HRG
Herbert, Rowland & Grubic, Inc.
Engineering & Related Services
AN EMPLOYEE-OWNED COMPANY

369 East Park Drive
Harrisburg, PA 17111
717. 564.1121
www.hrg-inc.com

MARCH 2016

CHAPTER 94
MUNICIPAL WASTELOAD MANAGEMENT REPORT
FOR
CALENDAR YEAR 2015

ELIZABETHTOWN BOROUGH
LANCASTER COUNTY, PENNSYLVANIA

HRG Project No. 000598.0435

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VIA HAND DELIVERY

March 31, 2016

PA Department of Environmental Protection
Southcentral Regional Office
909 Elmerton Avenue
Harrisburg, Pennsylvania 17110

Re: Elizabethtown Borough
Municipal Wasteload Management Report
Calendar Year 2015

Dear Sir or Madam:

On behalf of Elizabethtown Borough, we are submitting their Municipal Wasteload Management Report for Calendar Year 2015. Two (2) copies of the Report are enclosed for your use.

Please feel free to contact us if there are any questions or comments regarding this Report.

Very truly yours,

Herbert, Rowland & Grubic, Inc.

Edward A. Ellinger, P.E.
Director of Water & Wastewater Services

EAE/rb
000598.0435
P:\0005\000598_0435\2015 Chapter 94 Report\Cover Letter to DEP.doc

Enclosures

c: Roni Ryan, Elizabethtown Borough (w/Enclosure)
Wayne DeVan, Elizabethtown Borough
Dennis Bair, Elizabethtown Borough (w/Enclosure)
Nick Viscome, Elizabethtown Regional Sewer Authority (w/Enclosure)
Byrne Remphrey, P.E., BCEE, CDM-Smith
Dennis Michael, HRG
File (w/Enclosure)

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INTRODUCTION

This document was prepared pursuant to the Pennsylvania Chapter 94 Municipal Wasteload Management Annual Report requirements for the Borough of Elizabethtown. As suggested by the Pennsylvania Department of Environmental Protection (PADEP), the document was developed utilizing the PADEP Chapter 94 Template (PADEP Doc. ID 3800-FMBPNSPSM0507) and the PADEP spreadsheets and graphs found at www.depweb.state.pa.us/chapter94.

The Borough of Elizabethtown operates a 4.5 million gallon per day (MGD) wastewater treatment plant (WWTP) located at the intersection of Amosite Road and Bainbridge Road in West Donegal Township, just west of the Borough. This plant provides wastewater treatment services for the Borough of Elizabethtown, and the Elizabethtown Regional Sewer Authority (ERSA) which covers portions of Mount Joy Township and West Donegal Township. Information submitted by ERSA as required to facilitate the preparation of this report can be found as Attachment 8. This treatment facility operates under NPDES Permit PA0023108 which is currently in the process of renewal by PADEP.

The treatment process utilizes screening, grit removal, anaerobic selector with alum addition for phosphorus removal, phased oxidation ditch, secondary clarification, hypochlorite disinfection, bisulfite dechlorination, and cascade aeration. The WWTP discharges treated effluent primarily to the Susquehanna River, approximately five miles from the WWTP through a 20-inch diameter gravity outfall line. A portion of this treated effluent is utilized by the Lancaster County Resource Recovery Facility as a source of cooling water. A secondary outfall discharges treated effluent during higher wet weather periods to the Conoy Creek at the edge of the WWTP site. Waste sludge is mechanically thickened, aerobically digested and dewatered by belt filter press prior to disposal via landfilling or incineration. A detailed inspection report for the WWTP is included as Attachment 5 to this document.

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF POINT AND NON-POINT SOURCE MANAGEMENT

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DEPARTMENT OF ENVIRONMENTAL PROTECTION

CHAPTER 94 MUNICIPAL WASTELOAD MANAGEMENT ANNUAL REPORT

For Calendar Year: 2015

☒ Permittee is owner and/or operator of a POTW or other sewage treatment facility
☐ Permittee is owner and/or operator of a collection system tributary to a POTW not owned/operated by permittee

GENERAL INFORMATION

Permittee Name:	**The Borough of Elizabethtown**	Permit No.:	**PA0023108**
Mailing Address:	**600 South Hanover Street**	Effective Date:	
City, State, Zip:	**Elizabethtown, PA 17022-2522**	Expiration Date:	
Contact Person:	**Roni Ryan**	Renewal Due Date:	
Title:	**Borough Manager**	Municipality:	**Borough of Elizabethtown**
Phone:	**717-367-1700**	County:	**Lancaster**
Email:	**rryan@etownonline.com**	Consultant Name:	**Herbert, Rowland and Grubic, Inc.**

CHAPTER 94 REPORT COMPONENTS

1. Attach to this report a line graph depicting the monthly average flows (expressed in MGD) for each month for the past 5 years and projecting the flows for the next 5 years. The graph must also include a line depicting the hydraulic design capacity per the WQM permit. (25 Pa. Code § 94.12(a)(1))

   Check the appropriate boxes:
   ☒ Line graph for flows attached (**Attachment 1**)
   ☒ DEP Chapter 94 Spreadsheet used (**Attachment 1**)
   ☐ Section 1 is not applicable (report is for a collection system).

2. Attach to this report a line graph depicting the monthly average organic loads (express as lbs BOD5/day) for each month for the past 5 years and projecting the organic loads for the next 5 years. The graph must also include a line depicting the organic design capacity of the treatment plant per the WQM permit. (25 Pa. Code § 94.12(a)(2))

   Check the appropriate boxes:
   ☒ Line graph for organic loads attached (**Attachment 1**)
   ☒ DEP Chapter 94 Spreadsheet used (**Attachment 1**)
   ☐ Section 2 is not applicable (report is for a collection system).

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
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CHAPTER 94 MUNICIPAL WASTELOAD MANAGEMENT ANNUAL REPORT

For Calendar Year: 2015

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Contact Person:	**Roni Ryan**	Renewal Due Date:	
Title:	**Borough Manager**	Municipality:	**Borough of Elizabethtown**
Phone:	**717-367-1700**	County:	**Lancaster**
Email:	**rryan@etownonline.com**	Consultant Name:	**Herbert, Rowland and Grubic, Inc.**

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   Check the appropriate boxes:

   ☒ Line graph for flows attached (**Attachment 1**)
   ☒ DEP Chapter 94 Spreadsheet used (**Attachment 1**)
   ☐ Section 1 is not applicable (report is for a collection system).

2. Attach to this report a line graph depicting the monthly average organic loads (express as lbs BOD5/day) for each month for the past 5 years and projecting the organic loads for the next 5 years. The graph must also include a line depicting the organic design capacity of the treatment plant per the WQM permit. (25 Pa. Code § 94.12(a)(2))

   Check the appropriate boxes:

   ☒ Line graph for organic loads attached (**Attachment 1**)
   ☒ DEP Chapter 94 Spreadsheet used (**Attachment 1**)
   ☐ Section 2 is not applicable (report is for a collection system).

3. If the DEP Chapter 94 Spreadsheet was not used to determine projections, discuss the basis for the hydraulic and organic projections. In all cases, include a description of the time needed to expand the plant to meet the load projections, if necessary, and data used to support the projections should be included in an appendix to this report. (25 Pa. Code § 94.12(a)(3))

   Used the DEP Chapter 94 Report Spreadsheet. No hydraulic or organic overload conditions are indicated for this WWTP.

4. Attach a map showing all sewer extensions constructed within the past calendar year, sewer extensions approved or exempted in the past year in accordance with Act 537 and Chapter 71, but not yet constructed, and all known proposed projects which require public sewers but are in the preliminary planning stages. The map must be accompanied by a list summarizing each extension or project and the population to be served by the extension or project. If a sewer extension approval or proposed project includes schedules describing how the project will be completed over time, the listing should include that information and the effect this build-out-rate will have on populations served. (25 Pa. Code § 94.12(a)(4))

   Check the appropriate boxes:

   ☒ Map showing sewer extensions constructed, approved/exempted but not yet constructed, and proposed projects attached (**Attachment 2**)

   ☒ List summarizing each extension or project attached (**Attachment 2**)

   ☒ Schedules describing how each project will be completed over time and effects attached (**Attachment 2**)

   Comments:

   All information is included in Attachment 2 for the Borough system and Attachment 8 for the ERSA system.

5. Discuss the permittee's program for sewer system monitoring, maintenance, repair and rehabilitation, including routine and special activities, personnel and equipment used, sampling frequency, quality assurance, data analyses, infiltration/inflow monitoring, and, where applicable, maintenance and control of combined sewer regulators during the past year. Attach a separate sheet if necessary. (25 Pa. Code § 94.12(a)(5))

   Information is included in Attachment 3 for the Borough system and Attachment 8 for the ERSA system.

6. Discuss the condition of the sewer system including portions of the system where conveyance capacity is being exceeded or will be exceeded in the next 5 years and portions where rehabilitation or cleaning is needed or is underway to maintain the integrity of the system and prevent or eliminate bypassing, CSOs, SSOs, excessive infiltration and other system problems. Attach a separate sheet if necessary. (25 Pa. Code § 94.12(a)(6))

Check the appropriate boxes:

☒ System experienced capacity-related bypassing, SSOs or surcharging during the report year. On a separate sheet, list the date, location, and reason for each bypass, SSO or surcharge event.

☐ System did not experience capacity-related bypassing, SSOs or surcharging during the report year.

Comments:

Past surcharging in portions of the Radio Road Interceptor. See information regarding the Corrective Action Plan in Attachment 3.

7. Attach a discussion on the condition of sewage pumping (pump) stations. Include a comparison of the maximum pumping rate with present maximum flows and the projected 2-year maximum flows for each station. (25 Pa. Code § 94.12(a)(7))

Check the appropriate boxes:

☐ The collection system does not contain pump stations

☒ The collection system does contain pump stations (Number – **16**)

☒ Discussion of condition of each pump station attached (**Attachment 4**)

8. If the sewage collection system receives industrial wastes (i.e., non-sanitary wastes), attach a report with the information listed below. (25 Pa. Code § 94.12(a)(8))

a. A copy of any ordinance or regulation governing industrial waste discharges to the sewer system or a copy of amendments adopted since the initial submission of the ordinance or regulation under Chapter 94, if it has not previously been submitted.

b. A discussion of the permittee's or municipality's program for surveillance and monitoring of industrial waste discharges into the sewer system during the past year.

c. A discussion of specific problems in the sewer system or at the plant, known or suspected to be caused by industrial waste discharges and a summary of the steps being taken to alleviate or eliminate the problems. The discussion shall include a list of industries known to be discharging wastes which create problems in the plant or in the sewer system and action taken to eliminate the problem or prevent its recurrence. The report may describe pollution prevention techniques in the summary of steps taken to alleviate current problems caused by industrial waste dischargers and in actions taken to eliminate or prevent potential or recurring problems caused by industrial waste dischargers.

