DELAWARE COUNTY REGIONAL WATER QUALITY CONTROL AUTHORITY

EASTERN SERVICE AREA ACT 537 PLAN UPDATE

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Executive Summary

The purpose of this Act 537 Plan is to evaluate and select the best alternative for the long term sewage needs of DELCORA's current and future rate payers. In 2019, DELCORA estimated that capital costs to address the needs of the sewer system would be $1.2 billion by 2042. Over half of that estimate ($600 million) was earmarked for the City of Philadelphia's Long Term Control Plan (LTCP) costs being mandated by the EPA. This amount was a steep increase from the $178 million for the Philadelphia Water Department (PWD) LTCP costs estimated in April of 2013. DELCORA determined in 2019 that to avoid the cost of the EPA unfunded mandate of the PWD LTCP that is in the best interests of the rate payers to initiate an investigation into the best alternative for future wastewater service in the service area. Alternatives to staying in the City's system would provide the following general benefits:

- Avoid paying PWD over $600 million by leaving the PWD system by April 2028
- Instead, invest in the DELCORA system and save additional money over the long-term
- A smaller investment in the DELCORA system saves money and allows control of infrastructure and economic destiny
- Addresses the needs of growth in the Service Area and the DELCORA LTCP issues.

DELCORA believes to meet their Mission Statement, "Provide environmentally responsible and cost-effective wastewater management services to the citizens, businesses and industries of Southeastern Pennsylvania" and their Long Term Control Plan goals, it is incumbent on them to look at alternatives that address the identified needs in an environmentally sound, socially conscious and cost effective way.

DELCORA is a county-wide Authority. At its founding, the County was divided into two regions, the Eastern Service Area and the Western Service Area, each to be served by a regional wastewater treatment plant. DELCORA was to be responsible for building and operating interceptors and pump stations in both regions, building the regional treatment plant in the Western Service Area (WRTP), and acquiring capacity in the City of Philadelphia's (City) Southwest Water Pollution Control Plant (SWWPCP) for wastewater treatment for the Eastern Service Area. The DELCORA service area is shown on the attached Exhibit 3.

Chapters 1, 2, 3 and 4 of this Plan provide background information on the service area and the communities serviced by DELCORA. Chapter 3 specifically summarizes each municipalities condition reports for their respective systems. Chapter 4 summarizes the needs assessment for each

community. The remainder of the plan address the alternative identification and assessment as per Chapter 71 requirements.

Alternative 2 – Construction of the Deep Tunnel storage and conveyance facility and Upgrades to the Pumping and Treatment Facilities is the selected alternative. This selection is based on a combination of capital costs, operational costs and environmental justice considerations and regulatory issues in meeting the requirements of the DELCORA Long Term Control Plan (LTCP). The estimated capital cost of this alternative is $472,200,000. Chapter 6 of this Plan provides additional details on the advantages of this alternative. Additional long term advantages to the rate payers have been evaluated for both the selected alternative and for the impact of Aqua ownership. A link to the DELCORA website is included in Chapter 6 for additional details of these projected advantages to customers of Aqua ownership.

The evaluation of each of the potential alternatives will consider environmental justice impacts on the community serviced by DELCORA facilities. Since cost considerations have a significant financial impact on the rate payers, meaningful involvement of all people will be part of the applicable permitting and public outreach aspects of these future projects. Alternative 2 considers environmental justice aspects by managing rates while minimizing impact during construction due to the underground nature of tunnel construction and operation activities. Alternative 2 also provides flexibility and redundancy for future conditions that may mitigate the need for additional investment thus reducing future construction and rate impacts for all service area customers, including communities within the environmental justice corridor.

It is the intent of this Plan to document the current state of the system, explain the implementation plan and provide a timeline. Appended to this document is the Administrative Completeness checklist (Exhibit 2) reflecting the applicability of the required sewage facilities planning components. Also appended are the Resolutions of Adoption from the impacted communities. *Note, the Resolutions of Adoption are not included in this version sent out for public comment.*

The implementation schedule for this Plan is as follows:

March 18, 2020	-	Approval of Plan of Study
July 9, 2021	-	Draft of plan sent to PADEP
July 29, 2021	-	Draft ESA Act 537 Plan Virtual Discussion with PADEP
August 19, 2021	-	Municipal Engagement Virtual Meeting

September 1, 2021	-	Plan transmitted for all municipality's PC for review and comment Plan transmitted to DCPC, CCPC, CCHD and Joint Authorities 30- and 60-day comment periods begin
October, 2021	-	Address comments from the public and agencies.
November, 2021	-	Transmit plans to Municipalities for approval.
December, 2021	-	Receive resolutions of adoption from Municipalities
January, 2022	-	Transmit complete report for DEP approval
May, 2022	-	Anticipated PADEP Approval
July, 2022	-	Tunnel Contractor and Equipment Procurement
January, 2023	-	Start Shaft Construction

1. Previous Wastewater Planning

1.1 Previous Act 537 Planning

DELCORA was formed by the County of Delaware, PA (County) by resolution dated October 20, 1971 with the power to construct, finance, operate and maintain sewer systems throughout the County and adjacent areas included in its drainage basin. DELCORA was established as a county-wide authority and the County was divided into two regions, the Eastern Service Area and the Western Service Area, each to be served by a regional wastewater treatment plant. DELCORA was to be responsible for building and operating interceptors and pump stations in both regions, building the regional treatment plant in the Western Service Area (WRTP), and acquiring capacity in the City of Philadelphia's (City) Southwest Water Pollution Control Plant (SWWPCP) for wastewater treatment for the Eastern Service Area. DELCORA currently owns and operates several sewer collection systems serving municipalities within Delaware County, as shown on the attached Exhibit 3, while also providing service to most of Delaware County and a small section of Chester County.

Delaware County Sewerage Facilities Plan – 1971

This plan identified needs and recommended a regionalized sewer system for as much of the County as possible. The Delaware County Regional Water Quality Control Authority was created to address this need.

Comprehensive Water Quality Management Plan for Southeast Pennsylvania – 1974

This plan was intended to serve as a guide to wastewater planning in the entirety of southeastern Pennsylvania.

Philadelphia Water Department Act 537 Plan – 1993

The 1993 plan provided a set of goals and objectives including protecting public health, protection natural resources, providing consistent and appropriate wastewater planning, and ensuring adequate water pollution control within in the City of Philadelphia.

Act 537 Plan Partial Update Diversion Project - 1999

This plan was to address CDCA problems limed to peak flows during rainstorms. The preferred alternative to address the issue is the construction of the Central Delaware County Pump Station Diversion Project, which will redirect flow from the CDCA planning area to DELCORA's WRTP in Chester. The project included a flow splitter which will allow flow to pumped to either treatment facility or be split between the two facilities. The latter option will be used during peak storm flow periods to abate periodic overflows at the CDPS.

Eastern Service Area Act 537 Plan Municipal & Authority I&I Study – 2000

During 1996 & 1997 I&I studies were conducted (or recent studies submitted in lieu of conducting a new study) by each of the 24 individual municipalities as well and the four municipal authorities in Eastern Delaware County. These studies determined the extent of I&I in each municipality and identified segments with excess I&I through flow monitoring, field investigation, and data gathering. The collected data was then analyzed to develop a corrective action plan for each municipality. These studies were conducted in order to gather information required to update the county-wide Act 537 Sewage Facilities Plan. In 2002, the Eastern Act 537 plan update was developed which referred to this report, stating "This report is incorporated by reference and should be considered a component of this Official Act 537 Plan".

Delaware County Act 537 Plan Revision, Eastern Plan of Study - 2002

A major impetus for the preparation of this Countywide Act 537 plan update was the need to address changes in the condition of the existing sewer system network serving Eastern Delaware County. It was becoming apparent that the existing system was experiencing problems with I&I. Therefore, as early as 1985, in order to be eligible for capital improvements to deal with these issues, DELCORA requested that the County coordinate with it to prepare an Act 537 plan update. DELCORA offered its services to DCPD to help coordinate a comprehensive I&I study of the three major authorities with reported severe I&I problems (CDCA, MA, DCJA). The outcome of this study was to serve as the basis for the preparation of the 2002 Act 537 Plan, including analysis and recommendations.

Delaware County Act 537 Plan Revision, Western Plan of Study - 2004

This plan was prepared by the Delaware County Planning Commission in conjunction with the Delaware County Regional Water Quality Control Authority in 2004. This purpose of this plan was to evaluate alternatives to address the needs of infrastructure. Recommended alternatives for public sewer facilities, planning alternatives, institutional alternatives and alternatives by municipality were provided. They include alternatives to address the condition of the existing public infrastructure, alternatives to develop infrastructure to serve growth areas, alternatives to coordinate land use and sewage facilities planning, technical and economic alternatives to address the condition of existing public infrastructure and technical and economic evaluation of alternatives to develop infrastructure to serve growth areas.

Act 537 Plan Revision Re-Rate of WRTP – 2009

This Act 537 plan was created with the goal of increasing capacity of the WRTP from to 44 MGD to 50 MGD to account for significant future growth and/or development projects that have been identified in the Counties included in this plan. This expansion will be accomplished through a rerate of the WRTP.

Western Delaware County Act 537 Sewage Facilities Plan Update Chester-Ridley Creek Service Area – January 2011 revised through April 2012.

The recommended alternative in the plan was for DELCORA to take responsibility for sewage treatment by constructing a pump station and force main to convey sewage from the existing Baldwin Run Pollution Control Plant (BRPCP) location to the WRTP. The Southwest Delaware County Municipal Authority (SWDCMA) and Middletown Authority will continue to be responsible for the operation and maintenance of the collection system to the new pump station.

Eastern Service Area Act 537 Plan Update – 2014 (WITHDRAWN)

In June of 2013, an Eastern Service Area Act 537 Update was prepared and submitted in April 2014, which was ultimately rescinded. This rescinded Plan was intended to be an update of the existing Delaware County Act 537 Plan that was approved May 5, 2003. At the time the 537 planning was initiated, DELCORA was in negotiations with PWD regarding a new contract to

treat a portion of the wastewater generated in the Eastern Service Area. The purpose of this Plan was to examine reasonably feasible sewage disposal alternatives that were both environmentally and economically sound. The alternatives considered during the sewage facilities planning process were: (1) Diverting flow to the Delcora WRTP, (2) Constructing a new treatment facility, (3) Sending flow to PWD's SWWPCP for treatment, and (4) Constructing equalization Tanks. This plan was not adopted by many municipalities because of concerns over requirements for infiltration and inflow control within the private portion of the collection system. DELCORA formally withdrew this Plan on May 30, 2018.

Rose Valley Borough Treatment Plant Bypass Act 537 Plan - 2017

This Act 537 plan was put in place to abandon the existing Rose Valley sewage treatment plant and construct a new pump station and force main to convey flow to DELCORA's WRTP. The plan also includes provisions to upgrade the existing Old Mill PS & FM and provide conveyance capacity, via the Middletown Township Act 537 Plan Approval, for the Dutton Mill Interceptor replacement and the Chester Creek Interceptor Phase 2.

CDPS Act 537 Plan Special Study - 2019

The purpose of the study is to review the feasibility to construct a new force main to divert flows from the Crum Creek PS directly to the DELCORA Central Diversion Force Main, diverting flow away from the CDPS. This current plan being prepared will supersede this plan.

Sewage Facilities Planning Modules

DELCORA has historically processed planning modules in accordance with PADEP recommended guidelines. In communities where the entire system is owned by DELCORA, collection, conveyance and treatment capacities and flows are provided and capacity certified if available. In communities where only conveyance and treatment are provided, only those capacities and flows are certified.

2. Physical Analysis

2.1 Planning Area and Wastewater Service Area

The planning area for this plan encompasses both the existing Eastern and existing Western Service Areas. The service area has expanded outside of Delaware County through the years to include small sections of Chester County. Exhibit 3 shows the planning area.

The existing Western Service area includes: Aston Township, Bethel Township, Brookhaven Borough, Chester City, Chester Township, Chester Heights Borough, Eddystone Borough, Marcus Hook Borough, Middletown Township, Parkside Borough, Rose Valley Borough, Trainer Borough, Upland Borough, Upper Chichester Township, Lower Chichester Township and Upper Providence Township.

