VOLUME 2

PENNSYLVANIA-AMERICAN WATER COMPANY

2017 GENERAL BASE RATE CASE

R-2017-2595853

SCOPE OF OPERATIONS

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WATER

ABBEY WOODS

The Abbey Woods System of Pennsylvania-American Water Company supplies potable water for domestic and fire protection use for 54 customers in Cranberry Township, Butler County.

Source of Supply

Abbey woods is interconnected to the Franklin Gradient of Pennsylvania-American Water Company's Elwood System.

Distribution

The distribution system is fed from the Franklin Gradient of Pennsylvania-American Water Company's Elwood System through 1,000 ft of 14" DICL water main. The distribution system in the Abbey Woods development consists of approximately 5,300 ft of a mix of 8" DICL pipe and a mix of smaller plastic pipes down to 2". There are six fire hydrants connected to the 8" DICL mains.

ABINGTON

The Abington area serves the Boroughs of Clarks Summit, Clarks Green and Dalton; and portions of Abington, South Abington and Glenburn and Newton Townships. The estimated population served is 14,450.

SOURCE OF SUPPLY

Well No. 3, drilled in 1945, is 8 inches in diameter and 240 feet deep. It is located near the Operations Center in a cement block building with a stucco exterior. Pumping facilities consist of a 130 gpm Peerless deep well pump and an air stripping column, constructed in 1989 for removal of volatile organics. Water is pumped into the system from an underground concrete detention reservoir.

Well No. 4, drilled in 1913, is 8 inches in diameter and 599 feet deep. It is located on South Abington Road, Clarks Summit, in a cement block building with a stucco exterior. Pumping facilities consist of a 200-gpm Worthington submersible pump and a 200-gpm Ingersoll Rand high service pump. Water is pumped into the system from a 28,000-gallon underground detention reservoir.

Well No. 5, drilled in 1953, is 10 inches in diameter and 620 feet deep. It is located on North State Street, South Abington Township. The main building is of cement block construction with a stucco exterior. The well is located in an attached wooden structure. Pumping facilities consist of a 150 gpm 15 H.P. Gould's submersible pump and a 125 gpm Byron Jackson vertical turbine high service pump. Water is pumped into the system from an underground detention reservoir. A sequestering agent is fed at the well before chlorination to sequester iron and manganese.

Well No. 6, drilled in 1957, is 10 inches in diameter and 565 feet deep. The well was redeveloped in 1990. It is located on Hemlock Street, Clarks Summit. The main building is of cement block construction with a stucco exterior. The well is located in an attached wooden structure. Pumping facilities consist of a 150 gpm Gould's submersible pump and a 150 GPM Gould's horizontal high service pump. Well water is chlorinated and aerated prior to delivery to the system. Water is pumped to the system from a 2,800-gallon detention tank located at the base of the aerator.

Well No. 7, drilled in 1969, is 8 inches in diameter and 376 feet deep. It is located on Griffin Pond Road, South Abington Township, in a wooden building with a shingled exterior. Pumping facilities consist of a 200 gpm Gould's submersible well pump and a 200-gpm Ingersoll Rand high service pump. Chlorine is injected at the wellhead, prior to a 4,000-gallon detention tank.

Well No. 8, drilled in 1970, is 8 inches in diameter and 505 feet deep. It is located on Willowbrook Road, South Abington Township, in a concrete block building with a brick exterior. Pumping facilities consist of a 150 gpm Gould's submersible well pump and a 160-gpm

Ingersoll Rand high service pump. Water is pumped into the system from a 4,000-gallon detention tank.

Well No. 9, drilled in 1951, is 10 inches in diameter and 620 feet deep. It is located on North Abington Road and Puritan Drive in Abington Township. The structure is of wooden construction with vertical and horizontal aluminum siding exterior. The well was redeveloped in 1991. Pumping facilities consist of a 150 gpm Gould's submersible well pump and a 175 gpm Burk's high service pump. Water is pumped into the system from a detention pipe 36" in diameter and 70' long.

Pump operation for each of the wells is done though a combination of SCADA and telemetry all by the levels in the Clarks Green Standpipe with the exception of Well No. 4, which is manually controlled. Wells No. 5, 6, and 9 run continuously. Well No. 3 is operated by telemetry from Clarks Green Standpipe. Wells No. 7 and 8 are operated by SCADA at office through level from Clarks Green Standpipe.

Dalton Upper Well, drilled in 1912, is 8 inches in diameter and 620 feet deep. It is located on Main Street, Dalton, in a cement block building with stucco exterior. Pumping facilities consist of a 115-gpm Berkley submersible pump which discharges into the Dalton Standpipe. Pump operation is pressure controlled from tank elevation. This is an emergency use facility.

The Waverly System, acquired in 1989 is supplied by four drilled wells. Waverly Well No. 1 consists of a 15hp Goulds submersible pump set approximately at 215 feet. Waverly Well No. 2 is a 15 H.P. Goulds submersible pump at 100 gpm; pumping bowls are set at 233 feet. Waverly Wells No. 3 consists of a 15 H.P. turbine peerless pump rated at 100 gpm and is 600 feet deep with bowls set at 200 feet. Well No. 3 is not used because of high hydrogen sulfide. Waverly Well No. 4 is a 300' well with pumping bowls set at 273 feet. The pump is a Berkley submersible pump 10 hp rated at 50 gpm. Wells No. 1 and No. 2 cannot be operated simultaneously because of their close proximity to each other. The Waverly system and Glenburn system was interconnected in 1993 and in 2003 interconnected with the Clarks Summit system.

TREATMENT

All of Abington's wells are no longer chlorine gas feed. They were all converted to sodium hypo with LMI chemical pumps.

A corrosion inhibitor is fed at all system wells. A sequestering agent is fed at well #4, #5, #6, #8 and #9.

The supply from the wells is supplemented by water delivered by the Scranton Area Filtration Plant. Two 1000 gpm Deming pumps model 5062 located in Well No. 6 building deliver the water into the system. Pump operation is telemeter and SCADA controlled by the level in the Clarks Green Standpipe.

DISTRIBUTION STORAGE

Distribution storage consists of Clarks Green's two 300,000 gallon welded steel standpipes, 30 feet in diameter and 57 feet high, both located on Highland Avenue, Clarks Summit, and Dalton's 100,000 gallon welded steel standpipe, 27 feet in diameter and 23 feet high, located on West Main Street, Dalton. Waverly has a 208,000 gallon glass lined bolted steel standpipe located off of Carbondale Road. Abington West Side tank is a 400,000 elevated tank, approximately 200 feet high, located off Newton-Ransom Road, Newton Twp.

DISTRIBUTION

The West Grove Street, Winola Road Booster Pump stations, and the North Abington Road hydropneumatic booster pumping stations supply customers located in two separate residential areas, which are too high to be served from the Clarks Green Standpipe. Each building is of wooden construction with a shingle exterior, designed to appear as a small home. Facilities at Abington Road Booster consist of two Deming 20 H.P. 300 gpm pumps at 190' T.D.H. facilities at Winola Road Booster consist of two Deming 20 H.P., 360 gpm pumps at 148' T.D.H., a 30 H.P. 500 gpm Deming fire pump. Facilities at Grove Street Booster consist of two Deming 20 H.P. 300 gpm pumps. A 500-gpm-fire pump was installed at Grove Street booster in 1992. The Winola Road and Grove Street Booster Stations serve the Abington West Side Tank gradient. The Leach Hill Road Booster Station also services a residential area, which is too high to be served from the Clarks Green Standpipe. This is a prefabricated steel capsule which is underground and contains three Gould's pumps one rated for 200 GPM and two rated for 350 GPM and all necessary controls for variable speed operation. The Huntington Woods Booster Station was placed in service in 1996 and serves a small isolated residential system in the Borough of Dalton. There are two PACO 7 1/2 HP 100 GPM pumps and one PACO 40 HP 700 GPM fire pumps at this station.

A 60 KW trailer mounted portable generator provides standby power for the W. Grove Street, Winola Road and N. Abington Road boosters plus Leach Hill Booster Station.

In 2016, a twenty mile main extension was completed in order to provide public water service to approximately 350 property owners whose private wells were contaminated by local industry. The extension consisted of approximately 108,000 feet of 6"/8"/12" DICL water main, 9 pressure regulating stations, 35 fire hydrants, and 176 valves.

BANGOR

The Bangor system serves the Boroughs of Bangor and Roseto and portions of Washington, Plainfield, and Upper Mount Bethel Townships. The estimated population served is 12,400.

SOURCE OF SUPPLY

The main service system serves most of Bangor Borough, the eastern half of Roseto Borough, and portions of Washington and Upper Mount Bethel Townships. The West Bangor service system serves the village of West Bangor, adjacent portions of Washington and Plainfield Townships and western areas of Roseto Borough.

Supply to the four pressure gradients of the main service area is from a combination of six wells, several springs, a stream, and one impounding reservoir located at high elevation in Upper Mount Bethel Township, approximately three miles north of Bangor Borough.

Supply to the West Bangor service system is from six wells located at high elevation just northwest of the village of West Bangor. A booster pump station was constructed on Garibaldi Avenue in 2008 to facilitate the transfer of water from the main service system into the West Bangor service system. This pump station will supplement the supply from the West Bangor wells when delivery from the wells is inadequate. The pump station also will allow surplus water from the Bangor System to be transferred to the adjacent Blue Mountain / Nazareth District through an existing interconnection.

TREATMENT

The Bangor Treatment Plant, which delivers water to the main service system, was built on company-owned property along Route 191. The plant processes raw water delivered to the Lower Handelong Reservoir from the following sources: West Fork of Martin's Creek, Lower Handelong Springs, Joseph Handelong Well, Handelong Well #2, Labar Well, Getz Well #1(artesian only), Stofflet Well, Oxford Reservoir, and Smith Reservoir. The Pritchard Well delivers water directly to the treatment plant.

Raw water is transported from the Lower Handelong reservoir to the plant via 1100' of 10"and 12" main. Upon entering the plant, water passes through a rate controller, which measures the quantity of water to be treated. A Supervisory Control and Data Acquisition System automatically sets all chemical feed and filter rates. Pre-treatment chemicals fed include chlorine, caustic soda, liquid alum, and a liquid polymer. All chemicals are fed directly into an in-line static mixer. Water flows from the raw water piping on top of 3 filter units designed to filter at a maximum rate of 3.2 million gallons per day. The filter media consists of gravel, sand, and anthracite filter coal. Post treatment chemicals consist of chlorine gas, caustic soda and corrosion inhibitor. Water then flows into a .160 MG clear well where three transfer pumps rated at 1.6 MGD each, one transfer pump rated for 0.8 MGD and a wash water pump rated at 3.2 MGD are located. The transfer pumps deliver water from the clear well to the two 0.5 MG

bolted steel tanks via 2,700' of 16" main. These tanks were placed in service in 2014. Water from these tanks enters the system through 5000' of 16" transmission main. All processes of the system are automatically controlled and monitored at the treatment plant. Levels at Roseto Reservoir, Roosevelt elevated tank, and West Bangor reservoir are transmitted to the treatment plant. The operator is able to monitor and control pressures, well levels, and flows of all raw water sources as well as to start and stop these various pumps.

When supply is abundant, excess raw water is stored in the 50.0 MG Oxford Reservoir and the 80.0 MG Smith Reservoir. Smith Reservoir also has a substantial recharge from springs. An upgrade to the pumping facilities to the Oxford Reservoir, pending DEP approval, allows stored raw water to be pumped from the Oxford reservoir to the Lower Handelong Reservoir. Water stored in the Smith Reservoir is pumped to the Oxford Reservoir prior to being transferred to the Lower Handelong Reservoir.

The Bangor High Service System serves the western part of Bangor Borough, the western half of Roseto Borough, and a portion of Washington Township.

The Chestnut Street Booster Station transfers water from the Roseto Reservoir into the high service system.

The West Bangor Service System serves the village of West Bangor and adjacent portions of Washington and Plainfield Townships and western areas of Roseto Borough. Storage consists of the 0.236 MG West Bangor Reservoir, which was lined and covered in 2014.

Supply is from six wells located at high elevation just northwest of the village of West Bangor. At times when delivery from the wells is inadequate, supplemental supply is taken through a connection from the Bangor high service system. A booster pump station was constructed in 2008 to increase the capacity of this interconnection.

The Messinger Street High Service System has a hydropneumatic booster station of .460 MGD capacity, which is not in service.

In addition to those sources treated at the treatment plant, chlorination, pH adjustment, and corrosion control are provided for the West Bangor supplies.

The North Bangor Booster system has .115 M.G.D capacity, which serves a small portion of Upper Mt. Bethel Twp.

DISTRIBUTION STORAGE

Distribution storage consists of a .80 MG, reservoir in Roseto Borough serving the main service area which had it's cover and liner replaced in 2014, and the .10 MG Roosevelt Street elevated tank serving the Bangor high service system.

BERRY HOLLOW WATER

The Berry Hollow Water System of Pennsylvania-American Water Company supplies potable water for domestic, fire protection, and municipal use for 29 customers in in Lower Mount Bethel Township, Northampton County PA.

SOURCE OF SUPPLY

Berry Hollow is a groundwater system that consists of two wells, Well #1 and Well #2 are permitted for 26,000 gpd.

WATER TREATMENT

There is one treatment building. The building houses metering and disinfection facilities as well as a hydro pneumatic system for maintaining [pressure in the distribution system.

DISTRIBUTION

The distribution system is fed by from the hydro pneumatic tank. The system consists of small diameter plastic main.

BERWICK

The Berwick area serves Berwick, Nescopeck, and Briar Creek Boroughs and Briar Creek and Salem Townships. The estimated population served is 19,000.

SOURCE OF SUPPLY

The source of supply is from four drilled wells capable of a combined delivery of 6.0 MGD.

TREATMENT

Water from the wells is delivered via a 20-inch main to the treatment plant where chlorine and sodium hexametaphosphate are added. Chemical feeds and flow rates are monitored at the Operations Center. The water enters two 10,000-gallon retention vessels designed to provide adequate retention before entering the distribution system via a 20-inch transmission main. Alarm facilities are provided to indicate failure of pumps, chemical feed equipment, or low storage levels. All pumps are operated by automatic level controls from the Glen Brook Storage tanks.

DISTRIBUTION STORAGE

Distribution storage consists of two 0.800 MG steel reservoirs located on Water Dam Road, Briar Creek Township. The levels in these vessels are transmitted to the Operations Center and the Canal Street Station. A manual override permits operation of the pumps from the Canal Street Station. The Salem booster station located off Foundryville Road in Briar Creek Township serves a small high elevation area. Installed in 1967, this station can deliver 0.144 MGD.

BOGGS TOWNSHIP

The Boggs System of Pennsylvania-American Water Company supplies potable water for domestic, commercial, industrial, municipal, and fire protection use for 20 customers in Boggs Township, Centre County.

SOURCE OF SUPPLY

Boggs Well 1 and Boggs Well 2 are both located adjacent to Bald Eagle Creek. Both wells have 15 hp, vertical turbine pumps. Well #1 is capable of supplying 0.130 MGD (90 gpm) and Well #2 is capable of 0.115 MGD (80 gpm).

WATER TREATMENT

The Boggs Treatment Plant can process 0.236 MGD. The filtration and chemical feed equipment, as well as, a lab, office, and garage are housed in a block structure constructed in 2000 at 875 Old 220 Road, Milesburg in Boggs Township, Centre County.

The raw water from both wells travels through 4000 feet of 10 inch DI pipe before it enters the plant. Sodium hypochlorite and Delta Floc polymer are added to the plant influent, which is monitored for turbidity and residual chlorine.

The treatment plant consists of two vessels per stage and two stages, operating in a direct filtration mode. Each filter contains 16.5 sq. ft. of sand media approximately 20 inches deep. No anthracite cap is provided. The first stage uses uniformly graded #50X garnet sand with rough, irregular edges.

Following the first stage of filtration, the Delta Floc polymer is again injected prior to an in-line static mixer. The second stage filters contain approximately 20 inches of #60-80 garnet sand media.

The effluent of each individual filter, raw water, and combined stage effluents are monitored for turbidity.

The plant effluent flows through 265" of 36" pipe for contact time before it flows to the 0.50 MG elevated storage tank or goes directly to the distribution system.

RESIDUALS HANDLING FACILITIES

The wastewater generated by the filter backwashes is collected in the wastewater clarifier. The solids (waste residual) settle out and are removed by a contractor. The supernatant water from the wastewater clarifier is recycled to the head of the plant daily.

DISTRIBUTION STORAGE

Distribution storage is a 0.50 MG elevated storage tank providing for fire protection purposes and general usage.

DITRIBUTION

The distribution system is fed by gravity from the .05 MG tank and is comprised of predominantly 10" DICL water main with small sections of 8" DICL, 6" PVC, and 2" PVC water main. There is one PRV station in the distribution system and it has a single 10" valve.

BROWNELL/FALLBROOK

The Brownell/Fallbrook areas serve all or portions of Carbondale City, Carbondale, Scott, and Fell Townships, and Jermyn and Mayfield Boroughs, in Lackawanna County. The estimated population served is 17,000.

SOURCES OF SUPPLY

The Brownell system consists of a 245 Mgal upstream supply reservoir, known as Carbondale No. 4 Reservoir, and an 847 Mgal distribution reservoir, known as Brownell Reservoir, both located on Racket Brook. A third reservoir, Carbondale No. 7 Reservoir, not presently owned or controlled by PAWC, lies upstream of Carbondale No. 4 Reservoir on Racket Brook. Total drainage area is 4.0 square miles.

The Fallbrook system consists of a large upstream supply reservoir, known as Crystal Lake and a small downstream 8 Mgal distribution reservoir, known as Fallbrook Reservoir, both on Fallbrook. Total drainage area is 9.7 square miles.

TREATMENT

The Brownell plant is located immediately downstream of Brownell Dam adjacent to Route 6 in Carbondale Township. The plant has a rated capacity of 4 M.G.D. Water supply to the plant is provided by raw water pumping from Brownell Reservoir.

The raw water is pumped from the source of supply directly to the plant where initial pre-chemical additions are made. Pretreatment chemicals include alum, lime, potassium permanganate and activated carbon. After pre-chemicals are added, the water passes through rapid mixing units consisting of two in-line static mixers and then into two (2) two-stage flocculation units. The next step in the treatment process consists of granular media filtration. Filters are equipped for air/water washing.

After being filtered, water flows through the plant's clear well where many of the post treatment chemicals such as chlorine and ammonia for disinfection, lime or caustic soda for pH adjustment, and polyphosphate for corrosion control are added before entering the 2 - .78 Mgal storage tanks on the plant site.

On the plant site are two lined earthen lagoons used to store residual solids of the filter backwash water. After the wastes have settled, the clear supernatant is discharged into the adjacent stream, in accordance with an NPDES permit.

The Fallbrook plant is located adjacent to Fallbrook Dam in Carbondale Township. The plant has a rated capacity of 1.6 M.G.D. Water supply to the plant is provided by raw water pumping from Fallbrook Reservoir.

The raw water is pumped from the source of supply directly to the plant where initial pre-chemical additions are made. Pretreatment chemicals include alum, lime, potassium permanganate and activated carbon. After pre-chemicals are added, the water passes through rapid mixing units consisting of one in-line static mixer and then into two (2) two-stage flocculation units. The next step in the treatment process consists of high rate clarification with tube settlers followed by granular media filtration. Filters are equipped for water washing with surface agitation.

After being filtered, water flows through the plant's clear well where many of the post treatment chemicals such as chlorine and ammonia for disinfection, caustic soda for pH adjustment, and polyphosphate for corrosion control are added before entering the .75 Mgal storage tank on the plant site.

On the Fallbrook plant site is two lined lagoons used to store residual solids of the filter backwash water. After the wastes have settled the clear supernatant is discharged into the reservoir.

DISTRIBUTION

Water flows from the Brownell Water Purification Plant through two .78 Mgal storage tanks (overflow elevation of 1,585) to the distribution system through a 24-inch transmission main which divides into three separate mains, one serving higher elevation areas and two with pressure reducing valves serving lower elevation areas of Carbondale. Both a 14" and 16" transmission main delivers water from the Fallbrook Water Purification Plant to the distribution system. Storage at the Fallbrook Water Purification Plant site is comprised of one .75 Mgal water tank (overflow elevation of 1,414). The Brownell and Fallbrook service areas merge in Carbondale at a floating divide. Further downstream, two pump stations in series deliver mixed water to the area formerly served by Rushbrook Reservoir. When activated, the Powder Mill Pump Station can also deliver mixed water to the area formerly served by White Oak and Laurel Run Reservoir. This area is currently fed primarily from the Scranton Area Water Purification Plant.

WASTE WATER FACILITIES

On the plant sites are lined earthen lagoons used to store filter backwash water and sludge from the plant's clarification processes. After the wastes have settled, the clear supernatant is discharged into the adjacent stream or reservoir.

BROWNSVILLE

The Brownsville District serves a population of approximately 9,200 people in Fayette and Washington Counties, including: the Boroughs of Brownsville, West Brownsville, California, Coal Center, and the Townships of Brownsville, Luzerne, Jefferson, and Redstone and West Pike Run. Currently, the Brownsville Plant delivers up to 1.5 MGD to the Uniontown District via a 16-inch transmission main and booster station installed in 1998 and 2000, respectively, to connect the two districts. An emergency connection with North Fayette Municipal Authority provides a two-way metered feed. Up to 0.5 MGD can flow in either direction.

SOURCE OF SUPPLY

The Brownsville Treatment Plant is located at 17th Street, Brownsville, Pennsylvania. The Monongahela River is the sole source of supply for the treatment plant. Two reservoirs in West Virginia, the Tygart Reservoir and Lake Lynn, in conjunction with a series of locks and dams, regulate the flow in the Monongahela River. The Pennsylvania Department of Environmental Protection has determined that the available water at the Brownsville intake is 193 MGD. The allocation permit allows PAWC to withdraw up to 3.1 MGD. The permit was issued in 2014 and is valid for a period of 25 years.

PLANT DESCRIPTION

The Brownsville treatment plant consists of an intake, raw water pump station, conventional flocculation and settling basins and filters, and a finished water pump station. The Brownsville plant can produce up to 3.1 MGD with all filters in service. Treatment facilities at the plant provide coagulation, flocculation, sedimentation, and filtration of the surface supply, with pH adjustment, disinfection with gaseous chlorine and addition of a zinc-orthophosphate corrosion inhibitor. Improvements to filters, pipe gallery, and utilizing Hiller Reservoir as the clear well were completed in 1999.

The raw water pump station, located near the Monongahela River draws water through its intake into the deep-well. From the deep-well, the water is pumped through a metered 16-inch raw water pipeline to the chemical feed building located approximately 25 feet away. Pretreatment chemicals are injected into this main and mixed through an in-line static mixer located in the vault beneath the chemical feed building. The 16-inch raw water pipeline leads to the influent side of the flocculation basins where it splits into two 12-inch inlet pipes, one going to each 38,000 gallon flocculation basin. Each basin consists of two flocculator chambers. Located on the effluent side of each flocculation basin is a 122,620-gallon sedimentation basin. As the treated water nears the end of each sedimentation basin, it cascades into v-notched weirs and flows into the common 20-inch influent pipeline in the east pipe gallery. This pipeline delivers the treated water to each of the six dual-media filters located in the filter building. The six filters have a combined capacity of 3.1 MGD @ 2 gpm/ft^2. As the water goes through each filter, it collects into one main effluent that leads into the clearwell and high service pump well. Post-treatment chemicals are fed into the clearwell. This well has a capacity of approximately 118,500 gallons and the water is pumped through a dedicated 16-inch transmission pipeline to

the 3.5 MG Hiller Reservoir providing the plant significant detention time for post treatment disinfectant. An ammonia feed station at the Hiller Reservoir can provide chloramination as required for control of disinfection by products.

Filters are backwashed based on run-time, loss of head, and turbidity. The backwash sequence is initiated by draining the filter and opening two 12-inch PRV valves located in east pipe gallery which take water from the dedicated 16-inch transmission pipeline to Hiller Reservoir. The wastewater is sent to the waste water building vault via a 12-inch pipeline. The water is allowed to settle for two hours before the supernatant is decanted to the river. PAWC possesses a NPDES permit that allows the supernatant to be discharged to the river.

The SCADA system plays a crucial role in the operation of the plant. This system gives the user the ability to monitor and control all facets of the treatment process, i.e., pump control, the amount of chemicals fed, filter backwash sequence, and monitoring all on-line instruments. SCADA computers are located in the microbiology lab, the filter building, and the main office building.

TREATMENT RESIDUALS

Water treatment plant residue (sludge) is generated by filter backwash water and by cleaning the sedimentation basin. Backwash water, filter-to waste water, and sedimentation residuals are discharged to a 100,000-gallon, rectangular concrete holding tank where suspended solids are allowed to settle. A motorized control valve is operated to decant the supernatant discharges to the Monongahela River by gravity. After decanting is completed, submersible sludge pumps are operated to pump settled residue to the Brownsville Sewer Authority Wastewater Treatment Plant.

DISTRIBUTION STORAGE

Distribution storage consists of the covered 3.5 MG in-ground concrete Hiller Reservoir, the 0.43 MG steel standpipe California Tank, the 0.127 MG Aquastore glass lined Allison Tank, the 0.18 MG welded steel Daisytown Tank and 0.500 MG Rt. 88 Tank.

DISTRIBUTION

Two high service pumps each have a capacity of 2.9 MGD at 461 TDH each. The system has two booster pump stations, the Brownsville Station with 2.1 MGD capacity and the Route 88 Station with 1.2 MGD capacity; and seven (7) PRV's.

BUTLER

The Butler area serves the City of Butler; the Borough of East Butler; Connoquenessing Borough and Saxonburg Borough ; and portions of Butler, Center, Connoquenessing, Forward, Franklin, Oakland, Penn, Clinton and Summit Townships. The estimated population served is 44,600.

SOURCE OF SUPPLY

Source of supply is obtained from impoundments on the Connoquenessing Creek, Thorn Run Dam and the Allegheny River. Main sources are Connoquenessing Creek and Thorn Run. In addition, a 16-inch waterline from the Pennsylvania American Water Ellwood System is available to supply up to an additional 2 MGD as needed.

Two impounding reservoirs located on 792 acres of land are Oneida, capacity 452.6 million gallons; and Thorn Run, capacity 138.7 million gallons.

Lake Oneida Dam is an earthen embankment structure, which was being rehabilitated in 2012 and 2013. The improvements include a new reinforced concrete primary spillway and roller compacted concrete embankment for overtopping protection. The maximum height of the dam is 38 feet and it has a length of 875 feet. The dam contains a concrete corewall which is cast on top of a steel sheetpile cutoff wall. The dam was originally constructed in 1918. The PADEP imposes a minimum release requirement in the creek downstream of the dam.

Thorn Run Dam is an earthen embankment structure, containing a reinforced concrete primary spillway and roller compacted concrete embankment overtopping protection. The maximum height of the dam is 39 feet high and it has a length of 660 feet. The dam contains a concrete corewall which is reportedly cast on top of a timber sheetpile cutoff wall. The dam was originally constructed in 1903 and was rehabilitated in 2010-2011. The PADEP imposes a minimum release requirement in the creek downstream of the dam.

Water taken from the Allegheny River at Brady's Bend is pumped through 11 ½ miles of 16 inch prestressed concrete pipe, It goes to either the Oneida watershed or to the Thorn Run watershed, where it is discharged into two stream beds and flows into the reservoirs. A metering station was installed in 1992 on the 16" line near the discharge points to the reservoirs to comply with a D.E.P. requirement to measure and control the flows from the Allegheny River to Lake Oneida and Thorn Run water sheds.

In 2016, both the East Brady and Kaylor Pump Stations were upgraded, consisting of installing an additional electrically driven pump at the East Brady location and installing 2 new electrically driven pumps at the Kaylor location.

TREATMENT

The water from Oneida Reservoir flows by gravity through a 24" main to the Oneida Valley Plant. Water from the Thorn Run Reservoir flows by gravity through two mains, one of which is 16" and the other 24", to a junction point with a 24" main from Oneida Reservoir.

The Oneida Valley Treatment Plant located on Pennsylvania State Route 38 has a capacity of 12.0 mgd. Potassium Permanganate is added at the gate houses of Oneida and Thorn Run Reservoir. Water from the reservoirs enters the raw water sump by gravity. It is then pumped from the raw water sump to the treatment units. Pre-chlorine is added between the raw water sump and the treatment units. Pre-lime, alum coagulant, and carbon are added in the raw water sump.

The plant has three Aldrich type purification units, each consisting of a steel tank 76 feet in diameter containing concentric steel shells, which provide separate compartments for flocculation, clarification and filtration. The filter compartments contain anthracite, sand and ilmenite media supported on gravel. Filter aid is added on top of the filters. From the treatment units the water flows by gravity to a 710,000 gallon clearwell where post-lime and post-chlorine are added. A project to renovate each of the three purification units was started in 1996 and was completed in 1998.

In 1989, a Supervisory Control and Data Acquisition System (SCADA) was installed at the Oneida Valley Treatment Plant. This system provides instant access of information for the entire operating system and focuses that information to a computer screen located at the plant. In 1993, chemical containment was added to surround all chemical storage tanks and feeders to prevent the accidental release of water treatment chemicals.

DISTRIBUTION STORAGE

There is a 150,000 gallon elevated tank on the North Hills High service system and a 150,000 gallon elevated tank on the South Hills high service system. There are two 250,000 gallon elevated tanks on the West End high service system, a 135,000 gallons reservoir on the East Butler system, a 250,000 gallon elevated tank on the Oak Hills high service system, and a 250,000 gallon elevated tank on the Lick Hill (Summit Twp.) high service system. There is also 475,000 gallon standpipe in the Center Township system as well as a 250,000 gallon elevated tank in Connoquenessing System. There are also three tanks serving the Saxonburg system; the welded steel 250,000 gallons Saxonburg Elevated Tank, the welded steel 664,000 gallons Saxonburg Standpipe and the elevated steel 400,000 gallons victory Road Elevated tank.

The Main Service system has a 2,000,000 gallon lined and covered reservoir and a 2,500,000 gallon ground storage tank. The reservoir is equipped with two pumps which can pump water into the North Hills system.

DISTRIBUTION

The distribution system is divided into eight service areas: The Main Service system, North Hills high service system, South Hills high service system, the East Butler system, the West End high service system, Oak Hills high service system, Lick Hill (Summit Twp.) high service system, and Center Township high service system. Also, there are two smaller booster systems serving a section of Portman Road and a portion of the system off Freeport Rd. south of Butler.

The North Hills high service system is supplied by the choice of 2 electrically driven pumps located at the North Butler booster or by 2 electrically driven pumps located at the North Hills booster.

The South Hills/Saxonburg high service system is supplied by four electrically driven pumps located at the Saxonburg Booster Station.

The East Butler system is supplied by 2 electrically driven pumps located at the East Butler booster station.

The West End high service system is supplied by the New Castle Road Booster Station, which contains three electrically- driven pumps. This station has a diesel-driven generator that provides power in the event of a power outage. The West End high service system can also be supplied through the 16" interconnection with the Pennsylvania American Water Ellwood System using the Swain Hill booster.

The Oak Hills high service system is supplied by 3 electrically driven pumps located in the Oak Hills booster station. This station was retrofitted in 2016/2017 with all new pumps and electrical equipment.

The Lick Hill (Summit Twp.) high service system is supplied by 2 electrically driven pumps located at the Lick Hills booster station,

The Center Township high service system is supplied by 3 electrically driven pumps located at the Oneida Valley plant. 2 of these pumps can be operated during power outages using the plant emergency generator.

The Main Service system is supplied by four pumps located at the Oneida Valley Plant. Three of the pumps are driven by electric motors and the fourth can be driven by either electric motor or diesel engine.

Two Mobile generators are available to provide secondary power in the event of power outage through transfer switch connections installed at all the boosters.

The Mt. Chestnut high service system is supplied by 4 electrically driven pumps located in the Mt. Chestnut Booster Station. This station has an emergency generator capable of operating 2 of the pumps in case of a power outage.

The Whitestown Road high service system is supplied by 4 electrically driven pumps located in the Whitestown Road Booster Station. This station has an emergency generator capable of operating 2 of the pumps in case of a power outage.

WASTE WATER FACILITIES

Sludge created during the treatment process is discharged automatically directly to the Butler Area Sewer Authority. Solids from the backwash water are settled in a concrete holding tank and pumped to the sewer authority following recycling of the backwash water.

CEASETOWN/WATRES

The Ceasetown area serves all or portions of Ashley, Courtdale, Edwardsville, Larksville, Plymouth, Pringle, Shickshinny, Sugar Notch, Laurel Run and Warrior Run Boroughs; Conyngham, Hanover, Hunlock, Plymouth, Newport, Union Salem, Wilkes Barre and Jackson Townships; Nanticoke and Wilkes-Barre Cities in Luzerne County. Watres serves people in all or portions of Avoca, Dupont, Duryea, Hughestown, Laflin, and Yatesville Boroughs; Jenkins, Pittston, Plains, and Wilkes-Barre Townships; and the cities of Pittston and Wilkes-Barre City. The estimated population served is 131,000.

SOURCES OF SUPPLY

The Ceasetown system consists of two interrelated sources of supply on the Pikes Creek and Harvey's Creek watersheds. The primary source of supply on the Pikes Creek watershed is the Pikes Creek (or Chenery) Reservoir. Rice Dam (also known as the Harvey's Creek Canal Headworks) is the primary withdrawal location on the Harvey's Creek watershed. Harvey's Lake, upstream of Rice Dam, is a recreational facility and not a source of water for PAWC.

Rice Dam is a 3.2 million gallon (Mgal) supply reservoir located on Harvey's Creek with a 20 square mile drainage area, which includes Harvey's Lake. Water released from Rice Dam flows through the Harvey's Creek Canal to the raw water pumping station for the Ceasetown Water Purification Plant. Raw water can either be pumped directly to the water purification plant, the Pikes Creek Reservoir, or both. The decision where to pump Harvey's Creek water is based on the storage level of Pikes Creek Reservoir and the water quality of Harvey's Creek. During periods of less than satisfactory water quality in Harvey's Creek or when sufficient storage levels exist in the Ceasetown Reservoir, water is not withdrawn from Rice Dam through the Harvey's Creek Canal.

Pikes Creek Reservoir is a 2.94 Bgal supply reservoir with an 11.1 square mile drainage area. A 42" pipeline transmits water directly from the Pikes Creek Reservoir to the Ceasetown Water Purification Plant. Water leaving the treatment process flows through a 2.8 Mgal finished water storage tank (overflow elevation of 1,016.5) and 42" transmission main to two delivery points to the distribution system. Overflow and releases from Pikes Creek Reservoir flow in Pikes Creek to the Pikes Creek Canal Headworks located immediately downstream. At the Pikes Creek Canal Headworks, water is collected from Pikes Creek and the Harvey's Creek Canal. Overflow from the Pikes Creek Canal Headwork's discharges into Harvey's Creek.

The Watres system consists of three independent but interconnected sources of supply. The Watres Reservoir is a 1,943 Mgal supply reservoir, which primarily supplies water to the Watres Water Purification Plant via the Gardner Creek Pump Station. Gardner Creek Reservoir is a 74 Mgal standby reservoir with a drainage area of 3.5 square miles. It can be introduced into the raw water supply mains to the Watres Water Purification Plant by pumps located at the Gardner Creek Pump Station. The third source, Mill Creek Reservoir, is a 616.7 Mgal supply reservoir with a drainage area of 3.0 square miles. Raw water from this source is intermixed with

the Gardner's Creek/Watres supplies at the flow control chamber for the Watres Water Purification Plant. Water leaving the Watres Water Purification Plant flows through two 1.6 Mgal finished water storage tanks (overflow elevation of 1,074).

TREATMENT

The Ceasetown plant is located approximately one mile downstream of Pikes Creek Dam along Route 29 in Jackson Township, Luzerne County. The plant has a rated capacity of 16.0 M.G.D. Water supply to the plant is provided by either gravity or pumping from either the Pikes Creek Reservoir and/or the Harvey's Creek Canal Headwork's (Rice Dam).

The raw water is delivered by either gravity or pumping from the sources of supply directly to the plant where initial pre-chemical additions are made. Pretreatment chemicals include alum, lime, potassium permanganate and activated carbon. After pre-chemicals are added, the water passes through rapid mixing units consisting of two basins in series with mixers. The next step in the treatment process consists of contact clarification units followed by granular media filtration. Filters are equipped for air/water washing.

After being filtered, water flows through the plant's clear well where many of the post treatment chemicals such as chlorine for disinfections, lime or caustic soda for pH adjustment, and polyphosphate for corrosion control are added before entering the 2.8M gallon storage tank and the 1.5M gallon storage tank on the plant site.

On the plant site are two lined earthen lagoons used to store filter backwash water and sludge from the plant's clarification processes. After the wastes have settled, the clear supernatant is discharged into the adjacent stream, in accordance with an NPDES permit.

The Watres plant is located near the junction of Westminster and Jumper Roads in Plains Township, Luzerne County. The plant has a rated capacity of 16.0 M.G.D. Water is supplied by gravity to the plant from Watres and/or Mill Creek Reservoirs and raw water pumping from Gardner's Creek Reservoir.

The raw water is delivered by gravity or pumping from the source of supply directly to the plant where initial pre-chemical additions are made. Pretreatment chemicals include alum, lime, potassium permanganate and activated carbon. After pre-chemicals are added, the water passes through rapid mixing units consisting of two basins in series with mixers. The next step in the treatment process consists of contact clarification units followed by granular media filtration. Filters are equipped for air/water washing.

After being filtered, water flows through the plant's clear well where many of the post treatment chemicals such as chlorine for disinfections, lime or caustic soda for pH adjustment, and polyphosphate for corrosion control are added before entering the 2 - 1.6 Mgal storage tanks on the plant site.

DISTRIBUTION

The first delivery points from the Ceasetown Water Purification Plant is the 18" transmission main in the vicinity of the Pikes Creek Canal Screen Chamber Intake. The system serves customers located in Nanticoke, Hanover Township, Newport Township, Shickshinny, Mocanaqua (Conyngham Twp.) and portions of Hunlocks and Plymouth Townships. The service area ranges in elevation from 520 to 890 feet and is served by five distribution pump stations and three distribution storage tanks area historically fed by PAWC Pine Run reservoir; comprising portions of Warrior Run, Sugar Notch, Ashley, and Hanover Townships, via the Sugar Notch booster pump station and the 1.0 Mgal Sugar Notch distribution storage tank distribution pumping station and five distribution storage tanks, and Wilkes-Barre Township via Georgetown pump and 500,000 gallon distribution tank.

The second delivery point from the Ceasetown Water Purification Plant is through the 42" transmission main to the 5.0 Mgal Plymouth Tank (overflow elevation of 993). Water is delivered from the Plymouth Tank through a 36-inch transmission main. The system serves people in Plymouth Borough and surrounding municipalities and in downtown and South Wilkes-Barre. It intermixes with water delivered from the Ceasetown 18" transmission main and the Watres Water Purification Plant. Its service area ranges in elevation from 520 to 956 feet and is served by five distribution-pumping stations and four distribution storage tanks. Service is provided to the area historically fed by Pine Run Reservoir; comprising portions of Warrior Run, Sugar Notch, Ashley, and Hanover Township; via the Sugar Notch booster pump station and the 1.0 Mgal Sugar Notch distribution storage tank. An interconnection point exists between the Ceasetown and Hillside supplies at the Courtdale pump station facility.

Water leaving the Watres Water Purification Plant's finished water storage tanks flow by gravity through transmission mains on Westminster Road to serve areas of Jenkins Township, Laflin Borough, and the lower portion of Plains Township. In addition, water flows south through 16-inch and 24-inch mains on Jumper Road and serves Wilkes-Barre, Plains Township and Wilkes-Barre Township. The N.P.W. pump station, located on Jumper Road, delivers water to the .5 Mgal Plains Township Tank (overflow elevation 1,251) which provides storage to the East Mountain Business Park. The 1.0 Mgal Laurel Run Tank can provide additional storage on the gravity supply system. There are additional small booster stations that serve small areas.

Water is also delivered to the higher elevation areas historically served solely from Watres Reservoir through the finished water pumps located at the Gardner's Creek Pump Station. From the pump station, transmission lines link the two .75 Mgal Old Boston water storage tanks (overflow elevation of 1,355) to the 10" Suscon main in Pittston Township and the 14" Old Boston main in Jenkins Township. Water can be transferred from the higher gradient Watres service area to portions of the Nesbitt service area through pressure regulating facilities. Ther are also other small booster stations that serve small areas.