Check the appropriate boxes:

☒ Industrial waste report as described in 8 a., b. and c. attached (**Attachment 6**)

☐ Industrial pretreatment report as required in an NPDES permit attached (**Attachment)**

9. Existing or Projected Overload.

Check the appropriate boxes:

- ☐ This report demonstrates an existing hydraulic overload condition.
- ☒ This report demonstrates a projected hydraulic overload condition.
- ☐ This report demonstrates an existing organic overload condition.
- ☐ This report demonstrates a projected organic overload condition.

If one or more boxes above have been checked, attach a Corrective Action Plan (CAP) to reduce or eliminate present or projected overloaded conditions under §§ 94.21 and/or 94.22 (relating to existing overload and projected overload). (25 Pa. Code § 94.12(a)(9))

☒ Corrective Action Plan attached **(Attachment 3)**

10. Where required by the NPDES permit, attach a Sewage Sludge Management inventory that demonstrates a mass balance of solids coming in and leaving the facility over the previous calendar year.

☐ Sewage Sludge Management Inventory attached **(Attachment)**

11. For facilities with CSOs and where required by the NPDES permit, attach an Annual CSO Report (including satellite combined sewer systems).

☐ Annual CSO Report attached **(Attachment)**

12. For POTWs, attach a calibration report documenting that flow measuring, indicating and recording equipment has been calibrated annually. (25 Pa. Code § 94.13(b))

☒ Flow calibration report attached **(Attachment 7)**

RESPONSIBLE OFFICIAL CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowledge of violations. See 18 Pa. C.S. § 4904 (relating to unsworn falsification).

Roni Ryan	R. Ryan
Name of Responsible Official	Signature
717-367-1700	3-30-16
Telephone No.	Date

PREPARER CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared by me or otherwise under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. The information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowledge of violations. See 18 Pa. C.S. § 4904 (relating to unsworn falsification).

Dennis Michael	Dennis Michael
Name of Preparer	Signature
717-564-1121	March 30, 2016
Telephone No.	Date

ATTACHMENT 1

Hydraulic and Organic Loading Spreadsheet
(www.depweb.state.pa.us/chapter94)
Hydraulic Loading Discussion and Supporting Data
Hydraulic Loading Graph (www.depweb.state.pa.us/chapter94)
Organic Loading Discussion and Supporting Data
Organic Loading Graph ((www.depweb.state.pa.us/chapter94)

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PADEP Chapter 94 Spreadsh
Sewage Treatment Plar

Reporting Year: 2015

Facility Name: ELIZABETHTOWN BOROUGH WASTEWATER TREATMENT PLANT

Permit No.: PA0023108

Persons/EDU: 3.5

Existing Hydraulic Design Capacity: 7.2 MGD
Upgrade Planned in Next 5 Years? NO Year:
Future Hydraulic Design Capacity: MGD

Existing Organic Design Capacity: 6,850 lbs BOD5/day
Upgrade Planned in Next 5 Years? NO Year:
Future Organic Design Capacity: lbs BOD5/day

Monthly Average Flows for Past Five Years (MGD)

Month	2011	2012	2013	2014	2015
January	1.864	2.433	2.311	2.734	1.862
February	2.822	2.105	2.347	2.879	1.733
March	3.578	2.007	2.291	2.675	2.934
April	3.572	1.734	1.721	2.969	1.822
May	2.606	1.982	1.547	2.936	1.538
June	1.905	1.915	1.573	1.709	1.883
July	1.54	1.528	1.589	1.44	1.578
August	2.013	1.712	1.796	1.389	1.905
September	4.591	2.107	1.492	1.998	1.676
October	2.517	2.659	2.792	1.509	2.091
November	2.873	2.316	1.795	1.584	1.786
December	2.8	2.089	2.535	2.006	2.176
Annual Avg	2.714	2.049	1.984	2.104	1.887
Max 3-Mo Avg	3.327	2.702	2.374	2.867	2.169
Max : Avg Ratio	1.23	1.32	1.20	1.36	1.16
Existing EDUs	11,200.0	11,257.0	11,429.0	11,464.0	11,504.0
Flow/EDU (GPD)	242.3	182.0	173.6	183.5	164.0
Flow/Capita (GPD)	69.2	52.0	49.6	52.4	46.9
Exist. Overload?	NO	NO	NO	NO	NO

Monthly Average BOD5 Loads for Past Five Years (lbs/day)

Month	2011	2012	2013	2014	2015
January	2,979	3,329	3,556	3,147	3,269
February	3,209	3,436	3,443	3,204	3,166
March	2,766	3,273	3,436	3,214	3,294
April	2,956	3,395	3,040	3,443	3,115
May	3,029	3,440	2,916	3,272	2,914
June	2,613	2,787	3,266	2,833	2,892
July	2,812	2,929	2,809	2,512	2,764
August	2,977	2,706	2,740	2,597	2,716
September	3,599	2,860	2,762	2,855	2,747
October	3,268	3,167	2,776	2,735	2,982
November	3,791	3,160	3,603	3,087	3,189
December	3,585	3,603	3,594	3,457	3,377
Annual Avg	3,132	3,178	3,164	3,013	3,031
Max Mo Avg	3,791	3,603	3,594	3,457	3,377
Max : Avg Ratio	1.21	1.13	1.14	1.15	1.11
Existing EDUs	11,200	11,257	11,429	11,464	11,504
Load/EDU	0.280	0.282	0.278	0.263	0.263
Load/Capita	0.080	0.081	0.079	0.075	0.075
Exist. Overload?	NO	NO	NO	NO	NO

Projected Flows for Next Five Years (MGD)

	2016	2017	2018	2019	2020
New EDUs	180.0	209.0	195.0	151.0	69.0
New EDU Flow	0.034	0.0365	0.0369	0.0266	0.013
Proj. Annual Avg	2.182	2.2215	2.2584	2.287	2.3
Proj. Max 3-Mo Avg	2.732	2.782	2.828	2.864	2.86
Proj. Overload?	NO	NO	NO	NO	NO

Projected BOD5 Loads for Next Five Years (lbs/day)

	2016	2017	2018	2019	2020
New EDUs	180	209	195	151	69
New EDU Load	49.104	57.016	53.196	41.193	18.823
Proj. Annual Avg	3,150	3,207	3,260	3,302	3,320
Proj. Max Avg	3,620	3,686	3,747	3,794	3,816
Proj. Overload?	NO	NO	NO	NO	NO

Show Precipitation Data on Hydraulic Graph?

Total Monthly Precipitation for Past Five Years (Inches)

Month	2011	2012	2013	2014	2015
January	2.06	3.24	3.55	2.64	2.64
February	2.95	2.24	1.37	3.72	0.93
March	4.62	1.56	2.4	3.97	3.9
April	6.36	2.36	1.83	5.72	1.86
May	4.05	8.4	2.53	3.56	2.65
June	4.34	4.12	5.46	3.55	7.17
July	3.22	5.95	3.7	3.85	2.14
August	6.17	4.5	4.16	1.86	5.01
September	18.13	7.18	1.71	3.13	4.61
October	3.88	7.59	10.58	3.14	5.23
November	4.25	1.28	2.32	2.7	1.19
December	3.37	2.52	4.16	3.61	4.77

1.A. Hydraulic Loading Discussion and Supporting Data

The current design hydraulic loading for the Borough of Elizabethtown's Wastewater Treatment Plant is 4.5 MGD on an average daily basis and 7.2 MGD on a maximum monthly basis. The design of the WWTP was based on the maximum monthly loadings. The attached hydraulic loading graph was prepared from flow measurements continuously recorded at the WWTP. Figure 1.1 shows monthly average, annual average, and 3-month maximum flows for the past 5 years along with the design flow of the WWTP. Figure 1.1 also shows the projected annual average and projected 3-month maximum flows for the next five years.

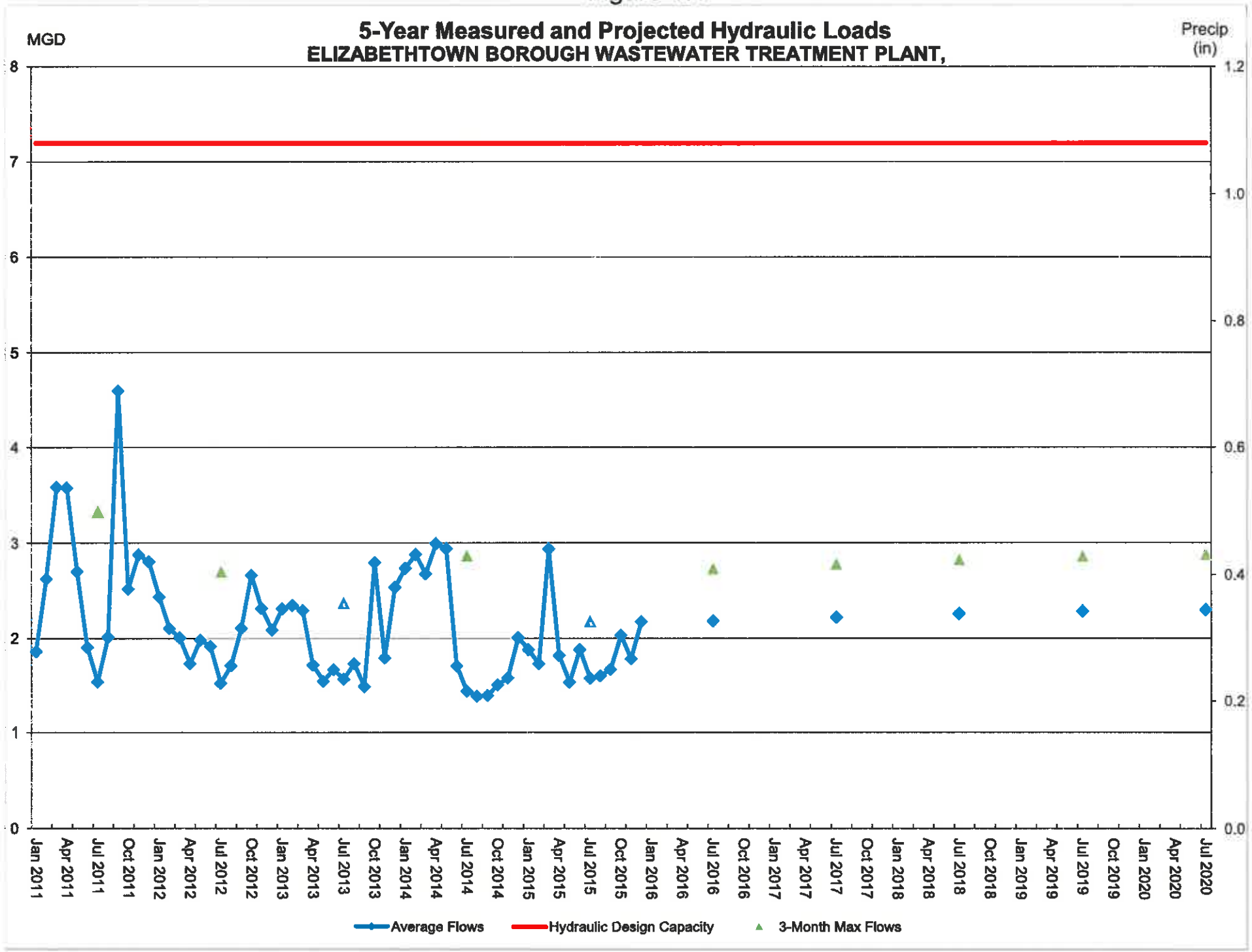
The flows shown in Figure 1.1 represent the combined flows from all contributing municipalities. The recorded annual average flow for 2015 was 1.887 MGD. The hydraulic loading information is also shown in the PADEP Chapter 94 Spreadsheet in this section.