The existing Eastern Service area includes: Aldan Borough, Clifton Heights Borough, Collingdale Borough, Colwyn Borough, Darby Borough, Darby Township, Edgmont Township, Folcroft Borough, Glenolden Borough, Haverford Township, Lansdowne Borough, Marple Township, Morton Borough, Nether Providence Township, Newtown Township, Norwood Borough, Prospect Park Borough, Radnor Township, Ridley Township, Ridley Park Borough, Rutledge Borough, Sharon Hill Borough, Springfield Township, Swarthmore Borough, Upper Providence Township, Upper Darby Township, Yeadon Borough, Tredyffrin Township(Chester County) and Easttown Township(Chester County).

For the purposes of this plan, given that all wastewater flows are intended to be treated at the WRTP, no differentiation will be given between the service areas.

2.2 Physical Characteristics of Planning Area

Delaware County is located in the southeastern corner of Pennsylvania. It is bordered to the north by Montgomery County, to the east by Philadelphia, to the southeast by the Delaware river and to the southwest by the State of Delaware.

Two major topographical areas run through the County:

The eastern section of Delaware County is level and lies in the Atlantic Coastal Plain and the western portion of the County is hilly and known as the Piedmont area. The lowest point in Delaware County is in Marcus Hook and the highest point is in Newtown Township.

Delaware county is located within the Delaware River watershed and is divided into eight major watersheds Chester County consists of portions of 21 watersheds that eventually drain to the Delaware River Basin.

Most of the service area is served by public water systems. The major water suppliers in the communities are Aqua Pennsylvania, Inc. and the Chester Water Authority.

3. Existing Sewerage Facilities in Planning Area

3.1 Eastern Service Area

DELCORA entered into an Agreement with the City of Philadelphia in 1974 to convey wastewater to the City's Southwest Water Pollution Control Plant (SWWPCP). The Agreement was renegotiated resulting in a fifteen-year Agreement between the City and DELCORA which became effective in April 2013. The flow capacity thresholds in the 2013 City Agreement have remained the same as in DELCORA's prior agreement with the City. The three thresholds are for instantaneous flow at 100 MGD, daily maximum flow at 75 MGD, and annual average daily flow at 50 MGD. DELCORA owns and operates three (3) major pump stations that transport wastewater to the City's SWWPCP. The pump stations are Central Delaware Pump Station (CDPS) with a design capacity of 40 million gallons per day (MGD); Muckinipates Pump Station (MPS) with a design capacity of 24 MGD; and Darby Creek Pump Station (DCPS) with a design capacity of 60 MGD. DELCORA sent an average of approximately 23 MGD in 2020 to the SWWPCP.

Local townships and boroughs own their own systems and convey wastewater to three conveyance authorities, namely, the Central Delaware County Authority, the Muckinipates Authority, and the Darby Creek Joint Authority. These conveyance authorities own and operate the interceptors that convey wastewater to DELCORA's pump stations noted above. The CDPS force main discharges to the City of Philadelphia's SWWPCP but can be diverted to DELCORA's Western Regional Wastewater Treatment Plant (WRTP) in Chester. DELCORA is responsible for wastewater treatment in the Service area. All of the Eastern Service Area Authorities have entered into Agreements with DELCORA for treatment and the Radnor-Haverford-Marple (RHM) Sewer Authority has entered into an Agreement with the Darby Creek Joint Authority.

In the Eastern Service Area, DELCORA owns and operates three (3) major pump stations that transport wastewater to the City of Philadelphia SWWPCP and the WRTP. DELCORA also owns and operates three (3) small pump stations tributary to the CDPS. The pump stations include those listed below:

Table 1	
Major Pump Station	**Design Capacity (MGD)**
Central Delaware Pump Station (CDPS)563 W. Sellers Avenue, Ridley Park, PA	40
Muckinipates Pump Station (MPS) 100 Amosland Road, Norwood, PA	24
Darby Creek Pump Station (DCPS) Calcon Hook Road and Tribbett Avenue,Sharon Hill, PA	60
Tributary Pump Stations	**Design Capacity (MGD)**
Bridle Way Pump Station (BWPS) 20 Bridle Way, Newtown Square, PA	0.79
Runnymeade Pump Station (RPS) 3547 Runnymeade Dr. Newtown Square, PA	1.22
Dream Valley Pump Station (DVPS) 45 Dream Valley Drive, Newtown Square, PA	0.22

The DELCORA owned force main system pumps to SWWPCP and the WRTP for treatment. The flow from the Central Delaware Pump Station (CDPS) is pumped to DELCORA's Western Regional Treatment Plant in Chester. Flow is diverted back to SWWPCP a minimum one day per week for 90 minutes to flush the force main. Wet weather flows in excess of 20 MGD are diverted to SWWPCP.

3.2 **Existing Facilities in Western Service Area**

Sewage facilities operated by DELCORA in the Western Service Area include the WRTP and the collection and conveyance systems in the City of Chester, the Boroughs of Upland, Parkside, Trainer, Rose Valley, and Marcus Hook and a portion of Chester Township. The system includes eight pump stations (Chester Pump Station, Marcus Hook Pump Station, Eddystone Pump Station, PS-6, Rose Valley Pump Station, Old Mill Pump Station, Price Street Pump Station, Chester-Ridley Creek Pump Station) and their respective force mains. Additionally, there are ten small lift stations (Broomall Street, Smith Street, Longpoint Lane, Brookhaven Road, Stadium, Delaware Avenue, 8th Street, Green Street, Feltonville, and Viscose Village), and approximately 129 miles of separate and combined sewers shown in Figure 6. Included in the 129 miles of sewers are: 11.7 miles of an interceptor system; 3,209 manholes; twenty-five (25) CSO regulators controlling storm overflows; and two (2) outfalls that have no regulators. Chester Pump Station CSO (Outfall #027) and the Jeffrey Street CSO (Outfall #006) have been eliminated and were removed from the NPDES permit effective January 1, 2014.

The WRTP also processes wastewaters from the Boroughs of Eddystone, and Brookhaven, the Townships of Lower Chichester, Nether Providence, and Upper Providence, and Southern Delaware County Authority, Bethel Township Sewer Authority, Southwest Delaware County Municipal Authority, and Middletown Township Sewer Authority. Additionally, typical dry-weather flow (up to 20 MGD of wet-weather flow) from the Central Delaware Pump Station is diverted for treatment at the WRTP. This service is provided through service agreements and DELCORA does not own, operate, or maintain collection systems within those areas but does own and operate the pump stations and force mains used to convey the wastewater to the WRTP.

3.3 **Western Regional Treatment Plant**

DELCORA owns and operates the WRTP in Chester, PA. A complete understanding of the future flow and loading needs of the WRTP is paramount before starting a capital project of this significance. Exhibit 7 provides the details of the existing WRTP. Additionally, upgrades and improvements to the outfall from the plant, long anticipated to improve the discharge to the Delaware River are underway. Additional work remains to complete the preliminary modeling for the proposed dual-pipe outfall with multiport diffusers. Upon completion of the modeling phase, DELCORA will proceed with the design and construction of the proposed outfall. A schematic of the WRTP is provided as Exhibit 4.

The WRTP is a permitted 50 MGD activated sludge treatment plant (with the outfall upgrade). This hydraulic rating is based on specific language in the current permit for determining if a hydraulic overload exists. Treatment Plant components include aerated grit removal, primary clarification, activated sludge treatment employing fine bubble diffusers, secondary clarification, and effluent disinfection utilizing chlorine. Secondary sludge is thickened with gravity belt thickeners and combined with the primary sludge. The combined sludge is dewatered using belt filter presses and incinerated using multiple hearth incinerators (more detailed information on solids loading and handling follows in subsequent paragraphs). The WRTP is about 45 years old and major components have been upgraded over the years.

The WRTP treats wastewater generated in the Western Service Area collection system including the collection and conveyance systems in the City of Chester, the Boroughs of Upland, Parkside, Trainer, Rose Valley, and Marcus Hook, and a portion of Chester Township. The system includes seven pump stations and force mains, six small lift stations and approximately 129 miles of separate and combined sewers. Included in the 129 miles of sewers are: 11.7 miles of an interceptor system; 3,209 manholes; and twenty-five (25) combined sewer outfall regulators controlling storm overflows. The 2020 Annual Average from the WRTP was 39.28 MGD. Based on Chapter 94 reporting no hydraulic or organic overloads exist.

The WRTP also processes wastewaters from the Boroughs of Eddystone, and Brookhaven, the Townships of Lower Chichester, Nether Providence, and Upper Providence, and Southern Delaware County Authority, Bethel Township Sewer Authority, Southwest Delaware County Municipal Authority, and Middletown Township Sewer Authority. Additionally, typical dry-weather flow (up to 20 MGD of wet-weather flow) from the Central Delaware Pump Station is diverted for treatment at the WRTP. This service is provided through service agreements and DELCORA does not own, operate, or maintain collection systems within those areas but does own and operate the pump stations and force mains used to convey the wastewater to the WRTP.

The WRTP solids handling unit processes include (1) gravity belt thickeners (GBTs) for thickening waste activated sludge (WAS); (2) belt filter presses (BFPs) for dewatering combined primary sludge, thickened WAS and trucked sludge discharged directly to the sludge holding tanks; (3) multiple hearth incinerators for thermal processing of the dewatered sludge; and (4) numerous related systems such as sludge pumping equipment, sludge storage tanks, wash water pumping equipment, sludge cake conveyors, polymer storage and feed systems, etc.

The WRTP influent design organic (BOD5) loading capacity is 161,000 pounds per day. The average BOD5 loading for 2016 through 2020 was 92,241 pounds BOD5 per day. The average organic loading in 2020 was 105,197 pounds BOD5 per day. The organic (BOD5) design of the WRTP aeration system is 108,000 pounds per day. This applies to the loading after primary treatment. The current facilities adequately handle the processing of the organic loadings to the WRTP.

The summary of the proposed upgrades to the WRTP is included in the Kleinfelder Value Engineering Scenario 2 Concept Design Memorandum dated January 22, 2021 (Exhibit 7). The Memorandum recommends the installation of additional dewatering capacity equivalent to the capacity of one (1) 2-meter BFP (i.e., 2,000, lbs./hr.) for the processing of additional sludge generated by the treatment of Eastern Service Area (ESA) wastewater plus the volume of trucked liquid waste, trucked grease and sludge delivered to the WRTP.

3.4 **Long Term Control Plan**

The Long Term Control Plan Update (LTCPU) for the Delaware County Regional Water Quality Control Authority (DELCORA) evaluates the sewer systems according to United States Environmental Protection Agency (USEPA) requirements and guidance. The final plan was submitted to the USEPA on February 15, 2019. Revisions to the plan were submitted on July 15, 2020 and January 21, 2021 in response to PADEP and USEPA comments. The January 21, 2021 version of the LTCP, is currently under review and addresses all aspects of the Consent Decree issued to DELCORA by USEPA. Although monitoring and modeling studies show DELCORA is

not causing Water Quality Standards to be exceeded, the plan includes further investment to reduce Combined Sewer Overflow (CSO) discharges and improve water quality. The investments include improvements to the collection system and the treatment plant that will provide multiple benefits to DELCORA customers. These improvements increase the level of system wide annual average wet weather flow capture to over 90% of the total wet weather flow. This level of capture exceeds Federal Clean Water Act requirements under USEPA's "Presumption" approach.

Prior to this LTCPU, DELCORA has expended approximately $100 M in capital improvements to address CSOs as planned in the original 1999 Long Term Control Plan. This update adds over $150 M in life cycle costs to the prior and ongoing investment within an accelerated 12 year schedule. This additional investment is affordable if other program costs do not increase significantly.

DELCORA Monitoring and Modeling required by the DELCORA/USEPA/Pennsylvania Department of Environmental Protection Consent Decree has shown that high wet weather flows in the separate sewered areas result in DELCORA's Sanitary Sewer Overflows (SSOs) and contribute to increased CSO discharges. Projects planned under the LTCPU address the impact of CSO discharges as required by the Clean Water Act, while also addressing the elimination of SSOs in the DELCORA system.

3.5 **Discussion of Agreements**

In accordance with County Wide Sewerage Facilities Plan developed with PADEP in 1972, various municipalities, municipal authorities and industries in Delaware County were mandated to negotiate with DELCORA for future treatment. DELCORA entered into service agreements with municipalities and major industries. The agreements are for various terms up to 50 years. A listing of all municipal agreements is attached as Exhibit 5.