WASTE WATER FACILITIES

On the Watres plant site is an equalization basin, a plate settler building, and eight sand drying beds utilized to separate and dewater residual solids from the plants backwash and clarification processes. Supernatant and filtrate is recycled to the plant influent. The Watres plant operates as a zero discharge plant.

On the Ceasetown plant site are two lined earthen lagoons used to store residual solids of the filter backwash water. After the wastes have settled, the clear supernatant is discharged into the adjacent stream, in accordance with the NPDES permit.

CLARION

The Clarion area serves the Boroughs of Clarion, Shippenville, Sligo and Strattanville; and portions of Clarion, Elk, Limestone, Knox, Monroe, Paint, Piney and Farmington Townships. The estimated population served is 11,600.

SOURCE OF SUPPLY

The system utilizes the Clarion River as its source of supply.

TREATMENT

Raw water from the Clarion River flows by gravity from two different intakes into a collection well where potassium permanganate and, as river water quality necessitates, powder activated carbon, are added. This water is then pumped using three (3) vertical turbine raw water pumps to the head of the treatment process located at the top of the adjacent hill. As this water enters the facility, polyaluminum chloride or liquid alum, caustic, polymer and chlorine, is added. The water then enters one or both of the (2) two Actiflo treatment trains rated for 3 mgd each.

The treatment process using the Actiflo treatment trains consists of coagulation, injection, maturation and tube settling. Coagulant, in the form of polyaluminum chloride, is added before the Actiflo unit, and at the unit, sand and polymer are injected into the mixed water to enhance the coagulation process. Maturation and tube settling is accomplished immediately following the sand and polymer addition. Filtration is conducted via three dual media (anthracite and sand), rated for 2 mgd each.

After passing through the filters, the water enters the common filter effluent line where, caustic soda and chlorine, is added before entering the 0.440 MG finished water clearwell storage. Chlorine, hydrofluosilicic acid, corrosion inhibitor and ammonia are added in the common clearwell effluent line, which is the suction line for the high service pump station.

The solids removed from the filters are backwashed into one of (3) lagoons. Decant water from these gravity flows to a concrete wastewater holding tank from which discharge is made to the Clarion River under and NPDES permit issued by the Department of Environmental Protection. It is planned that the residue from the retention lagoons and wastewater tank will be haul offsite to either a landfill or a beneficial use end-user.

DISTRIBUTION

There are three distributive pumps in the pumping station located adjacent to the clearwell to pump finished water to the distribution system. Two 12 inch transmission mains supply water to the main service gradient grid system and the two main service 500,000 gallon elevated tanks. The Clarion Township booster has two pumps which deliver water to the Clarion Township gradient, where a 310,000 gallon standpipe provides distribution storage. In addition, water is transmitted through a pressure reducing station to the Sligo area where a 250,000 gallon

tank provides additional storage. In addition, the Paint Township Booster Station pumps water to the Farmington Township Municipal Authority and the Elk Township PRV station serves the Shippenville and Elk Township portions of the system.

WASTE WATER FACILITIES

Filter backwash and actiflo return solids flow by gravity to one of three wastewater holding lagoons where the solids are allowed to settle before the clear supernatant is returned to the stream. The settled sludge is allowed to dry and the de-wasted material is removed and is typically land applied as a soil amendment for beneficial use.

COATESVILLE DISTRICT – WATER

The area serviced by the Coatesville District is approximately 28.0 square miles and serves approximately 11,569 customers. The water system is divided into ten (10) pressure zones. There is an interconnection between the Coatesville pressure zones (low and high) and the Brandywine Pump Station via manually operated street valves. There is also an interconnection between the West Chester Road Pump Station service area and Caln Township via manually operated valves located in vaults.

The water source for the district is the West Branch of the Brandywine Creek and supplemented by Chambers Lake. The water is treated at the Rock Run Water Treatment Plant and pumped into the system through parallel 18" and 20" water mains. The 18" water main flows directly into the Brandywine Pump Station which pumps the water directly into a 24" water main for distribution east, towards Caln Township, and west to Parkesburg. The 20" water main provides service to Coatesville City low pressure zone.

PARKESBURG SYSTEM

The water traveling west to Parkesburg flows into a 5.0 million gallon reservoir. The Parkesburg Pump Station draws water from the reservoir and pumps directly into a 24" water main which travels west into the Mars Hill Storage Tank. The Wright Street Pump Station draws water from 24" water main to feed the Parkesburg Elevated Storage Tank (0.1 mg). The storage tank provides domestic and fire flow to a small residential area in the northern portion of Parkesburg Borough. The Mars Hill Tank (2.0 mg) provides domestic and fire flows to a rural portion of the service area west of Parkesburg Borough.

The water from the Parkesburg Reservoir also flows east to Caln Township area to provide domestic and fire flows via a 24" water main.

COATESVILLE SYSTEM

The Rock Run Water Treatment Plant pumps (7.0 MGD) water into the system through parallel 18" and 20" water mains. The 20" water main flows directly into Coatesville City. The city is divided into two (2) pressure zones. The low pressure zone is serviced directly through water pumped from the water treatment plant. This pressure zone provides service to residential, commercial and industrial customers in an urban area. The low pressure system also provides water to the Mt. Pleasant Street Storage Tank (2.0mg) and the Glendale Avenue Storage Tank (1.0 mg). The Mt. Pleasant Street Pump Station draws water from the Mt. Pleasant Street Storage Tank which serves a residential area in Coatesville City and Valley Township. The high pressure zone is served through the 4th Avenue Pump Station which takes suction from the low pressure zone. The 4th Avenue Pump Station pumps to the North Hill Tank (0.5 mg). The North Hill Tank, via a pressure regulating valve, provides water to the South Hill Tank (0.25mg).

EAST FALLOWFIELD TOWNSHIP SYSTEM

The South Hill Tank provides water to the West Chester Road Pump Station which provides domestic and fire service to a residential area in East Fallowfield Township. This is a closed system. There is an interconnect between the East Fallowfield Township System and Caln Township, which is served via the Parkesburg Reservoir.

INTERMEDIATE SERVICE AREA

There are two (2) pump stations which draw directly from the 24" water main between Parkesburg Borough and Coatesville City. The Strasburg Pump Station provides domestic and fire flows to a small residential area in East Fallowfield Township. This is a closed system. The AIM Pump Station pumps to the AIM Elevated Storage Tank (0.25mg). The tank provides domestic and fire flows to an area comprising of residential, commercial and industrial customers in Sadsbury Township. The tank also provides water to the Rt. 340 Pump Station. This pump station pumps to the Hill Road Tank (0.2mg) which serves residential customers in West Caln Township.

CONNELLSVILLE

The Connellsville area serves the City of Connellsville; South Connellsville Borough; Connellsville Township; and a portion of Bullskin Township. The estimated population served is 11,450.

SOURCE OF SUPPLY

The Connellsville area purchases all of its water requirements from the Municipal Authority of Westmoreland County, the North Fayette County Municipal Authority, the Pleasant Valley Water Authority and the Indian Creek Valley Water Authority.

There are six connections through which the purchases occur. The first is located on Cramer Avenue approximately 130 feet west of Hyndman Street in South Connellsville. This is a 12-inch connection with two 4-inch meters. The second connection is an 8-inch with a 4-inch meter and is located in Royal Alley midway between Perry Street and Wayne Street in the City of Connellsville. The third connection is 6-inch and is located at the intersection of 5th and Wine Streets in South Connellsville with one 4-inch and one 1-inch meter. The fourth connection to North Fayette Country Municipal Authority and is located along Morrell Avenue (Route 119). This is an 8-inch connection with a 6-inch meter. The fifth connection to Pleasant Valley Water Authority is 6-inch with a 2-inch meter and is located on Breakiron Road in Bullskin Township. This sixth connection to the Indian Creek Valley Water Authority is a 6-inch connection on Springfield Pike.

EMERGENCY CONNECTIONS

There are two emergency connections for this system. One is 12-inch and is located at the end of Sullivan Alley in South Connellsville. The other is 6-inch at the intersection of West Crawford Avenue and South Twelfth Street.

DISTRIBUTION STORAGE

The system has one standpipe and two reservoirs. The Joint High School Reservoir has a capacity of 0.158 million gallons. The two Gibson reservoirs owned by the Municipal Authority of Westmoreland have a capacity of 5.0 million gallons and 2.5 million gallons.

DISTRIBUTION

The Joint High School Tank service system is supplied by 4 electrically driven pumps located in the Snyder Street Booster Station. This station has an emergency generator capable of operating 2 of the pumps in case of a power outage. The Springfield Pike service system is supplied by 2 small pump stations in series that each have 2 electrically driven pumps.

CRYSTAL LAKE

The Crystal Lake area serves all or portions of Fairview, Rice and Wright Townships in Luzerne County. The estimated population served is 8,000.

SOURCE OF SUPPLY

The Crystal Lake system consists of two interconnected sources of supply located on adjacent watersheds. Bear Creek Intake is a stream intake with a 36 square mile drainage area located approximately one mile downstream of Bear Creek Lake on Bear Creek, a tributary of the Lehigh River. Water can be pumped from the Bear Creek Intake at a nominal maximum rate of 13 mgd into Crystal Lake. The DEP water allocation permit limits total pumpage from Bear Creek into Crystal Lake to 1,095 Mgal per year and also requires that a minimum stream flow of 35.9 cubic feet per second (cfs) must be maintained downstream of the Bear Creek Intake. Crystal Lake, located on Wapwallopen Creek, is a 2.54 Bgal distribution reservoir with a 3.3 square mile watershed and an overflow elevation of 1,942.54. Two water transmission mains connect Crystal Lake Reservoir to the Crystal Lake Water Purification Plant.

TREATMENT

The Crystal Lake plant is located approximately one-half mile downstream of Crystal Lake Dam in Bear Creek Township. The plant has a rated capacity of 6.5 M.G.D. Water supply to the plant is gravity from the Crystal Lake Reservoir.

The raw water is delivered by gravity from the source of supply directly to the plant where initial pre-chemical additions are made. Pretreatment chemicals include alum or polyaluminum chloride, lime, potassium permanganate and activated carbon. After pre-chemicals are added, the water passes through rapid mixing units consisting of two basins in series with mixers and then into flocculation units consisting of four basins with two stages horizontal reels. The next step in the treatment process consists of granular media filtration. Filters are equipped for air/water washing.

After being filtered, water flows through the plants clear well where many of the post treatment chemicals such as chlorine for disinfections, lime or caustic soda for pH adjustment, and polyphosphate for corrosion control are added before entering the 1.0 Mgal storage tank on the plant site.

DISTRIBUTION

Water leaving the Crystal Lake Water Purification Plant flows through the two 1.0 Mgal finished water storage tanks and 12", 14" and 20" transmission mains to serve people in the Mountain Top area. The Crystal Lake service area ranges between 1224 and 1,700 feet in elevation. Most customers are served through pressure reducing valves. The 1.0 Mgal Crestwood Tank (overflow elevation of 1,680) provides storage to the regulated service area within the Crestwood Industrial Park.

Water can also be delivered to the service area historically fed by Pine Run Reservoir through a 16-inch transmission main. This service area comprises portions of Warrior Run, Sugar Notch, Ashley, and Hanover Township. This service area, which is primarily fed from the Ceasetown supply area, contains the Sugar Notch booster pumping station and the 1.0 Mgal Sugar Notch distribution storage tank.

WASTE WATER FACILITIES

On the plant site are two lined earthen lagoons used to store residual solids of the filter backwash water. After the wastes have settled, the clear supernatant is discharged into the adjacent stream, in accordance with an NPDES permit.

ELLWOOD CITY

The Ellwood City Plant serves the Boroughs of Ellwood City and Ellport, and portions of Perry and Wayne Townships and New Beaver Borough in Lawrence County; the Borough of Koppel and portions of North Sewickley, Franklin Township, and Big Beaver Borough in Beaver County; and portions of Jackson and Lancaster Townships in Butler County. The estimated population served is 16,610. The Ellwood system is also interconnected with the PA American Water Butler system and the Evans City Municipal Authority. There are also two connections with the North Sewickley Township Municipal Authority. One connections serves a small portion of the North Sewickley system while the other is an emergency connection.

SOURCE OF SUPPLY

The Ellwood Plant obtains its water supply from Slippery Rock Creek near its confluence with Connoquenessing Creek. A diversion dam, constructed of reinforced concrete and fiberglass tilting gates, spans Slippery Rock Creek and forms a pool from which water flows to a reinforced concrete intake structure on the left bank of the creek.

TREATMENT

The raw water passes through a traveling screen at the intake and then through a 30 inch pipe to the low-lift pump well at the Ellwood Treatment Plant on the right bank of the creek. A concrete block and brick structure atop the intake well, on the left bank of the creek, houses the electrical equipment for the traveling screen and sluice gate.

Potassium permanganate is added to the raw water well for oxidation of iron & manganese. Three low-lift pumps deliver water from the raw water well to a concrete basin with four compartments. The first section is a two stage, rapid mix chamber equipped with two lightening mixers and the remaining three sections are flocculation chambers equipped with paddle mixers. Ferric chloride is added for coagulation along with a non-ionic polymer as a coagulant aid when raw turbidities are high. There is one steel, spiral flow tank and one concrete basin that provide for sedimentation. Lime and chlorine are added between the two basins. Filtration is provided by eight sand and anthracite media filters, complete with Leopold underdrains and surface wash. A cationic polymer is fed as a filter aid. The filtered water empties into a 285,000 gallon clearwell, where chlorine and ammonia gas are added for disinfection.

In 1989, additional disinfection equipment was added to the treatment process at the Ellwood plant, as well as a Supervisory Control and Data Acquisition System (SCADA) which provides instant access to information. In 1990, additional washwater piping was installed to improve backwash water rates for better cleaning of the filters at the Ellwood plant. An additional wash water tank and piping was installed in 1992 to improve wash water flows to and

through the filters. In 1994, filter media was replaced in all eight (8) filters at the Ellwood Treatment Plant. A new laboratory was constructed in 2000. Ammonia gas feed equipment was installed in 2003 and the disinfection process was adapted for chloramination. In 2007, the chlorine gas feed equipment was updated to a Wallace & Tiernan vacuum system, and the coagulant roto-dip feeders were replaced with new Peristaltic pumps.

DISTRIBUTION STORAGE

The welded steel 3.0 MG Aiken Avenue Reservoir and welded steel 0.5 MG West End Reservoir provide storage for the Ellwood main gradient. The welded steel 0.317 MG Franklin Township Standpipe and the 0.538 MG Aquastore glass lined Swain Hill Tank provides storage in the Franklin/Jackson gradient. In addition, the 0.15 MG welded steel Forest Hills (Skyline) Standpipe and the 0.30 MG Wiley Hill Elevated Tank provide storage to their respective gradients.

DISTRIBUTION

The Ellwood Main Service gradient is supplied by five pumps located at the Ellwood Treatment Plant. The Mechlem booster supplies water to the Franklin/Jackson gradient, the Wiley Hill Booster supplies water to the Wiley Hill gradient and the Fox booster supplies water to the Forest Hills gradient. In addition, the Bridge Street booster provides pressure to the Bridge Street area, and a Pressure Reducing Station provides water to Evans City. The Route 19 service system is supplied by 4 electrically driven pumps located in the Route 19 Booster Station. This station has an emergency generator capable of operating 2 of the pumps in case of a power outage.

WASTE WATER FACILITIES

Spent filter backwash flows by gravity through a 20 inch pipe to one of two holding lagoons. Sludge is periodically pumped from the flocculation and sedimentation basins to the large lagoon. After settling, the clear water is drawn off the lagoons and returned to Slippery Rock Creek. Sludge in the lagoons can then be pumped to a drying bed located approximately 500 feet from lagoons; or more recently, removed directly from the lagoons and land applied. If the drying bed is utilized this material can also be removed and land applied.

FOREST CITY

The Forest City areas serve all or portions of Clinton Township, Fell Township, Forest City and Vandling Boroughs in Susquehanna and Wayne Counties. The estimated population served is 3,700.

SOURCES OF SUPPLY

This system consists of three sources of supply, two located on the Lackawanna River and one on the tributary Brace Brook watershed. The primary withdrawal point is the Stillwater Intake located about 6,000 feet downstream of Stillwater Flood Control Reservoir. Stillwater Flood Control Reservoir has a normal operating capacity of 200 Mgal, of which 65 Mgal of storage is dedicated for water supply purposes. Water is released to the Lackawanna River and picked up at the Stillwater Intake, which has a total upstream drainage area of 37 square miles. Raw water then flows by gravity through a 30-inch main from Stillwater Intake to the Forest City Water Purification Plant. A secondary point of withdrawal is located downstream on the Lackawanna River at the Forest City Intake Reservoir, adjacent to the water purification plant. Water must be pumped from this intake reservoir to the water purification plant. The Brace Brook Reservoir is a single 4.4 Mgal standby supply reservoir located on Brace Brook with a 2.1 square mile drainage area.

TREATMENT

The Forest City plant is located adjacent to Forest City Pump Intake along the Lackawanna River in Forest City Borough, Susquehanna County. The plant has a rated capacity of 1.0 M.G.D. Water supply to the plant is provided by gravity from Stillwater Intake or raw water pumping from Forest City Pump Intake.

The raw water is delivered by either gravity or pumping from the sources of supply directly to the plant where initial pre-chemical additions are made. Pretreatment chemicals include alum, lime, potassium permanganate and activated carbon. After pre-chemicals are added, the water passes through rapid mixing units consisting of one in-line static mixer and then into flocculation units consisting of one basin with two staged horizontal reels. The next step in the treatment process consists of sedimentation followed by granular media filtration. Filters are equipped for conventional water washing.

After being filtered, water flows through the plants clearwell where many of the chemicals such as chlorine for disinfection, lime for pH adjustment, and polyphosphate for corrosion control are added.

DISTRIBUTION

Treated water is pumped to the system through a 12-inch finished water transmission main. The pump station is located at the Forest City Purification Plant and consists of two variable speed pumps rated at 800 gallons per minute each, together with associated valves and

appurtenances. The distribution system contains one .75 million gallon distribution storage tank with an overflow elevation of 1,828. Pump operation is controlled indirectly by the level of the storage tank. An interconnect pump station was built on Day Street in Fell Township. This station can deliver Brownell water to the Forest City system if needed. Also Forest City water can be sent to parts of the Brownell service territory using PRV and pumps also in this station.

WASTE WATER FACILITIES

On the plant site are two lined earthen lagoons used to store filter backwash water and sludge from the plant's clarification processes. After the wastes have settled, the clear supernatant is discharged into the adjacent stream in accordance with an NPDES permit.

FRACKVILLE

The Frackville area serves the Borough of Frackville and portions of West Mahanoy, Mahanoy, New Castle, and Butler Townships. The estimated population served is 5,520.

SOURCE OF SUPPLY

Source of supply for the Center Street station is ~~four~~ five drilled wells. One additional drilled well is located at the Nice Street Station. The combined system withdrawal capacity is 1.0 million gallons per day.

TREATMENT

Treatment at the Center Street Aeration Facility consists of water from the four (4) wells being pumped to a 33' x 5'9" diameter aeration tower equipped with two (2) 5,200 CFM air blowers. Water from the aeration tower is discharged into a 0.029 MG concrete clearwell where chlorine, caustic soda (for pH adjustment), and a corrosion inhibitor are added. All of the chemical feed rates are flow paced and chlorine and pH are also residual controlled as well.

Treatment at the Nice Street Aeration Facility consists of water from the one (1) well being pumped to a 28' x 3' diameter aeration tower equipped with a 1,000 CFM air blower. Water from the aeration tower is discharged into a 0.011 MG concrete clearwell where chlorine and a corrosion inhibitor are added.

All processes at both facilities are automatically monitored for flow, chemical feed status, and pressure. All parameters are transmitted to the Operations Center via a SCADA system.

DISTRIBUTION STORAGE

Distribution storage consists of a 0.335 MG circular concrete reservoir with a hypalon liner and a floating cover. This storage is for the main service gradient and is located north of West Pine Street between Sixth and Seventh Streets in Butler Township. Also, a 0.5 MG steel storage tank located in the Frackville Industrial Park serves as storage for that part of the system and also for the higher elevations of the system.

DISTRIBUTION

Water is pumped to the distribution system from the Center Street Station and the Nice Street Station. At the Center Street Station water flows through a 12-inch main to the main pump building where three high service pumps, each with a capacity of .576 MGD capacity each deliver water to the system. The pumps are controlled by the level in the main service reservoir via the SCADA system.

At the Nice Street station, the water from the clearwell is delivered to the distribution system by a 150 GPM vertical turbine high service pump.

The Morea Road Station has a capacity of .547 MGD and serves the Industrial Park area and higher elevations of the system. This station's operation is controlled by the water level in the Industrial Park Tank.

GLEN ALSACE

PAWC – Glen Alsace serves the Townships of Exeter Township and Amity Township in Berks County. The Golden Oaks satellite system serves 57 homes on a golf course community in Ruscombmanor Township, Berks County. The estimated population served is 23,800.

SOURCE OF SUPPLY

The primary source of supply is the groundwater wells and interconnects with neighboring municipalities. In Exeter Township, there are seven wells located at (3) East Neversink Road in Exeter Township, (1) Fairmount Drive Exeter Township and (3) at Butter Lane Exeter Township. Surface water supply from Reading Water Authority is located at 19th and Woodvale in Reading. There are two interconnects with Mount Penn Water Authority (Groundwater wells) one site is Siedel Street and Levan Street. The second site is at Bingaman Street and Route 562. In Amity Township six wells are located at (2) Nicholson Ave, Old Swede Road, Timberline Drive, Rosecliff Drive, Levingood Rd. Golden Oaks Wells #1 and #2 are permitted for 55 gpm and 35 gpm, respectively and pump into a treatment station on the same property. The water is treated and flows into a 33,000 glass lined boled steel tank which is used for pumped storage. Three 24 gpm booster pumps deliver water to the system. The system is controlled through SCADA at the Glen Alsace warehouse.

WELL STATIONS

Well #8 is 8 inches in diameter and 220 feet deep. The pump is a vertical turbine set at 46' in, water lubricated pump, with a rated capacity of 500 GPM. This well supplies water to the Grant street tanks.

Well #9 is 8 inches in diameter, and 116 feet deep. The well is equipped with a vertical turbine pump set at 41' in 1994, with a rated capacity of 500 GPM. This well supplies water to the Grant street tanks.

Well #9A is 8 inches in diameter, and 315 feet deep. The well is equipped with a vertical turbine pump set at 105' in 2006, with a rated capacity of 300 GPM. This well supplies water to the Grant street tanks.

Well #1 is 8 inches in diameter and 162 feet deep. This pump is a 2 stage, 7.5 HP Peerless Submersible pump set at 144' in 1985, with a rated capacity of 160 GPM. This well supplies water to the Butter Lane tank.

Well #5 is 8 inches in diameter and 205 feet deep. This pump is a 2 stage, 7.5 HP Peerless Submersible pump set at 135' in 1990, with a rated capacity of 110 GPM. This well supplies water to the Butter Lane tank.

Well #7 is 6 inches in diameter and 170 feet deep. This pump is a 2 stage, 7.5 HP Peerless Submersible pump set at 100' in 1966, with a rated capacity of 110 GPM. This well supplies water to the Butter Lane tank.

Well #GL2A is 8 inches in diameter and 270 feet deep. This pump is a 14 stage, 25 HP Crown Submersible pump set at 320' in 2004, with a rated capacity of 135 GPM. This well supplies water to the Grant street tanks.

Well #DG3 is 6 inches in diameter and 262 feet deep. This pump is a 7 stage, 15 HP Peerless Submersible pump set at 189' in ????, with a rated capacity of 70 GPM. This well supplies water to the Green Briar tanks.

Well #DG4 is 8 inches in diameter and 245 feet deep. This pump is a 15 stage, 25 HP Burks Diamond Submersible pump set at 210' in 1996, with a rated capacity of 125 GPM. This well supplies water to the Green Briar tanks.

Well #DG6 is 8 inches in diameter and 397 feet deep. This pump is a ?? stage, 25 HP Peerless Submersible pump set at 357' in 1996, with a rated capacity of 125 GPM. This well supplies water to the Green Briar tanks.

Well #DG11 is 8 inches in diameter and 357 feet deep. This pump is a 13 stage, 30 HP Crown Submersible pump set at 259' in 1997, with a rated capacity of 250 GPM. This well supplies water to the Green Briar tanks.

Well #DG12A is 8 inches in diameter and 392 feet deep. This pump is a 6 stage, 20 HP Crown Submersible pump set at 261' in 2002, with a rated capacity of 120 GPM. This well supplies water to the Green Briar tanks.

Well #DG13 is 8 inches in diameter and 350 feet deep. This pump is a 16 stage, 20 HP Crown Submersible pump set at 320' in 2004, with a rated capacity of 100 GPM This well supplies water to the Green Briar tanks.

All well stations are operated by a SCADA system either locally or remotely.

Exeter/Amity Townships use the following chemicals. Chlorine is added to the raw water for disinfection. Zinc Orthophosphate and Polyphosphate is also added for control corrosion in the distribution system. In Amity Aqua-mag is used for control corrosion in the distribution system. The chemicals are added before the water is delivered to the distribution system.

PURCHASE WATER

The Reading Municipal Water Authority Interconnection is an 8-inch line capable of providing 2.0 million gallons per day. This interconnect supplies water to Neversink Tank # 2.

The Mount Penn Water Authority Interconnection (Neversink zone) is a 3-inch meter capable of providing approximately 250,000 gallons per day. This interconnect supplies water to Neversink Tank # 1.

Mount Penn Water Authority Interconnection (Artesian zone) is a 2-inch meter capable of providing approximately 250,000 gallons per day. This interconnect supplies water to Church Lane Road Tank #1.

There are currently formal agreements with both suppliers to provide water between the two systems.

DISTRIBUTION STORAGE

Tank #1, Neversink Tank #1 is approximately 35 feet high and 32 feet in diameter, with a capacity of 210,000 gallons. This Steel tank acts as ground water storage to maintain pressure in the Neversink Zone service gradient of the distribution system.

Tank #2, Neversink Tank #2 is approximately 16 feet high and 52 feet in diameter, with a capacity of 250,000 gallons. This Steel tank acts as ground water storage from which water to maintain tank level in Neversink Tank #1.

Tank #3, Grant Street Tank #1 is 40 feet high and 46 feet in diameter, with the capacity of 500,000 gallons. This Steel tank acts as ground water storage to maintain pressure in the main service gradient of the distribution system.

Tank #4, Grant Street Tank #2 is 42 feet high and 65 feet in diameter, with the capacity of 1,000,000 gallons. This Steel tank acts as ground water storage to maintain pressure in the main service gradient of the distribution system.

Tank #5, Church Lane #1 is 15 feet high and 62 feet in diameter, with the capacity of 300,000 gallons. This Concrete tank acts as ground water storage to maintain pressure in the Exeter Artesian gradient of the distribution system.

Tank #6, Green Briar Tank #1 is 40 feet high and 46 feet in diameter, with the capacity of 500,000 gallons. This Steel tank acts as ground water storage to maintain pressure in the main service gradient of the distribution system.

Tank #7, Green Briar Tank #2 is 55 feet high and 75 feet in diameter, with the capacity of 1,500,000 gallons. This Concrete tank acts as ground water storage to maintain pressure in the main service gradient of the distribution system

Tank #8, Butter Lane Tank is 31 feet high and 33 feet in diameter, with the capacity of 200,000 gallons. This Steel tank acts as ground water storage to maintain pressure in the Butter Lane service gradient of the distribution system

DISTRIBUTION

There are five (5) booster stations within the Glen Alsace Area:

The Exeter Artesian Booster station is located on Scottland Dr in Exeter Township and is equipped with two 680 GPM centrifugal, electrically drive pumps. This station can be operated locally or remotely through the SCADA system.

The Grant Street Booster Station is equipped with a 290 GPM centrifugal, electrically operated pump. This station is used to deliver Water to the Neversink zone

The Lincoln Road Booster Station is equipped with two 750 GPM centrifugal, electrically operated pumps equipped with a VFD. The pump can be run locally or remotely through the SCADA system. It see the tank level from Tank #3 and operates off of the Tank #6 level from Green Briar (Douglassville) to supplement normal supply at high demand and provide adequate pressure in the high service gradient.

The Artesian Residential Booster Station is equipped with a 30 GPM centrifugal, electrically operated pump. This station delivers water to 9 customers via a 2" water main.

The Green briar Booster station is located on Berkshire Dr in Amity Township (Douglassville) and is equipped with a (1) 35 GPM centrifugal, electrically drive pump, (1) 100 GPM centrifugal, electrically drive pump, (1) 200 GPM centrifugal, electrically drive pump and (1) 1200 GPM centrifugal, electrically drive pump for high demands. This station is equip with a back up generator. This station can be operated locally or remotely through the SCADA system.

Green briar Booster station and tank site has back up generator none of the other booster stations or wells have a generator back, but they are all wired for a portable generator.

All the scada is monitored at the Glen Alsace warehouse.

HERSHEY

PAWC's Hershey system serves the Borough of Palmyra and portions of the Townships of Annville, North and South Annville, North and South Londonderry, all in Lebanon County. In Dauphin County, portions of the Townships of South Hanover, West Hanover, Londonderry, Conewago and Derry including the village of Hershey are served. The estimated population served is 43,623.

SOURCE OF SUPPLY

Water is taken from the Manada and Swatara Creeks. Supply is also purchased from the City of Lebanon at the east end of the distribution system.

WATER TREATMENT

The Gerald C. Smith Water Treatment Plant is located approximately two miles north of the town of Hershey near the confluence of the Manada and Swatara Creeks in South Hanover Township. The plant has a rated capacity of eleven (11) million gallons per day (MGD). Water can be withdrawn from either or both of the two stream sources. Up to five MGD can be withdrawn from an impounding reservoir formed by a dam on the Manada Creek. After passing through an intake and traveling screen, raw water from the Manada Creek is pumped with two submersible pumps. Up to eleven (11) MGD can be withdrawn from the Swatara Creek. After passing through an intake and a traveling or stationary screen, raw water from the Swatara Creek is pumped with three vertical turbine pumps. The raw water is pumped from the two sources directly into the plant where initial "pre" chemical additions are made. After these chemicals are added, the water passes through a static mixer and then into a chamber where slower mixing can take place with a mechanical mixer. The water enters adjoining distribution chambers where further chemical additions can take place before entering into a vacuum chamber where the water is lifted and released to create a pulsating action. The water then enters one of five "superpulsator" clarifiers where inclined plates along with the pulsating action combine to accelerate solids contact and allow for uniform accumulation in a "blanket". Excess solids accumulate in a trough and are periodically siphoned out.

The clarified water (above the blanket) enters a perforated pipe that leads into a flume that distributes the flow into one of five filters. The filters are conventional units with multimedia including several layers of gravel, sand, and granular activated carbon. After being filtered, the water is piped through a chamber where final "post" chemical additions are made before entering a two million gallon clear well. The water is pumped out of a sump adjoining the clear well with three high service turbine pumps into the distribution system. Two wash water pumps provide water from the clearwell to backwash the filters.

DISTRIBUTION STORAGE

There are five storage vessels in the distribution system. The North (Hershey) Reservoir has a capacity of 2,000,000 gallons, South (Hershey) Reservoir has a capacity of 3,000,000

gallons, Annville Tank has a capacity of 750,000 gallons and Mt. Alem Reservoir (S.W. Derry Twp.) has a capacity of 500,000 gallons. Water from a 150,000 gallon Westford tank (W. Hanover Twp.) is stored and re-pumped into the distribution system.

DISTRIBUTION SYSTEM

The South Reservoir booster station supplies customers at high ground elevation in southwest Derry Twp. This is a completely automatic system consisting of three vertical turbine pumps, together with their associated valves and appurtenances, housed in an above ground structure. Pump operation is controlled by the water level in the Mt. Alem Reservoir.

The Mt. Alem booster station supplies customers located at high ground elevation east and south of the Mt. Alem Reservoir. Pumping facilities consist of two end suction centrifugal pumps, one of which operates continuously, together with their associated valves and appurtenances, housed in an underground enclosure.

The Ridge Road booster station supplies customers at high ground elevation north and east of Ridge Road in N. Londonderry Twp. This is a completely automatic system consisting of four end suction centrifugal pumps, one of which operates continuously, together with their associated valves and appurtenances, housed in an above ground structure.

Country Squire Booster station supplies customers in Country Squire Estates in S. Londonderry Twp., east of the village of Campbelltown. This is a completely automatic system consisting of three end suction centrifugal pumps, one of which operates continuously, together with their associated valves and appurtenances, housed in an above ground structure.

Westford booster station and the Westford Tank comprise a pumped storage system to supply customers in W. Hanover Twp. This is a completely automatic system, which includes three end suction centrifugal pumps, and a control valve housed in an above ground structure. The control valve allows water to fill the Tank by gravity from the Hershey system at night and is pumped out during the day.

A Pressure Reducing Valve (PRV) station located on Railroad St. in Annville controls pressure and flow which maintains adequate levels in Stienmetz Reservoir and Meyer's tank. Another Pressure Reducing Valve (PRV) station located along Route 422 east of Annville controls pressure and flow of purchased water from the City of Lebanon.

College View Heights Booster Station supplies customers in Horseshoe Pike in North Annville Township. This is a completely automatic system consisting of two turbine centrifugal pumps, together with three hydropnumatic tanks, associated valves and appurtenances. All of these are housed in an underground enclosure.

RESIDUALS HANDLING FACILITIES

Residuals from the filter back washing and sludge from the super pulsator clarifier is piped into one of two earthen lagoons. After the wastes have settled, the clear supernatant is discharged into the Swatara and Manada Creeks, in accordance with the company's NPDES permit.

HILLCREST

The Hillcrest water system provides service to approximately 49 residential customers in portions of Kingston Township. The supply consists of one 6-inch well with depth of 490 feet. The well's average daily output of 7,550 gallons per day is pumped to the 2,500 gallon steel storage tank located the Hillcrest well site. Water is disinfected with chlorine and treated with bi-metallic phosphate for iron and manganese sequestration at this location prior to delivery to the customers.

HOMESITE

The Homesite water system provides service to approximately 20 customers in a portion of Dallas Borough. The supply consists of one 6-inch well with depth of 179 feet. The well's average daily output of 4,355 gallons per day is pumped to the 6,150 gallon polyethylene storage tank located at the Homesite well site. Water passed through an air-stripping unit prior to disinfect with chlorine and delivery to the customers.

INDIAN ROCKS WATER

The Indian Rocks Water System of Pennsylvania-American Water Company supplies potable water for domestic and municipal use for 458 residential and 5 commercial customers in Salem Township, Wayne County.

SOURCE OF SUPPLY

The Indian Rocks is a groundwater system that consists of three active wells.

Well No. 1, which has a permitted capacity of 20 gpm (28,800 gpd).
Well No. 4 which has a permitted capacity of 27 gpm (38,880 gpd)
Well No. 5 which has a permitted capacity of 20 gpm (28,800 gpd).

WATER TREATMENT

The production facilities for the Indian Rocks system consists of two treatment buildings that treat the raw water from each of the wells. The wells pump water through their associated treatment buildings for chemical addition and then into the distribution system. At all wells, the raw water is chlorinated for disinfection.

DISTRIBUTION STORAGE

Distribution storage is provided by a 212,000 gallon ground storage tank and two hydro pneumatic tanks with a capacity of 500 gallons each.

DISTRIBUTION

The distribution system is made up of approximately 16 miles of a combination of mostly Schedule 40 and Blue Brute PVC pipe, with some small amounts of cast iron pipe. About 50% of the pipe in Zone 1 is Blue Brute PVC, which was installed in 1993. The remainder of the main is mostly Schedule 40 PVC that was installed when the development was originally constructed in the 1955-1965 time frame. In 2013, PAW performed a project to replace approximately 17,000 feet of this Sch 40 PVC main with 6 inch and 8 inch Ductile Iron mains to reduce leaks and breaks in the system.

INDIANA

The Indiana area serves the Borough of Indiana; and portions of Armstrong and White Township. The estimated population served is 22,360.

SOURCE OF SUPPLY

The Two Lick Creek is the area's source of supply. A 24" intake is located on the north bank of Two Lick Creek adjacent to the pumping station and filter plant. Water is drawn from the creek with four low service pumps.

TREATMENT

Water from Two Lick Creek is pumped directly to three Aldrich purification units, each having a nominal capacity of 2.0 mgd. Pre-filtration chemical treatment includes chlorine for disinfection and iron/manganese oxidation; pebble lime for pH adjustment; ferric chloride for coagulation; a non-ionic polymer for sludge blanket control; and powered activated carbon for taste and odor control. The points of application are the raw water influent line in the chemical vault.

Post-filtration chemical treatment includes additional chlorine application as well as hydrofluosilicic acid for fluoridation and caustic soda for corrosion control. The points of application are the filter effluent line in the chemical vault.

DISTRIBUTION STORAGE

The McHenry Hill storage tank has a capacity of 2 million gallons. The distribution system also has the West End tank, a steel ground level tank with a capacity of 680,000 gallons. A third storage tank, the Pleasant Hills tank, is an elevated tank with a capacity of 300,000 gallons.

DISTRIBUTION

The finished product passes to Clearwell #2 which has a capacity of 728,000 gallons and then to Clearwell #1 with a capacity of 152,000 gallons. The finished water is pumped from the clear well by means of four high service pumps, two rated at 1,100 gpm and the other two at 1,600 gpm. Water is also pumped from the pumping station to the McHenry Hill ground level storage tank and the West End ground level storage tank or directly into the distribution system through 12" cast iron and 16" ductile iron mains.

Five booster stations serve the system. One is located at the Pleasant Hills tank with a capacity of 0.360 mg. There are also booster stations for the Oak Hill Estates development and the Campus Crest development with rated capacities of 300 gpm each. The White's Woods booster station has a rated capacity of 174 gpm in the distribution system. The West End booster

station has a rated capacity of 250 gpm and is used to operate the West End tank as pumped storage.

WASTE WATER FACILITIES

Filter backwash and hydrotreator blow-down solids flow by gravity to one of two wastewater holding lagoons where the solids are allowed to settle before the clear supernatant is returned to the stream. The settled sludge is allowed to dry and the de-wasted material is removed and is typically land applied as a soil amendment for beneficial use.

KANE

The Kane area serves the Borough of Kane and a portion of Wetmore Township. The estimated population served is 4,780.

SOURCE OF SUPPLY

The area's source of supply is from seven wells and eight springs. The supply from the springs flows by gravity into the raw water reservoir. The seven wells have electric motors. An additional well is used as a monitoring well. The discharge from all wells is first aerated then flows into the same reservoir. Water flows from the raw water reservoir through the pressure filters into a .255 mg ground level clearwater tank.

TREATMENT

Caustic soda and chlorine are fed into the sedimentation basin for pretreatment; polymers fed into filter influent water to aid in filter performance. Chlorine, fluoride, corrosion inhibitor and caustic soda are fed into the combined filter effluent line between the filters and the clearwell to complete treatment. A Supervisory Control and Data Acquisition System (SCADA) was installed in 1992 that controls the treatment process and plant flows.

DISTRIBUTION

The distribution pumps feed the system through two 10 inch mains.

DISTRIBUTION STORAGE

At the highest point in the system a 26.5 foot diameter by 100 feet high standpipe with a capacity of 0.40 mg floats on the system. The level is maintained by the SCADA system that controls the distribution pumps.

WASTE WATER FACILITIES

Filter backwash flows by gravity to a wastewater holding tank where the solids are allowed to settle before the clear supernatant is returned to the stream. Settled sludge from the wastewater holding tank is trucked away to the nearby Kana Area Wastewater Treatment Plant for final disposal.

KITTANNING

The Kittanning area serves the Boroughs of Kittanning and Applewold, and portions of Manor and Rayburn Townships. The estimated population served is 5,250.

SOURCE OF SUPPLY

The source of supply is the Allegheny River. Water is taken by gravity through a 20" pipe which extends about 820' from the river to a suction well located adjacent to the pump station. Water is pumped by two centrifugal motor-driven low service pumps to the plant raw water basin.

TREATMENT

At the plant, hydrated lime, ferric chloride, chlorine, caustic soda, powered activated carbon and chlorine may be added as the water passes through an in-line mixer, in the chemical vault, and enters the treated raw water basin. Chlorine and caustic soda may be fed as the water flows by gravity into the sedimentation basin. Chlorine may be applied in the settled water, immediately prior to filtration. Water then flows, by gravity, to three dual media filters having a total capacity of 2.66 MGD. A 10' diameter and 11" deep concrete basin receives the filtered water. Hydrofluosilicic acid, caustic soda and chlorine are fed immediately prior to the basin.

