Cochran Impounding Dam

Lake Altoona

Mill Run Reservoir

Blair Gap Dam (Old Rt 22)

Tipton Dam (Gravity Masonry)



Tipton Reservoir & Treatment Plant

WATER TREATMENT FACILITIES

- Water is treated at seven (7) state-of-the-art water treatment facilities.
  - Andronic Pappas WTF – 7.5 Million Gallons Per Day (MGD)
  - Bellwood WTF – 5.0 MGD
  - Mill Run WTF – 5.0 MGD
  - Plane Nine WTF – 4.0 MGD
  - Tipton WTF – 4.0 MGD
  - Kettle WTF – 2.0 MGD
  - Homer Gap WTF – 1.0 MGD
- The combined treatment capacity of 28.5 MGD is almost two times the net safe yield of the reservoir system (14.6 MGD).

Andronic Pappas Water Treatment Plant

Horseshoe Curve Reservoir System

Mill Run Reservoir & Water Treatment Plant

Kettle Reservoir & Water Treatment Plant

Tipton Water Treatment Plant

Bellwood Water Treatment Plant

Typical Plant Interior

Plane Nine Dam and Water Treatment Plant

Homer Gap Water Treatment Plant

Ozone Generators

Traveling Bridge Filters

Ozone & Rapid Mix

Chemical Addition

WATER STORAGE

- The Authority has 17 finished water storage tanks with a combined storage capacity of 28.3 million gallons.

Oakton Water Storage Tanks

Prospect Water Storage Tank

Plane 9 Water Storage Tank

Fairview Hills Tank

Tipton Water Storage Tank

Architectural Facade – Prospect Tank

WATER DISTRIBUTION SYSTEM

- The total combined water distribution system consists of approximately 380 miles of transmission and distribution main piping ranging in size from 4” to 24”.

- The Authority operates 9 pumping stations throughout the system for various purposes including filling storage tanks, transferring water from one service area to another and maintaining hydraulic gradient.

WATERSHED PROTECTION PLAN

- Source Water Assessment and Watershed Protection Plan
  - The Authority has developed a watershed plan to provide relevant information on the ACA watershed system characteristics, describe the status of water quality and quantity in the system, identify present and future water resource demands, implement water protection efforts and enhance stakeholder understanding and involvement in watershed development and planning.
  - Ensures that the environmental rules and regulations governing streams, wetlands and watersheds are enforced and that open space, woodlands and special habitat areas are conserved in their natural state through land use regulation.
  - Successful implementation of the plan will have beneficial water quality impacts on the Susquehanna River Basin and will allow the Authority to further understand and address the needs of its drinking water sources.

CAPITAL IMPROVEMENT PROJECTS

PROJECT	YEAR	COST
WATER STORAGE, TREATMENT & DISTRIBUTION		
Bellwood Water Booster Pump Station	1993	$450,000
Juniata Water Storage Tank	1993	$1,100,000
Bellwood Water Treatment Facility	1994	$9,000,000
Duncansville Water Storage Tank	1992	$1,800,000
Easterly Water Booster Pump Station	1993	$800,000
Foot-of-Ten Water Storage Tank	1993	$800,000
Homer Gap Water Storage Tank	1995	$350,000
Homer Gap Water Treatment Facility	1996	$6,000,000
Horseshoe Curve Water Treatment Facility Modifications	2001	$15,000,000
Juniata Water Storage Tank and Transmission Main	1993	$1,700,000
Kettle Water Treatment Facility	1996	$6,500,000
Lake Altoona Pump Station/Mill Run 24" Water Transmission Main	1997	$2,750,000
Mill Run Water Treatment Facility	1997	$11,000,000
Plane Nine Water Treatment Facility	1994	$7,500,000
Pottsgrove Water Storage Tank and Transmission Main (Reservoir Replacement)	1991	$1,200,000
Super High Water Storage Tank	1992	$450,000
Tipton Water Storage Tank	1993	$1,100,000
Tipton Water Treatment Facility	1994	$7,500,000
Westerly Water Booster	1993	$750,000
Oakton/Prospect Water Storage Tanks (Reservoir Replacement)	2004	$7,750,000
SUBTOTAL		$83,000,000