3.6 **Summary of Information from each municipality impacted**

The individual municipal Act 537 Plans for the tributary communities reflect the descriptions and conditions of their wastewater systems. In the preparation of this Act 537 Plan, questionnaires were sent to each impacted municipality. Information below was provided in the questionnaires (included in Exhibit 6), from previous Chapter 94 tributary reporting (if provided) if no responses were received or from DELCORA information for owned systems. Additional information can be found in the Chapter 94 tributary reports from these communities. The following is a listing of the communities and a brief summary of any information provided to DELCORA. No municipal information noted reflects the fact that none was provided by the community. (The information in parentheses after each community name indicates the submittal type)

Aldan Borough (Chapter 94)

The Aldan Borough Sanitary sewer System is a gravity sanitary sewer system that is in good working condition and is structurally sound with no known capacity problems. Television inspection and night-time surveys have been utilized to identify areas in need of corrective action and to address I&I.

Aston Township (Questionnaire)

SWDMA contracts KBX Golden, LLC to maintain and operate the collection system including the pump stations. KBX Golden executes our RDII reduction program that includes metering of sewer sheds, cleaning and televising 35,000 feet of sewer mains annually and performs the investigation, repair/replacement of damaged sewer mains, as prioritized by the Authority.

Bethel Township (Questionnaire)

The Bethel Township Sewage Collection System is monitored continuously by a team of outside contractors. In addition, the sewer system is monitored by Township employees, officials and the Police Department. The team includes KBX Golden, LLC mechanics who visit large horsepower pump station at least three times per week and smaller pump stations at least weekly. Authority Engineers and Inspectors at Bradford Engineering Associations, Inc., monitor flow meters; system maintenance and repair procedures, I&I programs, etc.

Brookhaven Borough (Chapter 94)

There are no known areas of capacity exceedance and no areas of capacity exceedance expected in the next five years.

Chester City (DELCORA)

The collection system is owned and maintained by DELCORA. Manual inspections of critical elements are performed regularly. Generally, the entire collection system is inspected by video cameras about every 5 to 7 years, and the videos are recorded and kept on file for assessment and future reference. All work orders are computerized. The condition of the system is generally in good condition.

Chester Township (DELCORA)

The collection system is owned and maintained by DELCORA. Manual inspections of critical elements are performed regularly. Generally, the entire collection system is inspected by video cameras about every 5 to 7 years, and the videos are recorded and kept on file for assessment and

future reference. All work orders are computerized. The condition of the system is generally in good condition.

Chester Heights Borough (Chapter 94)

The Borough of Chester Heights does not own or maintain any public sewers within the Borough limits. The public sewer connecting the 38 homes is owned and maintained by SWDCMA.

Clifton Heights Borough (Chapter 94)

The Clifton Heights Borough Sewer System is a gravity collection sanitary sewer system that is in good working condition and is structurally sound with no known capacity problems. The public sewer lines are properly size for the connected population.

Collingdale Borough (Questionnaire)

The gravity mains in Collingdale Borough are generally in good condition. Collingdale Borough has three (3) main collection and conveyance systems that discharge to the Darby Creek Joint Authority's system. In accordance with the 2019 Chapter 94 report, the Borough has been analyzing and developing methods to reduce flows including by performing television videos and cleaning the systems, reviewing flow data and planning, designing, and completing rehabilitation projects. Deficiencies are addressed by either a separate contractor hired through public bidding or through the maintenance contract. The Borough periodically flushes and cleans sewer mains and manholes which is performed under the maintenance contract.

Colwyn Borough (Chapter 94)

The Borough performs routine maintenance and repairs of the sewer system. They observe conditions and look for evidence of overflows while performing routine maintenance. The Borough' sanitary sewer systems contains clay/terra cotta piping which is nearing the end of its useful life. The Borough has obtained funding under the PA Small Water and Sewer program to replace clay/terra cotta piping.

Darby Borough (Chapter 94)

The Darby Borough's systems in primarily terracotta pipe. Borough personnel observe conditions of the manhole frames and covers and look for evidence of overflows while performing routine Borough business.

Darby Township (Chapter 94)

Township personal and equipment are utilized for sewer system operation and maintenance on an "as-needed" basis. There are no known areas of capacity exceedance and no areas of capacity exceedance expected in the next five years.

Easttown Township (Chester County) (Chapter 94)

The sewer system is maintained by the Township Sewer Crew. The basic operation force consists of one (1) Crew Chief and three (3) Pump Station operators. This group is responsible for routine sewer and pump station maintenance and repair.

Eddystone Borough (Chapter 94)

Borough forces are used for inspection and troubleshooting of the sanitary sewer system. Contract forces are used for nonroutine maintenance.

Edgmont Township (DELCORA)

The collection system is owned and maintained by DELCORA. Manual inspections of critical elements are performed regularly. Generally, the entire collection system is inspected by video cameras about every 5 to 7 years, and the videos are recorded and kept on file for assessment and future reference. All work orders are computerized. The condition of the system is generally in good condition.

Folcroft Borough (Chapter 94)

Folcroft Borough inspects and trouble shoots the sanitary sewer system. Contract forces are utilized for routine maintenance. Based upon previous video inspections, the system is in fair to good condition. There are no know areas of capacity exceedance and no areas of capacity exceedance expected in the next five years.

Glenolden Borough (Chapter 94)

Glenolden Borough performs routine sewer maintenance including periodic flushing and cleaning as needed.

Haverford Township (Questionnaire)

The Township inspects for illegal connections to the sanitary sewers (sump pumps, basement drains, foundation drains, etc.) and has an Inflow and Infiltration Abatement Program in place. This program also includes a public education program to further educate residents

regarding illegal connections.

The Township has an ongoing preventative maintenance program. This program consists of preventive work such as cleaning and televising of the system to ascertain the condition of the sewer and identify problems. A 24-hour emergency response is provided. Complaints are investigated to determine responsibility and acted upon accordingly. There are a total of six (6) Township personnel who participate fully or partially in daily maintenance of the system. The Township also owns their equipment which includes a flush truck, a vac truck, and a T.V. truck equipped with video camera. This equipment enables the Township to perform routine maintenance such as video inspection, sewer jet cleaning, root cutting, etc.

Lansdowne Borough (Questionnaire and Chapter (94 Report)

The Borough of Lansdowne has a separate storm and sanitary sewer system. The sanitary system is comprised of VCP, PVC, DIP, RCP and HDPE. The age of the Borough's sewer system varies, but the majority is over 50 years in age. A significant sewer project is planned for 2021 to rehabilitate approximately 2,400 feet of the Borough sewer system.

Lower Chichester Township (Chapter 94)

The Township forces are used for inspection and troubleshooting of sanitary sewer system. Maintenance is completed by outside vendors as needed.

Marcus Hook Borough (DELCORA)

The collection system is owned and maintained by DELCORA. Manual inspections of critical elements are performed regularly. Generally, the entire collection system is inspected by video cameras about every 5 to 7 years, and the videos are recorded and kept on file for assessment and future reference. All work orders are computerized. The condition of the system is generally in good condition.

Middletown Township (Questionnaire)

The Middletown Township Sewage Collection System is monitored continuously by a team of dedicated and conscientious individuals with approximately 150 collective years of environmental protection experience. DEP records will demonstrate the proactive track record of this organization.

The Team includes: KBX Golden, LLC's mechanics visit all sewage pump stations a minimum of 3 times per week and smaller pump stations at least weekly. All stations have telephone or radio

dialers keeping mechanics apprised of any abnormal operating conditions. It should be noted that all KBX employees are licensed by DEP as Collection System Operators. Authority Engineers and Inspectors at Bradford Engineering Associates, Inc. monitor flow meters; system maintenance and repair procedures, I&I Programs, etc. Bradford Engineering specializes in sanitary sewer design and provides construction, operation and maintenance inspections. Authority Manager is a full time employee and is on call 24 hours per day to respond to system problems. I&I Program Coordinator is a full time employee responsible for coordination of projects such as lateral inspections, flow metering of the gravity sewers and pump stations, working with the engineer on closed circuit TV projects and repairs, as well as many other projects in Middletown Township.

Marple Township (Chapter 94 Report)

The Township has a full staff that does periodic monitoring of the sewer system in additional to the long-term maintenance of all the lines. Specifically, the Township's public works department performs scheduled services including monitoring, maintenance and repairs.

Morton Borough (Chapter 94)

Morton Borough has staff that are used for inspection of the sanitary sewer system. Contract forces are used for troubleshooting and maintenance. Video inspection of a portion of the sanitary lines were completed in 2019.

Nether Providence Township (Chapter 94)

Nether Providence Township public works department has a sewer maintenance schedule for cleaning and inspecting lines. The crews look for blockages, broken pipes, roots in lines and I&I issues. The general condition of the sewer system is good.

Newtown Township (Chapter 94)

The Newtown Township Sewer Authority currently uses Township administrative staff for billing as well as the Township Public Works Department to do periodic monitoring of the sanitary sewer system. The Authority has a contract with KBX Golden LLC to operate and maintain all Authority owned pump stations. Work is performed on an as needed basis by Township staff of private contractors, in addition to the long-term maintenance of all the lines.

Norwood Borough (Chapter 94)

Based upon video inspections completed in the reporting year, the Norwood Borough's system is considered to be in fair to good condition. Outside contractors are utilized for sewer system operation and maintenance on an as-needed basis.

Parkside Borough (DELCORA)

The collection system is owned and maintained by DELCORA. Manual inspections of critical elements are performed regularly. Generally, the entire collection system is inspected by video cameras about every 5 to7 years, and the videos are recorded and kept on file for assessment and future reference. All work orders are computerized. The condition of the system is generally in good condition.

Rose Valley Borough (DELCORA)

The collection system is owned and maintained by DELCORA. Manual inspections of critical elements are performed regularly. Generally, the entire collection system is inspected by video cameras about every 5 to 7 years, and the videos are recorded and kept on file for assessment and future reference. All work orders are computerized. The condition of the system is generally in good condition.

Prospect Park Borough (Chapter 94)

Prospect Park Borough personnel and equipment and outside contractors are utilized for sewer system operation and maintenance on an as-needed basis.

Radnor Township (Chapter 94)

Radnor Township's sanitary sewer collection system consists of a gravity collection system and four (4) pumping stations. The age of the Township systems ranges from over 100 years old to pipelines recently constructed.

Ridley Township (Chapter 94)

Township forces are used for inspection, troubleshooting and routine maintenance of the sanitary sewer system.

Ridley Park Borough (Chapter 94)

Ridley Park Borough personnel and equipment and outside contractors are utilized for sewer system operation and maintenance. Based upon previous video inspections, the system is in fair

to good condition. There are no known areas of capacity exceedance and no areas of capacity exceedance expected in the next five years.

Rutledge Borough (Chapter 94)

Based on video inspections, the Rutledge Borough system is in fair to good condition. Contract forces are used for trouble shooting and routine maintenance. Video inspection is conducted periodically and as needed in conjunction with emergency repairs.

Sharon Hill Borough (Chapter 94)

Sharon Hill Borough operates and maintains 12.18 miles of sanitary sewer. Most of the sanitary sewers are old and were constructed between 1905 and 1950. The sewers are primarily vitrified clay or reinforced concrete construction, and all are gravity. The Borough is not aware of any areas in their sanitary sewer system where conveyance capacity is being exceeded.

Springfield Township (Questionnaire)

Springfield Township has a monitoring, maintenance and rehabilitation program that was established in accordance with WEF MOP FD-6. The majority of Springfield Township's sanitary sewer system is operating adequately with occasional blockages due to root intrusion, grease accumulation, or a collapsed pipe. The maintenance and inspection activities are expected to keep the system in good working order.

Swarthmore Borough (Questionnaire)

The sewers in Swarthmore Borough are comprised mainly of terra-cotta clay pipe, with some cast iron, the majority of which was installed in the 1950's. PVC has been used for the new replacement. The system is in fair to good condition.

Trainer Borough (DELCORA)

The collection system is owned and maintained by DELCORA. Manual inspections of critical elements are performed regularly. Generally, the entire collection system is inspected by video cameras about every 5 to7 years, and the videos are recorded and kept on file for assessment and future reference. All work orders are computerized. The condition of the system is generally in good condition.