DISTRIBUTION

From the basin, the water flows through a 20" and 16" pipe to the concrete clearwell. This clearwell has two (2) chambers in a serpentine arrangement for chlorine contact purposes and a total volume of 0.262 mg. Water flows from the clearwell compartments to two (2) storage chambers with a total volume of 0.9 mg. Water is delivered to the system from these storage compartments by gravity through a 20" pipe then to 14" and 16" pipe to the distribution system. Corrosion inhibitor is added after the clearwell chambers for distribution system corrosion control. Ammonia can be added after the clearwell chambers to create chloramines for disinfection by product control. Sodium hydroxide addition is also possible after the clearwells if required for pH adjustment.

The Orchard Station booster station is located in the northern extremity of the distribution system in Kittanning and serves a high elevation area with a 50 gpm pump.

The Troy Hill Booster Station serves Troy Hill and parts of East Kittanning in Rayburn Township. This is a capsule-type station, 8' in diameter, below grade, with two centrifugal pumps having a capacity of 150 and 250 gpm.

The Edgewood Booster Station serves the Typewriter Hill Area located on South Jefferson Street at the southern most extremity of the system. This is a prefabricated steel pump pit, which services a high elevation area with a centrifugal pump.

WASTE WATER FACILITIES

Filter backwash flows by gravity to a wastewater holding tank where the solids are allowed to settle before the clear supernatant is returned to the river. Settled sludge from the wastewater holding tank, raw basin and settling basin is removed annually. The sludge is typically land applied as a soil amendment for beneficial use.

LAKE HERITAGE

Pennsylvania-American Water Company's Lake Heritage system serves a private community of Lake Heritage, which includes portions of the Townships of Mt. Joy, Mt. Pleasant and Straban in Adams County southeast of Gettysburg, PA. The water system serves an approximate population of 1,624, some of which are seasonal.

SOURCE OF SUPPLY

Water is withdrawn from two wells, identified as #1 and 2A. Water is pumped from one or both wells with identical 15 H.P. multi-stage submersible pumps with a rated capacity of 150 gpm or 216,000 gpd each. Pumps are controlled by system pressure, a lead-lag operation, with only one well pump typically required to meet or exceed system demand.

WATER TREATMENT

Water pumped from one or both wells is treated in a nearby chemical control building with a sodium hypochlorite solution for disinfection. Liquid diaphragm chemical feed pumps start with well pumps and inject solution into the water before entering a 260 feet of 24" main, which provides detention time before entering the distribution system.

DISTRIBUTION STORAGE

One 60,000 gallon elevated standpipe floats on the system and provides water pressure.

DISTRIBUTION

The system consists of 13 miles of 4", 6", and 8" mains.

The Longstreet booster station supplies customers at high ground elevation in the northwest portion of the distribution system. This is a completely automatic system consisting of three vertical multistage pumps, one of which operates continuously. Each pump, rated at 60gpm together with their associated valves and appurtenances are housed in an underground enclosure.

LAUREL RIDGE - Frackville

The Laurel Ridge area serves the Laurel Ridge Development along Morea Road in Frackville.

SOURCE OF SUPPLY

Source of supply for the Laurel Ridge Development is an interconnection from the Schuylkill County Municipal Authority (SCMA). The development can also be supplied with water from the Frackville System. This water supply is obtained from one well located at Nice Street and four wells located at Center Street.

TREATMENT

This system currently utilizes purchased water from the SCMA. The water is supplied from SCMA Laurel Run Reservoir Filtration Plant. Since Laurel Ridge is a consecutive system, there are no production facilities associated with it.

Water could also be supplied from the Frackville System. Treatment at the Center Street Aeration Facility consists of water from the four (4) wells being pumped to a 33' x 5'9" diameter aeration tower equipped with two (2) 5,200 CFM air blowers. Water from the aeration tower is discharged into a 0.029 MG concrete clearwell where chlorine, caustic soda (for pH adjustment), and a corrosion inhibitor are added. All of the chemical feed rates are flow paced and chlorine and pH are also residual controlled as well.

Treatment at the Nice Street Aeration Facility consists of water from the one (1) well being pumped to a 28' x 3' diameter aeration tower equipped with a 1,000 CFM air blower. Water from the aeration tower is discharged into a 0.011 MG concrete clearwell where chlorine and a corrosion inhibitor are added.

All processes at both facilities are automatically monitored for flow, chemical feed status, and pressure. All parameters are transmitted to the Operations Center via a SCADA system.

DISTRIBUTION STORAGE

Distribution storage consists of two SCMA tanks located on the south side of Route 81 West of Exit 124W.

DISTRIBUTION

The system consists of 4470 feet of 6" and 8" mains and 7 public fire hydrants.

LEHMAN PIKE

The Lehman Pike Service Area consists of 11 different water systems: Blue Mountain Lakes, Birch Acres, Country Club of the Poconos, Mountain Top Estates, Saw Creek Estates, Pine Ridge, Wild Acres (Hickory), Marcel Lakes (Silver), Milford Landing (Three Lanes), Fernwood, and All Seasons.

Blue Mountain Lakes (PWSID # 2450133) water system is located mainly in Stroud Township, Monroe County with a small portion in Smithfield Township, Monroe County. This system currently provides water service to 713 customers.

Birch Acres (PWSID # 2450019) water system is located in Smithfield Township, Monroe County with a total number of 45 water service connections.

The Birch Acres system has been incorporated into the Country Club of Pocono's system via the installation of approximately 15,000 feet of 12 inch DICL main, under PWSID #2450119.

County Club of the Poconos (Mid Monroe) (PWSID # 2450119) water system is located in Middle Smithfield Township, Monroe County. This system currently serves a population of 1,200 through 585 metered residential customers and four commercial customers in this gated community. The current projected build out for the community is approximately 1,600 homes.

Mountain Top Estates (PWSID # 2450045) water system is located in Smithfield Township, Monroe County with a total number of 79 water service connections.

Saw Creek Estates (PWSID # 2520062) water system is located mainly in Lehman Township, Pike County, and a small portion located in Middle Smithfield Township, Monroe County. Water from Saw Creek Estates also supplies the Rustic Acres and Winona Lakes Developments by means of pipeline extensions/interconnections with these developments. Rustic Acres is located in Lehman Township, Pike County and Winona Lakes is located in Middle Smithfield Township, Monroe County. Saw Creek Estates currently has 2,537 water connections, Rustic Acres has a total of 168 water connections and Winona Lakes has a total of 88 water connections.

Pine Ridge Community (PWSID # 2520096) water system is located in Lehman Township, Pike County with a total number of 1,042 water connections.

Wild Acres Lakes (Hickory) (PWSID # 2520034) water system is located in Delaware Township, Pike County with a total number of 1,202 water service connections.

Marcel Lakes Estates (Silver) (PWSID # 2520035) water system is located in Delaware Township, Pike County with a total number of 351 water service connections.

Milford Landing (Three Lanes) (PWSID # 2520085) water system is located in Westfall Township, Pike County with a total number of 176 water service connections.

Water service is furnished to approximately 6,986 active accounts and 1,325 availability accounts within these developments.

Fernwood (PWSID # 2450134) water system is located in Middle Smithfield Township, Monroe County with a total of 136 water service connections.

All Seasons (PWSID # 2520056) water system is located in Delaware Township, Pike County with a total of 47 service connections.

SOURCE OF SUPPLY

Water is supplied through a network of 31 active groundwater wells, all located within the confines of the respective developments.

Blue Mountain Lakes - BML Well No. 1 is an 8-inch diameter well drilled to a depth of 541 ft. with a current permitted pumping capacity of 275 gpm, but is currently operated at 100 gpm. Treated water from the well is pumped into 90 ft of 36 inch chlorine contact main before entering the distribution system.

Blue Mountain Lakes – BML Well No. 2 is an 8-inch diameter well drilled to a depth of 598 ft. with a permitted pumping capacity of 64 gpm. Treated water from the well is pumped into 36 ft of 36 inch chlorine contact main before entering the distribution system.

Blue Mountain Lakes – BML Well No. 3 is an 8-inch diameter well drilled to a depth of 597 ft. with a permitted pumping capacity of 170 gpm. Treated water from the well is pumped into 80 ft of 36 inch chlorine contact main before entering the distribution system.

Birch Acres Well #2 is a 6-inch diameter well drilled to a depth of 52 ft with a permitted capacity of 50 gpm. Treated water from the well enters the distribution system after going thru a 2,000 gallon above ground hydro-pneumatic tank.

Birch Acres Well #3 is a 6-inch diameter well drilled to a depth of 75 ft with no reported yield. This well is for emergency purposes only and we must notify PADEP if used.

Country Club of the Poconos (CCP) Well #1 is an 8-inch well drilled to a depth of 300 ft. with a permitted capacity of 123 gpm. This well is equipped with a 30 H.P. submersible well pump sized to delivery 123 gpm @ 635 feet total dynamic head. Raw water is pumped from this well to the Wells 1&2 Treatment Facility where it is blended with Well #2 raw water, and then treated, via pressure filtration, for Iron & Manganese. 4-log inactivation of viruses is achieved via 12.5% sodium hypochlorite injection and 60 ft. of 36" contact main prior to entering the distribution system.

Country Club of the Poconos (CCP) Well #2 is an 8-inch well drilled to a depth of 500 ft. with a permitted capacity of 40 gpm. The well is equipped with a 15 H.P. submersible well pump

sized to deliver 123 gpm at 590 feet total dynamic head. Raw water is pumped from this well to the Wells 1&2 Treatment Facility where it is blended with Well #1 raw water and then treated, via pressure filtration, for Iron & Manganese. 4-log inactivation of viruses is achieved via 12.5% sodium hypochlorite injection and 60 ft. of 36" contact main prior to entering the distribution system.

Country Club of the Poconos (CCP) Well #3 is an 8-inch well drilled to a depth of 753 ft with a permitted capacity of 65 gpm. Raw water from this well is pumped to the Wells 3&5 Treatment Facility, where it is blended with raw from Well #5, and then treated for Iron and Manganese via polyphosphate sequestration. 4-Log inactivation of viruses is achieved via 12.5% sodium hypochlorite injection and 55 ft. of 36" contact main prior to entering the distribution system.

Country Club of the Poconos (CCP) Well #5 is an 8-inch well drilled to a depth of 805 ft. with a permitted capacity of 65 gpm. Raw water from this well is pumped to the Wells 3&5 Treatment Facility, where it is blended with raw from Well #3, and then treated for Iron and Manganese via polyphosphate sequestration. 4-Log inactivation of viruses is achieved via 12.5% sodium hypochlorite injection and 55 ft. of 36" contact main prior to entering the distribution system.

Mountain Top Estates Well #2 is a 6-inch diameter well drilled to a depth of 500 ft. with a yield of 25 gpm. Treated water is blended with water from Well #6 and sent to the storage tank.

Mountain Top Estates Well #6 is an 6-inch diameter well drilled to a depth of 250 ft. with a yield of 32 gpm. Treated water is blended with water from Well #6 and sent to the storage tank.

Saw Creek Estates Well No. 1 (Rigby Well) was drilled to a depth of 300 feet in 1976. It contains a 25 horsepower, Goulds Pump, Model 150H-25 set at 221 feet. The well casing has a pitless adapter and sanitary well cap with vent. Treated water from Well No. 1 pumps into a 75 ft length of 36 inch chlorine contact main before entering into the 6-inch plastic transmission main connecting directly to the distribution system. The well pump is controlled by the water level in Rigby Tank #5.

Saw Creek Estates Well No. 2 (Snowdon Well) was drilled in 1978 to a depth of 275 feet and cased to 51 feet. It contains a 25 horsepower, Pleuger Pump, Model PN63-14, set at 126 feet. The well casing has a pitless adapter and sanitary well cap with vent.

Saw Creek Estates Well No. 3 (Saunder Well) was drilled in 1979 to a depth of 150 feet and cased to 61 feet. It contains a 20 horsepower, Pleuger Pump, Model PN63-13 with Franklin Motor set at 109 feet. The well casing has a pitless adapter and sanitary well cap with vent.

Saw Creek Estates Well No. 4 (Bertha Well) was drilled in 1980 to a depth of 150 feet and cased to 60 feet. It contains a 20 horsepower, Goulds Pump, Model 70S-20 with Franklin Motor set at 84 feet. The well casing has a pitless adapter and sanitary well cap with vent.

Saw Creek Estates Well No. 5 (Dorchester Well) was drilled in 1980 to a depth of 250 feet and cased to 61 feet. It contains a 20 horsepower, Pleuger Pump, Model NN62-20 with Franklin Motor set at 221 feet. The well casing has a pitless adapter and sanitary well cap with vent.

Saw Creek Estates Well No. 6 (Woodbridge Well) was drilled in 1984 to a depth of 75 feet. It contains a 10 horsepower, Goulds Pump; Model 100H-10 set at 60 feet. The well casing has a pitless adapter and sanitary well cap with vent. Currently, this well is not being used due to poor water quality issues.

Saw Creek Estates Well No. 7 was drilled in 1986 to a depth of 500 ft. and cased to a depth of 52 ft. It contains a 25 horsepower pump set at 399 ft. The well casing has a pitless adapter and sanitary well cap with vent. Currently, this well is not being used due to poor water quality issues.

Saw Creek Estates Well No. 8 is low yield (8 gallons per minute) and is not connected to the water system.

Saw Creek Estates Well No. 9 (Delaware Court Well) was drilled in 1987 to a depth of 247 ft. and cased to a depth of 52 ft. It contains a 7 ½ horsepower, Goulds Pump, Model 100H-10 set at 22 ft. The well casing has a pitless adapter and sanitary well cap with vent.

Saw Creek Estates Well No. 10 (Southport Well) was drilled in 1989 to a depth of 63 feet and cased to a depth of 52 feet. It contains a 25 horsepower, Crane Deming Pump, Model M65E25 set at 48 ft. A six-inch diameter gravel packed brass screen was installed from 52 ft. to 62 ft. The well casing has a pitless adapter and sanitary well cap with vent. Currently, this well is not being used due to poor water quality issues.

Saw Creek Estates Well No. 10a was drilled to a depth of 92 ft. An eight-inch diameter gravel packed stainless steel screen was installed from 30 ft. to 92 ft. Well 10a is currently not in use.

Saw Creek Estates Well No. 12 was drilled in June, 1995 to a depth of 605 ft. and cased to a depth of 65 ft. A single phase, 7 HP, Goulds Model 45J07 submersible well pump was installed to deliver approximately 45 gallons per minute.

Pine Ridge Well 1 is an 6-inch diameter well drilled to a depth of 220 ft. with a permitted capacity of 30 gpm. The well casing was extended 8 ft. in order to get the top of casing above grade and capped at this time due to poor water quality issues.

Pine Ridge Well 2 is an 6-inch diameter well drilled to a depth of 748 ft. with a permitted capacity of 55 gpm. Treated water from this well pumps into a 54 ft. length of 24 inch chorine contact main before entering the distribution system.

Pine Ridge Well 3 is an 8-inch diameter well drilled to a depth of 550 ft. with a permitted capacity of 58 gpm. Treated water from this well pumps into a 72 ft. length of 24 inch chorine contact main before entering the distribution system.

Pine Ridge Well 4 is an 8-inch diameter well drilled to a depth of 705 ft. with a permitted capacity of 65 gpm. Treated water from this well pumps into a 63 ft. length of 24 inch chorine contact main before entering the distribution system.

Pine Ridge Well 5 is an 8-inch diameter well drilled to a depth of 700 ft. with a permitted capacity of 100 gpm.

Wild Acres Lakes (Hickory) Well #2 is an 8-inch diameter well drilled to a depth of 443 ft. with a permitted capacity of 100 gpm. Treated water from this well pumps into a 90 ft. length of 24 inch chorine contact main before entering the distribution system.

Wild Acres Lakes (Hickory) Well #3 is an 8-inch diameter well drilled to a depth of 650 ft. with a permitted capacity of 43 gpm. Treated water from this well blend with treated water from Well #4 and then enters the storage tank before entering the distribution system.

Wild Acres Lakes (Hickory) Well #4 is an 8-inch diameter well drilled to a depth of 500 ft. with a permitted capacity of 37 gpm. Treated water from this well blend with treated water from Well #3 and then enters the storage tank before entering the distribution system.

Wild Acres Lakes (Hickory) Well #5 is an 8-inch diameter well drilled to a depth of 525 ft. with a permitted capacity of 150 gpm. Treated water from this well then enters a buried chlorine contact tank before entering the storage tank and distribution system.

Marcel Lakes (Silver) Well #1 is an 8-inch diameter well drilled to a depth of 1,000 ft. and was able to produce approximately 40 gpm before being taken off line because of other system improvements. This well is an emergency stand-by well that is not in use at this time because of other wells within this development.

Marcel Lakes (Silver) Well #2 is an 8-inch diameter well drilled to a depth of 915 ft. and was able to produce approximately 40 gpm before being taken off line because of other system improvements. This well is an emergency stand-by well that is not in use at this time because of other wells within this development.

Marcel Lakes (Silver) Well #3 is an 8-inch well drilled to a depth of 454.5 ft. with a permitted capacity of 150 gpm. Treated water from this well blends with treated water from Well #4 and then enters the below grade clear well for chlorine contact time before entering the distribution system.

Marcel Lakes (Silver) Well #4 is an 8-inch well drilled to a depth of 451.5 ft. with a permitted capacity of 150 gpm. Treated water from this well blends with treated water from Well #3 and then enters the below grade clear well for chlorine contact time before entering the distribution system.

Milford Landing (Three Lanes) Well #3 is an 8-inch well drilled to a depth of 164 ft. with a permitted capacity of 52 gpm. Treated water from this well blends with treated water from Well #5 and then enters the storage tank before entering the distribution system.

Milford Landing (Three Lanes) Well #5 is an 8-inch well drilled to a depth of 211 ft. with a permitted capacity of 178 gpm. Treated water from this well blends with treated water from Well #3 and then enters the storage tank before entering the distribution system.

Fernwood Well #3 is a 10 inch diameter well drilled to the depth of 168 feet with a permitted capacity of 100 gpm. Raw water from this well is pumped to the Wells 3&6 treatment facility, where it is blended with raw from Well #6. 4-Log inactivation of viruses is achieved via 12.5% sodium hypochlorite injection and 140 ft. of 24" contact main prior to entering the distribution system.

Fernwood Well #6 is an 8 inch diameter well drilled to the depth of 185 ft with a permitted value of 50 gpm. Raw water from this well is pumped to the Wells 3&6 treatment facility, where it is blended with raw from Well #3. 4-Log inactivation of viruses is achieved via 12.5% sodium hypochlorite injection and 140 ft. of 24" contact main prior to entering the distribution system.

Fernwood Well #9 is a 12 inch diameter well drilled to the depth of 160 ft with a permitted capacity of 390 gpm. Raw water from this well is treated for Iron and Manganese, via polyphosphate sequestration. 4-Log inactivation of viruses is achieved via 12.5% sodium hypochlorite injection and 280 ft. of 24" and 420 ft. of 10 inch contact main prior to entering the distribution system.

All Seasons Well #1 is a 6-inch diameter well drilled in the 1950's to a depth of 400 ft with an unknown length of casing and is permitted at 25 gpm. Treated water is disinfected and then enters the distribution system.

TREATMENT

Blue Mountain Lakes Well Building No. 1 – Blended polyphosphate and liquid sodium hypochlorite are utilized for sequestering/disinfection purposes prior to entering the chlorine contact main via a day tank where the polyphosphate and sodium hypochlorite are manually diluted and mixed into solution. Hach CL17 chlorine analyzers are installed for Ground Water Rule Compliance monitoring before treated water enters the distribution system. The chlorine analyzer(s) constantly monitor chlorine residuals and shutdown the water supply if 4 log virus removal is not met. The well station is visited daily to insure that the treatment system remains reliable.

Blue Mountain Lakes Well Building No. 2 – Blended polyphosphate and liquid sodium hypochlorite are utilized for sequestering / disinfection purposes prior to entering the chlorine contact main via a day tank where the polyphosphate and sodium hypochlorite are manually diluted and mixed into solution. Hach CL17 chlorine analyzers are installed for Ground Water Rule Compliance monitoring before treated water enters the distribution system. The chlorine analyzer(s) constantly monitor chlorine residuals and shutdown the water supply if 4 log virus removal is not met. The well station is visited daily to insure that the treatment system remains reliable.

Blue Mountain Lakes Well Building No. 3 – Liquid sodium hypochlorite is utilized for disinfection purposes prior to entering the chlorine contact main via a day tank where the sodium hypochlorite is manually diluted and mixed into solution. Hach CL17 chlorine analyzers are installed for Ground Water Rule Compliance monitoring before treated water enters the distribution system. The chlorine analyzers constantly monitor chlorine residuals and shutdown the water supply if 4 log virus removal is not met. The well station is visited daily to insure that the treatment system remains reliable.

Birch Acres Well Treatment Building – Liquid sodium hypochlorite is utilized for disinfection purposes prior to entering the hydro-pneumatic tank via a day tank where the sodium hypochlorite is manually diluted and mixed into solution. Hach CL17 chlorine analyzers are installed for Ground Water Rule Compliance monitoring before treated water enters the distribution system. The chlorine analyzer(s) constantly monitor chlorine residuals and shutdown the water supply if 4 log virus removal is not met. The well station is visited daily to insure system remains reliable. The hydro-pneumatic tank maintains system pressure and discharges directly into the distribution system and is manually recharged once a month with a small reciprocating air compressor.

Country Club of the Poconos Well Building No. 1&2 – Pre-filter liquid sodium hypochlorite is utilized for Fe&Mn oxidation prior to the water entering the dual pressure filters that then removes the oxidized Fe&Mn. Post filter polyphosphate injection for corrosion control, and liquid sodium hypochlorite injection for disinfection is performed prior to the water entering the distribution system. Hach CL17 chlorine analyzers are utilized for Ground Water Rule Compliance monitoring before treated water enters the distribution system. The chlorine analyzer constantly monitors chlorine residuals and shutdown the water supply if 4-log removal of viruses is not met. The well station is visited daily to insure that the treatment system remains reliable.

Country Club of the Poconos Well Building No. 3 & 5 – Blended polyphosphate and liquid sodium hypochlorite are utilized for sequestering/disinfection purposes prior to entering the water storage tank via a day tank where the polyphosphate and sodium hypochlorite are manually diluted and mixed into solution. Hach CL17 chlorine analyzers are installed for Ground Water Rule Compliance monitoring before treated water enters the distribution system. The chlorine analyzers constantly monitor chlorine residuals and shutdown the water supply if 4 log virus removal is not met. The well station is visited daily to insure that the treatment system remains reliable.

Mountain Top Estates Well Building No. 2 & 6 – Sodium hydroxide and liquid sodium hypochlorite are utilized for ph adjustment / disinfection purposes prior to entering the water storage tank via a day tank where the sodium hydroxide and sodium hypochlorite are manually diluted and mixed into solution. Hach CL17 chlorine analyzers are installed for Ground Water Rule Compliance monitoring before treated water enters the distribution system. The chlorine analyzers constantly monitor chlorine residuals and shutdown the water supply if 4 log virus removal is not met. The well station is visited daily to insure that the treatment system remains reliable.

Saw Creek Estates Well Building No. 1 – Sodium hydroxide and liquid sodium hypochlorite are utilized for ph adjustment / disinfection purposes prior to entering the chlorine contact main via a day tank where the sodium hydroxide and sodium hypochlorite are manually diluted and mixed

into solution. Hach CL17 chlorine analyzers are installed for Ground Water Rule Compliance monitoring before treated water enters the distribution system. The chlorine analyzers constantly monitor chlorine residuals and shutdown the water supply if 4 log virus removal is not met. The well station is visited daily to insure that the treatment system remains reliable.

Saw Creek Estates Well Building No. 2 & 3 – Blended polyphosphate and liquid sodium hypochlorite are utilized for sequestering / disinfection purposes prior to entering the transmission main then to the distribution system / water storage tank via a day tank where the polyphosphate and sodium hypochlorite are manually diluted and mixed into solution. Hach CL17 chlorine analyzer is installed for Ground Water Rule Compliance monitoring before treated water enters the distribution system. The chlorine analyzer constantly monitors chlorine residuals and shutdown the water supply if 4 log virus removal is not met. The well station is visited daily to insure that the treatment system remains reliable.

Saw Creek Estates Well Building No. 4 & 5 – Blended polyphosphate, sodium hydroxide and liquid sodium hypochlorite are utilized for sequestering / ph adjustment / disinfection purposes prior to entering the transmission main then to the water storage tank via a day tank where the polyphosphate, hydroxide and sodium hypochlorite are manually diluted and mixed into solution. Hach CL17 chlorine analyzer is installed for Ground Water Rule Compliance monitoring before treated water enters the distribution system. The chlorine analyzer constantly monitors chlorine residuals and shutdown the water supply if 4 log virus removal is not met. The well station is visited daily to insure that the treatment system remains reliable.

Saw Creek Estates Well Building No. 9 & 10A – Blended polyphosphate, sodium hydroxide and liquid sodium hypochlorite are utilized for sequestering / ph adjustment / disinfection purposes prior to entering the transmission main via a day tank where the polyphosphate, hydroxide and sodium hypochlorite are manually diluted and mixed into solution. Hach CL17 chlorine analyzer is installed for Ground Water Rule Compliance monitoring before treated water enters the distribution system. The chlorine analyzer constantly monitors chlorine residuals and shutdown the water supply if 4 log virus removal is not met. The well station is visited daily to insure that the treatment system remains reliable.

Saw Creek Estates Well Building No. 12 – Blended polyphosphate, sodium hydroxide and liquid sodium hypochlorite are utilized for sequestering / ph adjustment / disinfection purposes prior to entering the chlorine contact main via a day tank where the polyphosphate, hydroxide and sodium hypochlorite are manually diluted and mixed into solution. Hach CL17 chlorine analyzers are installed for Ground Water Rule Compliance monitoring before treated water enters the distribution system. The chlorine analyzers constantly monitor chlorine residuals and shutdown the water supply if 4 log virus removal is not met. The well station is visited daily to insure that the treatment system remains reliable.

Pine Ridge Development Well Building No. 2 – Sodium hydroxide and liquid sodium hypochlorite are utilized for ph adjustment / disinfection purposes prior to entering the chlorine contact main then into the distribution system via a day tank where the sodium hydroxide and sodium hypochlorite are manually diluted and mixed into solution. Hach CL17 chlorine analyzers are installed for Ground Water Rule Compliance monitoring before treated water enters the

distribution system. The chlorine analyzers constantly monitor chlorine residuals and shutdown the water supply if 4 log virus removal is not met. The well station is visited daily to insure that the treatment system remains reliable.

Pine Ridge Development Well Building No. 3 – Sodium hydroxide and liquid sodium hypochlorite are utilized for ph adjustment / disinfection purposes prior to entering the chlorine contact main then into the distribution system via a day tank where the sodium hydroxide and sodium hypochlorite are manually diluted and mixed into solution. Hach CL17 chlorine analyzers are installed for Ground Water Rule Compliance monitoring before treated water enters the distribution system. The chlorine analyzers constantly monitor chlorine residuals and shutdown the water supply if 4 log virus removal is not met. The well station is visited daily to insure that the treatment system remains reliable.

Pine Ridge Development Well No. 4 – Blended polyphosphate, sodium hydroxide and liquid sodium hypochlorite are utilized for sequestering / ph adjustment / disinfection purposes prior to entering the chlorine contact main via a day tank where the polyphosphate, hydroxide and sodium hypochlorite are manually diluted and mixed into solution. Hach CL17 chlorine analyzers are installed for Ground Water Rule Compliance monitoring before treated water enters the distribution system. The chlorine analyzers constantly monitor chlorine residuals and shutdown the water supply if 4 log virus removal is not met. The well station is visited daily to insure that the treatment system remains reliable.

Pine Ridge Development Well No. 5 – Blended polyphosphate and liquid sodium hypochlorite are utilized for sequestering / disinfection purposes prior to entering the transmission main then to the distribution system via a day tank where the polyphosphate and sodium hypochlorite are manually diluted and mixed into solution. Hach CL17 chlorine analyzer is installed for Ground Water Rule Compliance monitoring before treated water enters the distribution system. The chlorine analyzer constantly monitors chlorine residuals and shutdown the water supply if 4 log virus removal is not met. The well station is visited daily to insure that the treatment system remains reliable.

Wild Acres Lakes (Hickory) Well Building No. 2 – Sodium hydroxide and liquid sodium hypochlorite are utilized for ph adjustment / disinfection purposes prior to entering the chlorine contact main then into the distribution system via a day tank where the sodium hydroxide and sodium hypochlorite are manually diluted and mixed into solution. Hach CL17 chlorine analyzers are installed for Ground Water Rule Compliance monitoring before treated water enters the distribution system. The chlorine analyzers constantly monitor chlorine residuals and shutdown the water supply if 4 log virus removal is not met. The well station is visited daily to insure that the treatment system remains reliable.

Wild Acres Lakes (Hickory) Well Building No. 3 & 4 – Sodium hydroxide and liquid sodium hypochlorite are utilized for ph adjustment / disinfection purposes prior to entering the water storage tank and then into the distribution system via a day tank where the sodium hydroxide and sodium hypochlorite are manually diluted and mixed into solution. Hach CL17 chlorine analyzers are installed for Ground Water Rule Compliance monitoring before treated water enters the distribution system. The chlorine analyzers constantly monitor chlorine residuals and shutdown

the water supply if 4 log virus removal is not met. The well station is visited daily to insure that the treatment system remains reliable.

Wild Acres Lakes (Hickory) Well Building No. 5 – Liquid sodium hypochlorite is utilized for disinfection purposes prior to entering the chlorine contact chamber then into the water storage tank via a day tank where the sodium hypochlorite is manually diluted and mixed into solution. Hach CL17 chlorine analyzers are installed for Ground Water Rule Compliance monitoring before treated water enters the distribution system. The chlorine analyzers constantly monitor chlorine residuals and shutdown the water supply if 4 log virus removal is not met. The well station is visited daily to insure that the treatment system remains reliable.

Marcel Lakes (Silver) Well Building No. 3 & 4 – Liquid sodium hypochlorite is utilized for disinfection purposes prior to entering the below grade clear well then into the distribution system via a day tank where the sodium hypochlorite is manually diluted and mixed into solution. Hach CL17 chlorine analyzer is installed for Ground Water Rule Compliance monitoring before treated water enters the distribution system. The chlorine analyzer constantly monitors chlorine residuals and shutdown the water supply if 4 log virus removal is not met. The well station is visited daily to insure that the treatment system remains reliable.

Milford Landing (Three Lanes) Well Building No. 3 & 5 – Sodium hydroxide and liquid sodium hypochlorite are utilized for ph adjustment / disinfection purposes prior to entering the water storage tank and then into the distribution system via a day tank where the sodium hydroxide and sodium hypochlorite are manually diluted and mixed into solution. Hach CL17 chlorine analyzers are installed for Ground Water Rule Compliance monitoring before treated water enters the distribution system. The chlorine analyzers constantly monitor chlorine residuals and shutdown the water supply if 4 log virus removal is not met. The well station is visited daily to insure that the treatment system remains reliable.

DISTRIBUTION

Blue Mountain Lakes – Treated water from Wells No. 1, 2 &3 is pumped directly into the distribution system and controlled by the water level in the Blue Mountain Lakes water storage tank. Distribution piping in the Blue Mountain Development is mainly plastic. Customer service lines have a meter pit installed at the property line.

Birch Acres – Treated water from Well No. 2 enters the distribution system through a hydro-pneumatic tank. The hydro-pneumatic tank maintains system pressure and discharges directly into the distribution system and is manually recharged as needed with a small reciprocating air compressor. The distribution system contains approximately 4,800 feet of 8 inch ductile iron water main installed by PAWC in 2011. There is an additional 1200 feet of 4 inch galvanized water main. In 2011 each customer had a meter pit installed by PAWC.

Country Club of the Poconos (CCP) - The service area is divided into seven (7) pressure zones. Five pressure reducing valve (PRV) stations divide the pressure zones. The stations consist of either 4-inch or 6-inch PRVs (with 2-inch PRV bypasses) located in below ground concrete vaults. The pressure in the highest zone is established by the water level in the two water storage

tanks. A pumped pressure zone was established in 2006. This zone is serviced by a variable frequency drive (VFD) booster station located inside the Wells 3&5 treatment building. The VFD booster consists of a 30 gpm pump @ a TDH of 330 ft and two 160 gpm pumps @ a TDH of 330 ft. An additional booster pump rated at 750 gpm @ 85 psi provides back up volume for large water use events ie main breaks or fire.

The distribution system was constructed in the early 1990s and consists primarily of plastic (PVC or PE) with some ductile iron pipe around the PRV stations. Several new sections of the development consist of 12-inch and 8-inch ductile iron pipe cement lined pipe. The distribution system supplies mainly residential customers with some commercial at this time.

Mountain Top Estates – Treated water from Well No. 2 enters the distribution system from the water storage tank via an underground hydro-pneumatic tank. The hydro-pneumatic tank maintains system pressure and discharges directly into the distribution system and is manually recharged as needed with a small reciprocating air compressor. Distribution piping in Mountain Top Estates consists of 13,000 ft. of 2-inch and 4-inch plastic pipe. The distribution system is not designed to provide fire protection. A 3,000 gallon hydropneumatic is used to buffer the distribution system. A booster pump containing three (3) - 40 gpm pumps help to maintain flow into the distribution system.

Saw Creek Estates Tank No. 1 Zone – Treated water from Well No. 9 and 10A is pumped into a 400 ft. length of 24-inch diameter chlorine contact main before entering directly into the distribution system. The water then fills the St. Andrews Tank (Tank No. 1). The wells are controlled by tank level and SCADA controls. There is a Tank No. 1 Booster Station that is used to supplement the Timothy Lake Tank (Tank No. 6) when needed, this station is manual operation. There is also the Woodbridge Booster Station No. 2A that pulls water from the St. Andrews Tank (Tank No. 1). This booster station runs on a time clock and is used to feed water to the Section 8 Tank (Tank No. 3) and the Brentwood Tank (Tank No. 2). This water also supplies the Tank No. 1 distribution areas accordingly.

Saw Creek Estates Tank No. 2 Zone – Treated water that is supplied from Tank No. 1 via the Woodbridge Booster Station No. 2A is sent into the distribution piping for this zone, along with being used to supplement the Section 37 Tank (Tank No. 7) zone. Distribution water is pulled from the Tank No. 2 zone into the Tank No. 7 zone via the Lancaster Booster Station. The Lancaster Booster Station is controlled by time clock at the present time. This water supplies the Tank No. 2 and Tank No. 7 distribution areas accordingly.

Saw Creek Estates Tank No. 3 Zone - Treated water that is supplied from Tank No. 1 via the Woodbridge Booster Station No. 2A is sent into the distribution piping for this zone and into the Section No. 8 Tank (Tank No. 3). There is a Tank No. 3 Booster Station that is located at the tank which helps boost pressure in this area to customer around the tank accordingly, along with the remainder of the Tank No. 3 distribution zone.

Saw Creek Estates Tank No. 4 Zone - Treated water from Wells No. 4 and 5 are connected directly to Dorchester Tank (Tank No. 4) with a 4-inch plastic transmission main for a distance of 4,100 ft. Water passes thru pressure reducing valves in the distribution system to help supply the

Section 8 Tank (Tank No.3) Zone. Well operation is controlled by the water level and SCADA controls. This water also supplies the Tank No. 4 and Tank No. 3 distribution areas accordingly.

Saw Creek Estates Tank No. 5 & 6 Zone - Treated water from the Wells No. 1 pumps into a 75 ft length of 36-inch diameter chlorine contact main before entering into the 6-inch diameter plastic transmission main connecting directly to the distribution system. Treated water from Well No. 2 and 3 is pumped into a 8-inch plastic transmission main for the distance 2,900 ft before entering into the distribution system. The treated water from Wells No. 1, 2 and 3 is also use to fill the Rigby Tank (Tank #5) and the Timothy Lake Tank (Tank No. 6). The wells are controlled by tank level and SCADA controls. This water also supplies the Tank No. 5 and Tank 6 distribution areas accordingly.

Saw Creek Estates Tank No. 7 Zone – Treated water that is supplied from Tank No. 1 via the Woodbridge Booster Station No. 2A is sent into the distribution piping for the Tank No. 2 zone and distribution water is pulled from the Tank No. 2 zone into the Tank No. 7 zone via the Lancaster Booster Station. Treated water from the Well No. 12 treatment building leaves the building via a 51 ft. length of 24-inch chlorine contact main before entering the distribution system. The well is controlled by tank level and SCADA controls. This water supplies the Tank No. 7 distribution area accordingly.

All the customers in Saw Creek Estates are metered by meters in the homes. Meters are read on a monthly basis.

Pine Ridge Well No. 2, 3, 4, & 5 pumps treated water into the distribution system and them into the Pine Ridge Tank. Well No. 2, 3 and 4 are controlled via tank level and SCADA controls. Well No. 5 is controlled via a time clock at the present time. All customers are metered, with water meters being located in the homes for the most part. Meters are read on a monthly basis in the Pine Ridge Development..

Wild Acres Lakes (Hickory) – Well No. 2 pumps into a chlorine contact main before entering the main gradient portion of the distribution system then into the Tank No. 3 & 4 water storage tank. Wells No. 3 & 4 water is treated then enters the water storage tank before entering the main gradient of the distribution system also. Well No. 2, 3 & 4 all feed the lower gradient of the distribution system thru a pressure reducing valve station. Well No. 5 enters the chlorine contact chamber then into the water storage tank before entering the high gradient of the distribution system. Customer service lines have a meter pit installed at the property line.

Marcel Lakes (Silver) - Well Building No. 3 & 4 water is treated and travels thru the clear well at the treatment building for chlorine contact time. Once the water is treated, it enters the distribution system and fills the Marcel Lakes water storage tank. At the tank site is a booster pump system that helps boost the pressure for 15 homes that surround the storage tank site. Well No. 3 & 4 treatment building also has a stationary generator that is used in the event of a power disruption in the area. Customer service lines have a meter pit installed at the property line.

Milford Landing (Three Lanes) - Well Building No. 3 & 5 treated water enters the water storage tank and then into the distribution system via a booster pumping system that is located

inside the treatment building. There is also a 75 hp fire pump system installed at the treatment building that meets the NFPA requirements. The distribution system stays pressurized at approximately 52 psi, but in the event that the system drops to 40 psi the fire pump will start up and help to supply the system accordingly. The maximum pressure the fire pump will create is 64 psi. The treatment building site also has a stationary generator that is used in the event of a power disruption in the area. The distribution system supplies residential and commercial customers.

Fernwood Well Building No 3 & 6 consists of a small wood framed building constructed in the 1980's. Raw water is pumped directly into the treatment building where sodium hypochlorite is used for disinfection. The water then flows to a chlorine contact pipe that is 2 ft in diameter and 140 ft long before the first point of use. Based on the 4-log worksheet, this is sufficient to meet the requirements for 4-log removal.

Fernwood Well No. 9 Building consists of large block building constructed in 2014. Raw water is pumped directly into the treatment building where it is dosed with sodium hypochlorite for disinfection and the oxidation of soluble iron and manganese before being removed via three green-sand type pressure filtration vessels. Blended polyphsphate (Aquamag) is also added for corrosion control in the distribution system. The treated water then flows to contact main that is 36" diameter, 162 ft. long before entering the distribution system.

The Fernwood distribution system consists of various sized (2" through 10") plastic pipe constructed from the 1980's through the 2000's. The system operates on a single pressure gradient; the average pressure in the system is 60 psi.

All Seasons Well Building consists of a small wood framed building constructed in 1990. Raw water is pumped directly into the treatment building where Aqua-Mag is added to sequester iron and magnesium in the raw water. Sodium hypochlorite is then used for disinfection. The water then flows to a 700 gallon underground tank for chlorine contact time. Hydropneumatic tanks provide pressure regulation to the system. The well is controlled by the pressure in the distribution system

The distribution system contains approximately 6,000 feet of pipe and the system operates on a single pressure gradient. Information on the distribution system piping is limited but the plans submitted to DEP with the last upgrade to the treatment building in 1990, along with what PAWC has learned since acquiring the system, indicate the system consists of 1 and 2 inch polyethylene mains. However 2,500' of this main was replaced in 2013 with 2inch HDPE.