Flow projections were developed from anticipated sewer connection information obtained from all contributing municipalities. Attachment 2 contains the anticipated sewer connections over the next five years for each municipal entity in Table 2.1. The anticipated connections were multiplied by the average flow per EDU over the previous five years to obtain the annual increase in projected flows. The increase was then added to the average annual flow of the overall average from 2011, 2012, 2013, 2014, and 2015 within the PADEP Chapter 94 Spreadsheet to obtain projected flows beginning with year 2016. More detailed breakdowns of projected connections for ERSA are included in Attachment 8. Projected connections for each development in the Borough are summarized in Table 2.2.

The 3-month maximum flows were determined by selecting the period of three consecutive months with the highest average monthly flows. The projected 3-month maximum flows were determined by first finding the ratio of the 3-month maximum to annual average flow for each of the previous five years. The average of these ratios was then applied to the projected annual flows for years 2016 through 2020 to obtain the projected 3-month maximum flows.

The data presented indicate that there is not now, nor is there a projected hydraulic overload condition at the Elizabethtown WWTP through 2020.

Figure 1.1


5-Year Measured and Projected Hydraulic Loads
ELIZABETHTOWN BOROUGH WASTEWATER TREATMENT PLANT,
MGD
Precip (in)
8
7
6
5
4
3
2
1
0
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Jan 2011
Apr 2011
Jul 2011
Oct 2011
Jan 2012
Apr 2012
Jul 2012
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Oct 2018
Jan 2019
Apr 2019
Jul 2019
Oct 2019
Jan 2020
Apr 2020
Jul 2020
Average Flows
Hydraulic Design Capacity
3-Month Max Flows

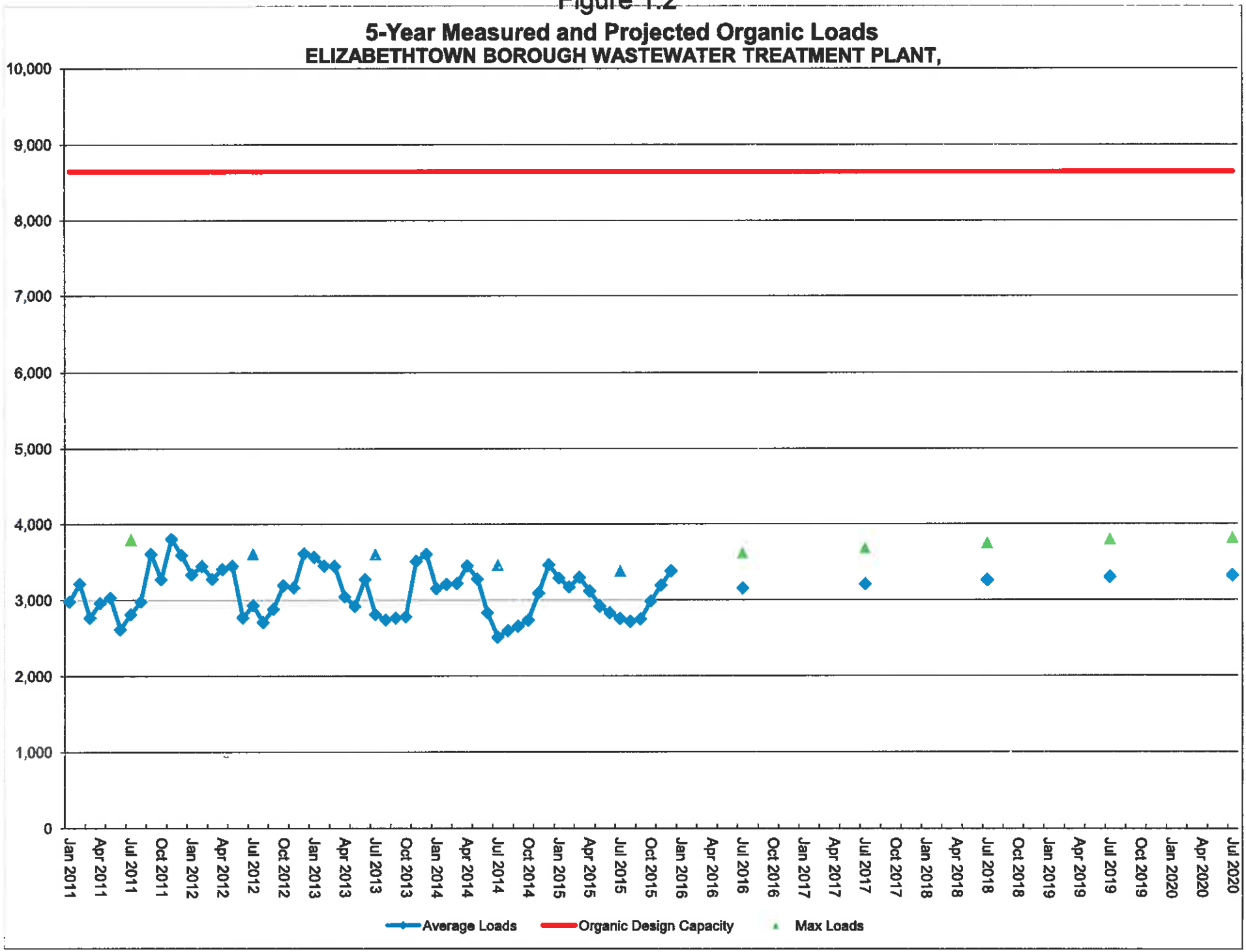
1.B. Organic Loading Discussion

The current design organic loading for the Elizabethtown WWTP is 7,500 pounds of BOD-5 per day on an average daily basis and 8,650 pounds of BOD-5 per day on a maximum monthly basis. The organic loading graph shown as Figure 1.2 was prepared using influent BOD-5 samples collected and analyzed by the Borough's WWTP personnel. The monthly average organic loadings were calculated by multiplying the respective monthly average influent BOD-5 concentration in milligrams per liter (mg/L) times the corresponding monthly average flow in MGD times a conversion factor of 8.34 lbs/day/MG x mg/L. The organic loading data for the Elizabethtown WWTP is also summarized in the PADEP Chapter 94 Spreadsheet.

The organic loading projections were developed using the approach of multiplying the anticipated increase in connections for each future year times 3.5 persons per EDU times the average BOD-5 per person over the previous five years. The annual increase was then added to the average of the previous five year's loading to obtain projected loadings.

The projected maximum month organic loadings were determined by first finding the ratio of the maximum month to average month over the average annual organic loading for the past five years. This percentage increase was then applied to the projected annual organic loading for years 2016 through 2020 to obtain the respective projected maximum month organic loading. As shown in Figure 1.2, the projected maximum monthly organic loading is not expected to exceed the design organic loading of 8,650 pounds of BOD-5 per day during the next five years.

Figure 1.2


5-Year Measured and Projected Organic Loads
ELIZABETHTOWN BOROUGH WASTEWATER TREATMENT PLANT,
10,000
9,000
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6,000
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Oct 2019
Jan 2020
Apr 2020
Jul 2020
Average Loads
Organic Design Capacity
Max Loads

ATTACHMENT 2

Sewer Extensions Discussion and Data
Map of Borough of Elizabethtown

2.A. Sewer Connections and Extensions

Table 2.1 summarizes the number of connections to the Elizabethtown service area for the Borough and ERSA over the past five years and those anticipated over the next five years. This information was used to determine anticipated future hydraulic and organic loadings to the WWTP. Figure 2.2 summarizes the projected future Borough connections by development. Similar information for the ERSA service area is contained in Attachment 8 of this report.

There was one sewer extension to the Borough's wastewater system in 2015, Conoy Crossing, Phase 2B totaling 523 linear feet of 8" SDR-35 pipe. This sewer extension is noted on the map contained in this section of the report.

A total of 21 EDUs were connected to the Borough's portion of the sewer system during 2015. Also during 2015, 19 EDUs were connected to the ERSA service area. Other information regarding the ERSA sewer lines and connections is included in their portion of this report includes as Attachment 8.