Tredyffrin Township (Chester County) (Chapter 94)

The sewer system is in good condition and received consistent oversight and maintenance, including chemical root control and CCTV inspection. Only a portion of Tredyffrin Township's sewer collection system flows to RHM.

Upland Borough (DELCORA)

collection system is owned and maintained by DELCORA. Manual inspections of critical elements are performed regularly. Generally, the entire collection system is inspected by video cameras about every 5 to7 years, and the videos are recorded and kept on file for assessment and future reference. All work orders are computerized. The condition of the system is generally in good condition.

Upper Darby Township (Chapter 94)

Upper Darby Township sewer division has a routine maintenance plan to maintain the system, which includes the replacement of deteriorated sections of the pipe, the cleaning of grease, removal of roots and jet sewer lines at known problem locations.

Upper Chichester Township (Questionnaire)

The system is owned and maintained by the Southern Delaware County Authority.

Upper Providence Township (Chapter 94)

The collection system that flows into CDCA (Farnum Road District) is comprised of an 8" PVC gravity main to the Crum Creek Interceptor. There is no apparent gravity main or low-pressure sanitary sewer main which exceeds capacity and no know surcharges or SSOs occurred in this district.

Yeadon Borough (Questionnaire)

The Yeadon Borough collection system is primarily constructed of terracotta. The Borough had made progress replacing main sections with PVC pipe over the last 5 years. The Borough owns and maintains the collection system; however, Philadelphia is responsible for the treatment of the system. The Borough cleans and televises the sewer mains where there are known issues. Also, the Borough adds degreaser to manholes where it is needed. Routine sanitary sewer checks are performed by the Borough during and after rain events in order to avoid sanitary sewer overflows.

4. Future Growth and Land Development

4.1 **Land use plans and zoning maps**

Each municipality has its own zoning maps and land use plans that can be accessed from either the Municipal website or Municipal office. The tables in the following sections are based on information provided by individual municipalities or absent any responses, the Delaware Valley Regional Planning Commission Municipal Data.

4.2 **Historical municipal population data**

The DELCORA Eastern and Western Service areas include portions of many municipalities. The primary service area is Delaware County with a few municipalities in Chester County. The growth continues to be influenced by the suburban expansion outward from Philadelphia through Chester, Delaware, and Montgomery Counties. Census population data from 1970, 1980, 1990, 2000 and 2010 for the service area municipalities is summarized on Table 2.

Table 2 1970-2010 Historic Populations						
	1970	1980	1990	2000	2010	% Change
Aldan Borough	5,001	4,671	4,549	4,315	4,152	-16.98%
Aston Township	13,704	14,530	15,080	16,205	16,592	21.07%
Bethel Township	2,034	2,438	3,330	6,420	6,791	233.87%
Brookhaven Borough	7,370	7,912	8,567	7,985	8,006	8.63%
Chaddsford Township	1,281	2,057	3,118	3,170	3,640	184.15%
Chester City	56,331	45,794	41,856	36,855	33,972	-39.69%
Chester Heights Borough	597	1,302	2,273	2,481	2,531	323.95%
Chester Township	5,708	5,687	5,399	4,605	3,940	-30.97%
Clifton Heights Borough	8,348	7,320	7,111	6,780	6,652	-20.32%
Collingdale Borough	10,605	9,539	9,175	8,665	5,786	-45.44%
Colwyn Borough	3,169	2,851	2,613	2,455	2,546	-19.66%
Darby Borough	13,729	11,513	11,140	10,300	10,687	-22.16%
Darby Township	13,603	12,264	10,955	9,625	9,264	-31.90%
Easttown Township	9,565	9,064	9,570	10,270	10,477	9.53%
Eddystone Borough	2,706	2,555	2,446	2,440	2,410	-10.94%
Edgmont Township	1,368	1,410	2,735	3,915	3,987	191.45%
Folcroft Borough	9,610	8,231	7,506	6,980	6,606	-31.26%
Glenolden Borough	8,697	7,633	7,260	7,475	7,153	-17.75%
Haverford Township	56,873	52,349	49,848	49,608	48,491	-14.74%
Lansdowne Borough	14,090	11,891	11,712	11,044	10,620	-24.63%
Lower Chichester Township	4,009	3,784	3,660	3,590	3,469	-13.47%
Marcus Hook Borough	3,041	2,638	2,546	2,315	2,397	-21.18%
Marple Township	25,040	23,642	23,123	23,735	23,428	-6.44%
Middletown Township	12,878	12,463	14,130	16,065	15,807	22.74%
Morton Borough	2,602	2,412	2,851	2,715	2,669	2.57%
Nether Providence Township	13,589	12,730	13,229	13,456	13,706	0.86%
Newtown Township	11,081	11,775	11,366	11,705	12,216	10.24%
Norwood Borough	7,229	6,647	6,162	5,985	5,890	-18.52%
Parkside Borough	2,343	2,464	2,369	2,265	2,328	-0.64%
Popcopson Township	1,556	2,331	3,266	3,350	4,582	194.47%
Prospect Park Borough	7,250	6,593	6,764	6,595	6,454	-10.98%
Radnor Township	28,782	27,676	28,703	30,880	31,531	9.55%
Ridley Park Borough	9,025	7,889	7,592	7,195	7,002	-22.42%
Ridley Township	39,085	33,771	31,169	30,790	30,768	-21.28%
Rose Valley Borough	876	1,038	982	945	913	4.22%
Rutledge Borough	1,167	934	843	860	784	-32.82%
Sharon Hill Borough	7,464	6,221	5,771	5,465	5,697	-23.67%
Springfield Township	29,006	25,326	2,416	23,675	24,211	-16.53%
Swarthmore Borough	6,156	5,950	6,157	6,170	6,194	0.62%
Trainer Borough	2,336	2,056	2,271	1,905	1,828	-21.75%
Tredyffrin Township	23,404	23,019	28,028	29,062	29,332	25.33%
Upland Borough	3,930	3,458	3,334	2,980	3,239	-17.58%
Upper Chichester Township	11,414	14,377	15,004	16,845	16,738	46.64%
Upper Darby Township	95,910	84,054	81,177	81,821	82,795	-13.67%
Upper Providence Township	9,234	9,477	9,727	10,510	10,142	9.83%
Yeadon Borough	12,136	11,727	11,980	11,762	11,443	-5.71%
Based on Census Data						

4.3 **Population Projections**

Population projection for each of the service area municipalities are presented in Table 3. The population projections were received from the Municipalities as part of a questionnaire sent. If there was no response available from the municipality, the Delaware Valley Regional Planning Commission Municipal Data Manager was utilized, and the 2050 population was extrapolated based on previous years.

Table 3 2020 - 2050 Population Projections								
	2020	2025	2030	2035	2040	2045	2050	% Change
Aldan Borough[2]	4,186	4208	4230	4248	4264	4277	4,295	2.61%
Aston Township[2]	16,745	17083	17227	17352	17455	17541	17,700	5.70%
Bethel Township[1]	9,359	9,550	9,745	9,914	10,052	10,170	10,250	9.52%
Brookhaven Borough[2]	8,138	8198	8259	8311	8355	8391	8,442	3.73%
Chaddsford Township[2]	3,848	3955	4065	4159	4237	4302	4,393	14.16%
Chester City[2]	34,281	34468	34659	34824	34960	35075	35,234	2.78%
Chester Heights Borough[2]	2,647	2667	2688	2706	2721	2733	2,750	3.90%
Chester Township[2]	4,140	4178	4216	4248	4275	4298	4,330	4.58%
Clifton Heights Borough[2]	6,709	6733	6758	6780	6798	6813	6,834	1.86%
Collingdale Borough[1]	8,866	8939	9014	9079	9132	9177	9,217	3.96%
Colwyn Borough[2]	2,584	2615	2646	2673	2695	2714	2,740	6.04%
Darby Borough[2]	10,756	10825	10896	10956	11006	11049	11,108	3.27%
Darby Township[2]	9,322	9326	9330	9333	9336	9337	9,340	0.19%
Easttown Township[2]	10,966	11309	11659	11961	12209	12420	12,711	15.91%
Eddystone Borough[2]	2,414	2420	2427	2433	2438	2442	2,448	1.39%
Edgmont Township[1]	4,214	4,358	4,504	4,631	4,735	4,823	4,900	16.28%
Folcroft Borough[2]	6,631	6625	6619	6614	6610	6606	6,601	-0.45%
Glenolden Borough[2]	7,194	7215	7236	7255	7270	7283	7,301	1.48%
Haverford Township[1]	17,386	17,630	17,884	18,129	18,393	18,648	18,914	8.79%
Lansdowne Borough[1]	10,639	10,671	10,688	10,702	10,714	10,724	10,724	0.80%
Lower Chichester Township[2]	3,488	3,499	3,510	3,519	3,527	3,534	3,543	1.58%
Marcus Hook Borough[1]	2,397	2,433	2,451	2,466	2,479	2,490	2,490	3.88%
Marple Township[1]	23,794	23,846	23,898	23,942	23,979	24,011	24,039	1.03%
Middletown Township[1]	16,185	16,371	16,560	16,724	16,858	16,972	17,000	5.04%
Morton Borough2	2,707	2,720	2,732	2,743	2,752	2,760	2,771	2.35%
Nether Providence Township[2]	13,893	13,977	14,063	14,138	14,199	14,251	14,323	3.09%
Newtown Township[2]	12,849	12,943	13,038	13,121	13,189	13,246	13,325	3.71%
Norwood Borough[2]	5,917	5,935	5,954	5,970	5,984	5,995	6,011	1.58%
Parkside Borough[2]	2,349	2,365	2,380	2,394	2,405	2,414	2,427	3.32%
Popcopson Township[2]	5,060	5,264	5,471	5,649	5,796	5,921	6,093	20.42%
Prospect Park Borough[2]	6,515	6,548	6,582	6,612	6,636	6,656	6,684	2.60%
Radnor Township[2]	31,808	32,003	32,201	32,373	32,513	32,633	32,798	3.11%
Ridley Park Borough[1]	7,065	7,100	7,100	7,384	7,668	7,952	8,236	16.57%
Ridley Township[2]	31,129	31,205	31,281	31,348	31,402	31,449	31,513	1.23%
Rose Valley Borough[1]	989	989	989	989	989	989	989	0.00%
Rutledge Borough[2]	798	801	804	807	809	811	814	1.95%
Sharon Hill Borough[2]	5,733	5,764	5,795	5,822	5,845	5,863	5,889	2.72%
Springfield Township[1]	24,612	24,822	25,035	25,220	25,372	25,500	25,596	4.00%
Swarthmore Borough[1]	6,249	6,287	6,325	6,359	6,386	6,409	6,429	2.88%
Trainer Borough[2]	1,833	1,822	1,810	1,801	1,793	1,786	1,777	-3.08%
Tredyffrin Township[1]	30,232	30,900	31,578	32,165	32,648	33,059	33,624	11.22%
Upland Borough[2]	3,263	3,274	3,286	3,296	3,304	3,311	3,321	1.77%
Upper Chichester Township[1]	16,738	17,350	17,526	17,678	17,803	17,909	18,000	7.54%
Upper Darby Township[2]	83,699	84,521	85,354	86,073	86,662	87,167	87,861	4.97%
Upper Providence Township[2]	10,592	10,735	10,881	11,007	11,110	11,198	11,319	6.87%
Yeadon Borough[2]	11,528	11,533	11,539	11,543	11,547	11,550	11,553	0.22%
[1] Provided by municipaltiy								
[2] Based on DVRPC Municipal Data Navigator								

4.4 **Potential Development**

Each of the municipalities in the service area were sent a questionnaire to complete regarding population projections, development projects and conditions of the sewer system. These are appended in Exhibit 6 of the plan. The potential development information was used to estimate additional service area flows that may be generated in the municipalities by the years 2025, 2030, 2035, 2040, 2045, and 2050.

4.5 **Projected Wastewater Flows**

Each of the municipalities in the service area have projected wastewater flows for the years 2025, 2030, 2035, 2040, 2045, and 2050. If flows were not provided by the individual municipalities, flows were projected based on the population projections in Table 3.

The following is a summary of projected additional EDUs to be added in the next 30 years from the tributary municipalities.