DISTRIBUTION STORAGE

Blue Mountain Lakes Tank No. 1 is a 65 ft high bolted steel tank with a diameter of 32 ft. built in 1995 with a nominal capacity of 403,000 gallons. This tank has an overflow elevation of 1047 ft which establishes the main system gradient. There is also a high pressure zone that is at the tank site via a booster station. This station supplies the homes surrounding the storage tank foot print due to elevation similarities.

Birch Acres Development does not have a water storage tank at this time. A hydro-pneumatic is used to help maintain system pressures.

Country Club of the Poconos (CCP) Storage Tank No. 1 is a bolted steel tank 33 feet in diameter and 35 feet high, with a nominal capacity of 200,000 gallons. The tank is located off Ridge View Circle and has an overflow elevation of 914.0.

Country Club of the Poconos (CCP) Storage Tank No. 3 is a welded steel tank. The 250,000 gallon storage tank is 46 feet in diameter and 20 feet high. The tank is located at the treatment building at Doral Ct. and has an overflow elevation of 914.0.

Mountain Top Estates Storage Tank No. 1 is a 66,000 gallon steel standpipe, but this only provides pump suction and chlorine contact. The distribution system is not designed to provide fire protection. A 3,000 gallon hydropneumatic is used to buffer the distribution system.

Storage in Saw Creek Estates is in the various pressure zones furnished by the following seven (7) water storage tanks:

St. Andrews Tank (Tank No. 1) is a 47 ft. high, 28 ft. diameter glass lined bolted steel tank with a nominal capacity of 210,000 gallons, constructed in 2016. This tank with an overflow elevation of 843 ft. establishes the hydraulic gradient for its service territory.

Section 4, Brentwood Tank (Tank No. 2) is a 33 ft. high, 34 ft. diameter glass lined bolted steel tank with a nominal capacity of 211,900 gallons constructed in 2016. This tank with an overflow elevation of 1,049 ft. establishes the hydraulic gradient for its service territory.

Section 8 Tank (Tank No. 3) is a 32 ft. high, 33 ft. 8-inch diameter bolted steel tank constructed 2006, with a nominal capacity of 200,000 gallons. This tank with an overflow elevation of 1,140 ft. establishes the hydraulic gradient for its service territory.

Dorchaster Tank (Tank No. 4) is a 72 ft. high, 21.5 ft. diameter bolted steel Peabody Tectank construction in 1996, with a nominal capacity of 197,000 gallons. This tank with an overflow elevation of 1,181.5 ft. establishes the hydraulic gradient for its service territory.

Rigby Tank (Tank No. 5) is a 64.5 ft. high, 21.5 ft. diameter bolted steel Peabody Tectank constructed in 1996, with a nominal capacity of 175,000 gallons. This tank with an overflow elevation of 1,173.5 ft. establishes the hydraulic gradient for its service territory.

Timothy Lane Tank (Tank No. 6) is a 66 ft. high, 25 ft. diameter bolted steel tank built in 2004 with a nominal capacity of 242,000 gallons. This tank with an overflow elevation of 1236.3 ft. establishes the hydraulic gradient for its service territory.

The Section 37 Tank (Tank No. 7) is a 100 ft. high, 18 ft. diameter, bolted steel tank built in 1998 with a nominal capacity of 190,000 gallons. This tank with an overflow elevation of 1,184 ft. establishes the hydraulic gradient for its service territory.

The Pine Ridge tank is a 75'8" high elevated storage tank with a bowl diameter of 47' 9" built in 1993 with a nominal capacity of 325,000 gallons. This tank has an overflow elevation of 1391.17 ft which establishes the main system gradient.

Wild Acres Lakes (Hickory) – Tank No. 2 is a 61 foot high, 20 ft. diameter welded steel tank with a nominal capacity of 100,000 gallons. This tank establishes the hydraulic gradient for its service territory.

Wild Acres Lakes (Hickory) – (Tank No. 5) is a 24 ft. 9-inch high, 30 ft. diameter welded steel elevated storage tank with a nominal capacity of 100,000 gallons. This tank establishes the hydraulic gradient for its service territory.

Marcel Lakes (Silver) - Tank is a 61 ft. high, 20 ft. diameter glass lined bolted steel tank with a nominal capacity of 135,000 gallons. This tank has an overflow elevation of 1441.0 ft which establishes the main system gradient.

Milford Landing (Three Lanes) Tank - is a 33 ft. high, 31 ft. diameter bolted steel tank with a nominal capacity of 180,000 gallons. This tank establishes the hydraulic gradient for its service territory.

Fernwood Tank # 1 is a 32 ft high 130,000 gallon welded steel tank. This tank establishes the hydraulic gradient for its service territory.

Fernwood Tank #2 is a 64 ft high 389,000 gallon bolted steel tank. This Tank establishes the hydraulic gradient for its service territory.

All Seasons- consists of (4) 119 gallon bladder tanks and a 700 gallon chlorine tank; however 1 bladder tank is currently disconnected. The system does not currently have a tank for stored water.

MCEWENSVILLE WATER

The McEwensville Water System of Pennsylvania-American Water Company supplies potable water for domestic, fire protection, and municipal use for 120 customers in McEwensville Borough and a portion of Delaware Township, Northumberland County.

SOURCE OF SUPPLY

The McEwensville Water System is a ground water system utilizing two wells. All sources are classified as groundwater. The McEwensville operational procedure is to utilize both wells alternating operations. All wells are 8-inch diameter and were constructed in accordance with the table below.

Source	Well Depth (ft)	Casing Depth (ft)
Well No.1	247	45
Well No.2	305	64

The well capacities are identified below.

Source	Permitted Capacity (gpd)	Safe Yield Capacity (gpd)
Well No.1	110,800	110,800
Well No.2	115,200	115,200
Total	226,000	226,000

WATER TREATMENT

There are two existing treatment buildings, one associated with each well

A wellhouse was constructed over Well No. 1 to house metering and disinfection facilities. The disinfection system utilizes a calcium hypochlorite system which mixes granular calcium hypochlorite into solution which is supplied by a chemical feed pump. The solution is pumped from a covered plastic solution tank that is provided with a continuous mixer. Contact time is provided by the 100,000 gallon storage tank located next to the treatment building. Three sample taps are provided: a raw water tap, a tap immediately after chlorination, and a tap after the storage pipe. The well is controlled by a pressure switch

A wellhouse was constructed adjacent to Well No. 2 to house metering and disinfection facilities. The disinfection system utilizes sodium hypochlorite solution which is supplied by a chemical feed pump. The solution is pumped from a 100 gallon covered plastic solution tank that is provided with a continuous mixer. Thirty-eight feet of 36-inch pipe was installed outside the treatment building to provide 25 minutes of contact time at a pumping rate of 80 gpm. Three sample taps are provided: a raw water tap, a tap immediately after chlorination, and a tap after the contact pipe.

DISTRIBUTION STORAGE

Distribution storage is a 0.100 MG storage tank.

DISTRIBUTION

The distribution system is fed by gravity from the .1 MG tank and is comprised of approximately 2 miles of pipe. The distribution system ranges in size from 4 to 6-inch diameter mains and the system operates on a single gradient. There are 6 fire hydrants in the system.

MILTON DISTRICT

Pennsylvania-American Water (Milton Area) serves an area located along the West Branch of the Susquehanna River in Union and Northumberland Counties. The territory is about 2.5 miles wide and 17.8 miles long, extending from Packer Island between Sunbury and Northumberland on the South, to Dewart on the North. The municipalities served are the boroughs of Lewisburg, Milton, Northumberland and Watsontown; and in all of East and West Chillisquaque, Kelly, Buffalo, East Buffalo, Turbot, White Deer, Point, and Delaware Townships; and portions of Upper Augusta and Gregg Townships. The estimated population served is more than 30,000 people living and working in the Milton service area.

SOURCE OF SUPPLY

The Milton Area has three (3) independent sources of supply, White Deer Creek, Spruce Run Creek, and the West Branch of the Susquehanna River. All are located in the Susquehanna River Basin.

The White Deer Creek has a watershed of approximately 37.7 square miles and an estimated safe yield of only 2.1 MGD. The Intake facilities are located about 6 miles West of Watsontown, Pa.; Water flows by gravity from a diversion dam into an intake chamber, through a traveling screen, and then through approximately 2,100 feet of 16-inch and 24-inch parallel pipelines to the W.D.C.F.P. Pump House. We have a water allocation, Permit No. WA-193, for 3.0 MGD.

The Spruce Run Creek has a watershed of approximately 13.5 square miles and an estimated safe yield of only 2.0 MGD. The intake facilities are located about 7 miles West of Milton, Pa.. Water flows from a diversion dam on Spruce Run Creek into a 420.0 MG earth embankment side-hill reservoir immediately adjacent to the creek. Raw water from the reservoir is pumped approximately 38,000 feet (13,000 ft. of 16-inch and 25,000 ft. of 24-inch pipe) to the White Deer Creek Filter Plant. We have a water allocation, Permit No.WA-193-B, for 5.0 MGD. A condition of Dam Permit No.D60-007A requires that a flow of at least 1.315 MGD be maintained in Spruce Run Creek in order for PAW to divert water from the creek into the Spruce Run Reservoir.

The West Branch of the Susquehanna River has a watershed of approximately 6,843 square miles and an estimated safe yield of 450 MGD. The water flows by gravity from an intake structure located in the river through a 42-inch pipe and then through a traveling screen to the raw water suction well. We have a water allocation, Permit No.WA-193-D, for 6.0 MGD.

There are no known surface water intakes located immediately downstream from either the White Deer Creek Plant and/or the Milton Filter Plant.

TREATMENT

Two water purification plants serve the Milton Service Area. The White Deer Creek Filter Plant located on White Deer Pike, 5 ½ miles West of Watsontown, treats raw water drawn from both White Deer Creek and Spruce Run Reservoir. The W.D.C.F.P. is rated at 6.0 MGD. The Milton Filter Plant located at 702 South Front Street purifies raw water strictly from the West Branch of the Susquehanna River. The M.F.P. is rated at a capacity of 6.0 MGD. Combined, these plants can produce up to 12 million gallons per day.

At the White Deer Creek Filter Plant, the raw water from White Deer Creek or Spruce Run Reservoir or both are pumped from the pump houses to the Filter Plant. Pre-treatment facilities provide for mixing, flocculation, and sedimentation.

The raw water flows through a Komax in-line mixer. Pretreatment chemicals (Alum, Lime, Chlorine, and Carbon when needed) are added at this point. The treated water is discharged into the center of two, three-section tanks. The center ring contains the flocculating chamber and lightnin mixing equipment. The flocculated water flows under a curtain wall into a second compartment where sedimentation takes place and then over v-notched weirs into the third compartment or ring where the filter area is located. Provision is made for the application of a polymer filter aid at this point. Water from the dual media filters is discharged to a filtered water header and then to a 20-inch pipe where post chemical treatment takes place, consisting of the addition of post chlorine for disinfection, lime for PH adjustment, and an inhibitor for corrosion control. It is then delivered to a 317,000 gallon capacity intermediate storage tank. Water from the intermediate tank is pumped to a 500,000 gallon capacity baffled contact clearwell with an overflow elevation of 796 feet, such that it provides gravity flow to the distribution system.

At the Milton Filter Plant, raw water is conveyed approximately 420 feet from the intake to the raw water suction well. Pre-treatment facilities provide for mixing, flocculation, and sedimentation. Powdered Activated Carbon is added in the suction well for taste and odor control.

Three 3.0 MGD pumps deliver water from the raw water suction well through a Komax in-line mixer. Pretreatment chemicals (Alum, Lime, Chlorine, and potassium permanganate) are added at this point. The treated water is discharged to the center of two, two-section tanks. The center ring contains the flocculating chamber with lightnin mixing equipment. The flocculated water flows under a curtain wall into the second compartment where sedimentation takes place and then over v-notched weirs into collecting launders located at the periphery of the settling compartments. The settled water flows from the clarifier through a 30-inch pipeline where intermediate treatment (chlorine, filter aid when needed) may be applied. The water flows into three conventional type filters containing a dual media bed. The filtered water drains into a 24-inch pipeline, post treatment (chlorine for final residual, caustic soda for PH correction, and an inhibitor for corrosion control are applied. The finished water then flows into a two-

chambered clearwell which has a capacity of 400,000 gallons. Water is then pumped from the clearwell by three 3.0 MGD high service pumps through a 20-inch transmission main into the adjacent distribution system.

DISTRIBUTION STORAGE

The Milton Service Area has seven (7) tanks and one (lined and covered) reservoir. The distribution system storage consists of a 1.0 MG standpipe in Milton, a 1.0 MG standpipe and a 0.230 standpipe in Lewisburg, a 0.50 MG hydropillar tank in West Lewisburg, one (1) 1.0 MG standpipe in Northumberland, one(1) Pre-cast Concrete tank 0.750 MG in Point Township, a 1.0 MG hydropillar tank north of Allenwood, and a 0.850 gallon (lined and covered) reservoir in Watsontown. The water levels in the storage vessels are monitored by a SCADA (Supervisory Control and Data Acquisition) system at the Milton Filter Plant Control Center. These distribution storage tanks are utilized for high demand usage and fire protection purposes.

DISTRIBUTION SYSTEM

The distribution system is divided into four (4) principal service areas. The Lewisburg Area is supplied from the West Milton and South Front Street distributive pumping facilities. The Milton Area is supplied from the West Milton pumping facility and the Milton Filter Plant. The Northumberland Area is served from the Montandon distributive pumping facility. The Watsontown/Allenwood Area is supplied from the White Deer Creek Filter Plant and the White Deer Village pumping facility. Note: There are several smaller booster systems within these principal areas.

Per our Annual Water Supply Report for 2009, our system has 261 miles of mains ranging in size from 1" to 24". Our system serves 12,200 connections, with approximately 725 public and 95 private fire services/hydrants.

The White Deer Village distributive pumping facility is located in the village of White Deer near the termination of the 16-inch transmission main from the White Deer Creek Filter Plant. Three 0.720 MGD pumping units deliver water to Allenwood area and the Allenwood Federal Bureau of Prisons complex, through 4 miles of 16-inch DICL pipe. Operation of this facility is telemeter controlled by the level in the Gregg Township elevated tank. Pressures and flow are monitored at the White Deer Creek Filter Plant..

The West Milton distributive pumping facility is located on River Road in West Milton. This facility has two pumps, which pump water through a 12-inch pipeline to Lewisburg on the west side of the Susquehanna River. And also, water from the 16-inch gravity transmission main from White Deer Creek Filter Plant passes through the West Milton facility to the river crossing to Milton. The flow to Lewisburg is transmitted to the control center.

The South Front Street distributive pumping facility is located on South Front Street in Milton near the front entrance to the Milton Filter Plant. Two (2) 1.5 MGD pumping units boost water from the Milton system through approximately 3 miles of 16-inch pipeline into the Lewisburg area. The operation of these units are controlled remotely by an operator at the Milton Filter Plant Control Center.

The Montandon distributive pumping facility is located approximately 2,000 feet southeast of Montandon. Three (3) 0.615 MGD pumping units deliver water to West Chillisquaque and Point Townships and Northumberland Borough. Pressures and flow are monitored at the Milton Filter Plant Control Center. This facility is operated manually by an operator at the M.F.P. Control Center.

The College Park Booster Station is located adjacent to the Lewisburg Standpipes. Three 0.63 MGD pumping units boost water into a high elevation area west of the standpipes and supply the West Lewisburg Tank. The operation of this booster station is monitored at the Milton Filter Plant Control Center.

The New Columbia Booster Station is located at 4th St. and Cherry Alley in New Columbia. This station serves an area west of New Columbia. Equipment consists of four (4) pumps with a combined delivery of 1.080 MGD. Note: This facility is equipped with an emergency generator in case of power failure.

The Mahoning Street Booster Station is located on Mahoning Street in Milton across from the Milton Area High School and serves a growing area in East Chillisquaque and Turbot Townships. Three(3) 0.200 MGD pumping units and one 1.000 MGD pumping unit boost water to this area. The operation of this station is controlled by system pressure.

The Turbot Avenue Booster Station is located on Turbot Avenue just north of the intersection of Turbot and Park Avenues. This station serves a high elevation area in the northeast section of the Milton Borough. Build by the Borough and leased by the company, Equipment consist of two (2) Grundfos vertical centrifugal pumps, each rated at 150 GPM at 140 feet of head, and one 1,000 GPM flow pump. The system is automatically controlled by system pressure. (Note: upgrade was completed May, 2006)

The Prince Street Booster Station is located at 7th & Prince St. in Northumberland and serves an area northeast of the Northumberland standpipe. Three (3) 0.576 MGD pumping units provide domestic, industrial, and fire protection to customers in Northumberland and Point Township high elevation area. The system is automatically controlled by system pressure. The pressures and flow are transmitted to the Milton Filter Plant Control Center.

The Watsontown Reservoir Booster Station is located at 3rd St. and Baylor Road and consists of two 0.305 MGD pumping units. The pumps take suction directly from the

storage reservoir and discharge to two separate pressure gradients (Watsontown hill section and the Dewart area) in the distribution system.

The Peachwood Booster Station is located west of J.P.M. Road on Lamplight Lane in Kelly Township. This Booster serves a developing residential area in Kelly Township northwest of Lewisburg. Two 0.216 MGD pumping units boost water to an isolated higher elevation.

WASTE WATER FACILITIES

Backwash water from the White Deer creek Filter Plant flows into a wastewater clarifier unit. Water from this holding tank is pumped back to the head of the plant. The sludge from this unit is discharged into two (2) drying basins. Dried sludge is removed to be land applied or taken to a registered landfill.

Backwash water from the Milton Filter plant flows into one of two sludge tanks. The sludge is removed to be land applied or taken to a registered landfill.

Company Statement: All material removed from the raw water from both White Deer Creek Filter Plant and Milton Filter Plant are disposed of in an environmentally sound manner.

OPERATION / DISTRIBUTION CENTER

The 11,520 square foot Milton Operations/Distribution Center, located in the Milton Industrial Park at the corner of Sodom and Industrial Park Roads, was constructed in 1982 and expanded in 1986 and 1989, provides a centralized reporting location for business, administrative, and distribution functions.

MON-VALLEY DISTRICT

Mon-Valley District serves a population of approximately 50,000 throughout the cities of Clairton and Monongahela; the Boroughs of Dravosburg, Elizabeth, Glassport, Jefferson, Liberty, Lincoln, New Eagle, and West Elizabeth; and the Townships of Carroll, Elizabeth, and Forward.

SOURCE OF SUPPLY

Mon-Valley District maintains six pipeline connections with the Pittsburgh District as their main source of supply. In addition to these, there are several smaller metered connections to the Municipal Authority of Westmoreland County (MAWC). One MAWC connection serves a small portion of the Mon-Valley system exclusively while the others augment flows from the Pittsburgh District.

DISTRIBUTION STORAGE

Storage in the Mon-Valley District is provided by eight tanks. The 0.88 MG lined and covered Clairton basin, the 0.30 MG welded steel elevated Fourth Street Tank, the 1.25 MG elevated Elizabeth Township Tank, the 0.50 MG elevated Eldora Tank, the 0.30 MG elevated Ridge Road Tank, the 0.5 MG Liberty Borough Tank, the 0.275 MG Lincoln Borough Standpipe, the 1.0 MG welded steel Monongahela Main Service Reservoir, the 0.30 MG elevated Route 885 Tank, and the 0.15 MG elevated Glassport Tank.

DISTRIBUTION

The Mon-Valley district operates as two separate systems. Water for the Valley system is primarily provided from the Shire Oaks gradient in the Pittsburgh district. The Clairton Basin provides storage for the main part of the Valley system while the Belle Bridge and Mill Hill boosters deliver water to the high elevations. There is also a series of PRV stations that regulate pressures to some of the lower elevations and also regulate flows to some of the storage tanks. Water for the Monongahela system is primarily provided through the Rt. 136 PRV connection to the Pittsburgh District to the Monongahela Main Service Reservoir. The Fisher Heights and Ridge Road boosters deliver water to the higher elevations in the system.

MOSHANNON VALLEY

The Moshannon Valley area serves the Boroughs of Philipsburg, Wallaceton, Chester Hill, and Osceola Mills; and portions of Rush, Morris, Decatur, Graham, Bradford, and Boggs Townships. The estimated population served is 22,218.

SOURCE OF SUPPLY

Water supply is taken from an 8.7 million gallon impoundment on Cold Stream Run, four miles south of Philipsburg. Additional sources of supply are the Blue Spring, which is equipped with a 15 h.p. submersible electric pump, and three wells. Water from the Philipsburg Reservoir, Spring, and Wells No. 1 and 2 is pumped from the Cold Stream Raw Water Pumping Station by means of three 900 GPM pumps to the Treatment Plant. Well No. 3 is pumped directly to the Treatment Plant from the well. A second water supply is located in the Trout Run Watershed area south of Osceola Mills. Trout Run Well No. 1 and Trout Run Well No. 2 pump water directly into the distribution system.

TREATMENT

The Cold Stream Watershed sources are fully treated and filtered through the Philipsburg Treatment plant, with a 2.3 MGD capacity. Cold Stream and Blue Spring have a combined water allocation of 1.4 million gallon per day. The 3 wells have a combined allocation of 1.03 MGD. The Trout Run Well No. 1 allocation is .533 MGD and Well No. 2 is .979 MGD and both are pumped directly into the distribution system after chemical treatment at the Penn 5 treatment building.

DISTRIBUTION STORAGE

Thirteen distribution storage tanks serve the area. The 1 million gallon tank located near the Philipsburg Treatment Plant is the first storage area after the plant process; water flows from the plant to the Philipsburg and/or Osceola Mills pressure gradients. The 420,000-gallon Curtis Park Standpipe serves the southeast portion of the system. The Windy Hill Standpipe, with a capacity of 310,000 gallons, supplies the area where several of the largest users are located. The Manor Hill Standpipe stores 108,000 gallons of water for use in the Osceola Mills area. The Shady Acres Tank has a storage capacity of 285,000 gallons and serves the area near the West Branch School, and the village of Allport. The 200,000-gallon Bigler Tank helps to supply the area in and near Bigler. The Pine Top Tank, also stores 200,000 gallons, and serves the Woodland area. The Pleasant Valley Tank operates on the same gradient as the Bigler Tank and has a storage capacity of 500,000 gallons. A 150,000-gallon tank serves the former Morris Authority system, acquired in 1996. The Spring Valley tank holds 110,000 gallons and serves the Spring Valley and Morgan Run areas. A 100,000 gallon tank at Sandy Ridge serves the village of Sandy Ridge and the West Decatur area is served by a 100,000 gallon tank just outside of West Decatur. The Eagle Eye Tank stores 100,000 gallons and serves the Drane area. A 136.000 gallon tank serves the Borough of Wallaceton.

DISTRIBUTION

Treated water flows from the Philipsburg Treatment Plant by gravity from to a 1.0 MG steel storage tank located 800' away. Water from the Penn 5 Treatment facility flow into the same pressure gradient from the tank, water continues into the distribution system where approximately 60 percent of delivery is provided without additional pumping. Fifteen (15) booster pumping stations raise pressures to serve various isolated high elevation areas, with one station, the Emigh Run Pumping Station, serves the entire northern portion of the system. Twenty-four PRV's regulate pressure throughout the system to keep operating pressures within standards. These pumps and PRVs create 32 different pressure zones.

NAZARETH / BLUE MOUNTAIN

The Blue Mountain District serves residential, commercial, industrial, and private and public fire service customers located primarily in Northampton County in the Boroughs of Nazareth, Wind Gap, Pen Argyl, Stockertown, Tatamy, Belfast, and portions of the adjacent townships of Ross, Bushkill, Plainfield, Forks, Upper and Lower Nazareth, and parts of Palmer. The certificated service area is located in the heart of the Lehigh Valley, parallel to Route 33 just north of the cities of Allentown, Bethlehem, and Easton, Pennsylvania.

SOURCE OF SUPPLY

The Blue Mountain District's existing facilities serve approximately 18 square miles of a total certified area of 83 square miles. The District's sources of supply consist of three covered springs located along Cherry Creek in Cherry Valley, Monroe County; six wells at Ross Common Creek, Monroe County; a surface supply at Pen Argyl in Northampton County; a surface supply at the headwaters of the Ross Common Creek, Monroe County; a well at Douglasville, Northampton County; a well at Wind Gap, Northampton County, an interconnection with PAWC's Bangor District in Pen Argyl, and two interconnections with Easton Suburban Water Authority, one located at the southern end of Nazareth Borough and the other located at the southern end of the Wolf's Run Development in Palmer Township. Both surface supplies are now being treated with the addition of two new water facilities constructed 1993 – 1994.

The water supply in Cherry Valley, obtained from three covered springs, flows by gravity to the Cherry Valley pumping station from where the water is pumped through a 12 inch transmission main to the Stony Garden Treatment Plant.

At Stony Garden the headwaters of Ross Common Creek and natural surface runoff are impounded in a 12,000,000-gallon reservoir having an earth and rockfill embankment dam with a concrete spillway. From this location water flows through a 14 inch transmission main to the Stony Garden Treatment Plant. After treatment and filtration, the water is pumped to two 0.5 MG distribution storage tanks where it flows by gravity through a 10 and 14 inch main to several borough distribution systems south and east of the mountain ridge.

At Ross Common there are five drilled wells numbers 1A, 2, 3, 4, and 5. Wells 1A, 2, 3, and 5 are connected to a single 10 inch trunk line increasing to 12 inch, which runs in an easterly direction through a 24 inch casing beneath legislative Route 33 and connects with the 10 inch influent main to the Stony Garden reservoir. During use of the wells the water is discharged into the Stony Garden reservoir for removal of carbon dioxide gas. Ross Common well no. 4 is used to augment the Ross Common stream flow. A minimum 229 GPM flow is required for this purpose by DEP. The flow is monitored at a weir located at Ross Common.

Ross Common Well No. 6, which is located on the easterly side of Route 33, pumps directly into the 10 inch influent main to the Stony Garden Reservoir.

TREATMENT

The Stony Garden filtration plant was constructed in 1993 and completed in 1994. The plant is designed to treat the raw water supply from the Ross Common stream, Cherry Valley springs, and Ross Common wells. The plant consists of one main treatment building, a backwash wastewater tank, a high service pump station, a sludge drying bed, two clearwell storage tanks (137,000 gallons and 491,650 gallons) and two (2) 0.5 MG steel finished water storage tanks. The main treatment building houses three (3) Infilco Degremont Advent filter units, each unit capable of treating 1.6 MGD. All required monitoring equipment, controls, and chemicals are also included in the treatment building.

The Penn Argyl filtration plant and booster station also began construction in 1993 and was completed in 1994. The plant is designed to filter the stream supply. The filtering system consists of two (2) 150 GPM filter units. The filters are the diatomaceous earth vacuum-type with a combined capacity of 300 GPM. The booster station consists of two pumps each rated at 30 GPM and one diesel-powered fire pump rated at 550 GPM and provides service to the upper elevations of Mary's Mountain Estates.

A 500,000 gallon steel, finished water storage tank is constructed at the Penn Argyl stream supply. The stream, which is fed by a spring approximately half-way up the ridge of the Blue Mountain, is directed by a concrete diversion chamber to an infiltration gallery and settling basin. The water passes through the various grades of sand and stone media at the infiltration gallery and flows through an 8-inch pipeline to a 1.3 MG raw water impoundment reservoir. The water flows from the reservoir through a 12-inch main and reduces to a 6 inch main before the diatomaceous earth filtration plant.

DISTRIBUTION STORAGE

The finished water is pumped into the 500,000 gallon storage tank. The effluent of the tank is a gravity feed system directly connected to the distribution system.

DISTRIBUTION

In 2001, an interconnection was completed between the Pen Argyl system and PAWC's West Bangor system. A maximum of 150 GPM can be transferred to the Penn Argyl system through a simplex booster pumping station. In the past, this interconnection was limited by a limited source of supply in West Bangor. Improvements to the West Bangor system have been completed which will ultimately increase the interconnection capacity to 1 MGD.

North of Wind Gap, 8 inch and 10 inch transmission mains extend from the 20 inch supply main eastwardly to Penn Argyl. The Constitution Avenue booster station increases the available water supply in the 10 inch main leading to the center of Penn Argyl. The 8 inch transmission main to Penn Argyl extends from Route 115 by way of Alpha Road to the south side of Pen Argyl. The water supply is supplemented by the Dietz well located near Constitution Avenue booster station.

The Nazareth Reservoir is concrete lined with a floating cover and has a capacity of 1,300,000 gallons. A new cover and liner is scheduled to be installed at this reservoir by April 2017.The reservoir receives water from two 8-inch and one 6-inch southerly transmission lines from the Wind Gap area, the 8-inch and 6-inch by way of Bushkill Center and Douglasville and the other 8-inch by way of Belfast and Stockertown, the latter line also providing the water supply to Stockertown, Tatamy, Upper Nazareth Township and Palmer Township.

The water supply is chlorinated at the Stony Garden Filtration Plant, the Penn Argyl Filtration Plant, and the Dietz Well at Wind Gap.

The distribution system pressures of the Blue Mountain District are directly influenced by the two 0.5 million gallon storage tanks located at the Stony Garden Treatment Plant. The 0.5 million gallon storage tank located at the Penn Argyl Water Treatment Plant balances pressures and flows from the Stony Garden storage tanks in the northeastern portion of the distribution system. Water flows by gravity from the Stony Garden storage tanks to the 304,000 gallon Nazareth tank and 1.3M gallon Nazareth Reservoir and the 300,000 gallon elevated tank in Palmer Township in the southern portion of the distribution system. Pressures and flows to the southern portion of the system are regulated by two pressure reducing stations, and a pressure sustaining station. A third pressure reducing station is being installed in 2013 in conjunction with a main replacement project at the south end of Wind Gap at Rt. 512 and Sullivan Trail. A booster station was installed in 2004 on North Schoeneck Avenue in Upper Nazareth Township to increase the pressure to existing customers at higher elevations along North Schoeneck and Clearview Avenues.

NESBITT/HUNTSVILLE

The Nesbitt/Hillside areas serve all or portions of Edwardsville, Forty Fort, Kingston, Luzerne, Swoyersville, West Wyoming and Wyoming Boroughs, and in Kingston Township. In addition, the Nesbitt area services customers in all or portions of Avoca, Duryea, Exeter, Hughestown, Moosic, Old Forge, and West Pittston Boroughs, Pittston City, Jenkins and Pittston Township in Luzerne and/or Lackawanna County. The estimated population served is 76,000.

SOURCES OF SUPPLY

Spring Brook, a major tributary of the Lackawanna River, is the source of water for the Nesbitt water supply system. Four impoundments located in the Spring Brook watershed serve as water supply reservoirs. These include Watres, Maple Lake, Nesbitt and Springbrook Intake Reservoirs.

Watres Reservoir is the most upstream impoundment on the main branch of Spring Brook. Watres is a 1.94 Bgal reservoir with a drainage area of approximately 15 square miles. The normal water elevation in Watres Reservoir is 1,426.35 feet. Although Watres Reservoir itself is utilized as a supply reservoir for the Watres Water Purification Plant, overflow from the Watres Reservoir is available to the supplies located downstream on Spring Brook. Water from the Watres Reservoir is transmitted via a transmission main to the Gardner Creek Pumping Station where a regulating valve controls inflow to the Watres Water Purification Plant.

Maple Lake, located on a tributary of Spring Brook, is a 214 Mgal reservoir with a drainage area of approximately one square mile. Maple Lake is used during low-flow periods to supplement flow into the Nesbitt Reservoir.

The Nesbitt Reservoir is a 1.28 Bgal impoundment located on Spring Brook. The Nesbitt Reservoir has a drainage area of approximately 21 square miles, not including the drainage areas of the upstream Maple Lake and Watres Reservoirs. The normal pool elevation in Nesbitt Reservoir is 1,155.75 feet. Historically, Nesbitt Reservoir was used only as a storage reservoir from which water was discharged to supplement the flow available at the downstream Springbrook Intake Reservoir. A 30-inch transmission line was constructed from Nesbitt Reservoir to the Nesbitt Water Purification Plant, located in the vicinity of Springbrook Intake Reservoir, to serve as the plants' raw water supply main.

The Springbrook Intake Reservoir is a 25.5 Mgal reservoir located on Spring Brook with a normal pool elevation of 910.73 feet. Springbrook Intake Reservoir drains a watershed area of approximately 6.2 square miles downstream of the Nesbitt Reservoir. Since the construction of the 30-inch Nesbitt transmission main, the Springbrook Intake Reservoir has been on standby status.

Nesbitt Reservoir is located over 200 feet higher than the Nesbitt Water Purification Plant. With the excess head available from the Nesbitt Reservoir, a hydro turbine is utilized at the Nesbitt Water Purification Plant to generate electrical power for plant operations. Treated

water is discharged from the water purification plant to two water storage tanks (2M gallon and 1M gallon) with an overflow elevation of 931 feet. Water is delivered to the distribution system through two parallel mains of 24 and 30-inch diameter.

The Huntsville system obtains its water from Huntsville Reservoir, a 1.92 MG supply reservoir with a drainage area of 8.0 square miles. Water is impounded behind a masonry arch dam, originally built in 1891. The spillway elevation is 1,133.09. Two 8-inch siphons and two gated outlets can release water from Huntsville Reservoir to maintain minimal stream flow Huntsville Creek. Raw water is drawn thru two fine meshed intake screens situated off the shore of the reservoir. Three variable frequency pumps with rated capacities of 2.8 MGD (2 each) and 2.5 MGD (1) are provide to pump water from the reservoir to the treatment facility. Water flows from the 163,000 gallon in-plant clearwell thru approximately 21,000 feet of 20" DICL finished water transmission main to two (2) .924 MG Water storage tanks (overflow elevation of 826.0) at the site of the former Hillside Water Purification Plant. A 30-inch water transmission main delivers finished water from these storage tanks to the distribution systems.

TREATMENT

The Nesbitt plant is located in close proximity to Springbrook Intake Dam along Route 502, situated on the boundary line between Moosic Borough and Springbrook Township. The plant has a rated capacity of 12.0 M.G.D. Water supply to the plant is provided by gravity from Nesbitt Reservoir.

The raw water is delivered by gravity from the source of supply directly to the plant where initial pre-chemical additions are made. Pretreatment chemicals include alum, lime, potassium permanganate and activated carbon. After pre-chemicals are added, the water passes through rapid mixing units consisting of two in-line static mixers and then into flocculation units consisting of six basins with two staged horizontal reels. The next step in the treatment process consists of granular media filtration. Filters are equipped for air/water washing.

After being filtered, water flows through the plant's clear well where many of the post treatment chemicals such as chlorine for disinfections, lime or caustic soda for pH adjustment, and polyphosphate for corrosion control are added before entering the 2.0 Mgal storage tank on the plant site.

The Huntsville Plant is located on the shoreline of Huntsville Reservoir along Reservoir Road in Dallas Township. The plant has a rated capacity of 4.5 M.G.D. Water supply to the plant is provided by raw water pumping from Huntsville Reservoir. The raw water is pumped from the source of supply directly to the plant where initial pretreatment additions are made. Potassium permanganate can be added as water exits the raw water pumping station for oxidation of soluble metals and organics. A baffled, concrete basin at the plant influent provides additional contact time for oxidation. Water entering the treatment plant is metered, chemically pretreated, and mixed prior to being distributed to the clarifiers. The primary chemical pretreatment scheme consists of polyaluminum chloride (Del Pac) and coagulant feed. Other pretreatment chemicals

that can be fed include powdered activated carbon, chlorine, and caustic soda. In-line static mixing serves to flash mix the pretreatment chemicals.

Following chemical addition and mixing, the water flows into four, 130-square foot clarifiers, where up flow adsorption/clarification takes place. Mixed water enters each clarifier at the bottom of the basin. Flocculation occurs in the void spaces within the non-buoyant media, and the flocculated particles are then adsorbed onto the media surface. The water then flows through a filter influent flume and spills out onto four, high-rate dual media filters, where remaining solids are removed. Each filter basin occupies approximately 260 square feet of surface area, and contain a total filter media depth of 57 inches, consisting of 48 inches of granular activated carbon (GAC) and 9 inches of silica sand. After filtration, three (3) post treatment chemicals (chlorine, caustic soda, and a corrosion inhibitor) are added to the water in the clear well influent and effluent. The clear well provides backwash water for the filters and additional volume to maintain the system gradient for the finished water supply. Water existing the clear well flows by gravity through a 20-inch transmission main to two ground storage tanks located adjacent to the former Hillside Water Purification Plant.

DISTRIBUTION

The Nesbitt water supply serves the low areas of the Wyoming Valley which border the Lackawanna and Susquehanna Rivers from Moosic south to Forty-Fort, Kingston, and Swoyersville. Its service area ranges in elevation between approximately 550 and 860 feet. The distribution system contains the W. Wyoming booster pump station and 250,000 gallon storage tank (overflow elevation 934). The Huntsville supply provides gravity service to areas ranging in elevation between 530 and 930 feet. Three distribution-pumping stations and three distribution storage tanks serve the upper elevations of this service territory. In addition to the gravity service area, water leaving the Water Purification Plant is transmitted to the 180,000 gallon Rice St. Tank (overflow elevation of 1,143) for service to customers in Trucksville and Shavertown/Kingston via the Rice Street pump station service territories. The Nesbitt water supply system merges with the Hillside Water Purification Plant supply system on the west side of the Susquehanna River. Water supply to Nesbitt/Hillside mix area can be controlled from either source, depending on demands and the output from the new 2.0 Mgal Campbell's Ledge tank and the two-ground storage tanks at Hillside.

Water from the Huntsville service area also crosses the river through two 24-inch mains and serves portions of downtown Wilkes-Barre. Pressure is reduced to the downtown area through the Court House regulators.

The Huntsville service area also adjoins the Ceasetown service area in Courtdale and Edwardsville. The hydraulic grade line of the Ceasetown service area is about 100 feet higher than the Huntsville service area at the normally closed divide between these two service areas. A limited amount of water can be transferred between the Ceasetown and Huntesville service areas.

WASTE WATER FACILITIES

On the plant sites are two lined earthen lagoons used to store residual solids of the filter backwash water. After the wastes have settled, the clear supernatant is discharged into the adjacent stream in accordance with an NPDES permit.

NEW CASTLE

The New Castle Area serves the City of New Castle; the Borough of South New Castle; and portions of Hickory, Mahoning, Neshannock, North Beaver, Shenango, Taylor and Union Townships, as well as portions of New Beaver Borough. The estimated population served is 42,998.

SOURCE OF SUPPLY

Source of supply is obtained from the Shenango River. Stream flow is regulated by the Pymatuning Dam, a flood control project located 35 miles upstream, and Sharpsville Dam, 20 miles north of the pump station. Two timber crib intakes are located in the river at the main station, and water is delivered to a stone masonry low-service suction well with a 16-inch and a 24-inch cast iron pipeline. Three vertical low service pumping units deliver the water to two sedimentation basins, 250 feet east of the main pump station.

TREATMENT

The chemical room is on the south end of the main station and contains two 7,000-gallon liquid alum tanks, a day tank, two alum pumps, four polymer pumps, a powdered activated carbon feeder and a caustic soda feed system, located in an adjoining room. Adjacent to the west wall of the chemical room is the corrosion inhibitor room, which contains one 4,760-gallon bulk tank, a day tank and two corrosion inhibitor pumps. Outside the Northeast wall of the chemical room is where the lime storage silo and the fluoride room are located. The Fluoride room contains a 5,000-gallon bulk tank, a day tank and two fluoride pumps. A potassium permanganate feeder is located adjacent to the Low Service pump area. Chemical containment was constructed around all chemical storage tanks and feeders in 1993 to prevent the accidental release of water treatment chemicals. The alum, fluoride and corrosion inhibitor tanks were replaced as part of this project. During 1995, a new lime slake system was installed to provide better reliability.

The control room area is next to the chemical room comprised of several separate rooms. The mix room contains two mixing tanks for adding various chemicals to the 20-inch raw water line, which runs directly under this side of the building. Across from the mix room contains the chlorinator room, and chlorine storage room complete with scales and monorail for changing cylinders. The control panel for monitoring the entire plant is located in the actual control room where the various analyzers and alarm systems and annunciators are housed. In recent years, a SCADA system has been added in which the various treatment turbidities, filter and plant flows, distribution system tank levels, flows and pressures have been integrated to, in addition to the control of several chemical feed systems and the Low and High Service pumps. The chart recorder bodies remain as most signal still pass through these devices, but monitoring and record

keeping is now accomplished via SCADA. A secondary, full function SCADA computer can also be found in the laboratory.