CAPITAL IMPROVEMENT PROJECTS

PROJECT	YEAR	COST
DAMS AND RESERVOIRS		
Homer Gap #2 Dam Modifications	1985	$650,000
Impounding Dam Modifications	1988	$4,000,000
Kettle Dam Modifications	1991	$3,300,000
Kittanning Point Dam Modifications	1986	$2,500,000
Lake Altoona Dam and Reservoir	1999	$8,000,000
Mill Run Dam and Reservoir	1996	$2,000,000
Mill Run Inflatable Dam Replacement	1991	$500,000
Plane Nine Dam Modifications	1991	$4,000,000
Tipton and Blair Gap Dam Repairs	2004	$550,000
SUBTOTAL		$25,500,000
TOTAL		$108,500,000

WASTEWATER SYSTEM HISTORY

- Originally the Central Altoona business district was designed as a combined sewer drainage system in the late 1800's. The system's disposal techniques included a unique sand filter bed system and Imhoff tank for primary treatment.
- To comply with Clean Water Act standards, the Authority was faced with renovating its two 1950's wastewater treatment facilities.
- The renovation of the Easterly and Westerly Wastewater treatment facilities and the completion of the Bellwood Avenue and Tuckahoe Park CSOs, culminated a 15-year planning, design and construction project in 1992.
- The Authority is now faced with a $40 to 50 million to upgrade the treatment plants to comply with the Chesapeake Bay initiative for control of nutrients (nitrogen and phosphorus).

WASTEWATER SYSTEM OVERVIEW

- The ACA wastewater system serves approximately 20,100 customers in the City of Altoona, Allegheny Township and Logan Township.

- The Authority's sewer system is divided into two drainage basins known as the Easterly and Westerly gravity sewerage basins.

- The Authority utilizes two combined sewer overflows (CSO) to capture the "first flush" from the combined sewer system and two state-of-the-art wastewater treatment facilities to provide advanced secondary treatment.

- The CSO facilities and treatment plants are one of the first systems in the eastern United States to integrate the treatment of wet weather flows, combined sewer overflow discharges and normal wastewater flows.

CUSTOMERS

- The ACA wastewater collection system serves customers in the City of Altoona, Logan Township and Allegheny Township with approximately 20,000 connections.

- The ACA wastewater collection system serves a population of approximately 49,000 in the City of Altoona, 1,000 in Logan Township and 300 in Allegheny Township.

- Additional wastewater generated by customers served directly by the Logan Township and Allegheny Township collection system is also connected and treated by the Authority's wastewater system.

INDUSTRIAL PRETREATMENT

- The industrial pretreatment program received its approval from the Environmental Protection Agency (EPA) Region III on June 18, 1984. At that time a total of eight (8) industries were permitted.

- Since that time, the program has grown and includes permitting of septic haulers, restaurants and super markets. Permits have been issued to the following industrial users:

  - 26 Industries
  - 7 Septic Haulers
  - 46 Restaurants
  - 6 Super Markets

- The delivery of liquid biosolids and sludges have also been approved through the pretreatment program as long as they meet the Pennsylvania Department of Environmental Protections Pollutant Concentrations and do not contain filamentous bacteria.

WASTEWATER TREATMENT FACILITIES

- The Easterly and Westerly Wastewater Treatment Facilities treat 8 million and 10 million gallons per day of wastewater, respectively. Each facility is capable of treating up to 20 million gallons per day during wet weather.

- Each facility's processes are identical in operation, beginning with three outfall sewers delivering wastewater from the City of Altoona and a portion of Logan Township. The Westerly WWTF also receives wastewater from a portion of Allegheny Township by a separate outfall.