BOROUGH OF ELIZABETHTOWN
2015 ANNUAL CHAPTER 94 REPORT

TABLE 2.1: PAST AND FUTURE CONNECTIONS

							PROJECTED				
		2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Elizabethtown Borough	Connections:	5	4	13	13	21	20	28	28	25	20
	Disconnections:	0	0	0	1	0	0	0	0	0	0
	NET GAIN:	5	4	13	12	21	20	28	28	25	20
Additional Connections for:											
Elizabethtown Regional Sewer Authority:		104	53	159	23	19	160	181	167	126	49
TOTAL ADDITIONAL EDUS:		109	57	172	35	40	180	209	195	151	69

NOTES:

1. Anticipated growth for the Borough is based on current economic trends.

ROO598.0435/01

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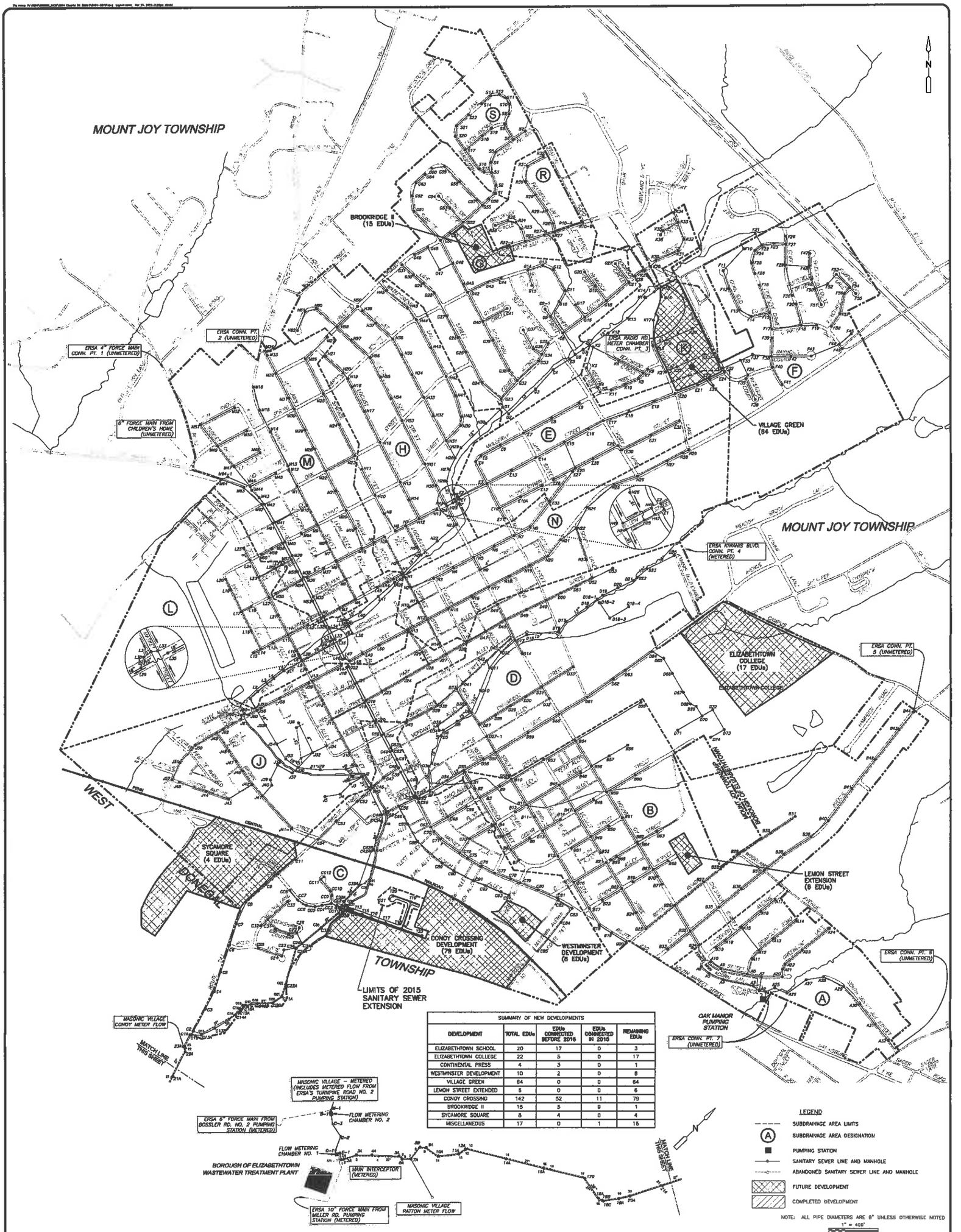
TABLE 2.2: PROJECTED FUTURE CONNECTIONS

Borough Development	Total Planned EDUs	EDUs In Service 1/1/2015	EDUs Connected 2015	EDUs Remaining 12/31/2015	2016	2017	2018	2019	2020
Elizabethtown School	20	17	0	3	0	0	3	0	0
Elizabethtown College	22	5	0	17	0	7	5	5	0
Continental Press	4	3	0	1	0	0	0	0	0
Westminster Development	10	2	0	8	0	0	0	0	0
Village Green	64	0	0	64	0	0	0	0	0
Lemon Street Extended	6	0	0	6	0	0	0	0	0
Conoy Crossing	142	52	11	79	15	16	16	16	16
Brookridge II	15	5	9	1	0	0	0	0	0
Sycamore Square	8	4	0	4	1	1	1	1	1
Miscellaneous	17	0	1	16	4	4	3	3	3
Total Borough EDU's	308	88	21	199	20	28	28	25	20

ROO598.0435/01



SUMMARY OF NEW DEVELOPMENTS

DEVELOPMENT	TOTAL EDUs	EDUs CONNECTED BEFORE 2016	EDUs CONNECTED IN 2015	REMAINING EDUs
ELIZABETHTOWN SCHOOL	20	17	0	3
ELIZABETHTOWN COLLEGE	22	5	0	17
CONTINENTAL PRESS	4	3	0	1
WESTMINSTER DEVELOPMENT	10	2	0	8
VILLAGE GREEN	64	0	0	64
LEMON STREET EXTENDED	6	0	0	6
CONDY CROSSING	142	52	11	79
BROOKRIDGE II	15	5	9	1
SYCAMORE SQUARE	8	4	0	4
MISCELLANEOUS	17	0	1	15

DRAWING NO. 1
SHEET NO. 1 OF 1
PROJECT D0056B.DASS

NO.	REVISION	DATE	BY

ELIZABETHTOWN BOROUGH
600 SOUTH HANOVER STREET
ELIZABETHTOWN, PA 17022

SEWER INDEX MAP
FOR
2015 CHAPTER 94 REPORT
ELIZABETHTOWN BOROUGH/LANCASTER COUNTY PENNSYLVANIA

HRG
Engineering & Related Services
AN EMPLOYEE-OWNED COMPANY
2619 East Park Drive
Harrisburg, PA 17111
(717) 564-1121
Fax (717) 564-1129
hrg@hrg-inc.com
www.hrg-inc.com

PROJ. MGR.	EAE
DESIGN	DM
CADD	RSF
CHECKED	
SCALE	AS NOTED
DATE	MAR. 2016

ATTACHMENT 3

Program for Sewer System Monitoring, Maintenance, and Repair
Condition of the Sewer System
Corrective Action Plan

3.A. Sewer System Monitoring, Maintenance and Repairs

The Borough's sewer system is in fair condition. During wet weather events, significant I/I is experienced. The Borough has been working on a sewer system monitoring, maintenance and repair program in an effort to address I/I problems since 1996. The Borough utilizes their vacuum truck and CCTV equipment to help maintain the collection system. The work completed by the Borough during 2015 is summarized in Tables 3.1 thru 3.9 and below:

- Sewer lines cleaned and televised 6,184.6 feet
- Sewer lines televised 3,085.8 feet
- Sewer lines cleaned 1,500.4 feet
- Sewer lines repaired and televised 242.41 feet
- Sewer line replaced 22.6 feet
- Sewer lateral connections replaced 15
- Sewer lateral lines replaced 102 feet
- Manholes repaired to prevent I/I 22
- Manhole riser rings installed 2
- Manhole frames and covers replaced 18
- Manholes removed 1
- Sewer laterals televised 14
- Sewer lines lined by contractor 301 feet

The Borough recognizes that I/I is still an issue in its system. The Borough intends to continue an I/I reduction program which will include routine investigation and rehabilitation efforts. These efforts will continue to be coordinated with the Borough's street repaving program.

During 2016 the Borough plans to work on the following sewer related items:

- Replace sewer line and manholes near the North Market Street Bridge prior to bridge replacement by PennDOT.
- Repairs to the sanitary sewer lines along Lime Street, Heather Circle, Iris Circle, Overlook Circle, Sunrise Boulevard to Conoy Avenue, Conoy Avenue to Spring Garden Street.
- Investigate lining the main sewer lines and laterals in the downtown area on Market Street which is scheduled to be repaved in 2016.
- The Borough intends to continue work on the evaluation of the Radio Road Interceptor during 2016. More information related to this is included in Section 3.B. of this document.

ERSA's Mount Joy Township flow enters the Borough's sewer system through seven connection points. The Borough's sewer system capacity model has been updated with the main sewer lines that are downstream of those ERSA connection points. This model allows the Borough to monitor the conveyance capacity available for each of the respective downstream interceptors.

ERSA's West Donegal Township wastewater flows enters the Borough's sewer system via three pumping stations and by gravity for 13 unmetered EDUs. The flow from the West Donegal Township area is primarily pumped directly to the WWTP and does not go through the Borough system. The Borough monitors flow rates from the pumping stations and the projected EDU connections to confirm that they stay within their treatment capacity allocation.

Discussions related to the condition and work on the ERSA sewer system is contained in their Chapter 94 Report included as Attachment 8 to this Report.

3.B. Radio Road Interceptor – Corrective Action Plan

The Borough identified surcharging in the Radio Road Interceptor during times of high groundwater and large storm events during wet weather investigations in 2014. Flow is completely contained within the sewer system and is designated as a projected hydraulic overload condition. Visual inspection previously completed by Borough staff identified the following:

1. Rainfall events greater than 5 inches typically result in surcharging
2. Rainfall events from 3 to 5 inches in high groundwater table typically cause surcharging
3. Rainfall events less than 3 inches typically do not cause surcharging

The surcharging is caused by infiltration and inflow (I/I) experienced in the Radio Road Interceptor drainage basin. In reviewing the flow projections for the Radio Road Interceptor, there is not much development anticipated in this basin with the exception of the potential Elizabethtown Crossing Development in Mount Joy Township.

To begin addressing the projected hydraulic overload condition the Borough began a six-phase interceptor study in the fall of 2014 to flush, televise and evaluate the condition of the Radio Road Interceptor and the tributary collection system to determine the best course of action. The phases of the project are broken down into interceptor sections identified by the following tributary manholes:

Phase 1 – Manholes K14/1 to G1
Phase 2 – Manholes G1 to H24
Phase 3 – Manholes H24 to H1
Phase 4 – Manholes H1 to L29
Phase 5 – Manholes L29 to L1
Phase 6 – Manholes L1 to C44

The Borough will utilize its own equipment as much as possible, including its vacuum/jet truck and CCTV inspection truck. Where sections of interceptor become too large or complex for the Borough staff/equipment, the Borough will work with a local contractor to clean and televise. Once each phase is completed the data collected will be evaluated to develop a plan for reducing I/I. If the Borough finds that excessive I/I is entering the Borough's sewer system in the Radio

Road drainage basin from Mount Joy Township, the Borough will coordinate with ERSA to perform I/I investigation and reduction in the system.

In addition to the I/I investigation the Borough plans to assess the future capacity needs of the Radio Road Interceptor by performing the following tasks:

1. Review and verify its EDU count tributary to the radio Road Interceptor
2. Monitor actual flows in the interceptor with portable flow meters to assess existing flow.
3. Determine future capacity requirements in the interceptor for the Borough and ERSA
4. Determine if capacity needs can be achieved with I/I reduction and/or interceptor expansion

The major work completed by the Borough in 2015 relative to the radio Road Interceptor Corrective Action Plan is summarized below.