There are two 1.0 mg basins 250 feet east of the main station, which under normal operating conditions, are in series but can be operated one at a time for cleaning and maintenance purposes. No. 1 basin is equipped with three baffle walls and between these walls are eight vertical flocculators. The water is collected in a launder at the north end of the basin and passes through a flume to No. 2 basin. Water is again collected in a launder at the north end and flows by gravity to the filter building approximately 100 feet west of No. 1 basin. A building was constructed in 1992 covering both of the basins to prevent freezing of the sludge collection equipment and collection of leaves and debris in the bottom of the basin that might damage equipment.

The filter building contains four, 2.1 mgd filters complete with Leopold bottoms, surface wash and air wash. Filter-to-Waste valves & piping were installed on all four filters during 2012. The media consists of 10-inches gravel, 5-inches silica sand, 3-inches garnet sand and 54 inches of granular activated carbon. There are two 60 hp, vertically mounted double-suction backwash pumps. Filtered water is delivered to the clearwell adjacent to the filter building by a 24-inch line.

DISTRIBUTION

Topography of the service area necessitates service at two pressures: main service for most of the business and industrial areas of New Castle, and high service for the remaining areas. The distributive pumps for these areas were completely replaced in 2000 by six vertical turbine pumps. Three of the new pumps serve the main service system, and three of the pumps serve the high service system.

The Main service pumps discharge through a transmission main to the two Pulaski tanks.

The High service pumps discharge to mains that provide service to the upper gradients of the system. This system is primarily serviced by the McQuiston tank. In 2004, the 1.0 MG Winter Road elevated tank was erected in the Union Township area to provide additional High Service system storage as well as system pressure and flow balancing. The Pearson Park system provides service for areas north and east of the McQuiston tank. In 2012, a third booster pump was added to the two existing pumps located at McQuiston tank which supply Pearson tank. These pumps take suction from the McQuiston tank and pumps into a 0.300 mg storage tank in Pearson Park south of Mitchell Road and west of Mercer Road. McQuiston also provides system pressure to fill both the Chestnut Street Auxiliary tank and Standpipe, and the West Pittsburg tank.

At the Chestnut Street location a reinforced concrete vault, partially below grade and between the two storage tanks, houses two 1.0 mgd booster pumps remotely controlled from the main pump station.

Winter Road and Shenango boosters are pressure sustaining boosters on the High Service system. Both of these systems are operated via a SCADA system and can be operated either remotely from the plant or automatically at the station. LeClair Booster is another pressure sustaining booster that serves a small portion of Hickory Township.

West Pittsburg tank is regulated through the use of a pressure regulating station located on Savannah Rd. This station is also operated through a SCADA system and has the same functionality as the booster systems.

DISTRIBUTION STORAGE

As noted in the Distribution section, a two pressure gradient system exists. The Main Service system storage capacity consists of the Pulaski tanks. These are two, 1.75 MG ground storage tanks. The High Service system storage is comprised of the McQuiston tank, a 1.1 MG ground storage tank; Winter Road tank, a 1.0 MG elevated storage tank; Chestnut Street Auxiliary Tank, a .250 MG ground storage tank; Chestnut Street Standpipe, a .220 MG standpipe; West Pittsburgh tank, a .410 MG ground storage tank; and the Pearson Park tank which is a .300 MG elevated tank.

WASTE WATER FACILITIES

The existing sludge room is located on the north end of the main station and houses an air compressor, four chemical feed pumps, a chemical mixing tank and a filter press to de-water the sludge. In 1989, a new residual sludge thickener system was constructed and placed in service. A sludge holding tank with a capacity to store approximately 120,000 gallons of residual sludge was constructed to provide adequate sludge storage and provide for proper treatment for eventual belt pressing of the sludge for disposal. The residual sludge thickener system also provided for pumping facilities to move the residual sludge from existing basins and filter backwash to the belt press.

During 1990, additional mechanical sludge units were installed in basin 2 which provided for the complete automation of sludge removal for the New Castle plant. A residual landfill was also constructed adjacent to the New Castle plant in 1990. This landfill was used for the final disposition of residual sludge, with two additional sludge storage cells opened at the landfill in 1992. However, in 2005, the residual sludge was classified for Beneficial Use by DEP and since then the sludge has been removed from the plant by a contractor and used in topsoil blends. The landfill was then closed in 2008 and all residuals were removed and beneficially used.

NITTANY

The Nittany system is located approximately 45 miles east of PAWC's Philipsburg system and 20 miles west of PAWC's Milton system in Walker Township, Centre County and Porter Township, Clinton County. The system serves approximately 1,600 people through 530 connections. The system consists of a single well, a storage tank and distribution network.

SOURCE OF SUPPLY

The well for the system is located approximately 1,200 feet west of Nittany Ridge Road in a predominantly wooded area. Both the in-service pump and the spare pump are 30hp, submersible pumps that are able to supply 0.374 MGD. The well is permitted for 300 gpm (0.432 MGD). The well operates automatically based on tank level. Alarm parameters notify remotely for operator set high and low tank level.

TREATMENT

The Nittany Treatment Facility can process 0.432 MGD. The raw water is treated with sodium hypochlorite for disinfection. The facility consists of a small block building located on site between the well and the tank at 500 Nittany Ridge Road, Howard, PA. The water is pump directly from the well, through the treatment building and into the tank. Water flows by gravity to the distribution system.

DISTRIBUTION STORAGE

Distribution storage consists of a 0.289 MG glass lined bolted steel standpipe and is available for fire protection purposes and general usage.

DISTRIBUTION

The system consists of approximately 12 miles of pipe ranging in size from 2 inch to 12 inch and one PRV station located in Porter Township along Nittany Ridge Road to create a second gradient for the majority of the Porter Township.

NORRISTOWN

The Norristown area serves Bridgeport Borough, Norristown Borough, East Norriton Township, West Norriton Township and portions of Upper Merion, Plymouth, Lower Providence, Whitpain, Worcester, Whitemarsh and Perkiomen Townships. The estimated population served is 101,026.

SOURCE OF SUPPLY

The Schuylkill River serves as the primary source of supply in the Norristown area and accounts for about ninety-seven (99%) percent of the source of supply. The balance of supply comes from a purchased water connection with the North Wales Authority in Whitpain Township. Four (4) wells located in Perkiomen Township have been retired. Emergency connections exist with Aqua Pennsylvania in Upper Merion and North Penn Water Authority. An additional emergency connection exists with the North Wales Water Authority in Whitpain Township.

TREATMENT - SURFACE SUPPLY

Water enters a crib intake located in the south channel of the Schuylkill River. The crib was rehabilitated in 1998. One-half inch bar racks were added to replaced cypress wood timbers. Dual 36" intake pipes were installed with 4 x 1" chemical feed lines inside of 8" chemical conduits. The 36" pipelines are capable of delivering 18 mgd each to the treatment plant. The chemical feed lines carry Potassium Permanganate for disinfection and future lines are installed for polymer as Zebra mussel control. The intakes and chemical lines extend northward from the crib to the main treatment plant. They cross Barbadoes Island and the north channel of the Schuylkill River.

The dual 36" raw water pipelines deliver water to the raw water pump station situated on the north bank of the river. The station consists of two (2) screen wells, two (2) suction wells and three (3) pumps. One screen well is equipped with an automated traveling screen to remove debris and the other has stationary screens. Gravity flow from the pipelines may be directed to either screen well. A third 36" intake line also exists. It is interconnected to a flume off the north channel and the 36" pipelines from the crib intake. Provisions exist for permanganate and polymer treatment in this pipeline. Intake lines on both channels of the river allow for extra protection from pollution events.

The raw water pumps each have a capacity of 9.0 mgd each and are equipped with variable frequency drive units. The vertical pumping units extend into the suction wells in the raw water station and pump into a common discharge header. The 36" header and pipeline delivers water to the pretreatment building. Additionally, the header is interconnected back to the screen wells. This interconnection allows for reversing flows through either intake for cleaning and maintenance.

The pretreatment building houses hydrated lime, ferric chloride, blanket polymer, and powdered activated carbon chemical feed areas along with the solids removal units. Chlorine may be added in the building before or after coagulation mixing. Chlorine may also be added to the treated/settled water. Normal operation is to add potassium permanganate as the primary disinfectant when water temperatures rise above forty degrees and chlorine at lower temperatures. Lime is used for alkalinity addition and pH control, ferric chloride as the primary coagulant for solids removal along with a coagulant aid polymer. The treated water flows through an in-line static mixer to a mechanical flocculator. The flocculator has a variable speed mixer with a chemical application point for powdered activated carbon for taste and odor control. Water leaves the flocculator through a series of splitters. The splitters divide the flow evenly for each of the four (4) Super Pulsators. In each splitter box, blanket control polymer and pre-chlorine application point exist.

The mixed water flows from the splitter boxes into the top of the vacuum chamber in the middle of each of four (4) Super Pulsators. Each Pulsator has a rated capacity of 4.5 mgd (18.0 mgd combined) under normal conditions or 6.0 mgd with one unit out of service. Water in the vacuum chamber is lifted by a continuously operated vacuum pump. Lifting is controlled by a valve that opens and closes to atmosphere on a repeating timer. The lifting and dropping on the water is referred to as the "Pulse." This pulsing action provides additional mixing for coagulation, maintains sludge blanket uniformity, and sludge removal from the treatment units.

The water flows from the vacuum chamber to series of laterals in the bottom of the Super Pulsators. As water flows upward in the treatment unit, floc and solids collect in a sludge blanket. The blanket is held in the units with the aid of settling plates. The plates are located in the upper third quarter of the unit at an angle. Excess blanket or sludge, is directed to sludge hoppers along the side of the unit for automated removal. The clarified water exits the top of the unit into troughs. The troughs tie into a collector flume that is connected with a combined clarified water trough. In the combined trough, chlorine and caustic soda can be added prior to filtration.

A 60" filter influent pipe is used to carry the combined clarified water into post filter chemical building. The pipe supplies water by gravity to filters numbered 1 - 7. Each filter has a rated capacity of 3.0 MGD. All filters have a mixed media filter bed with 36" of GAC. The granular activate carbon is used to help combat taste and odors commonly produced by water from the Schuylkill river. Water that passes through each filter drops directly into a 36" combined filter effluent line. The filters are equipped with electrically operated butterfly valves. Each filter has one valve each for the 24" influent, 14" effluent, 24" wash water, 24" drain, 16" rinse, and 10" air wash lines. Water flows through the combined filter effluent line into the transfer clearwell located underneath the post chemical filter building. Combined filtered water is treated with chlorine prior to entering the transfer clearwell. Chemical feed lines for caustic soda application are also available.

The transfer clearwell has a volume of 0.360 MG. Water flows from the transfer clearwell into separate pump sumps. The two sump areas allow maintenance to take place while the keeping the plant in operation. Three variable speed pumps take suction from the transfer

clearwell sump area and flow into the distributive clearwell. Each pump has a capacity of 9.0 MGD. Chlorine and Caustic application feed points are available on the transfer pump discharge line.

The distributive clearwell has a capacity of 2.45 MG and is split into a west and east bay. Each bay has series of baffle walls to control the flow of water and prevent short circuiting in the basins. Ammonia can be added to the water as it enters the east bay. The ammonia combines with the free chlorine to form chloramines. The clearwell application point is used typically in the summer months. Water leaving the basin through the distributive pump suction header is treated with caustic soda, ammonia, and zinc-orthophosphate. Chlorine can also be added. The caustic soda is used for final pH control as part of the corrosion control plan. The zinc-orthophosphate is also added for corrosion control in the distribution system. The ammonia is normally applied in the pump header.

The high service pump suction header is located on the east end the distributive clearwell in the distributive pump station. Four pumps rated at 4,8,8, and 6 MGD discharge finished water into the Norristown distribution system. From the plant, water is conveyed through transmission lines ranging from 16" to 36". The 16" pipeline transmits water the west while the 36" pipe is connected to a 24" and 30" pipe. Each pair of high service pumps are rated at 6.0 MGD and 8.0 MGD. The entire plant has a reliable rating of 18 MGD.

A 336,000 gallon wash water tower provides wash water for the plant filters. The tower refilled by a 3.8 or 15.0 MGD pump. The later pump is capable of providing enough wash water in the event the tower is out of service. Washwater is collected in two wastewater clarifiers and clear water from the clarifiers is recycled back to the raw water intake building. Solids are collected in a third tank called a sludge thickener.

DISTRIBUTION STORAGE

Finished water storage in the distribution system totals 9.77 MG. This is provided by the two DeKalb towers at 2.8 MG each, Curren Terrace elevated tower 0.25 MG, East Norriton tower 2.0 MG, West Norriton tower 0.5 MG, Church Road elevated tower 1.0 MG and Evansburg Tank 0.42 MG.

DISTRIBUTION

The Norristown distribution system operates on six (6) primary system gradients. The Norristown Main Service, Bridgeport Main Service, Suburban Main Service - DeKalb, Suburban Main Service - Forrest, Suburban High Service- Church Road, and the Perkiomen System. A total of eight booster stations are situated throughout the distribution system.

The Norristown Main Service gradient is supplied by the treatment plant and serves mostly Norristown and portions of West Norriton and Plymouth Township. Water from the plant is pumped to the DeKalb tanks which float on this gradient.

The Bridgeport Main Service is served by the Swede Street Relay station. It takes suction from the Norristown main service and supplies water to the borough of Bridgeport and the Bridgeport Booster. The Bridgeport booster takes suction from this gradient and serves a small elevated part of Bridgeport Borough and a portion of Upper Merion Township.

The Suburban Main Service - DeKalb is served by the DeKalb booster station. The station supplies water north and west of the Borough. The pumps take suction from the DeKalb reservoirs and deliver water to the East Norriton tank. The tank floats on system pressure. The gradient also supplies water to three minor gradients. The Belfry and Bluebell boosters are small underground stations that deliver water to higher elevations in Whitpain and Whitemarsh Township. The New Hope PRV delivers water to the Norristown High Service and the Curren Terrace elevated tower. This system serves portions of Plymouth Township and Norristown Borough.

The Suburban Main Service - Forrest is served by the Forrest Avenue booster station. The booster takes suction from the NMS and deliveries water to the western and southern parts of the service area. Water is supplied to the West Norriton tank which floats on this system. Portions of Lower Providence, East and West Norriton townships and Norristown borough are served. Both Suburban Main Service gradients are interconnected.

The Suburban High Service is served by the Providence booster station. The booster takes suction from the West Norriton Reservoir and supplies water to the Church Road elevated tank and the Montgomery County Prison Farm elevated tank. The gradient serves portions of Lower Providence, Worcester, East and West Norriton Townships. A PRV Station located along Germantown Pike reduces pressures to customer in the far western portion of Lower Providence Township.

The Perkiomen system is served by a pipeline from the Suburban High Service via the PRV along Germantown Pike. The Evansburg Booster station pumps water from the Meyers Road tank into this system. The tower is refilled by the pipeline and water is retreated to boost the chlorine residual at the Evansburg Rechlorination station along the pipeline.

WASTE WATER FACILITIES

Two wastewater clarifiers with 378,000 gallon capacity each are used to process filter backwash water. Filter rinse water is sent directly back to the raw water pump station. Solids are allowed to settle in the clarifiers and supernatant is decanted to the raw water intake sump and retreated. Solids from the bottom of the clarifier are pumped into the sludge thickener. The thickener has a capacity of 250,000 gallons. Solids from the Super Pulsators are also sent directly to the thickener where they settle out. Supernatant from the thickener flows into the wastewater clarifiers. Sludge from the thickener is pumped to the Residual Dewatering Building. Residuals are dewatering by two (2) centrifuges rated at 10,500 dry lbs per day each. Dewatering materials are stored in 30 cubic yard dumpsters located underneath the presses. Filled dumpsters are hauled away to a PADEP approved recycling center where the material is blend with other

soils and reused. In the event of a breakdown with the presses, liquid residuals can be pumped into tankers for disposal at a PADEP approved land application site.

OLWEN HEIGHTS WATER

The Olwen Heights Water System of Pennsylvania-American Water Company supplies potable water for domestic and municipal use for 175 residential customers in Roaring Brook Township, Lackawanna County.

SOURCE OF SUPPLY

Olwen Heights is a groundwater system that consists of three wells, Well #1 permitted for 60 gpm (86,400 gpd), Well #2 permitted for 45 gpm (64,800 gpd), and Well #3 permitted for 90 gpm (129,600 gpd).

WATER TREATMENT

The Well #1 treatment building is a small concrete building constructed in the 1960's. Raw water is pumped directly into the treatment building where sodium hypochlorite is used for disinfection. The water then flows to 1,200 gallon chlorine contact tank. Well #1 is metered and controlled by the pressure in the distribution system.

The Well #2 treatment building is a small brick and concrete building, partially buried, and constructed in the 1960's. Raw water is pumped directly into the treatment building where sodium hypochlorite is used for disinfection. The water then flows to two 554 gallon chlorine contact tanks. Well #2 is metered and controlled by the pressure in the distribution system.

The Well #3 treatment building is a small concrete building constructed in the 1960's. Raw water is pumped directly into the treatment building where sodium hypochlorite is used for disinfection. The water then flows to the 100,000 gallon storage tank. Well #3 is metered and controlled by the elevation in the storage tank.

DISTRIBUTION STORAGE

Distribution storage is provided by a 100,000 gallon storage tank.

DISTRIBUTION

The original distribution system consists of approximately 16,000 ft of 2 and 2 1/2-inch pipe installed in the 1970's with some 6 and 8 inch installed in 2007. The system operates on two pressure gradients; the average pressure in both gradients is 50 psi. There is an emergency pump station that can pump water from the lower to higher pressure gradient when required.

PAINT TOWNSHIP WATER

The Paint Township Water System of Pennsylvania-American Water Company supplies potable water for domestic and fire protection use for 37 customers in Paint Township, Clarion County.

SOURCE OF SUPPLY

Paint Township water is interconnected to Pennsylvania-American Water Company's Clarion System.

DISTRIBUTION

The distribution system is fed from the Pennsylvania-American Water Company's Clarion System. The distribution system consists of approximately 19,000 ft. of 12" DICL pipe and 2,500 ft. of 8" DICL pipe. There are 17 fire hydrants in the system.

PENN WATER

The area served by the Penn Water District is approximately 10.0 square miles and serves a population of approximately 31,697. This water system is divided into eight (8) pressure zones. Water can be transferred from one zone to another via pumps or automatic flow control pressure reducing stations.

SOURCE OF SUPPLY

Zone I source of supply include Wells No. 12, 13, and 16, 18, and pumps to two 500,000-gallon ground storage steel reservoirs (Mountain Tanks 1 & 2) located adjacent to Well No. 13 on the north slope of Grings Hill.

The Blanton Booster Station creates the pressures in Zone II. The booster station is located adjacent to the two 500,000 gallon reservoirs (Mountain Tanks 1 & 2) discussed in Zone I above. The booster station utilizes the storage tanks as suction reservoirs and has the capabilities to pump water to higher elevations on Grings Hill. Also can provide water to the 250,000-gallon storage tank (Grings Hill Tank) in Zone III. This booster station consists of three pumps with a combined capacity of 850 GPM, a hydropneumatic tank, and a diesel powered emergency generator to provide continuous service in the event of a power outage.

Zone III receives water supplies from Well No. 23 and the Blanton Booster Station pumping to the 250,000 gallon steel storage tank (Grings Hill Tank) located on the ridge of Grings Hill. The water pumped from the hydroconstant pump, which is housed in the new Regulating Station, provides water to the higher elevations of Grings Hill.

Zone IV covers the Shiloh Hills development located in the southeast portion of the service area. This zone is provided service by the Shiloh Hills Booster Station, which boosts the water and pressures from Zone III to the customers in Zone IV. The booster station consists of three pumps with a combined capacity of 1,000 GPM, a hydro-pneumatic tank, and a diesel powered emergency generator to provide continuous service in the event of a power outage.

Zone V receives water supplies from Wells No. 19, 20, 21 and recently developed Well 28 pumping to a 400,000 gallon elevated spheroid tank (Wyomissing Hills Elevated Tank) located on Grandview Boulevard in Wyomissing Hills. The Stief Farm pressure-regulating valve located on Columbia Avenue at Huron Boulevard also transfers water to this zone from Zone I, and water purchased from Western Berks Water Authority at a connection on State Hill Road also provides water to this zone when required in an emergency.

Zone VI pressures are regulated by the 570,000-gallon steel storage tank (Wyomissing Hill Low Tank)located adjacent to the Wyomissing Hills 400,000 gallon elevated spheroid tank on Grandview Boulevard. Water is supplied to this storage tank from Zone V through a pressure-regulating valve located in the Wyomissing Hills Booster Station and from Zone I through a pressure-regulating station located on Shillington Road, between Hiester Avenue and Spohn Road.

The Wyomissing Hills Booster Station is located adjacent to the 400,000 gallon elevated tank (Wyomissing Hills Elevated Tank) and the 570,000 gallon ground storage tank (Wyomissing Hills Low Tank). In addition to having a pressure-regulating valve for transferring water from Zone V to Zone VI, the station has three booster pumps to transfer water from the ground level tank to the elevated tank (Zone VI to Zone V). The booster station consists of three pumps with a total capacity of 825 GPM and pressure sensing automated controls between the elevated tank and the wells and the Stief Farm valve. In addition through Cushion Peak Regulating Station, Zone V can be supplemented by Zone VIII when PSI drop to a set point.

Zone VII, located in the northern region of the service area, consists of two pressure regulating valves, supplying water to a 1.0 million gallon storage tank (Spring Ridge Tank) located in the Spring Ridge Development. The two pressure regulating valves, one located on Broadcasting Road at Westview Drive and the second valve located on Van Reed Road at Village Drive, transfer water from Zone V to this Zone VII.

Zone VIII was created in 2003 and consists of a booster station with 225 GPM pumping capacity and the Cushion Peak 500,000 gallon steel tank located in the southwest portion of the service area.

PITTSBURGH

The Pittsburgh operation serves the 29th, 30th, 31st and 32nd Wards and portions of the 16th, 18th, 19th, 20th and 28th Wards of the City of Pittsburgh. The Boroughs of Baldwin, Bethel Park, Brentwood, Bridgeville, Carnegie, Castle Shannon, Crafton, Dormont, Dravosburg, Finleyville, Green Tree, Heidelburg, Homestead, Ingram, Jefferson, Munhall, Mount Oliver, Oakdale, Pleasant Hills, Rosslyn Farms, Thornburg, West Homestead, West Mifflin, Whitaker and Whitehall. The Townships of Baldwin, Collier, Scott, South Fayette, South Park, Union and Upper St. Clair; the Municipality of Mt.Lebanon, and portions of Cecil, Peters, Robinson and Nottingham Townships. The estimated population served is over 360,000.

SOURCE OF SUPPLY

Raw water is taken through two intakes along the Monongahela River. The Becks Run Intake is located about 4.5 miles upstream from the confluence of the Allegheny and Monongahela Rivers at the Pittsburgh Triangle and the E.H. Aldrich Intake is located about 21 miles south of the Becks Run Intake and further upstream near the Allegheny/Washington County line.

In addition to the Hays Mine and E.H. Aldrich facilities, there is a stand-by connection with the Pittsburgh Water and Sewer Authority. The connection between the Company and the Authority is able to provide a supply of water between 4 mgd and 12 mgd to the distribution system. This connection is utilized by pumping water through our Mt. Washington Booster Station.

The intake structure at Becks Run Station consists of two passive barrel type raw water intake screens with air burst that supply two 42-inch raw water lines that deliver water by gravity to a 72-inch suction header. This suction header, which is located at the bottom of the Becks Run pump station, provides suction to four (4) 20 mgd vertical turbine raw water pumps for a reliable capacity of 60 mgd. The raw water is delivered from the Becks Run Station to the Hays Mine purification facility, located about two miles southeast from Becks Run Station, via a number of raw water transmission mains. A 42-inch ductile iron line extends to a valve nest at Becks Run Road and Bajo Street and thence continues as three 24-inch cast iron lines to a valve nest at Becks Run Road and Agnew Road, adjacent to Hays Mine Pumping Station. From this point the three 24-inch mains converge with connections to two 48-inch prestressed concrete cylinder lines leading to the degritting tank. The fourth line from Becks Run Station is a 36-inch prestressed concrete cylinder pipe and ties in directly to the 48-inch lines.

At the E.H. Aldrich Station, raw water is taken from the Monongahela River and processed in a like manner as the Hays Mine facility. The inlet portion is provided with a roughing bar rack, the center portion with two traveling screens and the third section contains a chamber that serves as low-service suction well. Polymer and potassium permanganate additions can be made at this point. Five vertical turbine-type pumping units are installed with a total capacity of 70.3 mgd. All pumps discharge into a single header that is connected to a 42-inch prestressed concrete cylinder raw water transmission line.

TREATMENT

In 1990, three superpulsators were installed at the Hays Mine Station for the purpose of treating the water. The superpulsators are the latest technology in water treatment and give the plant a nominal treatment capacity of 60 mgd. The water from the degritting tank flows through two 54-inch prestressed concrete pipes through the mixing vault where the treatment chemicals are added. The chemicals utilized for the treatment are caustic soda, ferric chloride, sodium permanganate, cationic polymer and powdered activated carbon. After the addition of the chemicals, the water passes through a rapid mixer for even dispersion of the chemicals into the raw water. The 54-inch lines then continue to the weir box at the entrance to the three superpulsators. At the weir box, the water is evenly divided and dispersed to the treatment units. In the treatment units, the entire treatment process takes place. This includes flocculation, sedimentation, and clarification. From the superpulsators, the water is distributed to the 40 granular activated carbon filters at the plant by the way of three 48-inch connections. The units are so designed that any one unit can be taken out of service for maintenance and the flow rates through the plant can be maintained.

From the filters, the water flows to the collection clearwells where post-treatment chemicals are added. These chemicals include sodium hypochlorite (generated on-site from sodium chloride), fluoride and a corrosion inhibitor. The water then flows to the two primary clearwell tanks where aqua-ammonia is added after the clearwells to form chloramines before it is pumped to the distribution system.

The E.H. Aldrich facility consists of eight Aldrich purification units, a control building, two steel standpipe wash water tanks, a chemical application room and slurry activated carbon storage bins.

The control building houses the chemical storage tanks with feed and pumping equipment, the central control room for the purification and pumping facilities, the high service and wash water pumps and emergency generating equipment. A separate chemical feed building houses storage and feed equipment for the on-site generation of sodium hypochlorite and aqua-ammonia.

Water from the purification units flow by way of a 60" pipeline to a 4.2 M.G. clearwell basin located directly across Elrama Road from the control building. Water from this clearwell flows to a smaller clearwell with a capacity of .95 M.G. located below the ground floor level of the control building. The high service and wash pumps take suction from this clearwell.

All eight Aldrich purification units are identical. Each unit is a covered basin and is comprised of three concentric steel shells mounted on a concrete base. The central portion is equipped with a type "W" Dorr-Oliver Hydrotreator, having four arms, two of which are equipped with residue rakes to convey settled residue to a well from which it is blown off to waste. The influent pipe is located below the tank bottom and connects to the central riser pipe, from which the distributing arms are suspended. From the settling compartment, the water flows

over a weir into the filter compartment. The filter has a width of 6 feet 6 inches and extends around the periphery of the tank shell. The media used in these filters is granular activated carbon. The third and smallest ring forms the drain trough for collection of backwash water and draining the outer portion of the unit.

The 42-inch raw water transmission main enters the station at the chemical feed room. At this point ferric chloride, caustic soda, sodium hypochlorite and activated carbon are added as needed. The chemically treated water then flows on through the 42-inch pipe to the valve houses, from which it is distributed to the eight Aldrich purification units through 20-inch lines. After filtration, the water passes through a rate controller and flows to the clearwell. Additional chemical treatment includes provisions for post sodium hypochlorite, caustic soda, hydrofluosilicic acid and a corrosion inhibitor that is added to the filtered water inlet of the clearwater basin. Aqua ammonia is added to the final clearwell near the pump suctions to form chloramines before it is pumped to the distribution system.

Five high service pumps are located in the control building with a total rated capacity of 70 mgd.

DISTRIBUTION STORAGE

There are six steel reservoirs located at various locations, they are: Shire Oaks No. 1, Shire Oaks No. 2, Rocky Ridge No. 1, Rocky Ridge No. 2, Rocky Ridge No. 3, West Mifflin. Two steel elevated tanks are located at Castle Shannon and Green Tree. There are two steel standpipes at Finleyville: Finleyville No. 1, and Finleyville No. 2.

DISTRIBUTION

The Hays Mine Pump Station is located on Becks Run road approximately 200 yards from the Hays Mine Treatment Plant. Four (4) 20 mgd horizontal centrifugal pumps provide a reliable pumping capacity of 60 mgd..

The Shire Oaks Relay station is located one mile west of the E.H. Aldrich facility. The station consists of two 5 mg ground- level storage tanks and a building housing five horizontal centrifugal pumping units with a rated capacity of 70 mgd. A 48- inch transmission line from the E.H. Aldrich station connects the relay station tank. The pumps take suction from the storage tanks and relay the water into the distribution system through two 48-inch prestressed concrete cylinder lines.

There are also eight booster stations throughout the system located at Morton Plan, Gladden Heights, Rocky Ridge, South Fayette, Pinkerton, Thornburg, Rosslyn Farms and Mount Washington. A series of PRV Stations serve the lower elevations areas along the Chartiers Valley and the greater Homestead area.

WASTE WATER FACILITIES

At the E. H. Aldrich Station, all of the treatment residue which consists of backwash water, solid blowdowns, and any treatment unit draindowns, all collectable in a 750,000 gallon capacity clarifier. The solids are settled out and drawn off at the bottom of the clarifier and pumped to one of the two lagoons for further drying. The supernatant is drawn off at the top of the clarifier and returned to the river under the guidelines of our existing NPDES permit.

This beneficial use of our dried residue was made possible by having the material de-wasted by the Pennsylvania Department of Environmental Protection.

At the Hays Mine Station, waste water treatment facilities include a back wash water holding tank where the backwash is collected and pumped to two clarifiers on Madeline Street. At the clarifiers, the heavier material is settled out and pumped to the gravity thickeners. The supernatant from the settled water is then recycled through the plant treatment scheme. Residue sediment from the de-gritting tank is also pumped to the gravity thickener. Once the residue has been thickened, it is stored in a holding tank. From the holding tank, the residue enters the transfer pump station and is pumped to the solids dewatering building.

At the solids dewatering building, facilities are in place for the addition of polymers to aid in the dewatering of the residue. Also located at the dewatering building are four belt presses. The residue treated with the dewatering polymers is introduced to the belt presses and the water content of the residue is reduced. The residue then travels on a conveyor and is deposited in one of four receiving bins on the lower level of the building.

The dried treatment residue is then transported to a holding area where the contractor will either directly apply the material or blend in topsoil to utilize the material for topsoil purposes. The residue at this facility has also been de-wasted the same as the E.H. Aldrich material.

OFFICE FACILITIES

An office to support the operational activities for administrative, engineering, design of new construction facilities for all customers in the Pittsburgh area is located in McMurray.

Bethel Park Distribution Center contains an office, shop and garage area and is located in the Municipality of Bethel Park. The installation of mains, hydrants and services as well as maintenance and repairs to the distribution system are performed from the location.

The Meter Department located in the Borough of Mt. Oliver handles meter reading, customer service work, meter testing and repair work.

POCONO

The Pocono system serves customers residing in Mount Pocono Borough and Coolbaugh Township, Monroe County. The service territory currently consists of the following developments a Pocono Country Place, Pocono Farms East, Pocono Farms, Pine Hill, Summit Pointe, Stillwater Lake Estates, Lexington Woods, the Village of Tobyhana and Mt. Pocono Borough. The estimated population served is 22,250.

SOURCE OF SUPPLY

The six (6) distribution system zones within the service territory are supplied by nine (9) primary and seven (7) stand-by wells.

The main service gradient serves approximately 40 percent of the Pocono Country Place development. Supply is from one well located in section C of Pocono Country Place. This site is referred to as well #2. Average flow from this well is 400 GPM. Supplemental supply through a 4" control valve from the Victoria Circle gradient.

The high service gradient serves approximately 40 percent of the Pocono Country Place and receives its supply from the supplemental supply wells located in section J&K of Pocono Country Place referred to as well #3 and #4. Average flow from each of these wells is 100 GPM.

The Victoria Circle gradient is supplied by the Coolbaugh Township well, the Office Well and Well #7 in the Pocono Farms Development. This gradient includes 20% of Pocono Country Place, Pocono Farms, Pocono Farms East, Pine Hill and Tobyhanna Village. Average flow from Coolbaugh Twp and Well #7 is 500GPM and 250GPM respectfully. A new well was activated in 2008 at our field office. It is an 8 inch diameter well drilled 900' deep with a capacity of 150 gpm.

The Pocono Mt. Industrial Park well is the primary supply for the Industrial Park, Stillwater Lake Estates, Summit Pointe, and Borough of Mt. Pocono gradients. Average flow from this well is 240 gpm. Pine Hill Well and Summit Pointe well also serve this gradient. Average flow from each is 40 GPM and 60GPM respectfully.

Lexington Woods is a development acquired in 2006. It consists of 57 customers served by Well#1 and Well #2. The wells are pressure controlled off of hydroneumatic tanks. Well #1 and #2 produce 10GPM and 20GPM respectfully. This system was interconnected with the Victoria Circle tank gradient in 2009. After the interconnection was completed, Well #1 and Well #2 were put in stand-by status. Supply for this development is through a 2" by 8" prv vault installed during the interconnection.

TREATMENT

Separate treatment facilities are used at each well site. The treatment structures are equipped with SCADA analyzing equipment, and all necessary safety and containment equipment. All processes of treatment are automatically controlled and monitored at the PAWC operations center.

Chemical treatment includes chlorine caustic soda, and a corrosion inhibitor.

DISTRIBUTION

Well #2 in the Pocono Country Place main service gradient pumps directly into the distribution system. Supplemental supply from the high service gradient to the main gradient is available through a 3" pressure-reducing valve that allows water to flow by gravity. Pipelines to the Victoria Circle gradient interconnect this main gradient.

Wells #3 and #4 in the Pocono County Place high service gradient pumps directly into the distribution system. Primary supply is provided from the Country Place Drive Booster Station, which delivers water from the main gradient via two .232 MGD pumps.

Primary supply to the Pocono Farms East area is through a (2) 2" PVR's from the Victoria Circle gradient.

The well in the Pocono Mountain Industrial Park pumps directly to the Industrial Park Tank.

The Pine Hill system has a lower gradient controlled by the Pine Hill regulator on Edgewood Road.

DISTRIBUTION STORAGE

The main service area contains a .49 MG storage tank located on Country Place Drive.

The Pocono Country Place high service area has an elevated 400,000-gallon tank located in section L of Pocono Country Place.

Storage within the Industrial Park consists of the 100,000-gallon Pocono Mountain Industrial Park Tank, and 108,000 gallon Pine Hill tank. Storage for the Pine Hill zone, PFE, Pocono Farms, and Tobyhanna areas is provided by the Victoria Circle 500,000 gallon elevated tank.

Pocono Mountain Lake Forest Community Association

Pocono Mountain is most proximate to PAWC's Marcel Lakes (Silver) system. The system supplies potable water for domestic use for 63 customers in Delaware Township, Pike County.

SOURCE OF SUPPLY

Pocono Mountain is a groundwater system that consists of two wells, Well #2 and Well # 3, both permitted for 144,000 gpd each. Well #2 drilled to 609 ft with 42 ft of casing and Well #3 drilled to 804 ft with 50 ft of casing

WATER TREATMENT

Raw water is pumped directly into the treatment vault where sodium hypochlorite is used for disinfection. The water then flows to a 55,000 gallon storage tank. The wells are metered and controlled by the tank level. The treatment building has an emergency generator.

DISTRIBUTION

The distribution system is fed by service pumps from the 55,000 gallon tank and is comprised of primarily 4-inch plastic pipe. The system operates on one pressure gradient with an average pressure of 50 psi. There are no fire hydrants in the system.

PUNXSUTAWNEY

The Punxsutawney area serves the Boroughs of Punxsutawney and Big Run, and portions of Bell, Gaskill, Young and McCalmont Townships. The estimated population served is 8,500.

SOURCE OF SUPPLY

The sources of supply that are used include the East Branch of the Mahoning Creek, and three operating wells at the filtering plant and pumping station. The East Branch is pumped into a settling basin near the filter building as does the supply from the wells.

TREATMENT

Hydrated lime, ferric chloride, and chlorine are introduced into a rapid mix chamber and are controlled automatically by a pH analyzer, and chlorine residual analyzer, respectively. Provision is also made to feed potassium permanganate at this location if necessary. Water then passes to the flocculating chamber and through the sedimentation basin. Settled water is pumped by low service pumps to four filters which have a combined capacity of 1.76 mgd.

Chlorine and a corrosion inhibitor are introduced to the filtered water in route to the clear well tank; this is controlled automatically by a chlorine residual analyzer and by flow-pacing.

The ferric chloride is fed into the rapid mix chamber by metering pumps that are preset, one pump for surface water and one pump for each of the wells.

DISTRIBUTION

Two variable speed vertical pumps provide service at the treatment plant provide service to the Punxsutawney main gradient where a 2,000,000 gallon covered reservoir maintains storage. The North Main St. booster delivers water to the 300,000 gallon Adrian Hospital Tank and the Anita booster delivers water to the 200,000 gallon Anita tank. The South Main, Rockland Avenue and Fairview boosters all deliver pressure to higher elevations in the surrounding areas.

WASTE WATER FACILITIES

Filter backwash flows by gravity to a wastewater holding tank where the solids are allowed to settle before the clear supernatant is returned to the stream. Settled sludge from the wastewater holding tank and settling basin is pumped into a drying bed located on the plant property. The sludge is allowed to dry and the de-wasted material is removed and is typically land applied as a soil amendment for beneficial use.

ROYERSFORD / HOME

SOURCE OF SUPPLY

The Home Water District is divided into ten pressure zones. Zone I receives water supplies from Well No.4 and the Shady Lane Water Treatment and Filtration Plant pumping to the 3.0 million gallon lined concrete storage tank with floating cover located on Dunlap Road, and Wells No. 1 and No. 3 and the Second Avenue Booster Station pumping to the 400,000 gallon elevated spheroid tank located in Mingo Village. The overflow elevations of the Dunlap Road. Reservoir and the Mingo tank are almost identical thereby creating a large pressure zone.

Zone II receives water supplies from Wells No. 1 and No. 3 and the Second Avenue Booster Station pumping to the 400,000 gallon elevated spheroid tank located in Mingo Village.

Zone III receives water supplies from the Mennonite Road Booster Station and the Sowers Avenue Booster Station pumping to two 1.5 MG Standpipes located on Black Rock Road. The Mennonite Road Booster Station transfers water from Zone I to this Zone III; the Sowers Avenue Booster Station transfers water from Borough of Phoenixville's water system to this zone and the Norristown/Royersford Interconnect #2 transfers water from the Norristown District to this zone.

Zone IV is pressurized by the Limerick Booster Station located on Lewis Road and the Norristown Interconnect #1 Pump Station on Township Line Road and Bartlett Drive, both stations pumping to Limerick Tank II, a 750,000 gallon elevated tank located on Swamp Pike Road at Ziegler Road that was placed in service April 30, 2002. The Norristown Interconnect #1 pumps water from the Norristown System in Perkiomen Township to Limerick Tank II to supplement the Home Water System in Limerick Township. The Limerick booster station utilizes the 1.0 MG Limerick storage tank located on the same parcel as a suction reservoir and pumps water from Zone I to this Zone IV. The storage tank is equipped with an altitude valve and stores water from Zone I.

Zone V consists of water purchased from the Borough of Phoenixville at two metering locations and distributed to customers in the East Pikeland Township area of the certificated area. Pressures and flows in this area are provided from the Phoenixville system.

Zone VI is the East Pikeland water system. This system consists of Well EP-1 pumping to a 200,000-gallon steel standpipe, from which the booster station draws and pumps water into the distribution system and the Terry Lane Station which was upgraded in 2006 to provide additional service to parts of East Pikeland Township.

Zone VII is also a closed system created in February 2000 with the start-up of the Royersford Road booster station to provide expanded service to an area of higher elevations in Upper Providence Township.