Table 4
EDU projections per Municipality

	2025	2030	2035	2040	2045	2050
Aldan Borough[2]	8	8	7	6	5	7
Aston Township[1]	85	25	25	25	25	25
Bethel Township[1]	38	37	37	32	26	23
Brookhaven Borough[3]	5	23	20	17	14	19
Chester City[2]	72	74	64	53	44	61
Chester Heights Borough[2]	7	8	7	6	5	6
Chester Township[2]	15	15	12	10	9	12
Clifton Heights Borough[3]	0	10	8	7	6	8
Collingdale Borough[1]	10	28	24	21	17	38
Colwyn Borough[3]	0	12	10	8	7	10
Darby Borough[2]	26	27	23	19	16	22
Darby Township[3]	5	2	1	1	1	1
Easttown Township[4]	5	5	5	5	5	5
Eddystone Borough[2]	2	3	2	2	2	2
Edgmont Township[1]	184	125	40	30	25	22
Folcroft Borough[3]	5	0	0	0	0	0
Glenolden Borough[3]	0	8	7	6	5	7
Haverford Township[1]	58	25	25	25	25	25
Lansdowne Borough[1]	0	0	0	0	0	0
Lower Chichester Township[2]	4	4	3	3	3	3
Marcus Hook Borough[1]	0	0	0	0	0	0
Marple Township[1]	167	167	167	167	167	167
Middletown Township[1]	53	54	47	38	33	8
Morton Borough[3]	8	5	4	3	3	4
Nether Providence Township[3]	5	33	29	23	20	20
Newtown Township[2]	36	36	32	26	22	30
Norwood Borough[3]	5	7	6	5	4	6
Parkside Borough[2]	6	6	5	4	3	5
Prospect Park Borough[3]	5	13	12	9	8	11
Radnor Township[2]	76	77	66	54	46	64
Ridley Park Borough[1]	54	0	0	0	0	0
Ridley Township[3]	5	29	26	21	18	25
Rose Valley Borough[1]	0	0	0	0	0	0
Rutledge Borough[3]	5	1	1	1	1	1
Sharon Hill Borough[3]	4	12	10	9	7	10
Springfield Township[1]	185	185	185	185	185	185
Swarthmore Borough[1]	19	14	13	10	9	7
Trainer Borough[2]	0	0	0	0	0	0
Tredyffrin Township[1]	30	30	30	30	30	30
Upland Borough[2]	4	5	4	3	3	4
Upper Chichester Township[2]	150	75	50	75	50	75
Upper Darby Township[3]	25	322	279	228	195	267
Upper Providence Township[2]	55	56	49	40	34	.
Yeadon Borough[1]	56	0	10	0	10	0
	1482	1558	1338	1201	1083	1208
[1] Provided by municipaltiy questionnaire						
[2] EDU projections not provided by municipality. EDUs based on popuation projections						
[3] 2025 EDU projection based on 2020 Chapter 94 rport and addditional projections are based on population projections						
[4]Very small portion of Municipality flows to RHM. Use 1 EDU a year for projections						
Projected Additional Flow (262.5 gpd/EDU	389,025	408,975	351,225	315,263	284,288	317,100

4.5.1 WRTP flow increases based on Land Development

Based on the above table that summarizes population growth and development projections, the municipalities are projected to see a growth of approximately 7,900 EDUs through 2050. The projected increase in dry weather, average daily wastewater flows to the WRTP will be approximately 2,065,875 GPD based on a per EDU flow of 262.5 gpd.

4.5.2 Total flow and Loading contributions to the WRTP

The DELCORA WRTP is a complex facility as is the entire DELCORA system. Being a combined sewer system in parts adds the component of wet weather flow that has to be addressed as part of the system capacity in order to address the LTCP goals. Any sewage facilities planning that is undertaken at the facility has many flow and loading components that must be analyzed. Attached as Exhibit 7 is the Value Engineering Scenario 2 Concept Design Final Memorandum prepared by Kleinfelder, Inc. This memorandum discusses the various components of flows that are conveyed to the WRTP or will be from a diversion of ESA flows from Philadelphia. These flows include typical dry weather flows, recycle flows, flows from the hauled in waste component, the plant incinerator operations and from major Industrial user's tributary to the system (i.e. Kimberly Clark, Sunoco, etc.). An additional 3.0 MGD of allocation has been reserved in the WRTP expansion and upgrade for these industries based on historical usage. The report indicates these flows approximate 39 MGD currently to the WRTP from the WSA. Additional dry weather flows that would be diverted from the ESA to the WRTP approximate 26 MGD. The Kleinfelder report goes into detail alternatives addressed at the time of its authoring as to how the WRTP would be expanded to address the future needs of both the ESA and the WSA. Needless to say, the additional contribution of 2.06 MGD in development potential and the 3.0 MGD of industrial flow is adequately incorporated into a system that needs to address peak wet weather flows as its primary basis for design in meeting regulatory goals of the DEP and EPA. This results in an average daily flow capacity of 70 MGD for the proposed WRTP upgrades and expansion.

With regard to the future sludge production at the design basis dry-weather flow of 70 mgd, and assuming that the 2017 level of trucked waste processing is not increased, the additional annual average sludge production beyond 64 tons/day will be the sludge generated by the treatment of an additional 36 mgd of wastewater (70 - 34 = 36). Based on the current sludge generation rate of 0.8 tons/mgd, the treatment of an addition 36 mgd of wastewater will generate an additional dewatered sludge production of 29 tons/day, thus increasing the 2017 annual average sludge production of 64 tons/day to 93 tons/day, which is 10 tons/day less than the firm annual average dewatering capacity of 98 tons/day. Therefore, the firm annual average dewatering capacity of 98 tons/day

will enable a safety factor for additional trucked waste and/or for the BFPs to be operated at a rate nominally less than 2,000 lbs./hr.

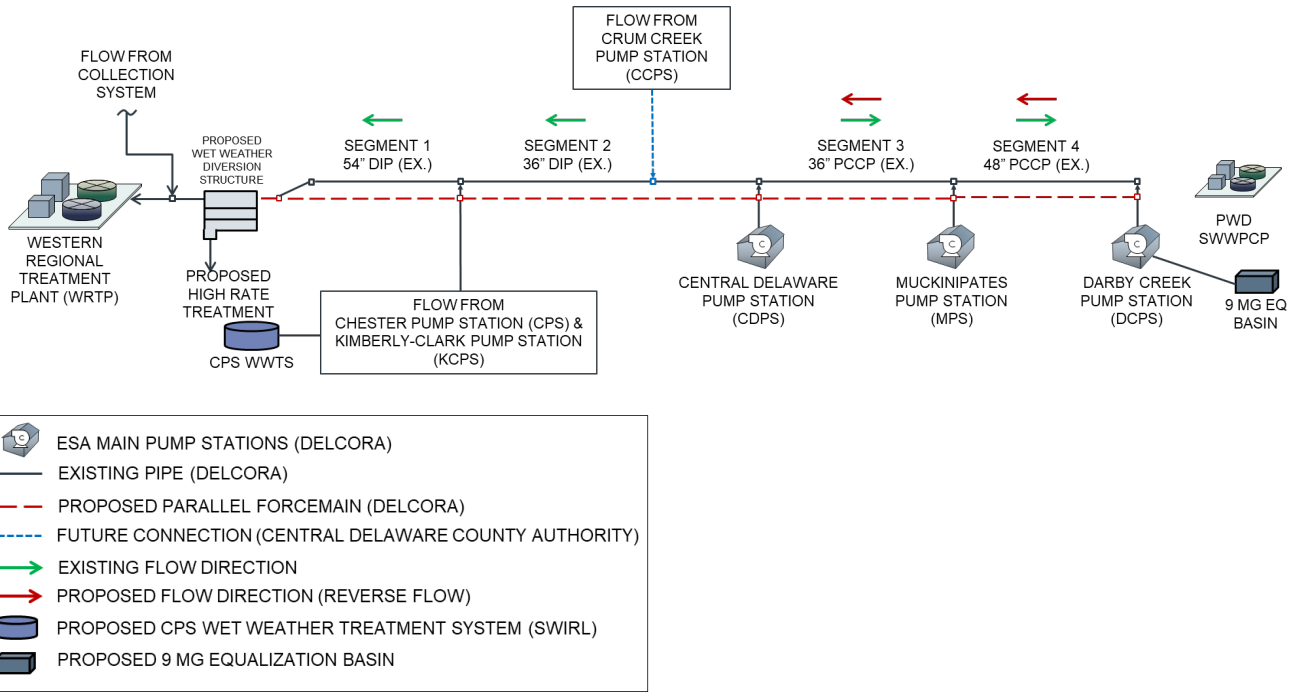
More detailed information is provided in Exhibit 7.

5. Identify Alternatives

As identified in the Executive Summary, DELCORA's Mission Statement is – "Provide environmentally responsible and cost-effective wastewater management services to the citizens, businesses and industries of Southeastern Pennsylvania." To achieve this goal and meet the anticipated regulatory requirements of the LTCP the following alternatives have been evaluated.

5.1 Alternative 1 – Construction of New Pipeline to Divert Flow to an Expanded WRTP with Wet Weather Biological Treatment

Figure 1



The improvements to the current configuration considered in Alternative 1 are categorized into four categories; (1) Install new ESA forcemains for the management of DELCORA's wet weather flows, (2) rehabilitation of DELCORA's ESA infrastructure, (3) upgrades to the WRTP to 70 MGD, and (4) CSO Long-Term Control Plan Implementation.

The ESA pipelines alternative includes the construction of new force mains parallel to the existing force mains. The direction of flow would be reversed through this new force main system to the

DELCORA WRTP, instead of the current configuration of having ESA flows directed to the Philadelphia Southwest Water Pollution Control Plant.

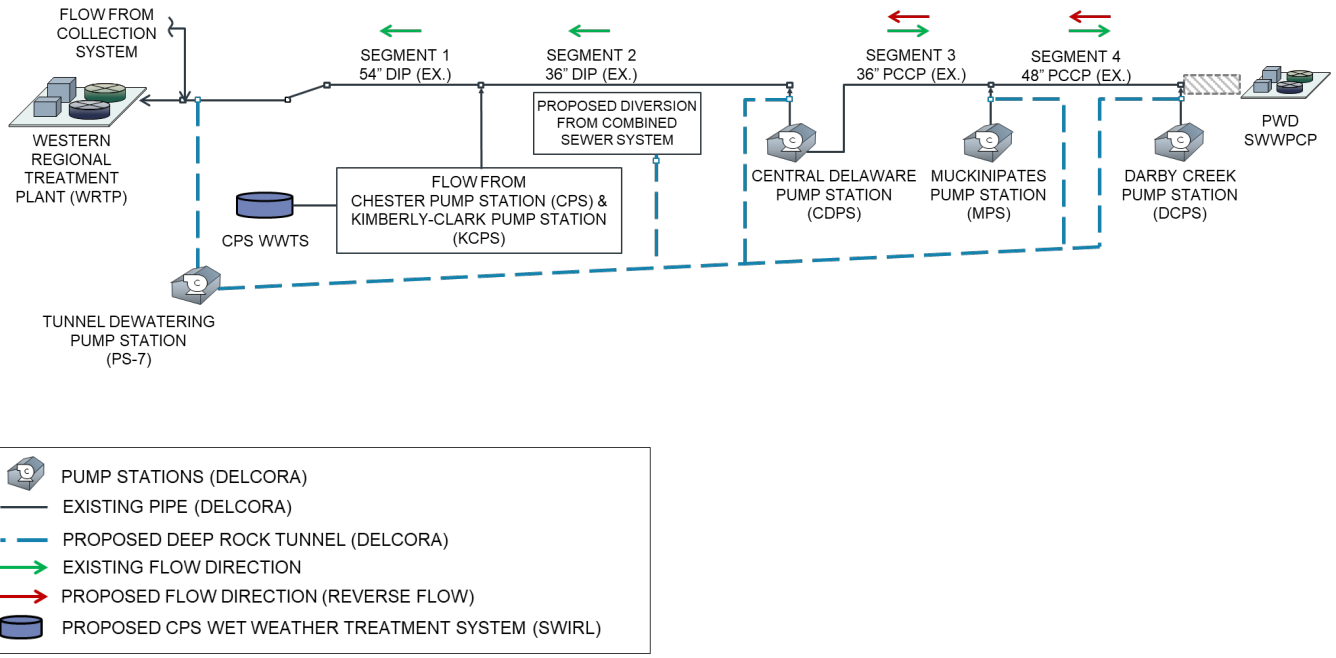
Rehabilitation and upgrade of the Darby Creek Pump Station, Muckinipates Pump Station and Central Delaware Pump Station are required to pump dry and wet weather flow to the WRTP. At the Darby Creek Pump Station, a 9 million gallon equalization basin is proposed to address the pressure limitations of the existing pipeline.