- The treatment facilities provide advanced secondary treatment capability, normally removing 95% of organic and suspended solids via the single stage nitrification, activated sludge process.

- Upon disinfection, the treated wastewater is discharged into an approved receiving streams. After treatment, remaining biosolids are loaded on trucks for delivery to approved farms for land application or disposal in a permitted landfill.

Westerly Wastewater Treatment Facility

Easterly Wastewater Treatment Facility

Bar Screens & Grit Removal

Overflow Storage Tanks

Ultraviolet Disinfection Tanks

Biological Aeration Tanks

Flow/Air Distribution Channel

Sludge Digestion Tanks

Operation & Control Building

Pipe Gallery Tunnel

COMBINED SEWER OVERFLOWS

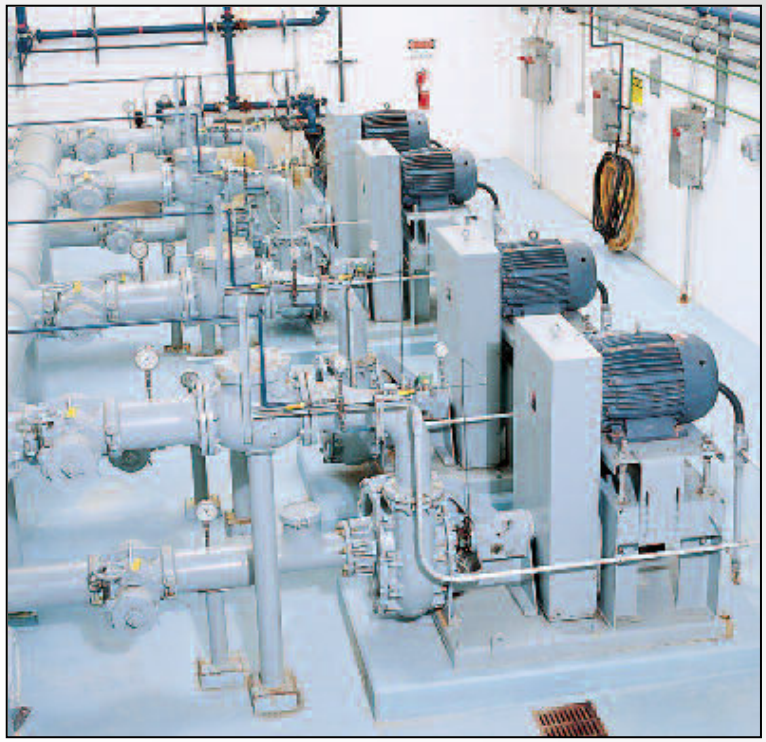
- Each WWTF has a combined sewer overflow facility which is also utilized as a holding tank for wastewater during wet weather.

- The Easterly CSO, located at Bellwood Avenue and Kettle Street, can hold 1.3 million gallons of wastewater, while the Westerly CSO, located at Tuckahoe Park, has a capacity of 1.5 million gallons.

- The CSO's capture the "first flush" from the combined sewer system which are then released at a controlled rate to the treatment facilities. The facilities, located almost entirely underground, utilize special aesthetic treatments and landscaping to correspond with the surrounding residential neighborhoods.

- Each CSO operates in the same way. When flow from the interceptor sewers reaches a predetermined set point, the flow is diverted into the CSO. Before wastewater enters the holding tanks, bar screens remove the large debris and places it on a conveyor belt which transports it to a holding pit. The debris is then collected for disposal at a landfill.

Tuckahoe Park



Bellwood Avenue CSO Storage Tank Construction and Discharge Pumps

66-Inch Combined Sewer Installation on Union Avenue

Inlet to CSO Storage Tank at Tuckahoe Park

WASTEWATER COLLECTION SYSTEM

- The Authority's wastewater collection system consists of approximately 230 miles of 6" - 48" diameter sewer line. Privately owned laterals add about 190 miles to the system for a total of more than 420 miles.