Zone VIII is also a closed system created in 2003 with the start-up of the Black Rock Road booster station to provide expanded service to an area of higher elevations in Upper Providence Township.

Zone IX is also a closed system serving an area of lower elevations in Upper Providence Township through an in line PRV vault that is supplied by Zone III.

Zone X is also a closed system created in 2005 with the star-up of the East Coventry booster station located at Rhinehart Road to provide expanded service to an area of higher elevations in East Coventry Township.

The District's primary source of water supply is the Schuylkill River. The raw water intake and treatment plant are located on the west bank of the river in East Vincent Township, Chester County. In 1971, the Company began the construction of four drilled wells to augment the river water supply. Three of the four wells (Well Nos. 1, 3 and 4) were adequate producers.

In 1972, the drilling of Wells No.1 and No.3 was completed. Well No. 1, located at Thomas and Mingo Road in Upper Providence Township (Roboda development) was placed in service in 1973. Well No.3 is located approximately one-half mile from Well No. 1 near Vaughn Road and Sixth Avenue (Fords Edge development) and water began entering the system from this well during the latter part of 1975. Well No. 4 is located on Schuylkill Road in East Vincent Township approximately one-half mile from the Dunlap Road reservoir. The well was placed in service in 1974 to supplement the supply to the 3.0 million-gallon reservoir.

TREATMENT

The treatment plant is located in a stone masonry building constructed in 1917. In addition to routine improvements made to the complex from time to time, a chemical feed house was constructed in 1929 and an attached garage and storage room were renovated in 1971. A paved driveway was added in 1972, and an enclosed chlorine room was added in 1976.

The treatment plant pumps finished water through a 16 inch cast iron transmission main to the 3.0 million gallon Dunlap Road distribution reservoir, located about one half mile from the treatment plant. The Dunlap Road reservoir is constructed of reinforced concrete in partial excavation and partial embankment with a liner and cover system installed in 2015. The reservoir is separated into two equal halves by a concrete wall, which was increased, to the full height of the reservoir in 1961. A small block storage/telemetry building is located at the reservoir site.

DISTRIBUTION

The well house structures for Well No.'s 1 and 3 are of masonry construction, designed to conform to the general architecture in the surrounding area. Each building houses a turbine pump, associated piping and equipment, and chlorinating equipment. At each well, the chlorinated water enters a 10,000-gallon chlorine detention tank from which it enters the distribution system. Well No. 4 consists of a turbine pump mounted on an elevated steel platform above the 100-year flood plain. This well is operated from the Shady Lane Treatment Plant where it is also chlorinated en route to the Dunlap Road Reservoir.

In 1974, the Company completed construction of a 400,000-gallon capacity elevated spheroid tank located in the Village of Mingo, Upper Providence Township. Also in 1974, a booster pumping station and 1.0 million-gallon ground level storage tank located on Lewis Road were constructed to meet the increasing system demand in Limerick Township. The modern masonry building at the Limerick booster station houses three electric high service pumps with a total capacity of 1,500 gpm, a 1,500 gpm diesel engine pump for emergency use, and a pneumatic pressure tank.

In 1981, Citizens Home acquired a satellite water system in a development known as "Merlin Hills", which is located off Merlin Road in East Pikeland Township, Chester County. The distribution system was extended in 1989 to provide service to additional homes in the Carriage Hills Development. In 1991, the system was again extended to include the Village of Kimberton and the residential development of Kimberbrea.

The well house structure is of masonry construction, designed to conform with the general architecture in the area. The building houses a 150-gallon per minute submersible pump, a pneumatic pressure tank system with associated piping and equipment, and chlorinating equipment. In 1991, the station was upgraded to include three electric high-service pumps with a total capacity of 1,150 gpm and an emergency generator.

A 200,000-gallon suction reservoir was constructed in conjunction with the improvements to the well station discussed above to serve the Merlin Hills and the Kimberton areas. This facility is located on Beacon Drive, and was placed in service in September 1991.

In 1986, the Company entered into an agreement with the Borough of Phoenixville to purchase water through an interconnect located on Camp Council Road to serve various developments in East Pikeland and Upper Providence Townships. In 1989, the increased demand brought on by the Kimberton Knoll and Powder Mill developments in East Pikeland Township necessitated another interconnect with the Borough of Phoenixville, which is located on Pothouse Road.

In 1991, another interconnect with the Borough of Phoenixville became operational through construction of the Sowers Avenue Booster Station located in Upper

Providence Township. This masonry building houses three high service electric pumps with a total capacity of 750 gpm. In 1991, two 1.5 million-gallon storage tanks were constructed on Black Rock Road. Water is pumped from the Sowers Avenue Booster Station to the tanks to serve new developments and industry in the Mont Clare, Oaks, and other portions of Upper Providence Township.

In 1991, a 5,000 square foot storage garage was built on South Limerick Road, next to the booster station, to be used as a warehouse and operations center for service personnel.

In 1992, a booster station was constructed on Second Avenue, which houses three high service pumps with a total capacity of 1,800 gpm and a diesel engine emergency generator. Water from the booster station is pumped to the Mingo elevated tank for distribution.

In 1992, a booster station was constructed on Mennonite Road in Upper Providence Township that houses three electric pumps with a total capacity of 1,350 gpm. Water from this booster station is pumped to the Black Rock Road Storage Tank to assist in meeting the ever-increasing demand in the Upper Providence area.

In 1994 a Supervisory Control and Data Acquisition (SCADA) system was installed at the warehouse on South Limerick Road. The application of this new technology enables us to utilize our service personnel in a more efficient manner and to pinpoint system problems more rapidly, thus reducing expense and customer inconvenience.

From 1994 to 1999 The Company undertook major renovations and improvements to the treatment plant to increase its operating capacity from 2.0 MGD to 3.7 MGD. The major components of the construction consisted of:

- Replaced concrete intake structure with three (3) Johnson Screen inlets and a wet well.
- Replaced two 10" mains with a single 16" suction line
- Replaced raw water suction pumps and motors
- Replaced finished water pumps and motors
- Installed new static mixer.
- Restored concrete flocculation, coagulation and sedimentation basins and wooden baffles.
- Replaced filter beds and underdrain system
- Replaced flocculators
- Installed new sludge/vacuum collection system with lift station and 50 foot diameter sludge thickening tank.
- Replaced all chlorine and chemical feed systems and pumps and installed a new liquid alum tank
- Renovated plant laboratory and added streaming current detector and SCADA system for improved process control
- Replaced entire electrical system

- Constructed a new garage for storage of equipment and chemicals
- Installed security fence around plant facilities

In January 2000 the Company placed in service the Terry Lane booster station, located in Carrigan Village, Spring City. This booster station utilizes the Dunlap Road reservoir as a suction reservoir and consists of four pumps with a total capacity of 400GPM, a fire pump rated at 1500 GPM and a diesel powered emergency generator. This station is of brick construction and was constructed to provide service to the Windgate Farms development and surrounding areas in East Vincent Township. In 2011, this system was merged with the Merlin Hills system through the extension of a 12 inch main along Hares Hill Road in East Pikeland Township.

In February 2000 the Company placed in service the Royersford Road booster station, located in Upper Providence Township. This booster station consists of three pumps with a total pumping capacity of 575 GPM, a fire pump rated at 2000 GPM and a diesel-powered emergency generator. This station is of masonry construction and was constructed to provide service to the higher elevations in Upper Providence Township.

In 2003 the Company placed in service the Black Rock booster station, located in Upper Providence Township. This booster station was upgraded in 2016 and new consists of three pumps with a total pumping capacity of 400 GPM, a fire pump rated at 1500 GPM and a diesel-powered emergency generator. This station is of masonry construction.

In 2005 the Company placed in service the East Coventry booster station, located in East Coventry Township. This booster station consists of four pumps with a total pumping capacity of 420 GPM, a fire pump rated at 800 GPM and a diesel-powered emergency generator. This station is of masonry construction.

SCOTT TOWNSHIP

The Scott Township System of Pennsylvania-American Water Company supplies potable water for domestic and fire protection use for 6 commercial customers in Scott Township, Lackawanna County.

SOURCE OF SUPPLY

Scott Township is interconnected to Pennsylvania-American Water Company's Abington System as part of the Ivy line extension project.

DISTRIBUTION STORAGE

The system has a 565,000 gallon storage tank.

DISTRIBUTION

The distribution system contains approximately 4,800 feet of 8-inch Blue Brute pipe and 1,000 feet of 8-inch ductile iron pipe. The system operates on a single pressure gradient.

SCRANTON/CHINCHILLA

The Chinchilla area serves all or portions of North Abington, South Abington, and Scott Townships in addition to PAWC'S Abington District. The Scranton Area Water Purification Plant serves customers in all or portions of Archibald, Blakely, Dickson City, Dunmore, Jessup, Moosic, Old Forge, Olyphant, Taylor and Throop Boroughs, and Scranton City in Lackawanna County. The estimated population served is 140,000.

SOURCES OF SUPPLY

The water supply for the Scranton Area Water Purification Plant is taken from the Stafford Meadow Brook, Roaring Brook, and Little Roaring Brook supplies. The reservoirs, which comprise the Stafford Meadow Brook supplies, are Williams Bridge and Lake Scranton Reservoirs.

Williams Bridge Reservoir is a 337 Mgal supply reservoir having a drainage area of 5.2 square miles and a normal pool elevation of 1,358.78 feet. Williams Bridge Reservoir supplies water via stream overflow or discharge directly to Lake Scranton Reservoir.

Lake Scranton is a large 2.49 Bgal impoundment located on Stafford Meadow Brook just downstream of Williams Bridge Reservoir. The normal pool elevation of Lake Scranton is 1,281.23 feet. Lake Scranton has a drainage area downstream of Williams Bridge Reservoir of approximately 1.5 square miles. This drainage area is small compared to the size of the reservoir and is insufficient to supply the demands of the Scranton Area Water Purification Plant service area. Inflow into Lake Scranton, therefore, depends on water overflowing from the upstream Williams Bridge Reservoir and, more importantly, on water transferred from the Roaring Brook watershed through the Elmhurst/Lake Scranton transmission mains.

The reservoirs, which comprise the Roaring Brook supplies, are Dunmore No. 7, Elmhurst, Curtis, Hollister and Johnson's Pond. Water from the Roaring Brook supplies is transferred to the Stafford Meadowbrook supplies to augment the safe yield of reservoirs on those watersheds.

Hollister Reservoir, the most upstream impoundment on the main branch of Roaring Brook, has a total drainage area of approximately 11 square miles. Hollister Reservoir has a design capacity of 1,350 Mgal, but at the present time the impounded volume of water is temporarily maintained at 182 Mgal. Water is released from Hollister Reservoir into Roaring Brook and flows downstream to Elmhurst Reservoir.

Curtis Reservoir is a 418 Mgal supply reservoir with a 2.2 square mile watershed located on White Oak Run. Water from Curtis Reservoir is used to supplement inflow to Elmhurst Reservoir, which is located immediately downstream.

Elmhurst Reservoir is a 1.22 Bgal supply reservoir located on Roaring Brook in the town of Elmhurst. The spillway elevation is 1,420.81 feet. Including the drainage areas of the

upstream Curtis and Hollister Reservoirs, the total drainage area of Elmhurst Reservoir is 35.2 square miles. Water is delivered from Elmhurst Reservoir to the adjacent Stafford Meadowbrook watershed through two transmission mains, which parallel Roaring Brook from Elmhurst Reservoir to Dunmore No. 7 Reservoir and one transmission main, which continues to Lake Scranton Reservoir.

Dunmore No. 7 Reservoir is the most downstream impoundment on Roaring Brook and has a drainage area of approximately 14 square miles downstream of Elmhurst Reservoir. Dunmore No. 7 impounds 107 Mgal and has normal pool elevation of 1,054.17 ft. Dunmore No. 7 is a standby reservoir, whose supply is capable of being transferred to Lake Scranton via a pumping station at Dunmore No. 7 Reservoir.

Additional water can be supplied to the Roaring Brook watershed by interbasin transfer from the Lehigh River pumping station, which has a 6.0 mgd capacity and is located on the Lehigh River. The Lehigh pump is utilized only during extreme dry weather periods.

The supply reservoirs comprising the Little Roaring Brook supplies are Dunmore No. 1, Marshwood, Dunmore No. 3, and Dunmore No. 4 Reservoirs. The total drainage area of the lowest reservoir in the Little Roaring Brook system, Dunmore No. 1 Reservoir, is 2.7 square miles.

Dunmore No. 1 Reservoir has a total capacity of 75 Mgal and a normal pool elevation of 1,212 feet. Water is supplied to Dunmore No. 1 Reservoir from three upstream supply reservoirs: Marshwood Reservoir, 54 Mgal; Dunmore No. 3 Reservoir, 18 Mgal; and Dunmore No. 4 Reservoir, 10 Mgal. The pump station at Dunmore No. 7 Reservoir will also permit the transfer of raw water from the Little Roaring Brook supplies to Lake Scranton Reservoir.

The water supply for the Chinchilla Water Purification Plant is taken from Leggett's Creek. The major storage reservoir on Leggett's Creek is Summit Lake, a 210 Mgal supply reservoir on Summit Lake Creek, and Griffin Lake, a 526 Mgal supply reservoir on Leggett's Creek. Water is released from these two supply reservoirs into the stream channel, then picked up in small downstream intakes, LaRue and Griffin Creek Intake, and piped to the Chinchilla Water Purification Plant. The remaining supply reservoir, Maple Lake, is located on Summit Lake Creek between Summit Lake and LaRue Reservoirs.

TREATMENT

The Scranton Area plant is located adjacent to Lake Scranton Reservoir between the main spillway and dam structure. The plant has a rated capacity of 33.0 M.G.D. Water supply to the plant is provided by raw water pumping from Lake Scranton Reservoir.

The raw water is pumped from the source of supply directly to the plant where initial pre-chemical additions are made. Pretreatment chemicals include alum, lime, potassium permanganate and activated carbon. After pre-chemicals are added, the water passes through rapid mixing units consisting of three basins in series with mixers. The next step in the

treatment process consists of clarification units followed by granular media filtration. Filters are equipped for air/water washing.

After being filtered, water flows through the plant's clear well where many of the post treatment chemicals such as chlorine for disinfection, lime for pH adjustment, and polyphosphate for corrosion control are added before entering the 2 - 2.5 Mgal storage tanks on the plant site.

On the plant site are two lined earthen lagoons used to store filter backwash water and sludge from the plant's clarification processes. After the wastes have settled, the clear supernatant is discharged into the adjacent stream, in accordance with an NPDES permit.

The Chinchilla plant is located along Route 6 approximately one-quarter mile south of the town of Chinchilla, South Abington Township, and Lackawanna County. The plant has a rated capacity of 5 M.G.D. Water supply to the plant is gravity from either Griffin Creek Intake or LaRue Reservoirs.

The raw water is delivered by gravity from the sources of supply directly to the plant where initial pre-chemical additions are made. Pretreatment chemicals include alum, lime, potassium permanganate and activated carbon. After pre-chemicals are added, the water passes through rapid mixing units consisting of one in-line static mixer and then into flocculation units consisting of two basins with four staged horizontal reels. The next step in the treatment process consists of granular media filtration. Filters are equipped for water washing with surface agitation.

After being filtered, water flows through the plant's clear well where many of the post treatment chemicals such as chlorine for disinfection, lime for pH adjustment, and polyphosphate for corrosion control are added before entering the 2 - 1.0 storage tanks on the plant site.

DISTRIBUTION

Lake Scranton supplies water from 2 - 2.5 million gallon water storage tanks (overflow elevation of 1,274) through a 48-inch main from the south end of the impoundment through a tunnel. Lake Scranton water also flows into the through inter-system transfer points where it mixes with water from the Nesbitt supply. The .5 Mgal Austin Heights Tank provides storage on the gravity portion of the Lake Scranton system. At the southerly end of the tunnel, a 42" transmission main delivers filtered water from the Scranton Area Water Purification Plant through the Mill St. pumping and regulating facility to the areas formerly served by Dunmore No. 7, Dunmore No. 1 and Williams Bridge Reservoirs and Lake Scranton Pavilion. The normal hydraulic gradient of 1,079 for the Dunmore No. 7 service area is established by pressure regulation at the Mill St. facility. The No. 7 service area consists of areas of low elevation bordering the Lackawanna River and merges with the Chinchilla service area on the west side of Scranton. A portion of the water feeds the Hollow Avenue Pump Station, which delivers it north along Route 6 to Eynon. The .4 Mgal Bell Mountain and .75 Mgal Route 6 Storage Tanks (overflow elevation of 1,400 $\pm$) provide storage capacity along the Route 6 pumped system. Water is delivered to the .315 Mgal Dickson City Tank through the Layborne St. Pump Station

The maximum hydraulic gradient of 1,247 for the Dunmore No. 1 service area is established by modulating a butterfly valve at the Mill St. facility to control the level of the 1.9 Mgal Dunmore No. 1 Tank. The Dunmore No. 1 service area is comprised of areas north of Scranton and east of the Lackawanna River. The mid-valley area, which had received its water supply from White Oak and Laurel Run Reservoirs prior to filtration, now receives filtered water through the Riverside and Sturgess Pump Stations. The 1.0 Mgal White Oak Tank (overflow elevation of 1,265) provides storage on this portion of the system. The service areas formerly served from Williams Bridge are established by pressure regulation (low service hydraulic gradient of 1,176) and pumping (high service hydraulic gradient of 1,359) at the Mill St. facility. The low service areas include portions of Scranton and Dunmore. The high service areas include the higher elevations on the east side of the Borough of Dunmore and portions of Scranton east of Interstate 81, commonly referred to as the Snook service area. The high service pumps at the Mill St. facility deliver water to the 1.9 Mgal Williams Bridge Tank located in the vicinity of the Lake Scranton Pavilion and is controlled by tank level. Water from the Williams Bridge Tank is pumped through the nearby Oakmont Pump Station, to the Bellefonte Tank. The .5 Mgal Bellefonte Tank establishes a hydraulic gradient of 1,545.0 for the service area formerly served from the Lake Scranton Pavilion.

Hollow Avenue also pump water to the storage tanks at the Chinchilla WTP. The area formerly services by the Chinchilla WTP is now serviced from Lake Scranton. Water leaving the Chinchilla Water Purification Plant is pumped via the Chinchilla Pump Station north along Route 6 to serve Chinchilla, South Abington Township, Clarks Summit and surrounding area. Water is delivered to the .5 Mgal Ivy Industrial Park Tank (hydraulic gradient of 1,738) through the Edella Road Pump Station for service to the Ivy Industrial Park and adjacent area in North Abington Township.

WASTE WATER FACILITIES

On the plant sites are two lined earthen lagoons used to store residual solids of the filter backwash water. After the wastes have settled, the clear supernatant is discharged into the adjacent stream, in accordance with an NPDES permit.

SUSQUEHANNA

The Susquehanna area serves the Boroughs of Susquehanna, Lanesboro, Hallstead, Great Bend, Montrose and Thompson; and portions of Harmony, Oakland, Great Bend and Bridgewater Townships. The estimated population served is 8,000.

SOURCE OF SUPPLY

The source of supply for the Northeast District is from two surface reservoirs and three wells. A concrete dam forms Comfort Lake located on the east branch of Canawacta Creek. Water flows from Comforts via the stream and is collected in Reeds Pond Dam located at the Susquehanna Filter Plant. The Plant intake is located in Reeds Pond.

An undeveloped reservoir supply, known as Churchill Lake, is located southwest of Comfort Lake. The 100 mg lake discharges into the South Branch Lake of Canawacta Creek, which joins the East Branch about 1/2 mile below the treatment plant. Additional piping and pumping would be required to use Churchill Lake as a source.

Lake Montrose Reservoir, located just east of Montrose Borough, is fed by springs and surface water and has an estimated capacity of 160 MG.

Hallstead Well No. 2 is located in Great Bend Township. Well No. 2 is an 8-inch drilled gravel well. The well is approximately 75-feet deep and is equipped with a 25 Hp Byron Jackson Pump with a General Electric motor. The flow ranges from 50 to 100 gpm. A 12-inch ductile iron pipe also supplies water to the Hallstead system from the Susquehanna Filter Plant.

Thompson No. 1 well is located adjacent to No. 1 reservoir. It is a drilled rock well, 8 inches in diameter and 342 feet deep, equipped with a 5 hp jacuzzi submersible pump, delivering 36 to 40 gpm.

Thompson No. 2 well is located at the south end of town. It is a drilled rock well, 8 inches in diameter and 209 feet deep. This well is equipped with a jacuzzi submersible pump delivering 17 gpm. The well discharges into No. 2 reservoir. The well is for emergency use.

TREATMENT

Reeds Pond is a small collecting reservoir formed by a concrete dam. A 16 inch gravity intake line leads from the dam to the Susquehanna Treatment Plant located a short distance below the dam. Plant operation is governed by a float control on the influent chamber from the settling basin to the filters. Level changes open and close a hydraulic valve in the 16-inch intake line. Water passes from the concrete settling basin through two mixed media filters into a 35,000 gallon covered clear well basin. The filters are equipped with an air scour for backwashing. Two high service vertical turbine pumps take suction from the clear well and pump to two steel storage tanks with a combined storage capacity of 180,000 gallons. Equipment is provided for the application of alum, chlorine, caustic soda, carbon and corrosion inhibitor and polymer.

The supply from Lake Montrose flows through a 12-inch intake line to a treatment plant on shore. One of two low service pumps pump the water through a static mixer to a 108,000 gallon steel coagulation-settling tank. Water enters a baffled section on the outer periphery, which forms a flocculation chamber, then continues in a circular pattern to the center of the tank. The settled water flows through two .325 mgd steel filters into a 40,000-gallon steel clear well. Equipment is provided for the addition of alum, caustic soda, chlorine, fluoride and corrosion inhibitor. Powdered Activated Carbon Feed System was added in 1998 and Potassium Permanganate was added in 2002.

Treatment facilities at both Thompson Well No. 1 and Well No. 2 consist of solution feed equipment for the application of soda ash and HTH. Both well are controlled by float switches located in their respective reservoirs.

Hallstead Well No. 2 treatment consists of the application of sodium hypochlorite and corrosion sequestering agent.

The 12-inch transmission main from the Susquehanna Filter Plant to the distribution system was cleaned and cement lined in 1992.

In 1993 approximately 8 1/2 miles of 12-inch transmission main was installed between the Susquehanna and Hallstead systems to interconnect the two systems. Filtered water from Susquehanna is controlled to Hallstead via a re-chlorination station. Electric butterfly valves maintain the desired flow rate and system pressure for the Hallstead system. The chlorine residual is also monitored and additional chlorine added if needed. Flow rates and tank levels are transmitted back to the Susquehanna Plant.

DISTRIBUTION STORAGE

Distribution storage consists of the 6300,000-gallon Convent Street Standpipe, a 440,000-gallon Hallstead Tank, two 375,000 gallon steel reservoirs in Montrose, and the 10053,000-gallon tank at Thompson Well No. 1.

WASTE WATER FACILITIES

Waste treatment facilities consist of two steel settling tanks and one concrete settling tank at Susquehanna and Montrose respectively.

SUTTON HILLS

The Sutton Hills water system provides service to approximately 78 residential customers in Jackson Township. The supply consists of one 6-inch well with a depth of 600 feet. The well's average daily output of 13,600 gallons per day is pumped to the 55,000 gallon steel storage tank located at the Sutton Hills well site. Water is disinfected with sodium hypochlorite prior to entering the tank and is feed to the customers through a 4-inch and 6-inch plastic line.

UNIONTOWN

The Uniontown area serves the City of Uniontown; and portions of Dunbar, Menallen, North Union, South Union and German Townships. The estimated population served is 20,775.

SOURCE OF SUPPLY

The Uniontown system is supplied by the PAWC Brownsville treatment plant. In addition, water is purchased from the Municipal Authority of Westmoreland County (MAWC).

A connection from the Brownsville Plant to the Uniontown system along Route 40 was completed in 1998. A new booster pumping station was completed in 2000. The new Menallen connection presently allows the transfer of up to 1.5 MGD from Brownsville to Uniontown.

The Mt. Line connection, rated at 3.0 mgd, is located approximately 3 miles from Uniontown and connects the Company's 20-inch main to the MAWC system. Water is pumped to the Uniontown system through the Mt. Line connection from the Uniontown booster station, which is located at the MAWC water treatment plant and has 3 electrically driven pumps and has an emergency generator capable of operating 2 of the pumps in case of a power outage.

The Airport Gradient high service system is supplied by 4 electrically driven pumps located in the Airport Gradient Booster Station. This station has an emergency generator capable of operating 2 of the pumps in case of a power outage.

EMERGENCY CONNECTIONS

The Atlas connection, rated at 0.5 mgd, is located on Route 40 and connects the NFCMA's 16-inch main to the Company's 12-inch main. The installation consists of one 6-inch turbo meter and bypass in an underground concrete vault. The connection is equipped with a check valve to prevent backflow from the Uniontown system into the NFCMA's system. Flow and pressure readings are telemetered to the Uniontown Operations Center. It is used only as a backup source during an emergency.

TREATMENT

At the Menallen connection with the PAWC Brownsville system, a chemical feed station is located on the transmission main to supplement chlorine, corrosion inhibitor, and fluoride feeds as required.

Chloramination facilities are available at the Mt. Line connection with the North Fayette County Municipal Authority for compatibility with chloraminated water delivered from the Brownsville District.

DISTRIBUTION STORAGE

The Menallen Elevated Tank, two North Union Ground Storage Tanks and the Hopwood Ground Storage Tank provide 3.6 million gallons of storage for the distribution system.

DISTRIBUTION

The Revere (0.50 MGD), Mt. Line (3.0 MGD) and Hopwood (0.39 MGD) booster stations are located on the distribution system.

WARREN

The Warren area serves the City of Warren and portions of Conewango, Mead, Glade, and Pleasant Townships. The estimated population served is 12,700.

SOURCE OF SUPPLY

The source of supply for the Warren Area is from eight wells located on Company property or near the pump station. Four wells are operated by direct suction by low service pumping units and discharge into the clear well tank. Wells No. 5, 6, 7, and 8, are equipped with deep well pumps. They discharge directly into the clear well tank.

There is an observation well to monitor the water table on the Glade Run Property.

TREATMENT

Chlorine dosage is controlled by an additive rate controller. Chlorine is added to the clear well tank from the chlorinator located in a chlorine room in the main pump station. Zinc-orthophosphate corrosion inhibitor is fed to the clear well tank.

DISTRIBUTION STORAGE

Tanner Hill Tank with 1.0 million gallon capacity automatically controls the high service pumps No's 6,7,8, and 11. The level is maintained by the SCADA system that controls the distribution pumps.

DISTRIBUTION

Water is pumped from the clear well tank by four high service pumping units and discharged into the distribution system.

A booster station on Cobham Park Road serves residential customers in Glade Township.

Bent Twig Booster Station located on Hill Street in Warren, PA is now serving 21 residential customers.

WASHINGTON

The Washington area serves the City of Washington; the Boroughs of Burgettstown, Canonsburg, East Washington, Frankfort Springs, Houston, McDonald, Midway and West Middletown; the Townships of Amwell, Buffalo, Canton, Chartiers, Cross Creek, Hopewell, Independence, Jefferson, Mount Pleasant, North Franklin, North Strabane, and South Strabane; and portions of the Townships of Cecil, North Fayette, Nottingham, Fallowfield, Hanover (Washington County), Hanover (Beaver County), Peters, Robinson, Smith Somerset, South Fayette, South Franklin, Borough of Claysville, and the Townships of Donegal and East Finley. The estimated population served is approximately 125,000.

SOURCE OF SUPPLY

The primary source of treated water for the Washington area is six pipeline connections with the Pittsburgh Division's facilities. These include a 30-inch metered connection on Irishtown Road, a 24-inch metered connection on Laurel Hill Road, a 20-inch metered connection on McMurray Road, a 16-inch metered connection on Hickory-Grade Road, and 8-inch metered connection on McMurray Road, and a 6-inch metered connection on McVey Street. In addition to these, there are several smaller metered connections to the Pittsburgh Area's facilities.

TREATMENT

The Washington District maintains no active water treatment facilities. The Canonsburg Treatment Plant was retired in June, 1992, although a laboratory and production office remains in service. Chlorination facilities are located at the Canonsburg laboratory site, the Eight-four Booster Station site and the McDonald metering station site. Ammonia is also added at the McDonald station to maintain combined chlorine residuals at the far ends of the McDonald area of the system.

DISTRIBUTION

There are three storage reservoirs which float on the main service system; two in Washington (Washington Reservoir - 2.0 MG, Kish Reservoir - 4.7 MG) and one in Canonsburg (Mapleview Reservoir 5.0 MG). In addition to these there are eleven other storage vessels: the Sanitarium Rd. 0.50 mg steel standpipe, the Mon Road 0.42 mg steel standpipe, the Lincoln Hill 0.10 mg steel standpipe, the McDonald 0.50 mg steel reservoir, the Cross Creek 1 mg standpipe, the Avella 0.125 mg standpipe, the Paris 0.3 mg standpipe, the Bulger 0.125 mg standpipe, the Atlasburg 1.0 mg steel elevated tank, the 0.36 MG pre-stresses concrete Mount Pleasant Tank and the 0.25 MG Claysville Tank.

There are also twenty-seven booster stations located throughout the distribution system to supply storage vessels and to increase pressures. They are the 0.720 mgd South Main booster station, the 0.720 mgd Quarry Road booster station, the 0.187 mgd Lincoln Hill booster station, the 0.09 mgd Hanna's Knob booster station, the 12.126 mgd Eighty-Four booster station, the

0.245 mgd Paris/Florence Booster Station, the 0.5 mgd Malone Ridge Booster Station, the 1.0 mgd Cross Creek Booster Station, the 0.5 mgd Christy Ridge Booster Station, the 1.0 mgd Avella Booster Station, the 1.5 mgd Gretna Booster, the 0.75 mgd Franklin Farms booster station, the 1.0 mgd Trinity Point Booster and the 1.0 mgd Rt 980 Booster, the 0.045 mgd Paxton Farms Road booster station, the 0.018 mgd Courson Hill Road Booster station, and the 0.045 mgd Weavertown Pointe booster station. The following boosters are rated for 0.05 to 0.10 mgd: Linden, Snowberry, Spring, Belgium, Overlook, Keys, Ridge, Saw Hill, DeGarmo Lane and Gladden Heights Booster

OFFICE FACILITIES

An administrative office located at 300 Galley Rd. in McMurray provides administrative support for the Brownsville – California, Butler Clarion, Connellsville, Ellwood, Indiana, Kane, Kittanning, Mon-Valley, New Castle, Punxsutawney, Uniontown, Warren and Washington.

The Washington meter department, outside commercial department, and distribution departments are also located at 300 Galley Road, McMurray. Meter reading, testing and repairs, and engineering services for construction are also handled from this facility. The installation of mains, hydrants and services, as well as maintenance and repairs to the distribution system, are all controlled from this location. In addition there is a Distribution Facility located at 101 Long Street Elizabeth which serves the Mon Valley Area.

WEST SHORE

The West Shore area serves the Boroughs of Camp Hill, Lemoyne, New Cumberland, Shiremanstown, West Fairview and Wormleysburg; the Townships of East Pennsboro, Hampden, Lower Allen and portions of the Townships of Silver Spring, Fairview, Newberry and Upper Allen. The estimated population served is 93,000.

SOURCE OF SUPPLY

Water is withdrawn from the Yellow Breeches Creek and the Conodoguinet Creek.

WATER TREATMENT

The West Shore Regional Water Treatment Plant is located approximately three miles southwest of the town of New Cumberland in Fairview Twp, York County. The plant has a rated capacity of twelve (12) million gallons per day (mgd). Water is withdrawn from an impounding reservoir formed by a dam on the Yellow Breeches near New Cumberland Borough. The intake consists of four (4) submerged screens, two (2) along the creeks edge and two mid-stream, all of which are cleaned with a burst of air periodically. Raw water from the Yellow Breeches is pumped with a combination of three (3) pumps, each rated at six (6) mgd, two (2) of which are variable speed, all located in pumping station adjacent to the Creek. Potassium permanganate, an oxidizer chemical, can be fed at that location. The raw water is pumped thru approximately three miles of pipe to the plant where initial "pre" chemical additions (ferric chloride and caustic soda) are made. After these chemicals are added, the water passes through a in-line static mixer and then into a chamber where slower mixing can take place with a mechanical mixer and further chemical additions (chlorine and polymer) can take place. The water enters adjoining distribution chambers before entering into a vacuum chamber where the water is lifted and released to create a pulsating action. The water then enters one of four (4) "superpulsator" clarifiers where inclined plates along with the pulsating action combine to accelerate solids contact and allow for uniform accumulation in a "sludge blanket". Excess waste solids accumulate and concentrate in a trough and are periodically siphoned out.

The clarified water (above the blanket) enters a perforated pipe that leads into a flume that distributes the flow into one of five (5) filters. The filters are conventional units with multimedia including several layers of gravel, sand, and granular activated carbon. After being filtered, the water is piped through a chamber where final "post" chemical additions (chlorine, caustic) are made before entering a one & one half (1&1/2) million gallon clear well. The water is pumped out a pipe adjoining the clear well with three (3) high service turbine pumps into the distribution system. Final chemicals (fluoride and zinc orthophosphate) are added as the water is pumped into the system. Two (2) wash water pumps provide water from the clearwell to backwash the filters.

The Silver Spring Plant is located on the Conodoguinet Creek in Silver Spring Township just upstream form Sample Bridge Road. The plant has a rated capacity of 8.0 MGD. It consists of an intake-pump building, control building, bulk chemical storage building, two purification units, wastewater clarifier, clear water tank and wash water tank. Water flows from the creek

through bar racks and two traveling screens into two low lift pump pits. Three low lift pumps deliver water from the pits through the control building into the covered purification units. Water flows from the purification units into the clear water tank. Chemicals are added in the control building, purification units and filter effluent piping. The intake-pump building also contains two wash water pumps and three high lift pumps. The wash water pumps deliver finished water into the wash water tank and the high lift pumps deliver water from the clear water tank into the distribution system.

A new above-ground, 500,000 gallon pre-stressed concrete Clearwell was constructed in 2010 at the Silver Springs Plant. The new Clearwell will operate in series with the existing above-ground, 500,000 gallon steel Clearwell constructed in 1969. The new Clearwell is baffled in order to provide 1-log post filtration disinfection required by PA DEP.

DISTRIBUTION STORAGE

There are four standpipes in the distribution system. The Lemoyne Standpipe has a capacity of 407,000 gallons, the Camp Hill Standpipe has capacity of 2,000,000 gallons, the Slate Hill Standpipe has a capacity of 3,000,000 gallons and the Pleasant View Standpipe has a capacity of 750,000 gallons. The Hampden tank is an underground storage tank with a capacity of 1,500,000 gallons.

DISTRIBUTION

The Evergreen Road Booster Station supplies customers in the Reesers Summit and Red Land areas of Fairview Township and customer in Newberry Township. This is a completely automatic system consisting of three vertical turbine pumps together with their associated valves and appurtenances, housed in a buried steel enclosure. The Booster supplies both the Reesers Summit PRV Station and the Pleasantview Tank.

The Reesers Summit PRV Station supplies customers at high ground elevation south and east of I-83 and the PA Turnpike. Water pumped from the Evergreen Road Booster Station to the Reeser's Summit area passes through a pressure reducing valve housed in an underground ground vault.

The Redland PRV Station supplies customers in the Redland area of Fairview Township and Newberry Township. Water passes through pressure reducing valves housed in a combination PRV/Rechlorination Station.

The New Kingstown Booster Station supplies customers on a ridge located north of Route 11 at the western edge of the system. This is a completely automatic system consisting of three horizontal centrifugal pumps, together with their associated valves and appurtenances, housed in a buried steel enclosure.

The Westport Booster Station located in Lower Allen Township currently serves customers in Westport Business Development, Rossmoyne Elementary School, and Fairwind's Residential Development. It is an automatic system consisting of four horizontal centrifugal

pumps, together with their associated valves and appurtenances, housed in an above ground steel structure.

The Camp Hill Pump Station is located adjacent to the 2,000,000 gallon Camp Hill Tank and is designed to pump water from the Camp Hill Tank during the day and allow the tank to refill at night. This allows for better turnover of water from the tank and thus better water quality. The Camp Hill Pump Station supplies customers in the main system gradient. It is a completely automated station consisting of three centrifugal pumps, a 12" flowmeter and an 8" back pressure sustaining/pressure relief valve.

The Slate Hill Pump Station is located adjacent to the 3,000,000 gallon Slate Hill Tank and is designed to pump water from the Slate Hill Tank during the day and allow the tank to refill at night. This allows for better turnover of water from the tank and thus better water quality. The Slate Hill Pump Station supplies customers in the main system gradient. It is a completely automated station consisting of three centrifugal pumps, a 12" flowmeter and an 8" back pressure sustaining/pressure relief valve. .

The New Cumberland PRV Station supplies customers in the New Cumberland and Fairview Gradient. Water from the West Shore Regional Water Treatment Plant and the main gradient pass through the pressure reducing valves and flow meters located in an above ground building. The PRV station contains two sets of valves to provide individual control to the two gradients that it feeds.

The Wormleysburg PRV Station supplies customers in the Wormleysburg Gradient. Water from the main gradient pass through the pressure reducing valves and a flow meter located in a below grade concrete vault.

Fairfield PRV station - is an underground pressure reducing station consisting of one 6" and two 2" PRV's to reduce water pressure in the Fairfield development located near the intersection of Valley Road and Old York Road in Fairview Twp., York County.

Pinehurst booster pump station - is a small above ground booster pump station consisting of two 3 horsepower (HP) centrifugal pumps to increase water pressure to the Pinehurst development located off of Smith Drive and Adeline Circle in Hampden Twp., Cumberland County.

The Brambles PRV station is an underground pressure reducing station consisting of one 6" and one 3" PRV to reduce water pressure to the Brambles development located off of Carlisle Pike in Hampden Township, Cumberland County.

RESIDUALS HANDLING FACILITIES

At the West Shore Plant, filter backwash water, clarifier sludge blowdown and sample waste is piped to and collected in two (2) wastewater holding basins. It is then pumped to one of two (2) earthen lagoons with two (2) submersible pumps. After the solids have settled in the

lagoon, the clear supernatant is discharged into a tributary of the Yellow Breeches Creek, in accordance with an NPDES permit.

At the Silver Spring Plant, filter wash water and purification unit sludge withdrawals are collected in a covered wastewater clarifier. After the wastes have settled, the clear supernatant can flow by gravity at a constant rate to the low lift pump sump pits for recycling through the plant. The thicker sludge which settles to the bottom of the wastewater clarifier is pumped to two lined lagoons. Clear supernatant from the wastewater clarifier and the two (2) lined lagoons can be discharged into the Conodoquinet Creek, in accordance with an NPDES permit, in lieu of recycling.

ADMINISTRATION OFFICE

This region of Pennsylvania-American Water Company's Central Operations is comprised of three distinct and separate areas know as the West Shore (Mechanicsburg Area), East Shore (Hershey Area), and Lake Heritage located east of Gettysburg. These three areas are combined administratively.

All Administrative Management support personnel are headquartered at the Office/Operations Center located at 852 Wesley Drive in Lower Allen Township, Cumberland County. West Shore field services, including distribution, meter reading and service personnel are also based at this location.

YARDLEY

PAWC – Yardley serves the Borough of Yardley and large portion of Lower Makefield and a small section of Falls Townships. There are approximately 186 miles of mains, 12,157 service connections and 786 fire hydrants. The estimated population served is 37,200.

SOURCE OF SUPPLY

The primary source of supply is the Delaware River. Other supplies include five (5) groundwater wells. Three (3) wells are located at 50 West College Avenue station in Yardley Borough and two (2) wells are located at Highland Drive Station in Lower Makefield Township. Emergency supplies are also available through interconnection with Morrisville Water Authority and Newtown Artesian Water Company.

TREATMENT

Raw Water from the Delaware River flows by gravity through six (6) intake screens (provisions for 8 total) into two (2) 24" intake lines into a wet well beneath the pump station on the west shore of the river. There is an air scour system in place to allow compressed air to be blown back through the intake screens to clear debris. There are also provisions for feeding a solution of Potassium Permanganate. A dry feeder with a vortex mixing and wetting system is included to prepare and control the feeding of the solution. These provisions were made for the control of Zebra Mussels. Samples of the raw water have not detected the mussels at this time.