The addition of all ESA flow to the WRTP would require expansion for both dry and wet weather flows. The ESA dry weather flow would be treated through major modifications of the existing WRTP and treatment process including the installation of Integrated Fixed-Film Activated Sludge (IFAS) technology that would replace the existing conventional activated sludge process. Up to 100 MGD of wet weather flow would be treated in a separate wet weather biological treatment train located adjacent to the WRTP. Introducing new treatment technologies at the WRTP was a notable downside to this alternative that is not reflected in the capital cost comparison. Similarly, not represented in the capital cost comparison is the understanding that the separate wet weather biological treatment train located adjacent to the WRTP would have a high frequency of activation.

The implementation of the CSO Long-Term Control Plan including the construction of CSO Storage to control Outfalls 018 and 019, the Chester Wet Weather Treatment System and other improvements to the collection system are proposed to increase CSO Capture.

5.2 **Alternative 2 – Construction of the Tunnel for Storage and Conveyance and WRTP Expansion.**

Figure 2



The improvements to the current configuration considered in Alternative 2 consists of an DELCORA Wastewater Tunnel Project to disconnect from PWD. The improvements to the current configuration are categorized into four categories: (1) ESA Tunnel Storage and Conveyance project, (2) rehabilitation of DELCORA's ESA infrastructure, including the pump stations and pipelines (3) upgrades to the WRTP, and (4) CSO Long-Term Control Plan Implementation.

DELCORA's Wastewater Tunnel Project consists of the following:

- ESA Tunnel System Project: Excess wet weather flows will be diverted from the Eastern Service Area pump stations and conveyed to the deep rock tunnel via connector sewers and drop shafts. The 8.5-mile (44,340 LF) long deep rock tunnel will extend from the DCPS in Darby Township to the WRTP in Chester. The deep rock tunnel will serve as conveyance and temporary storage of the excess flows during the storm events. Temporarily stored excess flows will be conveyed to the WRTP by the proposed tunnel dewatering pump

station, Pump Station 7 (PS-7). Additional technical details are included in Exhibits 10 and 11.

- Tunnel Dewatering Pump Station Project: At the downstream end of the tunnel adjacent to DELCORA's WRTP, a tunnel dewatering pump station (PS-7) will be constructed to lift flow into the Plant. A shallow connecting force main will convey flow to the treatment plant. Current plans call for a separate launching shaft to be constructed approximately 100 feet north of PS-7. The launching shaft (or Eastern Service Area Tunnel Shaft No.1 (ESATS 1)) will also include a starter and tail tunnel which will be used to assemble a tunnel boring machine (TBM) to excavate the downstream segment of the tunnel. Four drop shafts are planned to be constructed along the tunnel alignment to drop flow into the tunnel at the following locations: (ESATS 2) Ridley Creek CSO Drop Shaft, (ESATS 3) CDPS Launching/Receiving Shaft, (ESATS 4) MPS Drop Shaft and (ESATS 5) DCPS Receiving Shaft. Rehabilitation of the existing forcemains and rehabilitation and upgrades to the Darby Creek Pump Station, Muckinipates Pump Station and Central Delaware Pump Station are required to pump dry and wet weather flow to the WRTP. Additional technical details are included in Exhibit 10.

- Existing Forcemains Rehabilitation: Existing 36-inch, and 48-inch may need to be rehabilitated or replaced due to condition of PCCP pipe. Condition assessment will be performed to determine if the existing forcemains need to be rehabilitated or replaced. Additional technical details are included in Exhibit 10.

- Darby Creek Pump Station Rehabilitation: Improvements to the pumping capacities and configuration and upgrades to mechanical, electrical and HVAC systems are necessary to maintain operations and compliance with existing codes, as equipment and structure are nearing the end of its service life.

- Muckinipates Pump Station Rehabilitation: Improvements to the pumping capacities and configuration and upgrades to mechanical, electrical and HVAC systems are necessary to maintain operations and compliance with existing codes, as equipment and structure are nearing the end of its service life.

- Central Delaware Pump Station Rehabilitation: Due to the flow configuration of dry weather flow from MPS and DCPS being pumped into the wet well at Central (in order to decrease the pressures in the existing PCCP pipe), significant improvements will need to be made at CDPS. Improvements to the wet well, pumping capacities and pumping configuration will be required. Upgrades to mechanical, electrical and HVAC systems are necessary to maintain operations and compliance with existing codes, as equipment and structure are nearing the end of its service life.

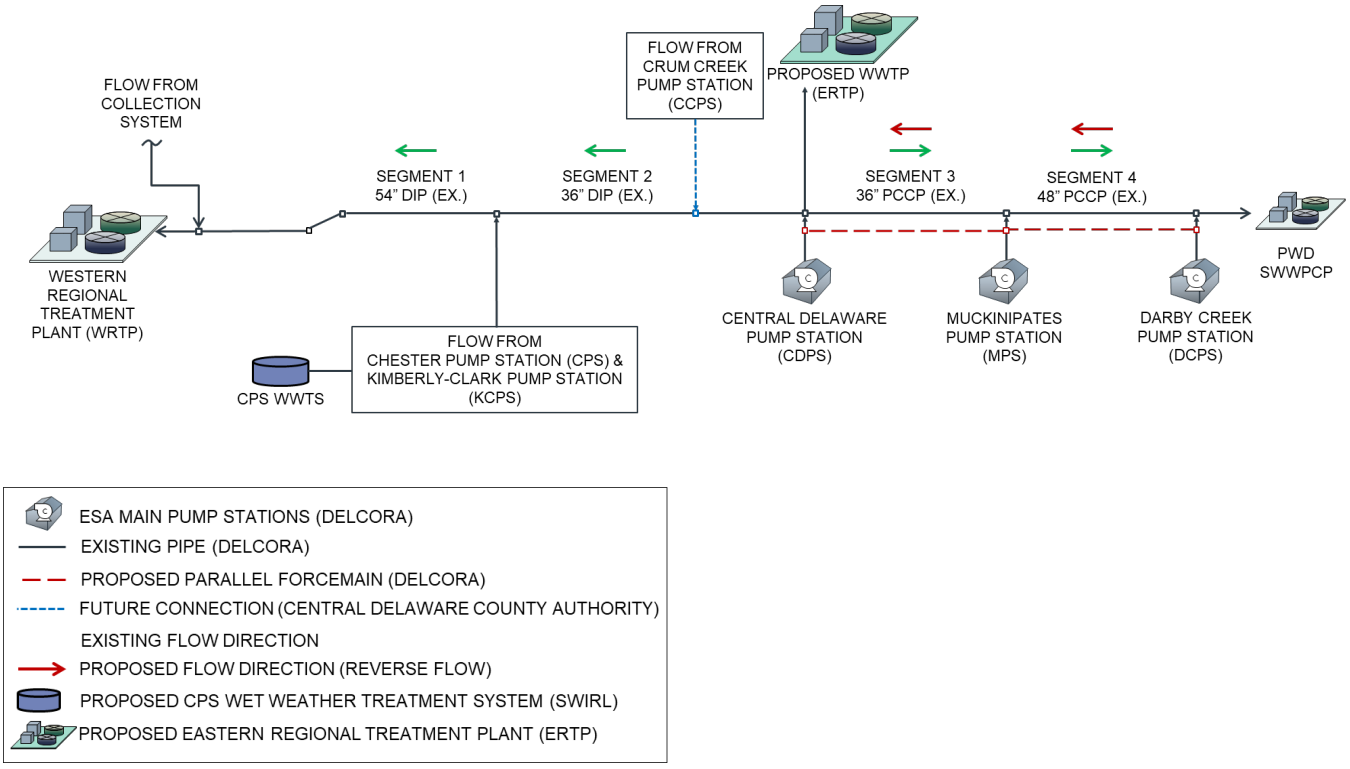
WRTP ESA Flow Upgrades: The addition of the ESA flow to the existing treatment process would require the average daily flow capacity to be increased to 70 MGD with peak flow capacity to be increased to 120 MGD. Rather than introduce new IFAS technology to the WRTP as is required in Alternative 1, in the Tunnel Alternative the existing conventional activated sludge system could remain and would only require expansion of the existing processes at WRTP which is a notable operational advantage to this Alternative. The WRTP conventional activated sludge system would be expanded by adding 5 MGD of aeration tank volume with associated blowers. Managing the additional solids will requires expansion of the sludge dewatering capacity. This will be accomplished by adding an additional dewatering unit within the existing structure. Disinfection of this additional flow would also require expansion of the chlorine contact tanks.

The implementation of the CSO Long-Term Control Plan including the construction of CSO Storage Tank to control Outfalls 018 and 019, the Chester Wet Weather Treatment System and other improvements to the collection system to increase CSO Capture.

Additional technical details regarding the selected Alternative 2 are included in Exhibits 10 and 11.

5.3 Alternative 3 – Construction of a new WWTP and the associated Conveyance Facilities.

Figure 3



This alternative represents the construction of an ESA Wastewater Treatment Plant. Improvements to the current configuration are categorized into four categories: (1) construction of the Eastern Wastewater Treatment Plant (2) rehabilitation of DELCORA's ESA infrastructure, and (3) CSO Long-Term Control Plan Implementation.

Eastern Wastewater Treatment Plant:

- Construction of a conventional activated sludge wastewater treatment plant capable of treating 25.5 MGD of dry weather flow and 100 MGD of wet weather peak flow.

- Construction of onsite solids management, including resource recovery of biogas for energy production through cogeneration and dried biosolids for beneficial reuse, such as land application.

Rehabilitation of the existing forcemains and rehabilitation and upgrades to the Darby Creek Pump Station, Muckinipates Pump Station and Central Delaware Pump Station may be required to pump dry and wet weather flow to the WRTP.

- Existing Forcemains Rehabilitation: Existing 36-inch, and 48-inch may need to be rehabilitated or replaced due to condition of PCCP pipe. Condition assessment will be performed to determine if the existing forcemains need to be rehabilitated or replaced.

- Darby Creek Pump Station Rehabilitation: Improvements to the pumping capacities and upgrades to mechanical, electrical and HVAC systems are necessary to maintain operations and compliance with existing codes, as equipment and structure are nearing the end of its service life.

- Muckinipates Pump Station Rehabilitation: Improvements to the pumping capacities and configuration and upgrades to mechanical, electrical and HVAC systems are necessary to maintain operations and compliance with existing codes, as equipment and structure are nearing the end of its service life.