1. The Borough developed a detailed Radio Road Sewer System Capacity Study Implementation Plan outlining the scope and schedule for a detailed CCTV inspection, flow metering and modeling program for the interceptor. The schedule for completion of major milestones as outlined in the Implementation Plan is as follows:

Begin Flow Metering	March 2016
Complete Flow Metering	July 2016
Complete CCTV Inspections	July 2016
Complete Hydraulic Modeling	August 2016
Complete Alternatives Analysis/Submit Draft Report	September 2016
Submit Final Report	October 2016

2. The following interceptor sections were cleaned and CCTV inspections completed by Borough staff:

MH H27 to MH H28 – 86.7 Feet	MHL 42 to MHL 41 – 195.0 Feet
MH H28 to MH H29 – 118.1 Feet	MHL 43 to MHL 42 – 37.5 Feet
MH H29 to MH H30 – 28.7 Feet	MH H27 to MH H26 – 244.4 Feet
MH G1 to MH H30 – 382.7 Feet	MH G6-1 to MH G6 – 35.4 Feet
MH G3 to MH G2 – 359.1 Feet	MH H1 to MH L43 – 154.1 Feet
MH G4 to MH G3 – 299.2 Feet	MH H5 to MH H1 – 312.0 Feet
MH G5 to MH G4 – 308.8 Feet	MH H22 to MH H5 – 282.5 Feet
MH H30 to MH H29 – 326.8 Feet	MH H23 to MH H22 – 242.6 Feet
MH L37 to MH L36 – 112.8 Feet	MH H24 to MH H23 – 246.5 Feet
MH L38 to MH L37 - 44.5 Feet	MH H25 to MH H24 – 91.8 Feet
MH L39 to MH L38 – 15.2 Feet	MH H26 to MH H25 – 171.7 Feet
MH L40 to MH L39 – 333.0 Feet	MH H47 to MH H25 – 8.3 Feet
MH L41 to MH L40 – 200.0 Feet	

3. The Borough contracted with Mr. Rahab to complete a 16 week metering program utilizing 10 flow meters throughout the interceptor. The meters were installed and the metering program commenced on March 7, 2016

In accordance with the October 9, 2015 correspondence from PADEP, the Borough will evaluate limitation of new connections and extensions to the Radio Road Interceptor on a case by case basis using the information obtained during completion of the Radio Road Sewer System Capacity Study. Upon completion of the Study in October 2016, a more detailed summary of limitation on new connections and extensions will be established by the Borough.

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TABLE 3.1: Cleaned and Televised Sanitary Sewer Lines for 2015 MH to MH

Street	Section	Footage
Lime	G31 - G30	125.6
	G30 - G29	246.1
	G29 -G28	238.9
	G27 - G26	390.6
	G26 - G25	168.1
	G25 - G24	393.1
	G24 - G23	292.2
	TOTAL	1854.6
Conoy Ave		
	G35 - G34	87.7
	G34 -G38	94.4
	G33 - G32	345.2
	G32 - G23	292.8
	G23 - G1	127.9
	G16 - G8	323.4
	TOTAL	1271.4
Heather Circle	G9 - G8	235.3
	G9 - G9-1	125.6
	TOTAL	360.9
Overlook Circle	G40 - G41	350.8
	TOTAL	350.8
Iris Circle	G36 - G34	118.8
	G37 - G36	273.4
	TOTAL	392.2
Sunrise Blvd.	G38 - G32	155.4
	G39 - G38	347.1
	G40 - G39	337.8
	G40 - G42	393.3
	TOTAL	1233.6
Right of Way	G9 - G10	184.1
	TOTAL	184.1
N. Mt. Joy	H58 - H57	264.9
	H57 - H56	272.1
	TOTAL	537

BOROUGH OF ELIZABETHTOWN
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TABLE 3.2: Televised Sanitary Sewer Lines for 2015 MH to MH

Street	Section	Footage
N. Mt. Joy	H58 - H60	341.7
	TOTAL	341.7
S. Mt. Joy	A32 -ERSA MH	178.7
	TOTAL	178.7
Sunrise Blvd.	G60 - G59	148.4
	G59 - G58	344
	G58 - G57	223
	G57 - G55	116.5
	TOTAL	831.9
E. Willow	E14 - E13	191.1
	TOTAL	191.1
Watercress Ave	H46 - H45	107.3
	H45 - H44	149.8
	H44 - H43	381.6
	H43 - H42	395.7
	TOTAL	1034.4
E. Willow	H25 - H47	91.9
	H25 - H26	171.7
	H26 - H27	244.4
	TOTAL	508

TABLE 3.3: Cleaned Sanitary Sewer Lines for 2015 MH to MH

Street	Section	Footage
Plum	B50 - B49	198
	TOTAL	198
Lime	G28 - G27	197
	TOTAL	197
E. Willow	M36 - M33	200
	TOTAL	200
E. Bainbridge	D29 - D30	223.7
	TOTAL	223.7
N. Mt. Joy	H56 - H55	199.4
	H57 - H56	272.3
	TOTAL	471.7
S. Market	J19 - J21	210
	TOTAL	210

TABLE 3.4: Miscellaneous Work Completed for 2015

The following is a summary of sewer lines repaired and televised, sewer lines replaced, sewer lateral connections replaced, sewer lateral lines replaced and manholes reparied to prevent I/I in 2015.

Street	Section	Footage
Sunrise Blvd.	G59 - G60	148
	* Replaced mainline 11.6 - 17.9	
S. Mt Joy	ERSAMH-A32	95.6
	*Replaced mainline 4.9 - 12.9	
	A31- A30	393.7
	*replaced mainline 28.4 - 40.4, 155.9 - 199.9 and connection @ 165.2, 309 - 314.7 and connection @ 312.4	
	A30 -A29	323.3
	*Replaced mainline 29 -39.9, 93.7 - 100.7, 183.2 - 190.2	
Acorn	A3 -A2	102.4
	*Replaced mainline 23 - 30	
Ridgeview	A19 - A18	246.6
	*Replaced mainline 11 - 14.10 and new connection @12.9	
	*Replaced mainline 144 - 147.3	
	A18 - A19	246.6
	*Replaced mainline 63 - 73.6	
	A17-A16	234.9
	*Replaced mainline 44.5 - 47.9, 7.3 - 25.4 and new connection @14.	
	A16 - A15	235.4
	*Replaced mainline 60 - 67 & new connection @65.10	
	*Replaced mainline 85.3 - 91.6	
	*Replaced mainline 137 - 151.6 & new connection @142.5	
Briarcliff	A14 - A13	123.6
	*Replaced mainline 118.9 - 129.9, 149.9, 158.9	
	*Replaced mainline 195 - 204.11 and new connections @ 196.11 & 203.2	
	A11-A12	196.5
	*Replaced mainline 26.1 - 30.9	
	A13 -A12	238.9
	* Replaced mainline 122.3 - 136.9 and new connections @130 & 130.7	
S. Mt Joy	A9 - A8	238.3
	*Replaced mainline 5.2 -8.2 and new connection @7	
	*Replaced mainline 30 -36.9, 59.3 -65.7, 144 -151.8 227.5 -237.8	
	A8 - A7	207.7
	*Replaced mainline 98.5 -101.8, 187.6 -202.6	

The following laterals and mainlines were replaced due to problems:

355 E. High St. N17-N16-275.3 - Replaced mainline 84.91 and new connection @88 and replaced lateral totaling 20.

530 S. Mt Joy St -B56-B54-372.2 -Replaced mainline 146.8 -151.4 & new connection @149.9 and replaced lateral totaling 30.

33 E. High St. -L49- L50-318.6 -Replaced mainline 104.4 -108.4 and new connection @106.6 and installed new lateral totaling 30

555 N. Mt. Joy St. -H58 -H57-264.9 -Reconnected lateral @65.4

The following manholes were sprayed with a concrete/quick plug material to seal and prevent any infiltration.

Willow St.:H3,H4,H7,H8H12,H13,H48,H49,E2,E3

Spruce St.: H2,H9,H10,H11

Locust St.: H6,H16,H17,H18

N. Mt. Joy St.: H50,H51,H53,H54

TABLE 3.5: Manhole Riser Rings Installed for 2015

The following manholes have had riser rings installed with original frame and lid during 2015

S. Market St. -C81

S. Mt Joy St. -A7

TABLE 3.6: Manhole Frames and Covers Replaced for 2015

The following manholes have had new frames and covers installed during 2015

Sunrise Blvd.: G57, G58, G59, G60

Ridgeview Ave.: A19, A18, A15, A16, A17

Briarcliff Road : A11, A12, A13, A14

S. Mt Joy St.: A8, A9, A31, A30, A29

TABLE 3.7: Manholes Removed for 2015

The following manhole was removed during 2015

S. Mt. Joy St.: A10

TABLE 3.8: Sanitary Sewer Laterals Televised for 2015

The following laterals were televised during 2015

543 E. Willow St.

426 Groff Ave.

355 E. High St.

623 E. Hummelstown St.

603 College Ave.

41 & 43 S. Market St.

33 E. High St.

520 E. Bainbridge St.

317 & 321 Snyder Ave.

591 & 589 E. Willow St.

500 N. Mt. Joy St.

301 E. Willow St.

333 Holly St.

560 E. Willow St.

TABLE 3.9: Sanitary Sewers Lined for 2015 MH to MH

The following sanitary sewer was lined by Mr. Rehab during 2015

Conoy Ave.: G32 to G23-301 Feet

ATTACHMENT 4

Sewage Pumping Stations

4.A. Condition of the Wastewater Pumping Stations

There are a total of 16 wastewater pumping stations in the overall Elizabethtown service area. Fifteen of the pumping stations are owned and maintained by ERSA. Information regarding the ERSA stations is contained in their Chapter 94 Report provided in Attachment 8 of this report. Only one of the stations, Oak Manor Pumping Station is owned and maintained by the Borough.

The 2015 average daily flows for each month for the Oak Manor Pumping Station are shown in Table 4.1. Run time hour meter readings are used to monitor flows at the Oak Manor Pumping Station. Flows experienced during 2015 were well below its design capacity. When the 2-year projected maximum flow as shown in Table 4.2 are compared with the capacity of the station it can be seen that the Oak Manor Pumping Station is within its design capacity.

This station is in relatively good condition and is currently operating within its design capacity. More information regarding the condition of this station is included in the annual report on the condition of the WWTP and Pumping Station included in Attachment 5 of this report. No overload condition is projected at this station over the next two years.