The raw water pumps consist of three (3) two stage vertical turbine pumps, each pump capable of pumping 2100 gpm or 3 MGD. One pump is in reserve for redundancy. The pumps draw suction from the wet-well. They are equipped with variable speed drives, which allow them to ramp up and down according to the Mill Road Plant clearwell level. Operator set points may also be entered. These pumps can be run locally or remotely through the SCADA system at the Mill Road Plant control room. A standby emergency diesel generator is on location. Water is pumped from the raw water pump station through a 24-inch transmission main to the treatment plant, a distance of approximately 1.6 miles.

The Mill Road Purification Facility, located at 1145 Edgewood near Mill Road in Lower Makefield Township, Bucks County, PA, is capable of producing a reliable yield of 5.4 MGD.

Raw water enters the raw water connection vault where liquid ferric plus alum and a polymer are added. These chemicals are added at this point to insure ample mixing before the Streaming Current Detector (SCD) reads the currents for automatic trimming of the coagulants. The water then flows through the chemical mixing vault where other pre treatment chemicals are added. Chlorine is added as a disinfectant. Caustic Soda Solution (25%) can be added to adjust pH for optimum treatment. Powdered Activated Carbon is also added to control taste and odors.

Water than enters the clarifiers. The flow passes upward through a bed of coarse, granular, non-buoyant media. While passing upward through the bed, floc is formed and

partially retained in the bed. The flow is then collected in troughs, and sent to the filters. The filters are a mixed media type.

Chlorine is added to the clearwell after the water passes through the filters. Zinc Orthophosphate is also added to control corrosion in the distribution system. Caustic Soda Solution (25%) is also added to reach an optimum pH before the water is delivered to the distribution system. In the clear well ammonia is added to convert the free chlorine to chloramines which help reduce Trihalomethane production in the distribution system.

Solids removed from the Clarifiers, which are rinsed with raw water, are sent to two below ground wastewater holding tanks. Solids removed from the filters are backwashed with finished water from the clearwell into the two wastewater tanks as well. After a period of settling and accumulation, the sludge is collected by a submerged collection system. The wastewater tanks are also equipped with a floating weir, where, at a selected turbidity, water is recycled to the head of the plant at the raw water connection vault. A flow-modulating valve limits the amount of recycled water to be 10% of the raw water flow.

The sludge collection system transfers the solids to a 10,000 gallon conditioning tank, where a polymer is added in the thickening process. The Netzsch Plate and Frame Press are located in the room with the conditioning tank. Lime and chlorine can be added to the sludge tank. Polymer is injected at the sludge pump. The cakes that are produced are hauled off-site and used as an approved co-product by Frey Brothers of Quarryville, PA. The supernatant from the press flows to two steel lagoons, where the settled water flows into an un-named tributary of Brock Creek under an approved NPDES permit #PA 0027634. Any residues from these lagoons are land applied by a commercial hauler at a site approved by the Pennsylvania DEP.

Two (2) Model LS 2500 SuperSettler inclined plate settling units are used for the pre-treatment of Delaware River water during periods of excessively high turbidity, when the existing treatment plant equipment cannot process the high solids loading. The units consist of an inclined tank with supporting structure approximately 12' x 20' x19' high. Plates provide a total of approximately 2,500 sq. ft. of equivalent settling area. The loading rate at the design flow of 6.0 mgd is 0.633 gpm/sq. ft..

The Mill Road Plant is able to pump directly into both the High Service and Main Service Gradients. All pumps draw suction from a 1,290,000 gallon clearwell which is located under the building.

The high service pumps consist of three (3) five stage vertical turbine pumps, each capable of pumping 1050 GPM or 1.5 MGD. One pump is held in reserve for redundancy. These pumps are controlled by the level in the Big Oak Elevated Tank. They can be run locally or remotely through the SCADA system in the Mill Road Plant Control room. They are equipped with variable speed drives which allow them to ramp up or down according to system demands.

The main service pumps consist of three (3) stage vertical turbine pumps, each capable of pumping 1050 GPM or 1.5 MGD. One pump is held in reserve for redundancy. These pumps

are controlled by the level in the Oxford Valley Tank (Standpipe #4). They can be run locally or remotely through the SCADA system in Mill Road Plant Control room. They are equipped with variable speed drives which allow them to ramp up or down according to system demands.

A 750 KVA emergency diesel generator is on location, and able to run all equipment at peak capacity.

WELL STATIONS

Well #4 is 10 inches in diameter and 530 feet deep. The pump is a 12 stage vertical turbine set at 341' in 1945, water lubricated pump, with a rated capacity of 450 GPM.

Well #6 is 15 inches in diameter, and 540 feet deep. The well is equipped with a 12-stage vertical turbine pump set at 351' in 1994, with a rated capacity of 250 GPM.

Well #7 is 10 inches in diameter and 330 feet deep. This pump is a 15 stage, vertical turbine water lubricated pump set at 265' in 1955, with a rated capacity of 350 GPM.

Well #8 is 12 inches in diameter and 402 feet deep. This well is equipped with a 17 stage vertical turbine, water lubricated pump set at 300' in 1963, with a rated capacity of 300 GPM.

Well #10 is 12 inches in diameter and 350 feet deep. This well is equipped with a 12 stage submersible pump set at 300' in 1995. It has a rated capacity of 150 GPM.

The combined safe yield of the five (5) wells in use is 1.038 MGD.

The College Avenue Aeration Facility treats raw water from well's 4,6 & 8. TCE and radon are removed through aeration. After aeration, chlorine, zinc orthophosphate (corrosion inhibitor) and C-5 (a sequestering agent for calcium) are added as water flows into the clear well. There are two distribution pumps capable of pumping 850 GPM each. The pumps are equipped with variable speed drives. While one pump is in the operating mode the other is held in reserve. This station is operated by a SCADA system either locally or remotely from the Mill Road Plant Control Room. Ammonia is added into the process.

The Highland Drive Aeration Facility treats raw water from well's 7 & 10 for the removal of Radon. The technology in use involves a Venturi aspirator as well as a "Lowry "bubbler system. A calcium sequestering agent is added before treatment. Sodium hypochlorite is added for disinfection after the units. Water is then transfer pumped into Standpipe #3. Standpipe #3, Highland Drive is 38.5 feet in height and 36 feet in diameter and has a capacity of 250,000 gallons. This tank is used to maintain pressure in the main service gradient of the distribution system. The pump station is operated by a SCADA system either locally or remotely from the Mill Road Plant control room. Ammonia is added into the process.

PURCHASE WATER

The Morrisville Municipal Authority Interconnection is an 8-inch line capable of providing 800,000 gallons per day, on an emergency basis if needed.

The Newtown Artesian Interconnection is a 12-inch line capable of providing approximately 600,000 gallons per day, on an emergency basis if needed. Newtown is equipped with emergency backup power.

There are currently no formal agreements with either supplier to provide water between the two systems.

DISTRIBUTION STORAGE

Standpipe #2, Williams Lane Tank is 34.5 feet high and 50 feet in diameter, with a capacity of 500,000 gallons. This Steel tank acts as ground water storage from which water is pumped by booster pumps to maintain pressure in the high services gradient of the distribution system.

Standpipe #4, Oxford Valley Road, is 80 feet high, and has a capacity of 1,172,000. This steel tank acts as ground water storage where it floats on the system to supply the Main Service gradient. There are also three (3) booster pumps, which can be used to supply water to the High Service gradient.

Tank #5, Big Oak Elevated tank is 120 feet in height and 83 in diameter with a capacity of 1,000,000 gallons. This steel tank floats on the high service gradient of the distribution system.

Standpipe #6, the Washington Crossing Road Tank is 51.5 feet in height and 60 feed in diameter and has a capacity of 1,000,000 gallons. This concrete tank and booster station supply water to what is called the Newtown Gradient.

DISTRIBUTION

There are six (6) booster stations within the Yardley Area:

The Black Rock Booster Station is equipped with a 520 GPM centrifugal, electrically operated pump. This station is used to deliver purchased water from the Morrisville interconnection if needed.

The Williams Lane Booster Station is equipped with an 840 GPM centrifugal, electrically operated pump equipped with a VFD. The pump can be run locally or remotely through the SCADA system at the Mill Road Plant Control Room. It takes suction from Standpipe #2 to supplement normal supply at high demand and provide adequate pressure in the high service gradient.

The Oxford Valley EFI packaged High Service Booster Station is equipped with one 550 GPM and two 950 GPM centrifugal, electrically operated pumps. These boosters can be used to pump water into the high service gradient from this main service.

The Oxford Valley Main Service Booster Station is equipped with two (2) 15 H.P. pumps (design flow 1,200 gpm @ 30' head) operated by variable frequency drives, and a 100 H.P. constant speed pump (design flow 3,000 gpm @ 90' head), for fire flow. The 15 H.P. pumps are used for domestic equalization; the VFD's are used to maintain constant discharge pressure. These pumps are designed to operate when the water level in the tank is in the upper 1/3 of the volume. The fire pump is designed to provide up to 3,000 GPM at all tank water levels.

The Quarry Road Booster Station is equipped with three 700 GPM centrifugal, electrically operated pumps. These pumps can be controlled locally or remotely through the SCADA system at the Mill Road Plant Control Room. This station serves what is known as the Newtown gradient, and is also used to fill the Washington Crossing tank. Operator entered set points control when the tank is filling or when the Washington Crossing Booster is running to satisfy the Newtown gradient demand.

The Washington Crossing Booster Station is equipped with three 1,000 GPM centrifugal electrically operated pumps. Two of these pumps are equipped with variable speed drives which ramp up or down according to system demand. One is designated as the lead and the other as the lag pump. The constant speed pump can be used on especially high demand days or for fire protection. These pumps can be run locally or remotely through the SCADA system at the Mill Road Plant Control Room. This station also serves what is known as the Newtown gradient. This station has a 125 KVA generator which can run the entire station.

WASTEWATER

Pennsylvania-American Water Company
Blue Mountain Lake Wastewater Collection System

Overview

The Blue Mountain Lake Wastewater System serves customers in Stroud Township and Smithfield Township in Monroe County. The collection system terminates at the Blue Mountain Lake Wastewater Treatment Plant, which is currently operating under NPDES Permit Number 0062464.

The Blue Mountain Lake wastewater collections system consists entirely of low-pressure sewers serving approximately 720 existing customers in the Blue Mountain Lake Estates, Mountain View, and Cornerstone Conservancy residential communities. The wastewater is conveyed through the system by semi-positive displacement grinder pumps that are owned and maintained by the individual customers. The system contains approximately 76,991' of low pressure sewer mains ranging in age from approximately 2 to 20 years. Most of the pipe installed is PVC with sizes ranging from 2-inch to 6-inch.

Wastewater from the customers within the Blue Mountain Lake Estates and Mountain View developments is discharges directly to the wastewater treatment plant through a single 6" low-pressure force main. Wastewater from the existing customers within the Cornerstone Conservancy Development discharges directly to the wastewater plant through a separate 6" low pressure force main.

Capacity/ Condition

The sewer mains are adequately sized to meet full system build-out and are in good condition. PAWC does not experience much infiltration and inflow (I&I) since the system is entirely low-pressure pipelines with no manholes and in good condition. PAWC will continue to monitor the system for future indications of excessive I&I.

Pennsylvania-American Water Company
Blue Mountain Lake Wastewater Collection System

Overview

The existing Blue Mountain Lake wastewater treatment plant is situated on a 2.44-acre exclusive utility easement with a non-exclusive access easement off of Brushy Mountain Road in Stroud Township. The exclusive treatment plant easement is part of a larger parcel designated as Commons Lands of Blue Mountain Lake. The Common Lands parcel includes a "maintenance area" for maintenance buildings, utilities, and drainage facilities for Blue Mountain Lake Estates.

The original Blue Mountain Lake Wastewater Treatment Plant was constructed as a 75,000 gpd fixed film rotating biological contactor (RBC) plant in the early 1990's by the developer of Blue Mountain Lake Estates. In 2004, prior to Pennsylvania American Water's acquisition, the plant was upgraded and expanded to a capacity of 135,000 gpd. In 2010, a second upgrade and expansion was completed by PAW which replaced the RBCs and primary and secondary clarifiers with a new sequencing batch reactor (SBR) system. With this upgrade, the capacity of the plant was increased to 183,333 gpd. Sewage flows were introduced to the new SBR facility on November 16, 2010. The plant's effluent limitations are established by NPDES permit #0062464 and by the Delaware River Basin Commission Docket D-1991-014 CP-3. The discharge limitations are based on an average flow of 275,000 gpd. A detailed description of the treatment plant and treatment process is outlined below and a process flow diagram of the treatment process is included as Figure 1.

Process

Plant Influent/Equalization Basin

Wastewater enter the treatment plant through two separate 6" low-pressure force mains into a 45,553 gallon in-ground, aerated, concrete flow equalization basin which was constructed in 2004. Since the raw wastewater received at the plant is entirely from individual residential grinder pumps, there is no need for pre-treatment at the plant such as a trash rack, screening equipment, or grinding facilities. Grit and large debris has not been a concern at the treatment plant since PAWC purchased the system in 2005. The raw wastewater is aerated within the equalization basin with a coarse bubble aeration system. There are two blowers (Roots Model 33URAI) located inside the main treatment plant building, each with a capacity of 134 scfm, that provide air to the equalization basin.

Sequencing Batch Reactors

From the equalization basin, wastewater flows by gravity through 8" ductile iron piping into the SBRs for removal of BOD and nutrients (nitrogen and phosphorus). The influent flow to the SBRs is controlled by 8" motor operated influent plug valves located in an underground concrete vault between the SBRs and the equalization basin. The SBR system consists of two parallel, in-ground, rectangular, concrete tanks each having a volume of 143,625 gallons. Each

SBR tank has a fixed-grid fin bubble aeration system, a 5 hp floating mixer, and floating travelling weir decanter. There are two 25 hp blowers

(Sutorbilt 408 "Heliflow") located inside of the SBR equipment building, each with a capacity of 338 scfm, that provide air to SBR tanks. Sludge from each SBR basin wasted to the PAD-G Digester with 1hp submersible pumps.

Decant Equalization Basin

From the SBR basins, the treated wastewater decants into an in-ground concretes equalization basin with an approximate volume of 48,000 gallons. The decant equalization basin is equipped with a fixed coarse bubble aeration system. A 3 hp blower (Sutorbilt 2LP "Legend") located inside of the SBR equipment building, with a capacity of 78 scfm, that provides air to the decant equalization tank through 8" PVC piping to the existing three cell repaid sand filter at a controlled rate using VFD controlled duplex submersible pumps (KRT Model 80-200/24XG, 3.4 HP). The SBR decant equalization tanks is sized to accommodate high rate decant cycles and peak flows while limiting the forward flow through the plant to a maximum of 390 gpm (561,600 gpd) which is within the hydraulic capacity capabilities of the downstream treatment plant.

Effluent Filtration

The packaged effluent rapid sand filter (RSF) is a Zimpro/Hydrocleas Model 3C7. The filter is located inside the main wastewater treatment plant building and consists of three cells of sand media and a clearwell located directly beneath the filter cells. The filter has a maximum capacity of 400gpm with one cell out of service which is adequate capacity to treat the anticipated design build-out effluent flow rate. There is a filter back wash pump located in the clearwell to backwash the filters. Filter backwash is initiated automatically based on head loss through the filter media. A backwash cycle can also be manually initiated. The backwash flow goes to an exterior mudwell via a 12" gravity overflow and is then pumped back to the influent equalization basin. The mudwell capacity is 9,048 gallons and the filter clearwell capacity is 8,378 gallons. In 2005 the RSF was reconditioned including installation of a new underdrain system and replacement of the sand media. In 2008, the filter was further upgraded to include a new process controller and an automatic cleaning system.

Disinfection

Plant effluent is disinfected using ultra violet radiation (UV). Effluent from the rapid sand filter flows by gravity from the RSF clearwell through a magnetic flow meter to a pit in the main treatment plant building that contains a new Enaqua UV unit (Series 23 Model S23.T06021U.clx) that is capable of treating a maximum flow of 561,600 gpd (390 gpm). The existing Trojan UV unit (Model 3150K PTP) that was installed in 2004 is piped in parallel to the new unit and can be used as a backup to the Enaqua unit if necessary. The Trojan UV unit is capable of treating a maximum flow rate of 210,000 gpd (145 gpm). A backup chemical disinfection system that uses sodium hypochlorite is also in place. The wastewater flows by gravity from the UV units to the in-ground concrete chlorine contact tank where chlorine can be added for disinfection if the UV units have failed. From the chlorine contact tank, the wastewater flows by gravity through 8" PVC piping to a post aeration tank.

Post Aeration Tank

A new in-ground, concrete, post aeration tank was constructed as part of the 2010 upgrade. The tank has a volume of 11,400 gallons and is equipped with a fixed grid fine bubble aeration system. From the post aeration tank, the treated wastewater discharges via gravity to the outfall.

Outfall

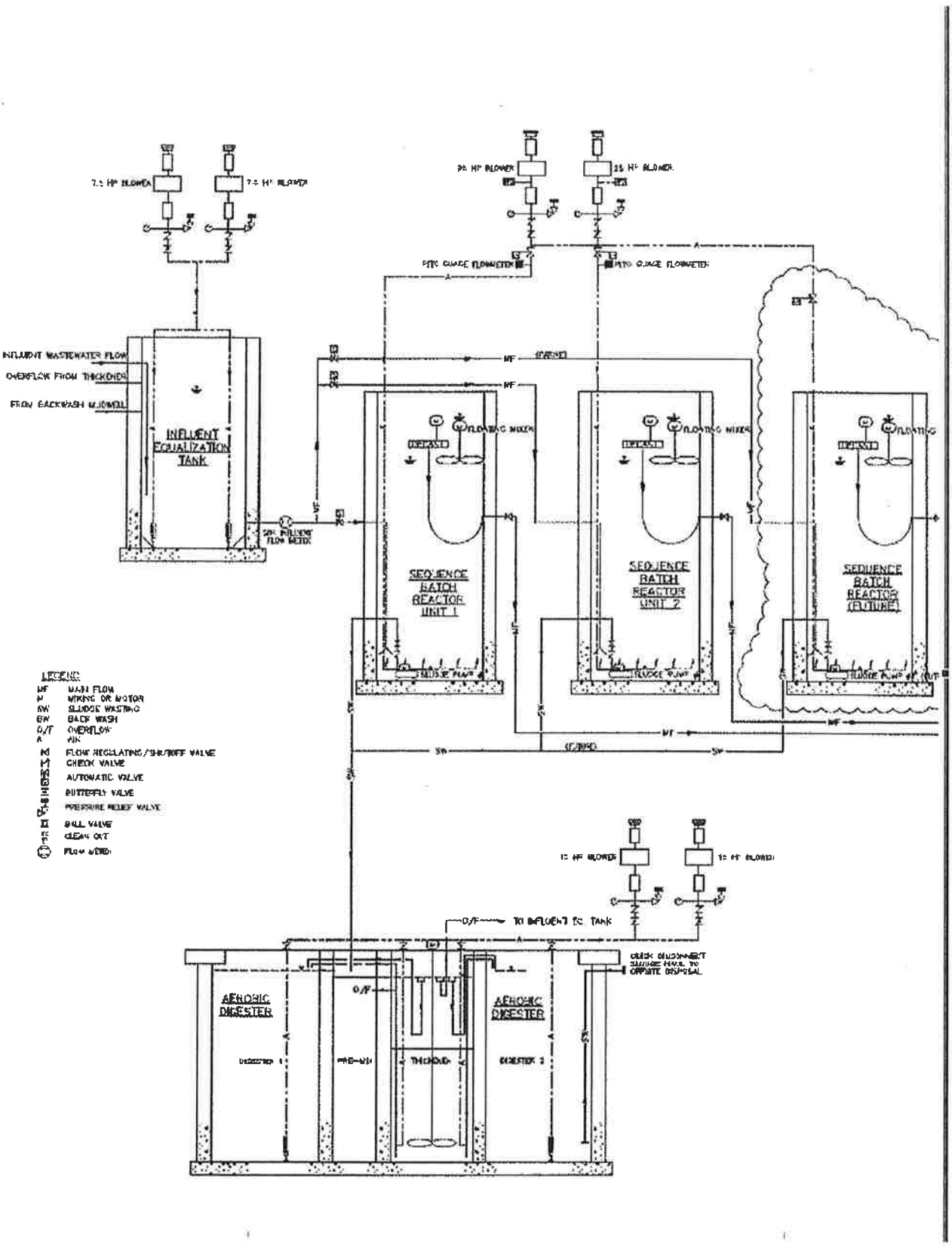
The existing outfall line is an 8" HDPE pipe out of the post aeration tank that is anchored to the ground, down a very steep slope to the receiving Sambo Creek.

Aerobic Sludge Digestion and Disposal

The existing sludge digestion system is a PAD-G process (Pre-thickened Aerobic Digestion with Gravity Thickener) supplied by EnviroQuip, Inc. and installed in 2004. The PAD-G is an aerobic digestion system with influent sludge pre-mix and gravity thickening and two aerobic digestion tanks. The design concept is that one digestion tanks operates continuously in loop with the sludge thickener while the other batch aerobically digests the thickened sludge. Thickened sludge is removed from the digester on a periodic basis and hauled to a third party disposal site.

Treatment Plant Building

An insulated metal building houses the rapid sand filter, UV disinfection equipment, blower/electrical room, garage and storage space, and an office, lab, and restroom.


INFLUENT EQUALIZATION TANK
SEQUENCE BATCH REACTOR UNIT 1
SEQUENCE BATCH REACTOR UNIT 2
SEQUENCE BATCH REACTOR (FUTURE)
AEROBIC DIGESTER
AEROBIC DIGESTER
LEGEND

CLARION WASTEWATER OPERATION

COLLECTION SYSTEM

Pennsylvania American Water (PAW) purchased the Clarion wastewater collection and treatment system from the Clarion Area Authority (CAA) on October 30, 2008. PAW operates a 1.75 MGD Wastewater Treatment Plant (WWTP), six (6) lift stations, and collection and conveyance sewers necessary to service Clarion Borough, Clarion Township, Monroe Township and a portion of Strattanville Borough in Clarion County. The system serves a population of approximately 6,600 through 2,183 customer connections.

The collection system contains approximately 206,250 lineal feet of 6" to 24" gravity sewer mains consisting of vitrified clay and PVC pipe. The majority of the pipe is vitrified clay with the oldest pipes being installed 70 to 80 years ago. The system also contains approximately 38,261 ft. of low pressure mains and 904 manholes. The majority of the manholes are of brick and mortar construction with the remainder constructed of precast concrete.

PAW operates and maintains six lift stations on the collection system. Strattanville Borough operates and maintains one lift station which discharges to the PAW system. The Toby (Third Avenue) lift station has two pumps rated at 250 gpm each. The Liberty lift station has 2 sets of pumps consisting of 2 pumps per set that operate on VFDs, which ramp each set of pumps up to their 1,270 gpm capacity as needed. The Mays lift station has two pumps rated at 240 gpm each. The Chernicky lift station has two pumps rated at 20 gpm each. The Hemlock Ridge lift station has two pumps rated at 110 gpm each. The Corridor lift station, which is operated by Strattanville Borough has two pumps rated at 70 gpm each.

The collection system also receives waste from a collection system owned and operated by Strattanville Borough and also from the Clarion University of Pennsylvania campus collection system.

WASTEWATER TREATMENT PLANT

The Clarion Wastewater Treatment Plant (WWTP) utilizes the contact stabilization activated sludge treatment process. This process uses activated sludge that is returned from the treatment system to provide the microorganism required to treat the incoming waste.

The flow enters the treatment plant through a barminutor to screen the influent for large solids and then comminute these solids into smaller pieces. After communition the influent enters the grit removal portion of the treatment process. Grit settling is enhanced by the application of diffused air. This is added by means of an air diffuser that is located near the bottom of the grit chamber. This diffused air mixes the wastewater and promotes grit settling. The aeration also pre-treats the influent prior to the contact tank.

As the influent exits the aerated grit chamber it enters the flow equalization weir box. The flow equalization weir box protects the treatment plant by preventing flows in excess of the plant's

treatment capacity from overwhelming the process units. As the flow reaches plant capacity the weir box redirects a portion of the flow into the equalization tank. This reduces the instantaneous peak hydraulic flows on the treatment process and helps to keep solids from washing out of the treatment units during periods of high influent flow. The equalization tank is mixed by means of an aeration system. The equalization tank drains to the clarifier wet well and is pumped back into the treatment system to undergo normal treatment.

At flows of less than plant capacity, all of the influent enters the normal treatment process. The degritted influent enters the contact tank. This tank is aerated and also receives return activated sludge from the stabilization tank. The activated sludge provides the microorganisms required to assimilate the organic material in the incoming sewage. The aeration provides the oxygen required for treatment as well as mixing the contents of the tanks.

After treatment in the contact tanks the waste flows into the clarifiers. The clarifiers are a quiescent area that allows the solids to settle from the wastewater. The clarified water is then withdrawn from the system and after disinfection is discharged to the receiving stream.

The sludge from the clarifier is added to the stabilization tanks. The stabilization tanks undergo aeration which reactivates the sludge. A portion of the reactivated sludge is then returned to the contact tanks as returned activated sludge to allow the process to continue. The remainder of the activated sludge is wasted to the digestor. The digestor is aerated and serves to eliminate the volatile solids in the sludge; stabilizing the sludge prior to drying via the belt filter press. After treatment through the belt filter press the sludge is disposed of at a landfill.

CLAYSVILE WASTEWATER OPERATION

COLLECTION SYSTEM

Pennsylvania American Water Company(PAWC) purchased the Claysville wastewater collection and treatment system from the Claysville – Donegal Joint Municipal Authority on July 31, 2008. PAWC operates a 0.16 MGD Wastewater Treatment Plant (WWTP), a lift station, and collection and conveyance sewers necessary to service Claysville Borough and portions of Donegal Township in Washington County. The system serves approximately 498 customer connections.

The collection system contains approximately 63,275 lineal feet of 8" and 10" sewer mains consisting of PVC pipe. The majority of the pipe was installed in 1983 with several small additions since that time. The system also contains approximately 342 manholes.

PAWC operates and maintains one lift station on the collection system located at the Welcome Center on Interstate 70 which was constructed in 1995. The lift station has two pumps rated at 70 gpm each with backup generator.

WASTEWATER TREATMENT PLANT

The Claysville Wastewater Treatment Plant (WWTP) utilizes Primary Sedimentation, Rotating Biological Contactors and Secondary Sedimentation. The facility is designed for a rated capacity of 0.16 million gallons per day (mgd). The head works is equipped with an influent comminutor and a bypass manual bar rack. Effluent from the comminutor flows to a wet well, where it is pumped to a 47,700 gallon equalization tank.

Effluent from the equalization tank flows by gravity to two primary sedimentation tanks. The primary tanks contain a chain and flight sludge collection system. Sludge from the primary tanks is pumped into holding tanks where it is aerated and hauled away to the East Washington WWTP to be processed.

Effluent from the primary sedimentation tanks flows to two Rotating Biological Contactors (RBC). Both units are covered and operate in parallel. Poly-aluminum chloride is fed into the effluent of the RBC's for phosphorus removal. Effluent from the RBC's flows to the secondary flocculating clarifiers.

Influent to the secondary clarifiers enters the units in the middle of the tank and flow down through a circular baffle wall. The flow exits the units via the v-notch weirs and continues to the chlorine contact tank. Solids collected at the bottom of the tanks are pumped back to the raw water wet well.

Chlorine is fed at the chlorine contact tank as a disinfectant. The treated effluent flows from the chlorine contact tank through a flow measuring weir to the outfall. Sodium bisulfate is fed just before the outfall and is used to dechlorinate the final plant effluent water before it flows into the stream.

A 70 kW generator is used for emergency power. The generator is sized to run the plant at design capacity.

Pennsylvania American Water Company
Coatesville Wastewater Plant Description

Pennsylvania American Water Company's wastewater treatment plant is located in South Coatesville Borough and discharges to the West Branch Brandywine Creek. The plant was originally constructed in 1932 and has been expanded and upgraded several times. It is currently operating under NPDES Permit Number PA0026859. This permit provides for a current effluent discharge rate of 7.0 MGD.

PAWC have completed a major expansion and rehabilitation of the wastewater treatment plant. Sewage flow were introduced into a portion of the newly expanded plant on June 24, 2009. The final phase of the project was placed in service on March 31, 2010. The treatment process has been changed from a trickling filter – extended aeration process to an oxidation ditch process. This upgrade and expansion has replaced aging equipment, increased the average daily treatment capacity to 7.0 MGD, and enabled the plant to meet more stringent effluent standards. Peak capacity was increased from approximately 8.0 MGD to handle wet weather flows. The upgraded plant consists of construction of new headworks structure and influent pump station, new biological treatment process including anaerobic and aerobic treatment units, three new secondary clarifiers, a return activated sludge (RAS) pumping station, tertiary filtration units, expansion of an existing disinfection system, and upgrades and modifications to the sludge handling facilities. Sludge is dewatered with a gravity belt thickener and centrifuges and the filter cake is disposed currently in a landfill and in the process of permitting the disposal by land application.

Wastewater is collected in a sanitary sewage collection system that is primarily gravity flow with several lift/pumping stations to assist with wastewater flow in the western portion of the system. Service is provided to customers in the City of Coatesville, the Borough of Parkesburg, East Fallowfield Township, Highland Township, West Caln Township and West Sadsbury Township. Bulk wastewater customers included Valley Township, Caln Township, West Brandywine Township, Sadsbury Township, Veterans' Hospital and commercial septic haulers.

Wastewater enter the wastewater treatment plant site through a 42-inch diameter gravity trunk line into the new influent pump station. This station houses three (3) screw pumps that transfer the wastewater through a 54-inch pipe to the headworks building. At the headworks building, larger debris is removed by an automatic bar screen. Screened sewage flow is measured with a parshall flume and travels into a grit removal unit where smaller particles and inorganic matter are removed. Wastewater then travels from the headworks building to the biological nutrient removal process, which consists of anaerobic and aerobic treatment process units. The first stage anaerobic unit mixes the wastewater and return sludge flow (without oxygen) to promote increased phosphorus removal in the following aerobic state where oxygen is added and mixing occurs for the oxidation of BOD and conversion of ammonia to nitrate. Wastewater flows to three clarifiers for settling of particulate matter; alum is added at the influent splitter box to the

Clarifiers to provide for additional phosphorus removal in the clarifiers. The overflow from the clarifiers flow into the filter influent pumping station, consisting of three (3) screw pumps, which transfer the treated wastewater to two sets of four gravity tertiary filter cell units, which remove finer particulate matter and ensures removal of phosphorus and copper in order to meet effluent requirements. The backwash waste is transferred by gravity to the backwash storage tanks where it is discharged at a lower controlled rate to the influent pump station. The final step before the wastewater leaves the plant site is the UV disinfection system, which provides disinfection against biological micro-organisms. The disinfected plant effluent falls over a series of concrete cascade steps to increase the oxygen level prior to discharge into West Brandywine Creek.

Waste solids are thickened by a gravity belt thickener prior to being transferred to the aerobic digesters. The aerobic digesters further reduce the sludge solids and provide sludge stabilization. Blowers located in the return activated sludge building provide the necessary air for the aerobic digesters. The sludge from the aerobic digesters is pumped to the centrifuges located in the upper level of the sludge building. The centrifuges dewater the sludge to a cake form. The dewatered sludge is transported by screw conveyor to the sludge storage pad for storage prior to final disposal in a landfill or land application. Sludge discharged from the centrifuges can also be fed to a lime sludge mixer in the event that either further stabilization, or percent solids increase, or both are required.

PAWC had a Preparedness, Prevention Contingency (PPC) Plan and Emergency Response Plan (ERP) Plan to support events that may occur at the wastewater plant.

Coatesville Wastewater Collection System

The wastewater collection system directly serves the City of Coatesville, the Borough of Parkesburg, West Sadsbury Township, East Fallowfield Township, West Caln Township and Highland Township. The wastewater collection system also provides bulk sewer service to Caln Township, West Brandywine Township, Sadsbury Township and Valley Township. The collection system terminates at the wastewater treatment plant in the Borough of South Coatesville, which is currently operating under NPDES Permit Number PA0026859.

The collection system consists of ten (10) sewer basins serving approximately 6,226 direct customers. The system contains approximately 440,465 feet of sewer mains and approximately 1,656 manholes. The sewer mains range in age from a few months to over 75 years and sizes ranging from 1-1/2-inch force main to 42-inch gravity mains. Older manholes are predominantly brick and mortar construction and newer ones are pre-cast concrete. Most of the older pipe is vitrified clay or reinforced concrete. The newer pipe installed has generally been SDR 35 PVC and is considered by PAWC to be in excellent condition. The collection system in East Fallowfield Township was purchased from the Township at the end of 2005. The wastewater collection system within the City of Coatesville is old but the physical condition is considered to be reasonably good. PAWC, on an on-going basis, endeavors to correct problems which have existed for many years and has been successful in decreasing the number of emergency conditions requiring attention. To aid in this work, television inspection equipment and a sewer line flushing/vacuum unit is used in a regular maintenance inspection program. Additionally, PAWC is working to reduce the infiltration and inflow (I&I) in the Parkesburg and Coatesville collection systems through an ongoing I&I reduction program. The program was initiated in 1995 and a review of the program status to date indicates the PAWC has achieved significant reductions in I&I.

Generally, the sewer mains are adequately sized with only a few projected hydraulic overloads identified in the past few years. Locations that were identified along the East End Trunk Line, West End Trunk Line and Main Interceptor have been upgraded in size conjunction with the construction of the new wastewater treatment plant.

The Parkesburg pumping station, owned and maintained by PAWC, contains three centrifugal sewage pumps having a combined design capacity of 600,000 gpd average day flow and 1.5 mgd peak flow rating. Flow equalization facilities also exist at the Parkesburg Pump Station. In West Sadsbury Township, PAWC owns and maintains two (2) lift stations, one at the Quebecor facility and one at the West Sadsbury Commons shopping center. Each of these stations contains duplex submersible centrifugal grinder pumps. Eight developments in East Fallowfield Township also have a total of eleven pump stations. There is one development in West Caln with a pump station and one pump station in the City of Coatesville.

In addition, the system also receives bulk wastewater from Caln, Valley, West Brandywine, and Sadsbury Townships. Wastewater is received into PAWC's system by both gravity and pumped means. The wastewater collection facilities serving these areas, including pump stations to convey wastewater to PAWC are not owned, operated or maintained by PAWC.

FAIRVIEW WASTEWATER OPERATION

COLLECTION SYSTEM

Fairview owns and operates the wastewater collection, conveyance, and treatment facilities serving Fairview Township in the northern drainage area. The collection and conveyance facilities include approximately 142,300 ft. of gravity sewer mains ranging in size from 8 to 12 inches in diameter and approximately 7,670 ft. of force mains.

PAWC owns and operates six pump stations in the North WWTP sewer service area. Each pump station is equipped with a device that records pump operating (run) time. Each station has two pumps.

Fairview owns and operates the wastewater collection, conveyance, and treatment facilities serving Fairview Township in the southern drainage area. The collection and conveyance facilities include approximately 198,716 ft. of sewer mains ranging from 8 to 16 inches in diameter and approximately 13,068 ft. of force mains.

PAWC owns and operates seven pump stations in the South WWTP sewer service area.

The Fairview collection and conveyance facilities within the Lower Allen WWTP service area include interceptor and sanitary sewer mains ranging in size from 8 to 10 inches in diameter, and two wastewater pumping stations located at Buttonwood Estates and Limekiln Road.

Fairview Township owns and operates two pump stations in the Lower Allen sewer service area. Each pump station is equipped with a device that records pump operating (run) time. Each station has two pumps. Data for each of the pump stations is provided below.

Pump Station	Rated Capacity (gpd)
Buttonwood Estates	302,400
Limekiln Road	79,000

WASTEWATER TREATMENT PLANTS

The North Wastewater Treatment Plant is located in the northeastern area of the Township and discharges to the Yellow Breeches Creek and then to the Susquehanna River via a shared outfall with Lower Allen. The plant was originally constructed in 1965 and was upgraded from 250,000 gallons per day to 500,000 gallons per day in 1992. In 2000, the plant was re-rated to a capacity of 726,000 gallons per day, 1.206 mgd maximum monthly flow, and 967lbs BOD/day. Unit processes provided to achieve the required pollutant removals include preliminary screening, extended aeration activated sludge, and UV disinfection.

A construction project was initiated at the North WWTP in August 2012 with substantial completion in April 2013. This upgrade project consisted of a new headworks building, new raw wastewater screen, new UV system, and associated site work. The Parkson screen unit was placed

into operation in April 2013. The UV disinfection system was placed into full operation in May 2013.

Other major repairs and/or replacements at the North WWTP during 2013 include the following:

- Installed blower on old chlorine tanks.
- Repaired generator controller.
- Installed reset loop in digester pump station.
- Installed new sidewalks.
- Repaired broken air pipes in aeration tanks.
- Installed strainers for sprayers on Parkson screen.
- Installed new security camera system.
- Installed new process water pump stack assembly.
- Installed VFDs on motors for underground pump station.
- Realigned fence on perimeter property for new gate controller.
- Routine service on all blowers.

Waste sludge generated at the North WWTP is transported in liquid form to the South WWTP. The sludge is blended in an aerobic digester/storage tank at the South WWTP. The sludge is dewatered using belt filter presses and placed directly into a roll-off type dumpster.

The Southern Wastewater Treatment Plant is located in the southern area of the Township and discharges to an unnamed tributary of Fishing Creek. The plant was constructed in 1993 with a permitted capacity of 0.5 mgd and 917 lbs. BOD/day. A re-rating application was submitted in 2000 to establish a maximum month flow of 0.94 mgd, a peak hourly flow of 1.25 mgd, a maximum month organic loading of 1,280 lbs./day, and a maximum day organic loading of 1,912 lbs./day.

Treatment unit processes consist of preliminary screening, sequencing batch reactors (SBRs) and disinfection with chlorine. The treated and disinfected wastewater is discharged to an unnamed tributary of Fishing Creek.

Solids handling facilities are comprised of an aerobic digester/storage tank and belt press filtration.

FRANKLIN WASTEWATER OPERATION (INCLUDING HAMILTONBAN)

COLLECTION SYSTEM

The collection system is a typical sanitary sewer system constructed in 2009. The collection system consist of approximately 55,199 ft. of pvc gravity main.

WASTEWATER TREATMENT PLANT

The Franklin Township Treatment Plant is an SBR system constructed in 2009 and has a design capacity of 0.200 mgd. The plant includes influent fine screening, biological treatment using SBR technology, chemical phosphorus removal, chlorination, and dechlorination. Waste activated sludge is digested in the plant's digester. Digested sludge is hauled out for disposal by a private hauler. The plant influent passes through an influent mechanical fine screen. After this, flow is pumped into one SBR unit constructed in an above ground concrete tank. Waste sludge flows via gravity from the SBR tanks to aerated sludge digesters. The waste sludge is thickened via decanting to 1% to 2% solids. Aerated sludge is wasted on an as needed basis. A chlorine system is used for disinfection of the plant effluent prior to discharge.

An emergency diesel generator provides standby power and is capable of powering the treatment process. The plant is surrounded with a chain link fence and is accessible by a paved road.

In 2016 the Hamiltonban wastewater system was connected to the Franklin system. The Hamiltonban Township Treatment Plant is lagoon system constructed in 1976 and has a design capacity of 0.050 mgd. The plant includes influent grinding, biological treatment using two lagoons in series, chlorination, and spray field disposal. Waste sludge is removed from the lagoons as required and hauled out for disposal by a private hauler.

The Hamiltonban Township system had no NPDES Permit as there is no direct discharge. The plant had a Water Quality Management Permit 0172403. The existing plant had no provision for storage of plant effluent. Therefore, the plant discharged to the spray field regardless of the saturation of the spray field or freezing temperatures. Discharging to the spray field when it was saturated from heavy rain has resulted in DEP documenting runoff from spray field entering an unnamed tributary of Little Marsh Creek. This constitutes a violation of the Clean Streams Law. DEP has also noted the spray field was used in freezing temperatures, which is a violation of its operating permit. DEP issued a Consent Order and Agreement to address these violations. The solution to the issue was to utilize the excess capacity in PAWC's Franklin wastewater system by constructing a pump station and force main and pumping the sewage to the Franklin plant. The existing lagoon system has been taken out of service.

KOPPEL WASTEWATER OPERATION

COLLECTION SYSTEM

The collection system is a typical sanitary sewer system with approximately 30,069 ft. of pipe ranging from 5 to 15-inch diameter. The Koppel Borough collection system does not contain any lift stations. The collection system piping material consists of clay and PVC piping.