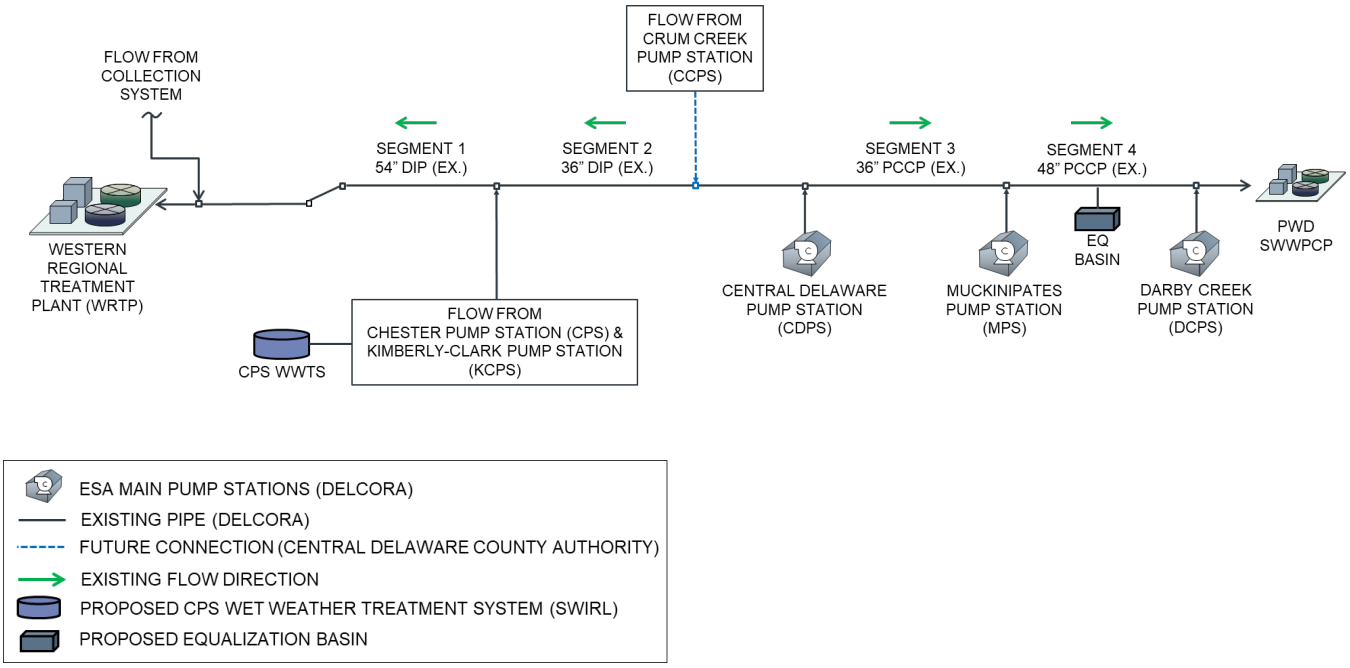
- Central Delaware Pump Station Rehabilitation: Due to the flow configuration of dry weather flow from MPS and DCPS being pumped into the wet well at Central (in order to decrease the pressures in the existing PCCP pipe), significant improvements will need to be made at CDPS. Improvements to the wet well, pumping capacities and pumping configuration will be required. Upgrades to mechanical, electrical and HVAC systems are necessary to maintain operations and compliance with existing codes, as equipment and structure are nearing the end of its service life.

The implementation of the CSO Long-Term Control Plan including the construction of CSO Storage Tank(s) to control Outfalls 018 and 019, the Chester Wet Weather Treatment System and other improvements to the collection system to increase CSO Capture.

5.4 **Alternative 4 – No Action/continued discharge to the City of Philadelphia**

The no action alternative will cost the rate payers substantial annual fees to have the wastewater treated by the PWD due to the US EPA and US Justice Department mandates that require DELCORA to fund part of the PWD's improvements. The last estimate for the cost from the City of Philadelphia was $605 million dollars.

Figure 4



This alternative represents required investments to include (1) contribution to the Philadelphia Water Departments Long Term Control Plan, (2) contribution to capital improvements at the Philadelphia Water Department Southwest Water Pollution Control Plant (3) rehabilitation of DELCORA's ESA infrastructure, and (4) CSO Long-Term Control Plan Implementation.

The alternative to remain in the PWD system, which includes the current agreement with PWD will require DELCORA to pay 9.44% of PWD's capital improvement program. Anticipated investments in PWD's CSO Long-Term Control Plan would include DELCORA's contribution to the PWD CSO LTCP compliance effort and is based on the Eastern Service Area's contribution of 9.44% to the peak wet weather flow. The current estimated cost that DELCORA will contribute is $605 Million through 2042. Contract term will be up for renegotiation in 2028, when the contract term ends.

Additional future infrastructure and potential fees anticipated at the Southwest Water Pollution Control Plant that DELCORA would be responsible for include the items below (Note: DELCORA does not have an estimate for the capital cost or DELCORA contribution to these items):

- Centrate Side Stream Pre-treatment for Ammonia Reduction. DELCORA would be responsible for contributing 10% of the capital funds for this project.

- Southwest WPCP Ammonia Control Improvements to address future potential nitrogen effluent criteria that may be imposed by the Delaware River Basin Commission and PADEP, if results from a current study of the impacts of nitrogen on the Delaware River determine that lower effluent limits for ammonia and other nitrogen series are necessary. DELCORA would be responsible for contributing 10% of the capital funds for this project.

- Wet Weather Surcharge for Flows above 100 mgd: DELCORA has an agreement with the City of Philadelphia for the treatment and disposal of wastewater and this agreement specifies DELCORA's flow thresholds to the SW WPCP to be an annual average of 50 MGD, a daily maximum of 75 MGD, and an instantaneous peak flow of 100 MGD. Flows above these thresholds are subject to exceedance charges.

Rehabilitation and upgrades to the Darby Creek Pump Station, Muckinipates Pump Station and Central Delaware Pump Station are required to maintain operation of the pump station and pipelines due to this infrastructure approaching the end of service life. This would include rehabilitating the 64" forcemain from the Darby Creek Pump Station to the City of Philadelphia. An equalization basin would be required located either at or between Darby Creek Pump Station and Muckinipates Pump Station to address the pressure rating limitations of the existing pipeline.

- Pump Station Rehabilitation: Upgrades to mechanical, electrical and HVAC systems are necessary to maintain operations and compliance with existing codes, as equipment and structure are nearing the end of its service life at the Darby Creek Pump Station, Muckinipates Pump Station, and Central Delaware Pump Station.

The implementation of the CSO Long-Term Control Plan including the construction of CSO Storage Tank to control Outfalls 018 and 019, the Chester Wet Weather Treatment System and other improvements to the collection system to increase CSO Capture.

5.5 **Discussion of future permit limits**

The Kleinfelder, Inc. Value Engineering Scenario 2 Concept Design Memorandum is attached as Exhibit 7. This document provides the design parameters for the expanded WRTP. The design of an expanded plant or new facility would need to address the LTCP and the future nutrient requirements anticipated for the Delaware River.

6. Evaluation of Alternatives

6.1 Evaluation of the Alternatives for Consistency

TABLE 5 CONSISTENCY ANALYSIS SUMMARY Determination For Wastewater Recommended Alternative									
Evaluation Category	Consistency Alt 1		Consistency Alt 2		Consistency Alt 3		Consistency Alt 4		Comments
	Yes	No	Yes	No	Yes	No	Yes	No	
Clean Streams Law or Section 208 of Clean Water Act	X		X		X		X		This alternative is consistent with the objectives and requirements of the Clean Streams Law
Chapter 94- Municipal Wasteload Management Plans	X		X		X		X		The existing sewer system and treatment plant have adequate capacity for the next 5 years.
Title II – Clean Water Act	X		X		X		X		This category is not applicable as Federal funding is not anticipated for this project
Comprehensive Plans	X		X		X		X		This alternative is consistent with the goals of the Municipal Comprehensive Plans
Antidegradation Requirements of PA Chapters 93, 95, 102	X		X		X		X		This category is not applicable as Federal funding is not anticipated for this project
State Water Plan	X		X		X		X		The recommended alternative is consistent with the State Water Plan
PA Prime Agricultural Land Policy	X		X		X		X		
County Stormwater Management Plan	X		X		X		X		No inconsistencies
Chapter 105 – Wetland Protection	X		X		X		X		
PNDI Review	X		X		X		X		
Historical and Archaeological Resource Protection	X		X		X		X		

Backup information regarding the consistency analysis are included as Exhibit 8 of this plan.

6.2 Proposed Plan to meet the Long-Term Need

Alternative 2 – Construction of the Deep Tunnel CSO capture facility and Upgrades to the Pumping and Treatment Facilities is the selected alternative. This selection is based on a combination of capital costs, operational costs, environmental justice considerations and regulatory issues in meeting the requirements of the LTCP. The following table provides a summary of the alternatives and the cost information. The costs in Table 6 are planning level estimates to different levels of certainty, however the difference between the alternatives is large

enough that any uncertainty in costs will not result the potential for the costs to change enough that the selected alternative is no longer the most cost effective.

Table 6

	Alternative 2	Alternative 1	Alternative 3	Alternative 4
	Tunnel	**New Pipelines & WRTP Expansion**	**New WWTP**	**Stay in Philly**
Cost Item	Construction of the Deep Tunnel CSO capture facility and Upgrades to the Pumping and Treatment Facilities	Construction of new conveyance facilities to divert flow to an expanded WRTP.	Construction of a new WWTP and the associated Conveyance Facilities.	No Action/continued discharge to the City of Philadelphia
Tunnel All Segments Plus Shafts	$ 295,500,000			
Tunnel Pump Station	$ 47,600,000			
Equalization		$ 45,100,000		$ 45,100,000
New Parallell Pipeline		$ 284,050,000		
WRTP Upgrades	$ 53,300,000	$ 66,800,000		
Wet Weather Treatment		$ 58,000,000		
Pump station upgrades	$ 17,500,000	$ 39,100,000	$ 39,100,000	$ 17,500,000
Existing Pipeline Rehabilitation				$ 160,000,000
Eastern Wastewater Treatment Plant			$ 337,400,000	
Acquisition of Property for ERTP			$ 10,000,000	
Conveyance to ERTP			$ 153,850,000	
PWD Costs (anticipated)				$ 605,000,000
Estimated Subtotal	**$ 413,900,000**	**$ 493,050,000**	**$ 540,350,000**	**$ 827,600,000**
Design Engineering & Field Work	$ 49,700,000	$ 59,200,000	$ 64,900,000	$ 45,900,000
Program Management & Admin	$ 8,600,000	$ 8,600,000	$ 8,600,000	$ 8,600,000
Estimated Total	**$ 472,200,000**	**$ 560,850,000**	**$ 613,850,000**	**$ 882,100,000**

Note that cost of Chester CSO Treatment ($22.9M) is not included in each alterative because it is a common cost that will be incurred regardless of the selected alternative.

As part of the analysis of the Alternatives, the comparison considers:

- Cost
- Disruption of the public
- Contaminated Soils
- Redundancy
- Climate Change/Extreme storms

- I/I controls
- Flexibility for future flows
- Rates/how it gets paid for – impact on the customer

When comparing the viable alternatives considered for the management of wastewater flows from the Eastern Service Area and in fact the entire service area, many factors were considered.

Alternative 2, the construction of a deep rock tunnel, is the most cost-effective alternative as shown above. In addition, this alternative has other benefits beyond being cost effective that were also considered and identified as part of the evaluation of alternatives. Alternative 1, the construction of a Pipelines, Pump Stations and WRTP Expansion including wet weather treatment, would be more disruptive than the selected Alternative 2 because the construction of a pipeline would include major roadway closures and traffic concerns. In addition, the pipeline construction would include the disturbance of soils close to the ground surface where potential contamination is possible around the Folcroft and Norwood Landfills. Alternative 1 does include some level of redundancy with a parallel pipeline but does not necessarily include the flexibility of storage that a tunnel does when faced with extreme weather and potential future flows. An additional notable benefit of Alternative 2 is the way it considers environmental justice aspects. It controls long term rates, while minimizing impact to environmental justice communities during construction thanks to the underground nature of tunnel construction and operation activities. Finally, the tunnel provides flexibility and redundancy for future conditions that may mitigate the need for additional investment thus future reducing construction and rate impacts for all service area customers, including communities within the environmental justice corridor.

Alternative 3, the construction of a new Eastern Regional Wastewater Treatment Plant and associated conveyance facilities would be more disruptive than the selected Alternative 2 because the construction of a pipeline would include major roadway closures and traffic concerns. Current potential siting for this facility is in the proximity to the Central Delaware Pump Station. For this ESA wastewater treatment facility to handle the separate sanitary flows of the Eastern Service Area service area while also handling the wet weather peaking factors due to Inflow and Infiltration (I/I), this facility would be built to handle 100 MGD of wet weather flow. In comparison, the tunnel storage included in Alternative 2 does not require the WRTP to increase in size by 100 MGD to accommodate ESA wet weather flows nor necessitate another point source discharge to the Delaware River or its tributaries.

Alternative 4 is to maintain the current system configuration, which includes sending flows from the Eastern Service Area to Philadelphia. This alternative is estimated to cost twice as much as the selected Alternative 2. These costs do not include additional costs that cannot be estimated at

this time but could be significant due to DELCORA's contract to financially contribute to improvements at the Philadelphia Water Department Southwest Water Pollution Control Plant. The Philadelphia Water Department has publicly shared plans to construct a centrate sidestream nitrogen removal process and is anticipating investment in ammonia removal due to future potential regulations. DELCORA's required contribution is unknown at this time and was not included in the provided alternative estimate. Even without these unknown contractual obligations, the cost to stay in Philadelphia is significantly greater than the other alternatives considered. In addition, the ability to manage high future potential flows and have redundant conveyance and storage systems are not viable and would require even greater investment to achieve a similar level of risk management that is being achieved by the other alternatives considered and the selected Alternative 2.