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TABLE 4.1: OAK MANOR PUMPING STATION FLOWS

YEAR 2015

Month	AVERAGE DAILY FLOW (gpd)
January	62,431
February	57,780
March	104,586
April	58,824
May	50,586
June	70,272
July	61,107
August	63,406
September	64,080
October	71,559
November	62,595
December	79,084
2015 Average	67,333
2014 Average	76,612
% Increase/Decrease from previous year	(-12.11%)
Maximum	104,586

Note:

Flows are based on hour meter readings recorded daily by Borough personnel

BOROUGH OF ELIZABETHTOWN
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TABLE 4.2 PUMPING STATION FLOWS

MUNICIPALITY	PUMPING STATION'	PUMP CAPACITY (MGD)	AVERAGE DAILY FLOW (MGD)	PROJECTED 2-YEAR MAXIMUM FLOW (MGD)
Elizabethtown (1)	Oak Manor	0.396	0.067	0.168

Notes:

(1) the Oak Manor Pumping Station capacity is the design capacity. Projected flow is the average daily flow multiplied by a 2.5 peaking factor to estimate a maximum hourly flow.

589.0435

fl

2015 OAK MANOR PUMP STATION

PUMP RUN TIME AND FLOW REPORT

The following report is for the time period from January 1, 2015 to December 31, 2015. This report includes total pump run time for (2) pumps and total flow through the Oak Manor Pump Station. The pumping rate for each pump is 360 gallons per minute.

January 2015

Total run time hours – 89.6 hours

Total flow – 1,935,360 gallons

February 2015

Total run time hours – 74.9 hours

Total flow – 1,617,840 gallons

March 2015

Total run time hours – 150.1 hours

Total flow – 3,242,160 gallons

April 2015

Total run time hours – 81.7 hours

Total flow – 1,764,720 gallons

May 2015

Total run time hours – 72.6 hours

Total flow – 1,568,160 gallons

June 2015

Total run time hours – 97.6 hours

Total flow – 2,108,160 gallons

July 2015

Total run time hours – 87.7 hours

Total flow – 1,894,320 gallons

August 2015

Total run time hours – 91 hours

Total flow – 1,965,600 gallons

September 2015

Total run time hours – 89 hours

Total flow – 1,922,400 gallons

October 2015

Total run time hours – 102.7 hours

Total flow – 2,218,320 gallons

November 2015

Total run time hours – 87.4 hours

Total flow – 1,877,840 gallons

December 2015

Total run time hours – 113.5 hours

Total flow - 2,451,600 gallons

The following are total run times and flow through the Oak Manor Pump Station for 2015. This also includes the average daily flow through the pump station for 2015.

Total 2015 run time hours – 1,137.8 hours

Total 2015 flow – 24,576,480 gallons

Average daily 2015 flow – 67,333 gallons per day

ELIZABETHTOWN WASTEWATER TREATMENT PLANT
OAK MANOR PUMP STATION

2015

January	Int	Time	Pump #1	Pump #2
1			1.6	1.1
2			1.5	1.2
3			1.9	1.4
4			2	1.5
5			1.7	1.3
6			1.6	1.2
7			1.6	1.2
8			1.5	1.1
9			1.6	1.2
10			1.7	1.3
11			1.6	1.2
12			2	1.5
13			1.7	1.3
14			1.7	1.3
15			1.7	1.3
16			1.6	1.2
17			1.5	1.2
18			1.6	1.2
19			1.7	1.3
20			1.4	1.1
21			1.5	1.1
22			1.5	1.1
23			1.5	1.2
24			1.9	1.4
25			1.7	1.3
26			1.7	1.3
27			1.7	1.3
28			1.6	1.2
29			1.5	1.2
30			1.6	1.2
31			1.6	1.2
		Total Hours	51	38.6

February	Int	Time	Pump #1	Pump #2
1			1.7	1.3
2			1.9	1.5
3			1.7	1.3
4			1.6	1.2
5			1.5	1.2
6			1.5	1.2
7			1.6	1.2
8			1.7	1.2
9			1.5	1.2
10			1.5	1.2
11			1.5	1.2
12			1.6	1.2
13			1.5	1.2
14			1.6	1.2
15			1.4	1.1
16			1.6	1.3
17			1.5	1.1
18			1.5	1.2
19			1.3	1
20			1.3	1
21			1.4	1.1
22			1.6	1.2
23			1.4	1.1
24			1.3	1
25			1.3	1
26			1.4	1.1
27			1.4	1.1
28			1.4	1.1
		Total Hours	42.2	32.7

March	Int	Time	Pump #1	Pump #2
1			1.4	1.1
2			1.6	1.2
3			1.5	1.1
4			2	1.5
5			1.7	1.4
6			1.7	1.3
7			2	1.5
8			2.1	1.6
9			2.4	1.8
10			3.8	2.7
11			5.1	3.4
12			4.5	3.2
13			4.5	3.1
14			9.4	4.7
15			5.8	3.9
16			4.3	3.1
17			3.5	2.6
18			2.9	2.2
19			2.7	2
20			2.4	1.9
21			2.5	1.9
22			2.2	1.7
23			2	1.6
24			1.9	1.4
25			1.7	1.3
26			2.1	1.6
27			2.2	1.6
28			2.1	1.5
29			2.3	1.7
30			1.8	1.4
31			1.7	1.3
		Total Hours	87.8	62.3

NOTES

ELIZABETHTOWN WASTEWATER TREATMENT PLANT
OAK MANOR PUMP STATION

2015

April	Int	Time	Pump #1	Pump #2
1			1.9	1.4
2			1.7	1.3
3			1.5	1.2
4			1.7	1.3
5			1.5	1.2
6			1.5	1.2
7			1.4	1.1
8			1.5	1.2
9			1.4	1.1
10			1.3	1
11			1.9	1.5
12			2	1.5
13			1.5	1.1
14			1.5	1.2
15			1.4	1.1
16			1.4	1.1
17			1.4	1.1
18			1.4	1.1
19			1.6	1.3
20			1.8	1.3
21			1.6	1.2
22			1.5	1.2
23			1.5	1.2
24			1.4	1.1
25			1.5	1.2
26			1.5	1.2
27			1.4	1.1
28			1.5	1.2
29			1.4	1.1
30			1.3	1
		Total Hours	45.9	35.8

May	Int	Time	Pump #1	Pump #2
1			1.2	0.9
2			1.4	1.1
3			1.4	1.2
4			1.3	1
5			1.3	1
6			1.3	1
7			1.3	1.1
8			1.3	1
9			1.3	1
10			1.3	1
11			1.4	1.1
12			1.3	1
13			1.3	1
14			1.3	0.9
15			1.2	0.9
16			1.4	1.1
17			1.4	1.1
18			1.4	1.1
19			1.4	1.1
20			1.3	1
21			1.3	1
22			1.2	0.9
23			1.2	0.9
24			1.3	1
25			1.3	1
26			1.4	1.1
27			1.3	1
28			1.4	1.1
29			1.3	1
30			1.3	1
31			1.4	1.1
		Total Hours	40.9	31.7

June	Int	Time	Pump #1	Pump #2
1			1.7	1.3
2			1.8	1.4
3			1.5	1.1
4			1.4	1.1
5			1.4	1
6			1.4	1.1
7			1.5	1.1
8			1.7	1.3
9			1.7	1.3
10			1.7	1.3
11			1.7	1.3
12			1.5	1.1
13			1.5	1.1
14			1.4	1.1
15			1.4	1.1
16			1.5	1.1
17			1.5	1.1
18			1.7	1.3
19			1.7	1.3
20			2.2	1.6
21			2	1.5
22			1.9	1.4
23			2.6	1.9
24			2.4	1.8
25			2.4	1.7
26			2.2	1.6
27			2.8	2.1
28			2.8	2
29			2.6	1.9
30			2.3	1.7
		Total Hours	55.9	41.7

NOTES

ELIZABETHTOWN WASTEWATER TREATMENT PLANT
OAK MANOR PUMP STATION

2015

July	Int	Time	Pump #1	Pump #2
1			2.3	1.7
2			2.1	1.5
3			2.2	1.6
4			2	1.5
5			2	1.5
6			1.8	1.4
7			1.7	1.3
8			1.7	1.3
9			1.7	1.2
10			1.7	1.3
11			1.5	1.1
12			1.4	1.1
13			1.8	1.3
14			1.6	1.2
15			1.5	1.2
16			1.4	1
17			1.3	1
18			1.4	1.1
19			1.6	1.2
20			1.5	1.1
21			1.4	1.1
22			1.4	1.1
23			1.3	1
24			1.5	1.1
25			1.4	1.1
26			1.6	1.2
27			1.5	1.1
28			1.4	1.1
29			1.4	1.1
30			1.5	1.1
31			1.4	1.1
		Total Hours	50	37.7

August	Int	Time	Pump #1	Pump #2
1			1.5	1.1
2			1.5	1.1
3			1.6	1.2
4			1.4	1.1
5			1.4	1.1
6			1.4	1.1
7			1.4	1.1
8			1.3	1
9			1.4	1
10			1.5	1.1
11			1.6	1.1
12			1.6	1.1
13			1.5	1.2
14			1.5	1.1
15			1.5	1.1
16			1.7	1.2
17			1.7	1.2
18			1.5	1.1
19			1.6	1.2
20			4.2	2.6
21			2.6	1.8
22			1.9	1.4
23			1.7	1.3
24			1.7	1.3
25			1.7	1.2
26			1.7	1.3
27			1.7	1.2
28			1.4	1.1
29			1.9	1.4
30			1.9	1.4
31			1.6	1.2
		Total Hours	52.6	38.4

September	Int	Time	Pump #1	Pump #2
1			1.7	1.3
2			1.6	1.2
3			1.7	1.3
4			1.9	1.4
5			1.8	1.3
6			1.3	0.9
7			1.7	1.2
8			1.6	1.2
9			1.5	1.1
10			2.3	1.7
11			1.4	1
12			2.7	1.9
13			2.1	1.5
14			1.8	1.4
15			1.7	1.2
16			1.9	1.4
17			1.8	1.4
18			1.3	0.9
19			1.7	1.3
20			1.6	1.3
21			1.6	1.2
22			1.5	1.3
23			1.4	1.1
24			1.5	1.1
25			1.3	1
26			1.4	1
27			1.6	1.2
28			1.5	1.1
29			2.3	1.6
30			1.9	1.4
		Total Hours	51.1	37.9

NOTES

ELIZABETHTOWN WASTEWATER TREATMENT PLANT
OAK MANOR PUMP STATION

2015

October	Int	Time	Pump #1	Pump #2
1			1.7	1.3
2			2.1	1.5
3			2.6	1.9
4			2.2	1.6
5			1.8	1.4
6			1.8	1.4
7			1.8	1.3
8			1.7	1.3
9			1.8	1.3
10			1.6	1.2
11			1.3	1.8
12			1.8	1.4
13			1.7	1.2
14			1.6	1.3
15			1.4	1.2
16			1.4	1.1
17			1.7	1.2
18			1.7	1.3
19			1.6	1.2
20			1.6	1.1
21			1.5	1.1
22			1.5	1.2
23			1.3	1
24			1.6	1.2
25			1.8	1.3
26			1.5	1.1
27			1.4	1
28			4.4	2.7
29			3.9	2.6
30			2.7	1.9
31			2.4	1.7
		Total Hours	58.9	43.8