WASTEWATER TREATMENT PLANT

The Koppel Borough Sewer Treatment Plant is an ICEAS system constructed in 2004 and has a permitted capacity of 0.240 mgd and the capacity to handle peak flows up to 0.900 mgd. The plant influent passes through an inline grinder prior to the treatment basins. Two treatment basins function as an integral unit each with a volume of 156,000 gallons. Treated sludge is pumped from the treatment basins to a 60,000 gallon aerated sludge digester. Sludge from the aerated digester is pumped through a single progressive cavity pump to a 0.7 meter sludge dewatered belt press. After the sludge has been dewatered, the cake is conveyed to a dumpster and hauled off site and land applied. Chlorine gas is used for disinfection of the plant effluent and is injected at the head of the Chlorine Contact Tank prior to discharging to the Jamison Run Creek. A 125 KW emergency generator provides standby power and is capable of powering the treatment process with the exception of the blowers associated with the aerobic digester.

Capital work in the Koppel system has included safety improvements to the access road, safety, security, and SCADA improvements at the treatment plant, and I/I improvements in the collection system.

Pennsylvania-American Water Company
Lehman-Pike Wastewater Treatment Plant Description

Overview

The collection system currently provides service to approximately 2,625 full and part time customers in various residential developments and campgrounds throughout Lehman and Middle Smithfield Townships in Pike and Monroe Counties. Much of the service area is made up of highly seasonal customers, nearly all of which are residential accounts (there are only approximately 13 commercial accounts).

The collection system is entirely low pressure and consists of approximately 267,781 of sewer force-main with 13 centralized lift stations, and each customer owns and maintains their own E-One® semi-positive displacement grinder pump system. In addition, the Timothy Lake Campgrounds maintain and operate their own gravity sewage collection lines and lift stations. However, there is an aerated equalization basin (2 tanks piped in parallel) at the Timothy Lake North Campground site which is owned and operated by PAWC. This tank system equalizes the flow from the campground and doses it, at a paced scale, into the PAWC owned collection system. These tanks are fitted with 6 submersible E-One grinder pumps that discharge from the EQ tanks into the Saw Creek system.

Within the collection system, sewage from the low pressure system is discharged into a series of lift stations and then conveyed to the Lehman-Pike wastewater treatment plant. The approximate 267,781' of sewer mains range in age from just a few years to roughly 35 years old (with most of the system being 20-30 years old); and sizes range from 1.25-inch in cul-de-sacs to the 10-inch force main entering the plant. The majority of the pipe is SDR-26, SDR-21 and SDR-18 PVC. There are no manholes, only various sized clean-outs located at regular intervals along the force mains.

Condition

PAWC maintains a regular program of monitoring collection system conditions. A three-person crew works in the sewer system by inspecting, cleaning and flushing any problem areas on a regular basis and systematically improving the system as needed. There is little to no inflow and/or infiltration (I&I) realized since the PAWC owned system is entirely low-pressure and relatively new and in good condition. Likewise, the system does not experience any I&I related operational issues (i.e. overflows, bypasses, or hydraulic overloading of the treatment works during storm events).

Lift Stations

PAWC also owns and maintains 13 sewer lift stations throughout the collection system. Seven of these stations are similarly designed Smith and Loveless above-grade vacuum primed lift stations. The remaining five are submersible-pump style stations with either grinder or non-clog submersible pumps. All of the lift stations are in good to fair condition, with nine of them being replaced in the past seven years, and they are cleaned and maintained by PAWC staff on a regular basis to ensure proper and efficient operation.

Pennsylvania-American Water Company
Lehman-Pike Wastewater Treatment Plant Description

Overview

The plant is a sequencing batch reactor (SBR) -activated sludge treatment facility with post-treatment chorine disinfection. The plant was originally constructed in 1976 and partially upgraded/expanded in 1987 and again in 1989 by the previous owners; and then completely rehabilitated/improved in 2008 by PAWC. The existing facility consists of one (1) 100,000 gallon aerated equalization tank, four (4) 100,000 gallon SBR tanks, two (2) 40,000 gallon aerated sludge digesters, (I) 40,000 gallon aerated sludge holding tank and (I) 40,000-gallon chlorine-contact/post-equalization tank. The plant has a permitted annual average flow rate of 0.750 MGD (NPDES # PA-0060640); however, the current hydraulic capacity of the plant is only 0.532 MGD. See the attached plant flow diagram for more information.

Process

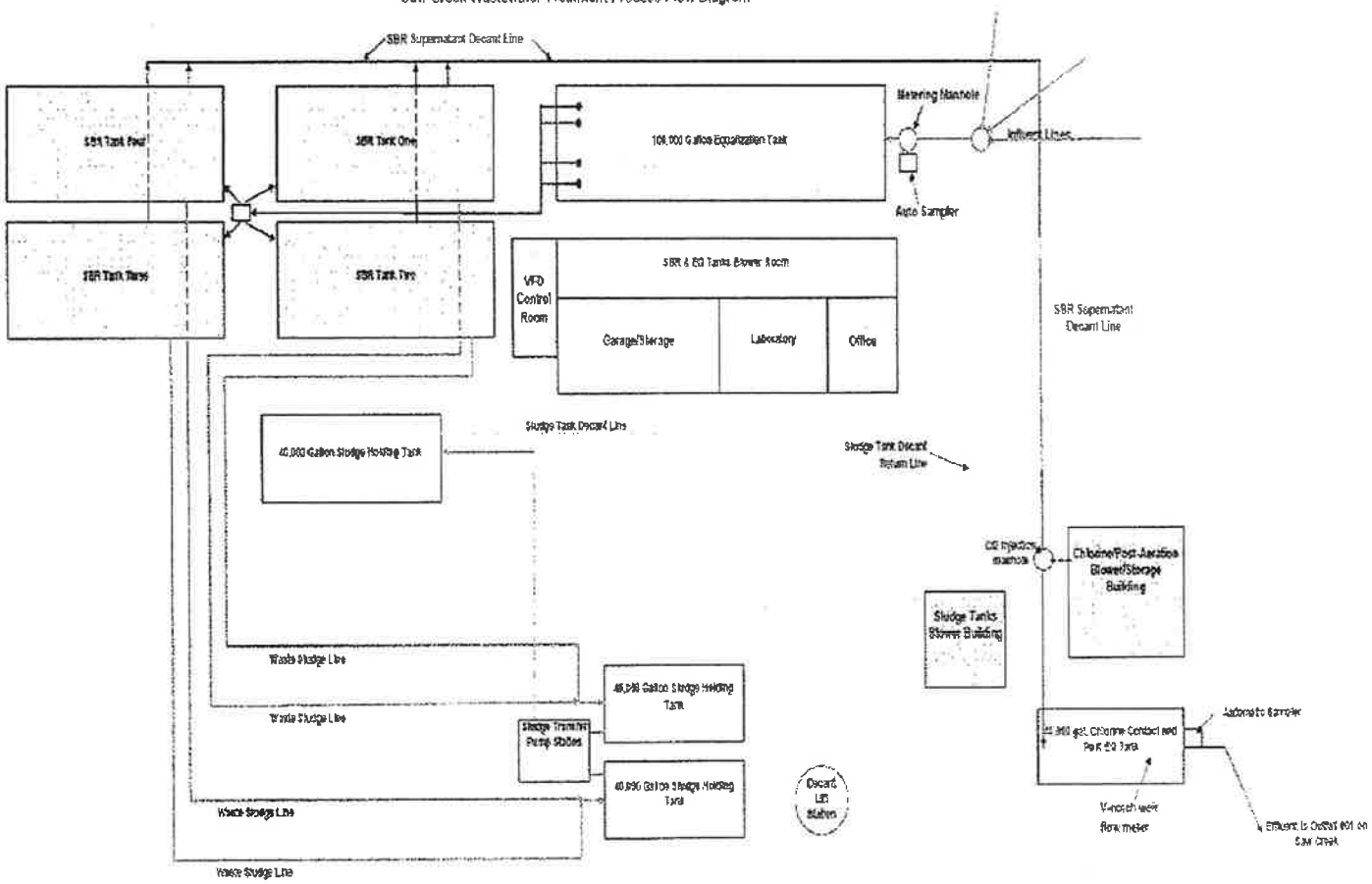
Wastewater enters the plant through three mains (one 10-inch pressure main from Saw Creek Estates, one 4-inch pressure main from Winona Lakes Residential Development; and one 8-inch gravity main from Falling Creek Estates) into a receiving manhole and then flows via gravity through a 12-inch inlet line to a partial flume with an ultrasonic flow meter and an automatic sampler. The raw water then gravity feeds into the 100,000 gallon aerated EQ tank where it is then transferred to one of the four SBR process tanks by four submersible pumps and an automatic valve splitter box. A 25% caustic soda (sodium hydroxide) solution is fed into the equalization tank in order to stabilize the raw wastewater pH.

Within the SBRs; aeration of the entire fill cycle is routinely performed in order to promote the growth of microorganisms, to remove ammonia and nitrogen compounds and to promote the breakdown of organic matter. After the fill/aeration cycle is complete in each unit, a settling and reactive stage occurs to gravity settle any remaining solids. After the settling period, the supernatant is decanted off the top of the tanks to the chlorine- contact/post-equalization tank by two floating decant pumps. Just prior to the contact/post-EQ tank a 12.5% liquid sodium hypochlorite solution is fed into the decant line for disinfection. The flow then enters the serpentine-baffled tank where adequate chlorine contact time is achieved. The flow then enters an aerated de-chlorination zone within the tank where a 38% liquid sodium-bisulfite solution is fed in order to keep the final effluent's chlorine residual beneath the plant's NPDES permit limit. The flow then travels through a v-notch weir with ultrasonic flow meter to measure effluent flow, then an effluent automatic sampler, and is then discharged to the receiving stream (Saw Creek).

The thickened solids are removed from the bottom of each of the four SBR tanks by submersible sludge pumps (two in each tank) and conveyed to one of two sludge digester tanks for further thickening. The supernatant from these two tanks is gravity fed to an adjacent lift station where it is returned to the head-works of the plant. The sludge

from these two digester tanks is then transferred, by submersible pumps, to the upper sludge holding tank from where it is pumped and hauled off-site to an approved de-watering and disposal facility. Portions of this activated sludge can also be returned to the head-works to assist in treatment when needed. Supernatant from the upper sludge holding tank is also decanted, via a telescoping valve, to the life station form return to the plant head-works.

Saw Creek Wastewater Treatment Process Flow Diagram



MARCEL LAKES WASTEWATER OPERATION

COLLECTION SYSTEM

The collection system is comprised of two sections. The western section is a low-pressure collection system and the eastern section is a gravity collection system that includes ten lift stations, and 97 manholes. The low pressure and gravity collection system combine for a total of 58,080 feet of collection mains. Customers served by the low-pressure system have individual grinder pumps, which are owned and maintained by the homeowner. The gravity collection system consists of 32,007 feet of 8-inch PVC-SDR 35, with nine lift stations located throughout the gravity system that convey wastewater to the wastewater treatment plant.

WASTEWATER TREATMENT PLANT

The Marcel Lake Estates Wastewater Treatment Plant was upgraded from an extended aeration system to a SBR treatment process in 1994. The treatment facility has a permitted design capacity to treat 0.100 mgd of sewage during low groundwater periods (dry weather) and the capacity to treat up to 0.200 mgd during high groundwater periods (wet weather). The effluent limitations on the plant's NPDES permit are based on an effluent discharge rate of 0.200 mgd.

The plant influent passes through an inline grinder prior to the three main sewage pumps. The main sewage pumps discharge to a splitter box that evenly distributes the flow between two treatment basins that function as an integral unit. The effluent decanted from the treatment basins flows by gravity to a circular clarifier. Sludge from the treatment basins and the circular clarifier is pumped to two aerated sludge holding tanks. Supernatant from the aerated sludge holding tanks is pumped to the head of the plant and the wet sludge is hauled away for disposal. Effluent from the final clarifier is disinfected with ultraviolet light prior to discharging to Dingmans Creek. A 100 kW emergency generator provides standby power and is capable of powering the entire treatment plant. The plant is surrounded with a chain link fence and is located adjacent to Dingmans Creek.

CAPITAL IMPROVEMENTS

The project involves the replacement of the entire gravity portion of the Marcel Lakes collection system with a new gravity collection system comprised of approximately 31,400 LF of sewer main, 3 sewage pump stations, and 2,500 LF of force main. The project is under a Consent Order and Agreement with the PaDEP and a PUC order. The Consent Order and Agreement with the PaDEP requires the project to be completed no later than February 2, 2018. The Company estimates the overall project will cost approximately $7.6 million. A portion of the project was placed in service in 2016 with the remaining $4.75 million of capital additions expected to be placed in service in 2017.

MCEWENSVILLE WASTEWATER OPERATION

COLLECTION SYSTEM

The collection system contains approximately 12,670 ft of 8-inch gravity pipe and approximately 1,242 ft. of force main. The collection system was places into operation in February of 1984,

There are four pump stations within the McEwensville collection system:

Pump Station 1 (simplex, residential) is located at the end of Maple Street.
Pump Station 2 (duplex, residential) is located at the intersection of Maple and Cherry Streets.
Pump Station 3 (simplex, residential) is off Main Street at the north end of town.
Pump Station 4 (duplex) serves 13 homes in the Wesner Development.

WASTEWATER TREATMENT PLANT

The McEwensville wastewater treatment facility is a lagoon-type system. There are two aerated lagoons, containing two cells each, separated by baffles. The wastewater collection system conveys wastewater to a wet well located at the head of the plant. The wastewater is then pumped into the first lagoon and flows sequentially into cells 2, 3, and 4. Each lagoon is approximately 110,000 gallons. In 2006, process modifications were installed to improve the performance of the plant. Replacement lagoon baffles and chlorine contact tank baffles were installed along with eight (8) floating, attached-growth Bioreactors in Lagoon No. 2, and a plate settler with a recycling sludge pump discharging back into the wet well. An ultrasonic level monitor and chart recorder were installed at the effluent weir. The treatment modification resulted in a significant improvement to the discharge quality of the plant. The ultrasonic monitor and recorder have resulted in a more accurate and permanent record of discharge rates. Disinfection is achieved using calcium hypochlorite and a chlorine contact tank prior to discharge. Solids are wasted periodically by hauling wet sludge. The treatment plant is designed to handle up to 45,000 gallons per day.

NEW CUMBERLAND WASTEWATER OPERATION

COLLECTION SYSTEM

The collection system is a typical sanitary sewer system with approximately 144,850 ft. of gravity pipe ranging from 6 to 21-inch diameter and approximately 6,900 ft. of force main. The majority of the system was constructed in the 1950's with terra cotta mains and brick manholes. The New Cumberland wastewater collection system contains three lift stations.

The Borough's collection system is divided into four sub-drainage areas. A small area drains to the Drexel Hills lift station, a larger area drains to the Cedar Cliff lift station, an area that flows by gravity directly to the treatment facility and a large area that drains to the Southeast lift station.. The Southeast lift station drainage area accounts for approximately 80% of the system flow.

There are three lift stations located in the collection system. With the exception of the Southeast lift station, they operate in a cascading manner by pumping the sewage that flows by gravity from a low elevation and lifting it to a higher elevation and allowing it to flow by gravity again. The Southeast station pumps sewage directly to the wastewater treatment facility.

The lift stations are all float controlled and are locally operated. Autodialers are provided for remote notification of alarms. The main lift station is the Southeast station, which pumps approximately 80% of the flows that enter the treatment plant. The Southeast lift station is provided with two sets of pumping trains, each pump train consists of two pumps located in series. The lift station characteristics are provided below:

Lift Station	Type	Capacity (gpm)
Southeast	Gorman Rupp	2,400
Cedar Cliff	Gorman Rupp	260
Drexel Hills	Gorman Rupp	100

The Cedar Cliff and Drexel Hills lift stations have relatively short runs of low pressure mains that the stations discharge through prior to entering a manhole and flowing by gravity to the wastewater treatment facility. The Southeast Pump Station has two ten-inch force mains.

WASTEWATER TREATMENT PLANTS

The Borough of New Cumberland Sewer Treatment Plant was a Contact Stabilization process originally constructed in the 1950's and upgraded to 1.25 mgd design capacity in the 1970's. On June 23, 2010, the Borough received a copy of the new draft NPDES permit. The new permit has the same limits as the previous permit, but also includes net total nitrogen and phosphorus load limits of 22,831 pounds and 3,044 pounds per year respectively. In order to meet the new load limits the Borough upgraded the wastewater treatment facility

The sewage enters the new headworks building capable of handling 3.5 MGD. Upon entering the new headworks, the influent passes through a screening unit equipped with a washer and compactor. After exiting the screener, the water enters a vortex grit chamber. Here grit settles

into the bottom of the vortex chamber and be pumped out of the unit where a conveyor drops it into a dumpster located within the building. Sewage then travels from the influent lift station to the anaerobic selector. The influent enters into the second of the tanks, where it mixes with return activated sludge from the first tank. The tanks are designed to both promote the growth of phosphorus absorbing bacteria within the wastewater prior to entering the oxidation ditch, and to retard the growth of filamentous bacteria that may inhibit settling.

The main component of the treatment plant upgrade is an oxidation ditch. The ditch has two trains, each with a volume of 0.52 mg. The influent passes through an influent distributor that directs the flow to one of the two trains. Here a submerged mixer directs the flow around the oval shaped track. Through a series of sensors and software, the oxidation ditch provides the required mixing and air to maximize efficiency. An automated sampling station located in the middle of the ditches monitors nitrate and ammonia levels to optimize the cycle times within the system. The treated effluent exits the system by flowing over a motorized effluent weir and into a secondary anoxic zone. A third tank follows the secondary anoxic zone. This tank is equipped with a header and coarse bubble diffusers. This process promotes the removal of nitrogen gas and deters the release of phosphorus in the final clarifiers. The effluent flows by gravity into one of two circular clarifiers. Waste activated sludge (WAS) is transferred from the secondary clarifiers to the aerobic digester. The clarifier effluent flows through two banks of UV lights for disinfection. Solids are dewatered with a centrifuge. Dewatered solids are then conveyed to a roll-off dumpster.

PAINT ELK WASTEWATER OPERATION

COLLECTION SYSTEM

The collection system consists of approximately 67,452 ft. of 6-inch and 8-inch vitrified clay and PVC gravity sewer pipe and approximately 12,222 ft. of force main. The system also has four duplex lift stations.

There are three lift stations located in the collection system and one located within the plant. The lift stations in the collection system operate in a cascading manor by pumping the sewage that flows by gravity from a low elevation and lifting it to a higher elevation and allowing it to flow by gravity again towards the treatment plant.

The lift stations are all duplex stations of various size and type as identified below. The stations in the collection system are float controlled and are locally operated with no remote control functions or any remote alarms. Operators perform daily inspections of the lift stations.

Lift Station	Type	Number of Pumps	Capacity per Pump (gpm)
Maple Drive	Submersible Duplex Grinder	2	30
River Hill	Dry Sump Below Ground	2	400
Route 66	Dry Sump Gorman Rupp	2	100

WASTEWATER TREATMENT PLANT

The PEJSA sewage treatment plant is an aerobic lagoon system constructed in 1992 that has a permitted capacity of 0.600 mgd. The plant is required to report flow, CBOD, suspended solids, fecal coliform, pH, and total residual chlorine on a monthly basis for both monthly average and average weekly values. The plant discharges into Paint Creek in Elk Township, Clarion County.

The sewage treatment plant consists of the headworks, four treatment lagoons and a chlorine contact tank for disinfection. A diesel generator is provided to operate the entire plant if needed and the property is provided with a chain link security fence. The process is very simple and the only operating equipment required in the process is: a channel grinder in the headworks, a duplex lift station located between Lagoons No.2 and No.3, 11 mechanical aerating mixers and the chlorination system used for disinfection. The plant treats the entire flow from the collection system, there is no plant bypass. The chlorination system includes a service water pump adjacent to the chlorine contact tanks.

Pennsylvania-American Water Company
Pocono Wastewater Collection System Description

Overview

The collection system is committed to serve a total 5,025 lots within the Pocono Country Place (PCP) development of which approximately 3,530 are currently developed and connected to the system. The collection system consists of a northern portion (Area 5) and southern portions (Areas 1, 2A, 2B, 3 and 4) which include a total of approximately 150,594 linear feet of mainline gravity sewer and 99,795 linear feet of low pressure lines, and two (2) lift stations (see attached system map for more information). Most of the low pressure lines (about 88,000 feet) are located in the northern part of the system in Area 5, with the remaining located in Area 4. There are approximately 776 manholes located throughout the gravity collection system; and each customer within the low pressure portions of the system owns and maintains their own sewage grinder pump system which are of various make, model and age.

Sewage from the collection system is discharged into the lift stations and then conveyed to the wastewater treatment plant, or conveyed directly to the plant from the collection system. The sewer mains range in age from a few years to roughly thirty-five years old (with the majority being in the 25-35-year-old time frame), and sizes range from 1-inch to 8-inch in the low pressure portions of the system and 8-inch to 24-inch in the gravity portions of the system. The majority of the pipe is PVC (SDR-26) with some of the smaller diameter pipe being ABS truss type. All of the pipe is in fair to good condition. The manholes are located in the gravity portions of the system and are concrete.

Condition

PAWC maintains a regular program of monitoring collection system conditions. A three-person crew works in the sewer system by inspecting, cleaning and flushing any problem areas on a regular basis and systematically improving the system as needed. The system does experience moderate inflow and infiltration (I&I), mainly due to a combination of high groundwater, aging residential grinder-pump systems (which, in many cases, are not properly maintained by the home-owners), illegal connections (downspouts, sump-pumps, etc.), and failures in the collection system (leaking manholes, pipe joints, etc.). Since 1997, an on-going, aggressive I&I abatement program has been undertaken by PAWC in order to minimize extraneous flows in the system. As a result of this program, a reduction in I&I of approximately 50% has been achieved to date, mainly through rehabilitation and replacement work completed throughout the collection system (i.e. main and manhole replacement, cleaning, lining, etc.).

Lift Stations

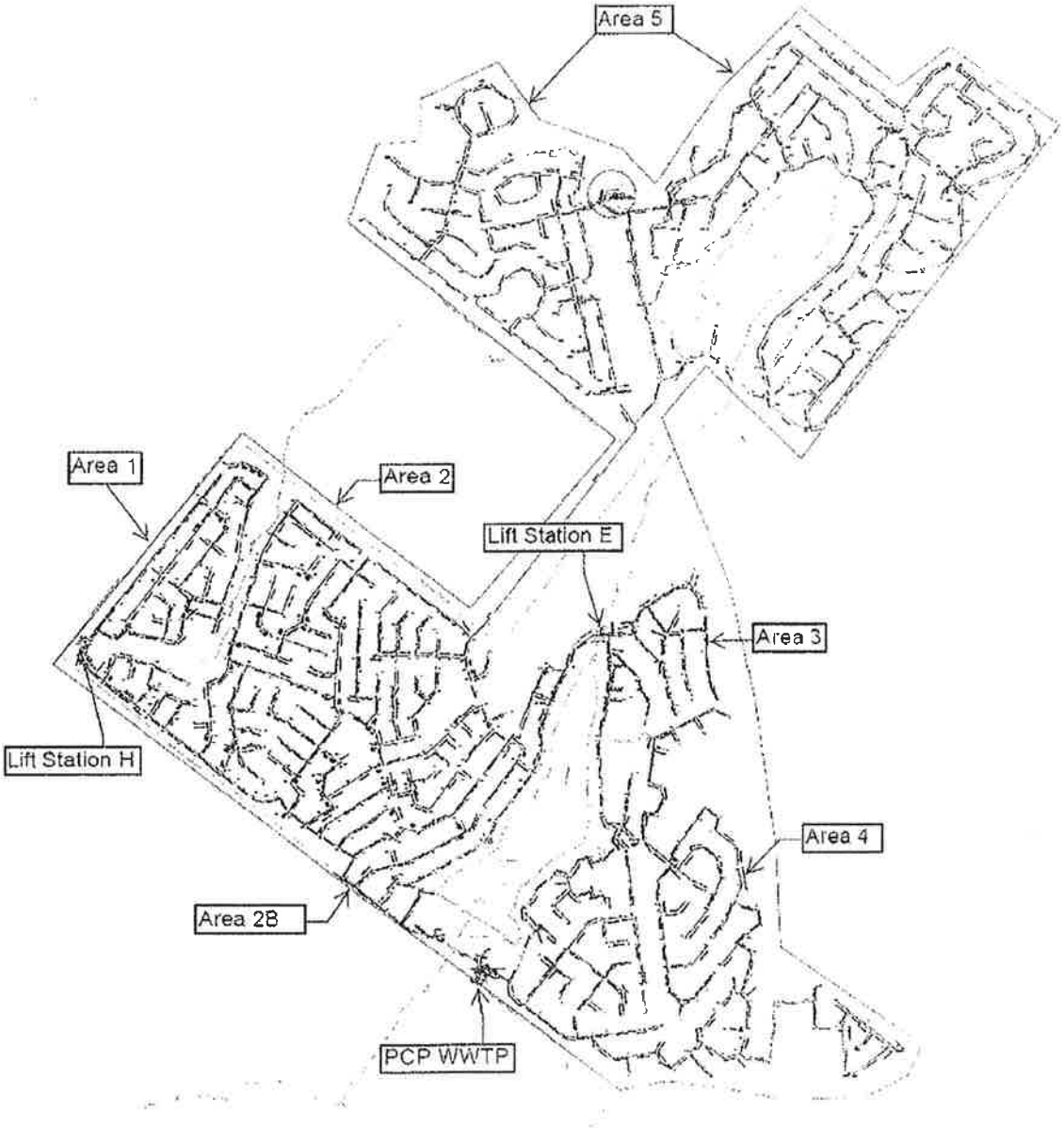
There are two lift stations located in the gravity collection portion of the system. Both stations are in good condition and adequately sized to meet the full build-out of the system. Further information on each station is as follows:

Lift Station H - Located along Country Place Drive in Area 1. This station consists of one concrete wet-well with one 10-inch inlet, one concrete dry-well with two Fairbanks-Morse 10 hp pumps, and one 6-

inch discharge force-main. This station is equipped with a Spectrum diesel powered emergency generator.

Lift Station E- Located along Country Place Drive in Area 3. This station was replaced in 2008 with a new 13' deep concrete wet-well with two 8-inch inlet lines and one 6-inch outlet line; and a Smith & Loveless above grade station equipped with two 15 hp vacuum prime pumps. This station is also equipped with a Spectrum diesel powered emergency generator.

PCP WW Collection System



Pennsylvania-American Water Company
Pocono Wastewater Treatment Plant Description

Overview

The plant is a sequencing batch reactor (SBR) - suspended biological treatment facility with post treatment UV disinfection. It was originally constructed in 1980 and then upgraded/expanded in 2000 by PAWC. The plant consists of an influent comminutor/pumping facility, three (3) 690,000 gallon SBR tanks, one (1) post treatment re-aeration tank, one (1) 200,000 gallon aerated sludge-holding tank, and one (1) sludge dewatering belt-press. The plant has a permitted annual average daily flow rate of 1.256 MGD (NPDES Permit# PA-0060097). See the attached plant flow diagram for more information.

Process

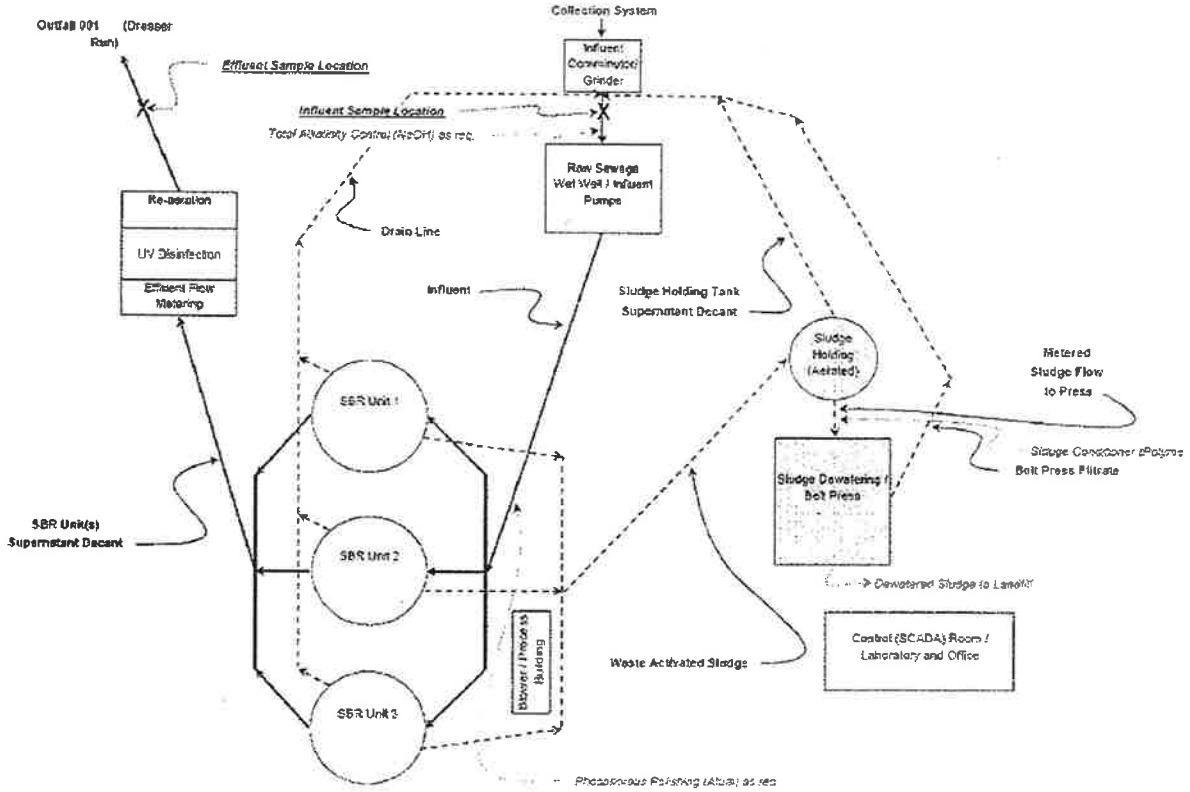
Wastewater enters the plant through one 24-inch force-main and one 15-inch gravity main, then travels through the comminutor and into the receiving wet-well where it is pumped by 4 submersible pumps into one of the three SBR units. A 60% sodium hydroxide solution is fed into the influent wet-well to stabilize the raw wastewater pH as needed.

Wastewater entering the SBRs is subjected to timed cycles of aerobic and anaerobic conditions along with various mixing stages. First, aeration of the entire fill cycle is routinely performed in order to promote the growth of microorganisms and to remove ammonia compounds and promote the destruction of organic carbon. After the fill/aeration cycle is complete, the blowers are turned off, but the mixers left on, and the concentration of dissolved oxygen is allowed to decrease. This anaerobic/mix stage further promotes the breakdown of various organic and inorganic materials. After most of the biodegradable matter is reacted, the mixers are turned off and a non-turbulent settling phase occurs. This settling period allows the solid material to migrate to the bottom of the SBR units while the clear supernatant remains at the top. Aluminum sulfate will be added at times to enhance the settleability of the remaining solids, and to provide increased reduction of phosphorus. After the settling period, the supernatant is decanted off the top of the tanks and passed through an effluent flow meter and then an ultraviolet light system for disinfection. The flow then enters the post-aeration tank and is then discharged to the receiving stream (Dresser Run).

The thickened solids are removed from the bottom of each of the three SBR tanks by submersible sludge pumps (one in each tank) and conveyed to the aerated sludge holding tank prior to being dewatered by the belt filter press. Polymer conditioning of the solids is done prior to the press to enhance its dewatering capabilities. Water released during the sludge pressing operation is returned to the head of the plant and reprocessed. The dewatered material from the filter press is hauled off-site to an approved disposal facility. Portions of this activated sludge from the SBRs can also be returned to the head-works

to assist in treatment when needed. Supernatant from the sludge holding tank is gravity decanted for return to the head-works of the plant.

PAW - Pocono Country Place WWTP Schematic



SCRANTON WASTEWATER

COLLECTION SYSTEM

The collection system is primarily gravity-fed and consists of over 317 miles of sewer lines, 80 permitted CSO structures, and 7 pumping stations.

An estimated fifty four percent of the Sewer System is a CSS, conveying the combined storm water and sanitary sewage flow to regulator chambers prior to connection with an interceptor sewer. Under wet-weather flow conditions, the regulators direct combined sanitary sewage and storm water flow in excess of the capacity of the interceptors to adjacent receiving streams.

The Main Interceptor sewer for the SSA CSS runs parallel to the Lackawanna River, which generally flows through the middle of Scranton. The Main Interceptor is approximately 5.8 miles in length, starting as a twenty-four inch diameter pipe at the upstream end of the system at the Leggetts Creek Regulator and increasing to a 78-inch diameter pipe at the headworks to the SSA WWTP. The 78-inch diameter portion of the Main Interceptor has a peak flow capacity of about 110 MGD compared to the existing peak capacity of the Scranton WWTP of 60 MGD. The Main Interceptor averages about 30 feet deep at its downstream end and crosses the Lackawanna River at three locations.

Outfall #	Location	Receiving Stream
#003	WWTP Overflow	Lackawanna River
#004	Wells Street	Lackawanna River
#005	Love Place	Lackawanna River
#006	Gardner Street	Lackawanna River
#007	Philo Street	Lackawanna River
#008	Hawk Street	Lackawanna River
#009	Meade Street	Lackawanna River
#011	Von Storch	Lackawanna River
#012	Grove Street	Lackawanna River
#013	Poplar Street 24"	Lackawanna River
#014	Poplar Street 90"	Lackawanna River
#015	Gordon Avenue	Lackawanna River
#016	Pettibone Street	Lackawanna River
#017	Vine Street	Lackawanna River
#018	Love Road	Lackawanna River
#019	Linden Street	Lackawanna River
#020	E Lack. Avenue	Lackawanna River
#021	W Scranton St	Lackawanna River
#022	Washburn Street	Lackawanna River
#023	Luzerne Street	Lackawanna River
#024	Hickory Street	Lackawanna River
#025	Willow Street	Roaring Brook
#026	W Elm Street	Lackawanna River

#027	Wash-Locust	Lackawanna River
#028	Fig Street	Lackawanna River
#029	Genet Street	Lackawanna River
#030	Prescott Avenue	Roaring Brook
#031	Leggetts Creek	Lackawanna River
#032	Watkins Street	Lackawanna River
#033	W Parker Street	Lackawanna River
#034	E Parker Street	Lackawanna River
#035	Sanderson Ave	Lackawanna River
#036	Tioga Street	Lackawanna River
#037	Brown Avenue	Lackawanna River
#038	Wurtz Avenue	Lackawanna River
#040	W Market Street	Lackawanna River
#043	Olive Street	Lackawanna River
#044	E Scranton Street	Lackawanna River
#045	Emmett Street	Lackawanna River
#047	Broadway Street	Lackawanna River
#048	Washington-Alder	Lackawanna River
#049	River Street	Roaring BrookII
#050	Schimpff Court	Roaring BrookII
#051	Birch Street	Lackawanna River
#052	Wyoming Avenue	Lackawanna River
#053	Cedar Avenue	Stafford Meadow
#055	Drinker Place	Lackawanna River
#056	Boulevard Avenue	Lackawanna River
#057	Richmont Street	Lackawanna River
#058	Grandview Street	Lackawanna River
#059	Woodlawn Street	Lackawanna River
#060	Park Avenue	Lackawanna River
#061	Morel Street	Lackawanna River
#062	Fisk Street	Lackawanna River
#063	Olyphant South 24"	Lackawanna River
#065	Drinker Street	Little Roaring Brk
#066	Burke Street	Roaring Brook
#067	Keyser Avenue	Keyser Creek
#068	S Sixth Street	Lackawanna River
#069	Crane Street	Lackawanna River
#070	Sand Street	Roaring Brook
#071	Lake Street	Roaring Brook
#072	Leggetts Street	Leggetts Creek
#073	Front Street	Roaring Brook
#074	Marion Street	Meadow Brook
#075	Capouse Avenue	Meadow Brook
#076	Sanderson-Marion	Meadow Brook
#077	Middle Street PS	Lackawanna River
#078	Shawnee Avenue PS	Lackawanna River

#079	Myrtle Street PS	Roaring Brook
#080	Keyser Valley PS	Keyser Creek
#081	Pittston - Brook	Stafford Meadow Brk
#082	Locust – Cedar	Stafford Meadow Brk
#083	Irving - Elm	Stafford Meadow Brk
#084	639 E. Elm Street	Stafford Meadow Brk
#085	644 E. Elm Street	Stafford Meadow Brk
#086	414 Maple Street	Stafford Meadow Brk
#087	Leggetts-Kelly	Leggetts Creek

The Scranton system has seven pumping stations as part of the wastewater conveyance system.

Pumping Station	Type	Rated Capacity, mgd
Dorothy Street	Wet Well/Dry Well	0.217
Froude Street	Submersible Pumps	0.019
Keyser Valley	Wet Well/Dry Well	1.735
Middle Street	Wet Well/Dry Well	0.634
Myrtle Street	Wet Well/Dry Well	1.208
Parrot Street	Wet Well/Dry Well	0.373
Shawnee Avenue	Wet Well/Dry Well	0.177

WASTEWATER TREATMENT PLANT

The influent discharges by gravity to the headworks of the treatment plant. This facility contains a coarse bar screen with manual solids removal, automatic fine screens and grit removal through an existing flow through Grit chamber. The fine screen is a continuous rake type screen which removes rags and other debris form the waste stream. The grit is removed in a flow through Grit chamber with a collection scrappers. Effluent from the Headworks Building flows to the raw influent pumping station. Flow from the raw water pumping station is directed to the primary clarifiers. The facility has five rectangular clarifiers. The bioreactors consist of four two pass BNR basins. Baffle walls were constructed to provide for alternating aerobic and anoxic zones for total nitrogen removal. Denitrification is enabled by influent step feed channels to provide anoxic zones. Two new rectangular settling tanks were constructed of similar volume and configuration to the existing four tanks. The RAS pumping station houses three pumps located in a vault. All of the new pumps are controlled by VFD's for speed control. Chemicals are utilized as part of the process for phosphorus and nitrogen removal and pH adjustment. The nitrogen removal process utilizes a proprietary methanol based feed material called Micro-C. The phosphorus removal system utilizes alum stored in four 8,000 gallon storage tanks located inside of the main treatment building. Feed pumps are located next to the tanks and distribute alum to the effluent of the bioreactors prior to secondary clarification. pH adjustment is achieved utilizing magnesium hydroxide stored in two 5,000 gallons tanks also located in the main process building. Chemical feed pumps are located adjacent to the tanks and feed the Magnesium Hydroxide to the RAS sludge returned to the Bioreactors. The effluent is disinfected with chlorine prior to final discharge.

Sludge from the bioreactors is wasted through the WAS pumps and directed to the rotary drum thickeners. The sludge is thickened from 1% solids to 4 % and discharged into a sludge holding

tank where it is mixed with the primary sludge. The mixture of waste activated and primary sludge is feed to two belt filter presses where it is dewatered to 25 – 30 percent solids. The dewatered sludge is mixed with dry lime in a pug mill to raise the pH and discharged through a chute to receiving trucks. Final disposal is at the landfill.

SHIPPENVILLE WASTEWATER OPERATION

COLLECTION SYSTEM

The wastewater collection and conveyance system consists of approximately 20,091 ft. of gravity sewer lines. The system also includes a single lift station located at 154 North School Street that has a design capacity of approximately 46 gpm/pump, serves seven residences, and has approximately 1,100 ft. of force main.

WASTEWATER TREATMENT PLANT

At the time of acquisition, Shippenville was a party to a Consent Order & Agreement (CO&A) with the Pennsylvania Department of Environmental Protection (DEP) and was faced with the prospects of constructing a new 100K GPD wastewater treatment plant at an estimated cost of $4,344,500. The system was under a CO&A for violations of its discharge permit caused by poor operations, undersized treatment processes, and a lack of redundancy in the treatment processes.

As the Shippenville system is approximately 1.2 miles from PAWC's Paint-Elk system, PAWC determined purchasing the system and interconnecting it to Paint-Elk would be a more cost effective way of dealing with the issues at the treatment plant. Construction of the interconnecting pump station and force main is underway with expected substantial completion in 2017.