With all alternatives, compliance with the future potential projects included in the DELCORA Long Term Control Plan is considered as a baseline cost that is excluded from each alternative. The construction of a Wet Weather Treatment Facility at the Chester Pump Station is an essential component of the DELCORA Long Term Control Plan and will support the reduction of combined sewage overflowing into the Chester Creek, Ridley Creek and Delaware River.

DELCORA is currently in the PUC process of transferring all assets to Aqua. The advantages to the rate payers has been evaluated for both the selected alternative of leaving PWD and expanding the DELCORA system and also further for the impact of Aqua ownership. It is possible for DELCORA to fund the improvements of the selected alternative. It is however less expensive over time for the rate payers if Aqua were to own and operate the system. A link to the DELCORA website[(1)] is provided for additional details of these advantages. Aqua's financial capabilities exceed those of DELCORA to implement the selected alternative.

DELCORA's plan to cost effectively address dry and wet weather flows from the Eastern Service Area and the entire Service Area considered the multiple goals that could be achieved through a modification to the existing system configuration. These goals include the commitment to the DELCORA rate payer and wholesale customers, the commitment to the extended community that DELCORA serves, the preparation and planning for future conditions, and the mitigation of risk through redundancy. The selection of Alternative 2 meets all these goals in the best and most cost effective manner. In summary, the advantages and disadvantages of the Alternatives are:

Stay in Philly (No Action)

- Costs do not include additional PWD costs that cannot be estimated at this time due to contribution to anticipated Southwest WPCP capital improvements.

- No ability to manage high future potential flows or provide redundant conveyance or additional storage.
- An equalization tank would be required near Darby Creek PS in order to address the pressure limitations of the existing pipeline.
- Without redundant conveyance provided by other alternatives, maintenance on the existing pipelines and infrastructure would require significant bypass pumping.

Surface Pipelines (Alternative 1)

- Pipeline more disruptive due to construction-related major roadway closures and traffic pattern disruption.
- Pipeline would include extensive disturbance of soils close to the ground surface where potential contamination is possible (Folcroft and Norwood Landfills).
- Pipeline does include some level of redundancy, but not the flexibility of storage
- Major process changes at the WRTP (IFAS and Wet Weather Biological Treatment Train) required in pipeline alternative.

New Plant (Alternative 3)

- Construction of a new Eastern Regional Treatment Plant (ERTP) and associated conveyance pipelines would be disruptive due to major roadway closures and changes to traffic patterns and public transit routes.
- The siting options that were evaluated for ERTP were borderline infeasible.
- Obtaining a new discharge permit for ERTP is very challenging, possibly infeasible.

Tunnel (Alternative 2)

The Tunnel considers environmental justice impacts by:

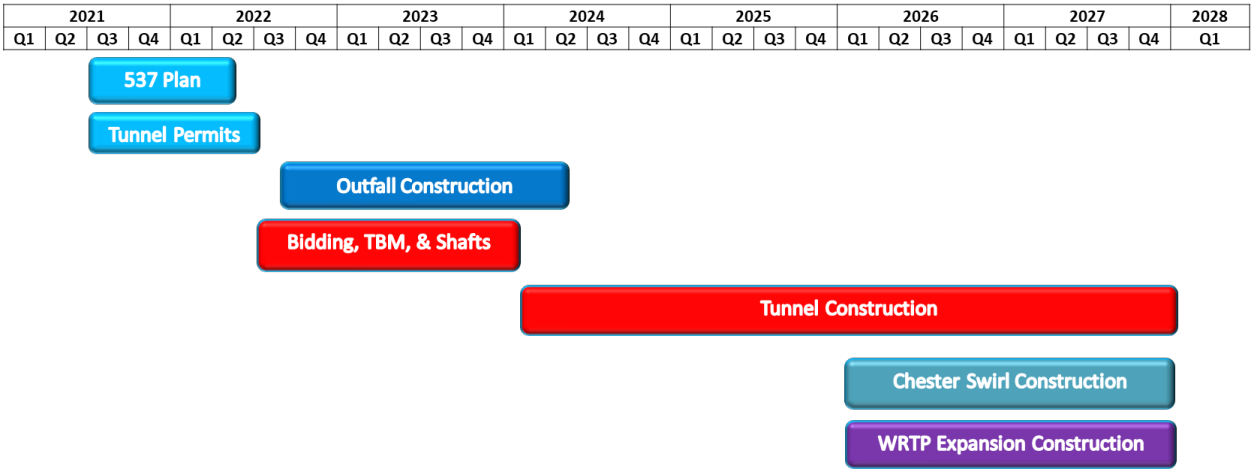
- Managing rates
- Minimizing impact during construction thanks to the underground nature of tunnel construction and operation activities
- Flexibility and redundancy for future conditions that may mitigate the need for additional investment
- Reducing future construction and rate impacts for all service area customers, including communities within the environmental justice corridor.
- The Tunnel provides additional Conveyance Capacity

(1) https://www.delcora.org/wp-content/uploads/2020/10/Presentation-For-537-Comments.pdf

6.3 **Phased implementation versus immediate**

DELCORA is committed to diverting flows from the Philadelphia system by December 2028. In order to do that the system components, need to be in place. The following is the anticipated schedule for the various components of the capital projects:

Figure 5



6.4 **An evaluation of the administrative organization and legal authority to implement the Plan will be discussed.**

DELCORA's charter authorizes the acquisition, construction, improvement, maintenance, operation, owning, and leasing of the sewer systems and sewer treatment facilities within the DELCORA Eastern and Western Service Areas. DELCORA is directed by a nine member Board of Directors appointed by the Delaware County Council. No incorporation of authorities or agencies will be required to ensure the implementation of the selected alternative.

DELCORA has retained a Land Agent for the ESA Program, ERM. Refer to Exhibit 9 for additional information on land and easements needs for the Selected Alternative. The Exhibit lists which easements will need to be acquired. Feasible alternatives exist for properties that DELCORA is unable to condemn.

Effective upon Closing of the Transaction with AQUA, AQUA shall be substituted for DELCORA for all purposes and DELCORA shall be released from all obligations and liabilities Within one business day of the Closing of the Transaction, AQUA shall notify the Court and the United States,

PADEP, and DELCORA as to the occurrence of Closing of the Transaction by filing on the docket as required by the closing of the Asset Transfer.

AQUA is a Pennsylvania Corporation with its principal place of business in Pennsylvania, regulated by the PAPUC pursuant to the Pennsylvania Public Utility Code, 66 Pa. Cons. Stat. Ann. §101 et seq.;

7. Institutional Evaluation

7.1 Existing Authority

DELCORA was formed by the County of Delaware, PA (County) by resolution dated October 20, 1971 with the power to construct, finance, operate and maintain sewer systems throughout the County and adjacent areas included in its drainage basin. DELCORA was established as a county-wide authority and the County was divided into two regions, the Eastern Service Area and the Western Service Area, each to be served by a regional wastewater treatment plant. DELCORA was to be responsible for building and operating interceptors and pump stations in both regions, building the regional treatment plant in the Western Service Area, and acquiring capacity in the City of Philadelphia's (City) Southwest Water Pollution Control Plant (SWWPCP) for wastewater treatment for the Eastern Service Area. DELCORA currently owns and operates several sewer collection systems serving municipalities within Delaware County. This capacity is provided though service agreements and as mentioned, some systems are owned by DELCORA, some are owned by municipal Authorities, and some are owned by the individual communities.

7.2 Discussion of Aqua Transfer

Effective upon Closing of the Transaction with AQUA, AQUA shall be substituted for DELCORA for all purposes and DELCORA shall be released from all obligations and liabilities within one business day of the Closing of the Transaction, AQUA shall notify the Court and the United States, PADEP, and DELCORA as to the occurrence of Closing of the Transaction by filing the docket as required by the closing of the Asset Transfer.

7.3 Financial and Debt status

DELCORA has a year 2021 annual budget of over $63 million in expenses which includes $12.8 million budgeted for debt service. Moody's Investors Service affirmed an Aa3 rating of DELCORA $158 million of sewer revenue debt and assigned a stable outlook in December 2017. As of December 31, 2020, the net asset value was approximately $198 million. Moody's evaluation was based on a large and stable Delaware County service area, long-term service contracts with communities and Regional Authorities that provide DELCORA stability in collections, and efficient management and operating protocols and procedures. The cost of the capital projects will be paid from sewer revenue bond issuance. DELCORA will recover system capital costs through the annual sewer system user fee charge. As shown in the Alternatives Analysis herein, the cost to remain with the City of Philadelphia would result in even higher rates to offset the future cost of treatment.

Section 6.4 of this Plan details the proposed legal/regulatory procedures of the transfer of assets to Aqua. Aqua financial capabilities exceed those of DELCORA to implement the selected alternative. Upon the sale of the system, all outstanding debt will be paid off. Rates and charges will be governed by Aqua and the PUC. The DELCORA website[(2)] provides additional information on the future rate projections to DELCORA's customers.

7.4 **Available Staff and Resources**

Day-to-day operations are handled by DELCORA's Executive Director and staff of approximately 140 employees: 60 salaried and 80 hourly/union. DELCORA employs 21 Class A certified operators, 16 Class E-4 collection system operators and 1 staff member who is a licensed engineer or has extensive engineering training and background.

7.5 **Intermunicipal Agreements**

In accordance with County Wide Sewerage Facilities Plan developed with PADEP in 1972, various municipalities, municipal authorities and industries in Delaware County were mandated to negotiate with DELCORA for future treatment. DELCORA entered into service agreements with municipalities and major industries. The agreements are for various terms up to 50 years. A listing of all municipal agreements is attached as Exhibit 5.

[(2)] https://www.delcora.org/wp-content/uploads/2020/10/Presentation-For-537-Comments.pdf

8. Implementation Schedule and Justification for Selected Technical and Institutional Alternatives

8.1 Discussion of Necessary Administration and Legal Activities for Implementation

The necessary administrative and legal activities to be completed and adopted to ensure the implementation of the selected alternative were reviewed. The initial step in completing most administrative and legal requirements, will require this Plan will be sent for adoption to all municipalities within the planning area and the City of Philadelphia. DELCORA has implemented many Act 537 Planning documents in the past and has the administrative and legal structure in place.

8.2 Proposed Institutional Alternative for Implementing the Plan

The selected institutional alternative is the continuation of current DELCORA organizations and activities. Effective upon Closing of the Transaction with AQUA, AQUA shall be substituted for DELCORA for all purposes and DELCORA shall be released from all obligations and liabilities Within one business day of the Closing of the Transaction, AQUA shall notify the Court and the United States, PADEP, and DELCORA as to the occurrence of Closing of the Transaction by filing on the docket as required by the closing of the Asset Transfer.

8.3 Municipal Engagement

A virtual meeting with all the Municipalities occurred on August 19, 2021 to update and inform representatives of the concepts and schedules of this Plan. Individual future meetings with municipalities for the eventual adoption of the Plan occurred on an as needed basis.

8.4 Implementation Schedule

March 18, 2020	-	Approval of Plan of Study
July 9, 2021	-	Draft of plan sent to PADEP
July 29, 2021	-	Draft ESA Act 537 Plan Virtual Discussion with PADEP
August 19, 2021	-	Municipal Engagement Virtual Meeting
September 1, 2021	-	Plan transmitted for all municipality's PC for review and comment Plan transmitted to DCPC, CCPC, CCHD and Joint Authorities 30- and 60-day comment periods begin

October, 2021	-	Address comments from the public and agencies.
November, 2021	-	Transmit plans to Municipalities for approval.
December, 2021	-	Receive resolutions of adoption from Municipalities
January, 2022	-	Transmit complete report for DEP approval
May, 2022	-	Anticipated PADEP Approval
July, 2022	-	Tunnel Contractor and Equipment Procurement
January, 2023	-	Start Shaft Construction

CLICK FOR LINK TO EXHIBITS