November	Int	Time	Pump #1	Pump #2
1			2.3	1.6
2			1.9	1.4
3			1.9	1.4
4			1.8	1.3
5			1.7	1.5
6			1.6	1.2
7			1.8	1.4
8			1.9	1.4
9			1.7	1.2
10			1.9	1.4
11			1.8	1.3
12			1.8	1.3
13			1.6	1.2
14			1.7	1.2
15			1.6	1.2
16			1.7	1.2
17			1.5	1.1
18			1.6	1.2
19			1.6	1.2
20			1.5	1.1
21			1.6	1.1
22			1.8	1.3
23			1.6	1.2
24			1.5	1.1
25			1.6	1.2
26			1.3	1
27			1.5	1.1
28			1.5	1.1
29			1.5	1.1
30			1.7	1.2
		Total Hours	50.5	37.2

December	Int	Time	Pump #1	Pump #2
1			1.8	1.4
2			2.2	1.6
3			1.7	1.3
4			1.5	1.1
5			1.7	1.2
6			1.8	1.3
7			1.8	1.3
8			1.7	1.2
9			1.7	1.2
10			1.6	1.1
11			1.5	1.1
12			1.6	1.2
13			1.8	1.2
14			1.7	1.2
15			1.5	1.1
16			1.4	1
17			1.6	1.2
18			1.5	1.1
19			1.7	1.2
20			1.7	1.2
21			1.7	1.2
22			1.7	1.2
23			4	2.5
24			3.4	2.2
25			2.5	1.7
26			2.6	1.9
27			2.6	1.8
28			3.3	2.2
29			4.3	3.2
30			3.9	2.7
31			3	2.2
		Total Hours	66.5	47

NOTES

ATTACHMENT 5

Wastewater Treatment Plant

5.A. Condition of the Wastewater Treatment Plant

The last upgrade and expansion of the Borough of Elizabethtown's Wastewater Treatment Plant was completed at the end of 2002. The project involved the removal or demolition of the majority of the old plant equipment and structures, as well as the construction and installation of new equipment and structures. The WWTP was converted from trickling filters to a phased oxidation ditch treatment process. The WWTP is performing quite well. Due to its age, the Borough is beginning to evaluate whether portions of the WWTP may need to be replaced since maintenance expenditures are beginning to increase.

A copy of the annual inspection report for the WWTP is included in this section.

No hydraulic or organic overload condition exists or is projected to occur at the Elizabethtown WWTP over the next five years.

BOROUGH OF ELIZABETHTOWN

Lancaster County, Pennsylvania

ANNUAL REPORT

ON THE CONDITION OF THE WASTEWATER TREATMENT FACILITIES

March 2016

Introduction

On March 1, 2016, Dennis Bair, Elizabethtown Wastewater Treatment Plant Superintendent, and Ed Spayd and Dennis Michael of HRG inspected the Borough's Wastewater Treatment Plant and the Oak Manor Pumping Station. The following is a report on the condition of those facilities. The last upgrade and expansion of the treatment plant was completed during 2002 and resulted in the replacement of virtually all of the plant's equipment and structures with the exception of the solids dewatering facilities. The treatment plant portion of this report is structured to follow the path of the wastewater as it is treated at this facility.

Treatment Plant

General

The Elizabethtown Wastewater Treatment Plant is currently permitted to treat an average daily flow of 4.5 million gallons per day (MGD) and a maximum month daily flow of 7.2 MGD. The design of the 2002 upgrade and expansion was based upon maximum monthly loadings. The design organic loading is 8,650 pounds.

During 2015, the average daily flow was 1.887 MGD and the maximum monthly flow recorded was 2.934 MGD. The treatment plant's influent and effluent flow meters are calibrated semi-annually. The calibration reports for the various flow meters are attached as Attachment 7 to the Chapter 94 Report. During 2014, the Miller Road flow meter and the Conoy Creek meter which are located at the treatment plant were replaced with new units.

The Borough of Elizabethtown and the Elizabethtown Regional Sewer Authority (ERSA – West Donegal Township and Mount Joy Township) continue to investigate and remediate their respective collection and conveyance systems. The Borough's I/I investigative and remedial efforts were discussed in the Infiltration and Inflow Program Status Report section of the Chapter 94 Report. Details of ERSA's efforts related to their collection and conveyance systems can be found in it's respective report.

The operation of the treatment plant is constantly monitored by a SCADA system. This system has operated satisfactorily since the original computer's hard drive was replaced in 2010. To minimize future control system problems, the most current version of the SCADA program is backed up on an external hard drive on a routine basis.

Headworks

Prior to entering the treatment plant, each of the main influent lines are metered using flumes and ultrasonic flow meters. After metering, the wastewater passes through two parallel mechanical fine screens to remove solids larger than one-quarter inch. Solids removed by the screen are rinsed to wash organic matter back into the wastewater stream before being compacted and discharged into small containers. The contents of these containers are then transferred into a dumpster until they can be hauled by a contract hauler to the Lancaster County Solid Waste Management Authority facilities for ultimate disposal.

After passing through the screen, the wastewater enters a vortex style grit chamber where settled matter, such as sand, gravel and some organic solids are removed. The grit is pumped from the chamber, passed through a grit classifier and is then discharged to a dumpster. In 2004, a wooden enclosure was constructed around the Pista Grit control panel and above ground equipment to minimize freezing problems during cold weather. No freezing issues have been reported since that time. After leaving the grit chamber, the wastewater flows through another measuring flume with an ultrasonic flow meter that measures the total influent flow to the treatment plant.

Overall, the headworks system is functioning well. All influent flow meters are calibrated semi-annually. During 2014, a drive unit on one of the screens was replaced and the lower bearings, sleeves, and cleaning rakes on both mechanical screen units were replaced. Also during 2014, the Pista Grit system pinch valve was replaced and the rest of the unit was serviced. The interior of the headworks building was also repainted during 2014. New level sensors were installed for the screens during 2015 that allows the screens to work on level differential in the automatic mode.

Influent Pumping Station

After leaving the headworks area, the wastewater flows into the influent pumping station wet well. The wastewater is then pumped by one of four pumps to the anaerobic selector tank located at the head of the oxidation ditch.

Overall, the influent pumping station is operating well. A new control panel was installed during 2012 and bearings were replaced in two of the pumps during 2013. All four pumps received routine service and new drive belts during 2015. The influent pumping station interior was repainted during 2015.

Anaerobic Selector Tank & Oxidation Ditch

Wastewater is pumped from the influent pumping station to the anaerobic selector tanks. The purpose of the anaerobic selector is to facilitate the biological uptake of phosphorus from the wastewater. Alum can also be added at this point to assist in the chemical removal of phosphorus. Currently, not all of the phosphorus can be removed biologically, and a small amount of alum is added to the wastewater. The three original submersible mixers in these tanks have been replaced with surface mixers in 2009 and 2010. These surface mixers are in good condition and require little servicing.

After passing through the anaerobic selector, the wastewater enters the oxidation ditch by passing over one of two adjustable weirs. The two oxidation ditches are operated in series using Kruger's Biodenipho™ process. The two ditches are operated in four phases: denitrification-nitrification, nitrification-nitrification, nitrification-denitrification, and nitrification-nitrification. There are five mechanical aerators

(rotors) and six submersible mixers in each of the ditches. There are also two adjustable influent weirs and four adjustable effluent weirs (2 large and 2 small) to distribute and discharge flow depending on the phase of operation. The effluent weirs required servicing in 2011 and 2012 after a lightning strike affected the control circuit boards. The smaller weirs have continued to be a problem but the large weirs are functioning properly and have been sufficient for the treatment units to function properly. Most of the submersible mixers have been repaired or replaced during the past few years and are function well at this time. A major issue that has occurred over the past few years is that some of the baffle plates located just after the rotors have begun to pull loose from the wall anchors. To date, three baffles have pulled loose and have been removed from the ditches. The Borough WWTP staff is working with HRG to evaluate this issue and possible options to remedy the situation.

The oxidation ditch system is the main treatment unit at the plant and despite the issues with the baffles, it is operating very well.

Secondary Clarifiers

After leaving the oxidation ditch, the wastewater/activated sludge mixture flows to a distribution box that conveys the wastewater to one of two secondary circular clarifiers. In these clarifiers, the activated sludge from the oxidation ditch settles to the bottom of the clarifiers. Most of the thickened sludge is returned to the first anaerobic selector tank where is available to treat more incoming wastewater. Excess sludge (waste activated sludge) is removed from the secondary clarifiers for thickening, dewatering and disposal.

Despite some minor issues, the clarifiers are reported to be working well. Due to their age and reliability concerns, the clarifier drive unit for Clarifier #1 was replaced during 2015. Also during 2015, it was discovered that the end section of one of the sludge scrapers on Clarifier #2 had fallen off and had to be replaced. The drive unit for Clarifier #2 was also replaced while it was down for the scraper repairs. In 2016, the operator is planning to modify the scum skimmers on the clarifier units to increase scum removal efficiency.

Chlorination/Dechlorination, Cascade Aeration, Effluent Flow Metering and Outfalls

From the secondary clarifiers, the treated clear supernatant flows to a chlorine contact tank where a sodium hypochlorite solution is added for disinfection. The NPDES Discharge Permit requires that the total chlorine residual be 0.5 mg/l or less at the point of discharge. Because of a distance of almost five miles between the treatment plant and the primary discharge point at the Susquehanna River, this has never been a problem. However, provisions are available to add a sodium bisulfite solution at the end of the contact tank if needed to dechlorinate the treated effluent.

The disinfected effluent flow is measured at the end of the chlorine contact tank before it enters the cascade aeration basin and exits the treatment facility through the outfall line to the Susquehanna River. A second outfall line was constructed as part of the 2002 plant upgrade that discharges directly to the Conoy Creek when the effluent flow rate exceeds approximately 6 MGD (the capacity of the Susquehanna River outfall line). Any flow discharged through the second outfall is metered and discharged in accordance with NPDES Permit requirements. Both effluent flow meters and a meter to monitor stream flow in the Conoy Creek are calibrated semi-annually.

The operator noted that there have been some problems with the Conoy Creek stream flow meter. This is being checked by the calibration company and may be due to some bad wiring.

Chemical Feed Systems

Several chemical feed systems were installed during the 2002 plant upgrade and expansion project. The alum feed system is used for phosphorus removal and consists of two fiberglass tanks, two metering pumps and a control system. During 2013, the alum pumps were rebuilt and the PVC piping inside the alum storage room was replaced. This system is reported to be working well.