- The wastewater system is accessible via 3200 manholes

- The Authority operates three wastewater pumping stations.
  - Spring Run Wastewater Pumping Station
  - East Juniata Sewage Pumping Station
  - Logan Hills Pumping Station

Spring Run Wastewater Pumping Station

COMPLETED PROJECTS

PROJECT	YEAR	COST
WASTEWATER CONVEYANCE & TREATMENT		
Bellwood Avenue (Easterly Altoona) CSO Storage/Pumping Control Facility	1990	$6,500,000
Easterly Altoona Wastewater Treatment Facility Renovations	1992	$36,000,000
Residual Sewage Solids Agricultural Utilization Land Application Project	1996	$1,000,000
Spring Run Wastewater Pumping Facility/16" Force Main/36" Interceptor	1990	$2,500,000
18th Street (4th Sewer District) Combined Sewer Replacement Project	1999	$6,000,000
Tuckahoe Park (Westerly Altoona) CSO Storage/Pumping Control Facility	1991	$7,000,000
Westerly Altoona Wastewater Treatment Facility Renovations	1991	$30,000,000
Westerly Wastewater Interceptor and Outfall System Improvements	2004	$4,000,000
TOTAL		$94,000,000

REGIONAL DEVELOPMENT ASSISTANCE

- I-99 Enterprise Campus (Antis Twp) - The Authority water system operates a 12” main extension into the development for fire protection and maintains service connections and fire lines to the 8 lots in the 55-acre site.

- Logan Town Centre (Logan Twp) – The Authority was the project sponsor for extending 7,500 feet of 12-16-inch transmission mains to Logan Town Centre. Authority participation resulted in a 1%, 20-year, $1.5 million loan for the project developer.

- Participation in extension of mains for industrial and commercial development including the purchase of pipe, fittings and valves.

- Extension of water service to unserved areas by . Last year the Authority installed waterlines 50 customers on Hillside Avenue, Logan Township at a cost of $195,000. The Authority paid for the material and passed along the installation cost to the customer in the tap fee.

25 YEAR CAPITAL IMPROVEMENT PLAN

A.	**WATER DIVISION**			
	1. Systemwide Replacement of Deficient Waterlines			
	a. City of Altoona System	$ 32,000,000		
	b. Former Blair Gap System	$ 15,000,000		
	Subtotal, Waterlines		$	47,000,000
	2. Dam and Spillway Improvements			
	a. Mill Run Dam	$ 7,200,000		
	b. Bellwood Dam	$ 8,300,000		
	Subtotal, Dams		$	15,500,000
	TOTAL PROJECTED CAPITAL PROJECTS, WATER DIVISION		**$**	**62,500,000**
B.	**WASTEWATER DIVISION**			
	1. Wastewater Treatment Plant BNR Improvements			
	a. Westerly Altoona Treatment Facility	$ 28,000,000		
	*b. Easterly Altoona Treatment Facility	$ 35,000,000		
	c. Contingency	$ 2,000,000		
	Subtotal, Wastewater Treatment		$	65,000,000
	2. Wastewater Collection and Conveyance System			
	a. City of Altoona Sewer Separation	$ 60,000,000		
	b. Sanitary Sewer System Replacement	$ 5,000,000		
	c. Sludge Filter Bed/Sludge Lagoon Mitigation	$ 10,000,000		
	Subtotal, Wastewater Collection/Conveyance		$	75,000,000
	TOTAL PROJECTED CAPITAL PROJECTS, WASTEWATER DIVISION		**$**	**140,000,000**
C.	**TOTAL, ALL PROJECTED CAPITAL PROJECTS**		**$**	**202,500,000**

Proposed Water Authority Administrative Office Building

Chestnut Avenue & 9th Street, Altoona