The sodium hypochlorite feed system is used for disinfection of the treated effluent and consists of two polyethylene tanks, two metering pumps and a control system. The tanks and piping for the sodium hypochlorite solution were replaced during 2010 due to some minor leakage that was developing. During 2015, the operators had to replace portions of the hypochlorite control panel due to power issues. This system is now reported to be working well.

The sodium bisulfite system is used for dechlorination on an as-needed basis. This system consists of two fiberglass tanks, two metering pumps and a control system. To date, the operators have not needed to use this system. The sodium bisulfite chemical remaining in the storage tanks has crystalized and should be removed. It is recommended that the operators consider purchasing sodium bisulfite in a 55 gallon drum or smaller size to minimize future problems due to non-use.

The paint on the walls and ceilings of the various rooms in the chemical building is coming off. The Borough staff anticipates re-painting these rooms in the near future.

There are two polymer feed systems at the treatment plant. One is used for the sludge thickeners and the other is used for the belt filter press dewatering system. The rotary drum thickener polymer system consists of a polymer wetting system with a metering pump, mix tank and polymer solution storage tank, and two metering pumps used to pump the polymer solution to one of the two thickeners. The second polymer system is for the belt filter press operation and consists of two polymer make-up tanks with mixers and two metering pumps. All of the polymer metering pumps were serviced during 2015. Both of these polymer systems are reported to be working well.

Sludge Production and Digester System

The waste activated sludge that settles out in the secondary clarifiers is pumped to a pair of rotary drum thickeners. These thickeners are used to remove a portion of the excess water from the waste sludge prior to being pumped to an aerobic digester. During the past two years, both unit's drive sprockets, drive chain and idler rollers have been replaced. One of the thickener drive units had to be replaced during 2015. In addition, one of the Moyno progressive cavity style thickener feed pumps was rebuilt during 2015 and the operator hopes to rebuild the other one during 2016. One of the flow meters on the thickener feed lines was replaced during 2015. The thickener system is reported to be operating well at this time.

The thickened sludge is then pumped by one of two double disc pumps to an aerobic digester for further processing. In the past year, new VFD's had to be installed for these pumps after the original units failed. A single submersible mixer keeps the aerobic digester well mixed while three positive displacement style blowers supply the required air through coarse bubble diffusers. All three digester blowers were serviced during 2015 and the motor on Digester Blower #3 had to be rebuilt. The aerobic digester and the associated systems are reported to be working well.

The digested sludge is eventually pumped via one of two Moyno progressive cavity style pumps to a belt filter press for further dewatering prior to disposal. The belt filter press is usually operated only a few days per week. The volume of sludge being processed is measured by a Doppler type flow meter located in the belt filter press sludge feed line. The dewatered sludge is temporarily stored in a covered storage building before being sent to the Lancaster County Resource Recovery Facility for ultimate disposal by landfilling or incineration. The operator reported that the belt filter press is getting old and is in need of a major overhaul. The VFD for the belt drive system had to be replaced during 2015. Several roller bearings had to be replaced during 2015 with several more starting to develop noises, and the rollers are also showing lots of wear. Due to the expense involved with this overhaul, replacement options are being evaluated. The belt filter press conveyor system was serviced during 2015.

Plant Water System

Like most treatment plants, a non-potable water system was installed during the upgrade and expansion project to provide a pressurized water source where potable water is not needed (hosing clarifiers, chemical dilution water, etc.). In 2015, due to an increasing number of problems with this system in recent years, the operators converted the plant water system from a vertical to a horizontal pumping system in an effort to reduce vibration problems impacting the pumps and connected piping. It is currently functioning well.

Emergency Power

The treatment plant has a back-up emergency generator that is capable of operating the entire wastewater treatment facility during any electrical power outage. During 2010, a special transfer switch was installed that will allow the plant to "shed power" during PPL declared emergencies or high power consumption times.

The Borough schedules the servicing of the entire generator and transfer switch system by the manufacturer's authorized service company on an annual basis to minimize the possibility that it would not function properly during power outages. The generator system is also exercised on a weekly basis to make sure it is working properly. The system was reported to be working well.

Oak Manor Pumping Station

This pumping station is a wet well/dry well type station that includes two Gorman-Rupp Series T-4 pumps. This station has a design flow capacity of 275 gallons per minute (gpm) which equals 396,000 gallons per day (gpd). The tested flow capacity is 360 gpm or 518,400 gpd. Based on pump run times, the 2015 average daily flows at this pumping station was 67,333 gpd with a maximum monthly flow rate of 104,586 gpd. Both of the pumps were serviced during 2015 and are reported to be operating well.

The increase in the amount of pump run time during wet weather periods indicate that the sewers flowing to the Oak Manor Pumping Station are subject to infiltration and inflow (I/I). The Borough is continuing to investigate the sewer lines tributary to this station in an effort to identify sources of the I/I.

The station's Muffin Monster comminutor was replaced in 2008 and the operator indicated that it is scheduled to be serviced again during 2016. The Borough hopes to paint the dry well walls and do some repairs to the pumping station fencing and grounds during 2016.

Sewer Maintenance

The Borough Wastewater Treatment staff maintains its sewer system using their own equipment. This includes a sewer "vactor" type truck for cleaning and flushing sewer lines, a closed circuit sewer televising truck and various pieces of excavation equipment needed for repair of sewer line breaks or leaks. The Borough also stocks some appropriate sized pipe and pipe repair items for emergency sewer line repairs. In addition, the Borough keeps manhole risers, grade rings, and manhole inserts in stock at the treatment plant. Infiltration and inflow exists in the Borough sewer system and they are working to address these issues as they are found. The Chapter 94 Report discusses the work performed on the Elizabethtown sewer system in detail.

Safety

It is highly recommended that the treatment plant personnel receive instruction on safety related issues on a regular basis. All plant personnel should be familiar with the use of gas detectors/monitors, self-contained breathing apparatus, confined space entry procedures, etc. It is a good idea to schedule monthly meetings to discuss safety related issues. Safety equipment suppliers are often willing to come to the treatment plant to demonstrate or review the use of their safety equipment. It is recommended that an annual inspection be made of all safety equipment to make sure it is operations. The Borough staff has indicated that the safety equipment is tested on a regular basis and that personal protective equipment is issued to all staff.

Summary

Overall, the Borough of Elizabethtown's Wastewater Treatment Facilities are in good to excellent condition. Despite its age, the equipment is operating as designed and the treatment plant is producing an excellent effluent. This facility is meeting all of its NPDES Discharge Permit requirements. The plant is getting old enough that major overhauls or replacement of some of the units will need to be considered in the near future.

Recommendations

- I/I continues to be a concern in the collection and conveyance system. Investigations should continue to identify sources of I/I. Appropriate repairs should be made as the problems are identified and funds become available to make those repairs.
- The Borough should continue the safety training program for all treatment plant personnel. Actual hands-on use of safety equipment during the training sessions is encouraged.
- The operations staff should continue to maintain equipment on a preventative and as-needed basis.
- The sodium bisulfite system should be cleaned to remove the crystallized material. Provisions should then be made to utilize 55-gallon drums or smaller drums in lieu of the large storage tanks.
- Due to its age, evaluate the complete overhaul of the belt filter presses versus other options such as a screw press or other equipment.
- Continue to evaluate the repair or replacement of the oxidation ditch equipment due to its age and the problems associated with the baffles and mechanical equipment.

ATTACHMENT 6

Industrial Wastes

6.A. Industrial Wastes

Permitted industrial and commercial establishments are monitored on a regular basis under the Borough's Industrial Waste Ordinance to regulate loadings. The Borough plans to continue inspections of commercial and industrial establishments in the service area. If deemed appropriate by the Borough, a permitting and monitoring program will be instituted for those establishments whose discharges might impact the collection, conveyance or treatment plant.

The Borough has identified a total of nine establishments that have been issued Industrial Waste Permits. Where appropriate, sampling is being required on a regular basis to assure compliance with the Borough's Industrial Waste Ordinance.

The primary contributor of industrial wastes to the Elizabethtown WWTP is Masterfoods USA (M&M Mars). The Masterfoods USA facility has a pretreatment plant which discharges to the Borough's collection system. A summary of the laboratory analyses of the Masterfoods USA pre-treated discharge samples for 2015 is summarized in Table 6.1.

ERSA is responsible for monitoring and administering commercial and industrial dischargers in their sewer system area. Refer to the ERSA Chapter 94 Report found in Attachment 8 of this report for additional information related to their industrial waste program.

BOROUGH OF ELIZABETHTOWN
2015 ANNUAL CHAPTER 94 REPORT

TABLE 6.1: INDUSTRIAL WASTE MONITORING

MASTERFOODS USA

Month	Effluent COD (mg/1)	Effluent BOD (mg.1)	pH RANGE	TSS (MG/1)	Flow (gpd)
January	179	12	7.74 - 10.02	27	51,030
February	155	18	7.33 - 8.47	26	44,921
March	177	13	7.22 - 8.56	24	47,827
April	199	16	7.06 - 7.80	65	46,267
May	142	11	7.19 - 7.67	41	53,904
June	119	6	6.96 - 7.63	31	51,192
July	95	4	7.16 - 7.72	26	52,804
August	110	8	7.24 - 7.95	35	53,143
September	123	12	7.06 - 8.03	43	58,113
October	143	16	7.08 - 7.92	64	60,844
November	132	10	6.98 - 7.79	66	45,529
December	87	10	X.XX - 7.93	31	47,271
2015 Average	138	11	7.18 - 8.12	40	51,070
2014 Average	153	17	7.19 - 8.08	51	55,402
% Increase/Decrease from previous year	-9%	-35%		-22%	-8%
2015 Maximum	199	18	10.02	66	60,844

Note:
The data for this table is taken from the Monthly Operation Summary Reports which are submitted by Masterfoods USA to the Borough of Elizabethtown.

MARS snackfood US

295 Brown Street
Elizabethtown, PA 17022
(717) 367-1500 Phone
(717) 367-0311 Fax

PROCESS EFFLUENT PRETREATMENT FACILITY MONTHLY OPERATION SUMMARY REPORT SUBMITTED TO THE ELIZABETHTOWN BOROUGH

MONTH OF: JANUARY 2015

EFFLUENT TOTAL GALLONS	1,581,929	GAL.
DAILY EFFLUENT AVERAGE FLOW	51.030	GAL
EFFLUENT PH (MIN.)	7.74	PH
EFFLUENT PH (MAX.)	10.02	PH
EFFLUENT SUSPENDED SOLIDS (AVERAGE)	27	MG/L
EFFLUENT SETTEABLE SOLIDS (AVERAGE)	0.0	MG/L
EFFLUENT COD (AVERAGE)	190	MG/L
EFFLUENT BOD (AVERAGE)	12	MG/L
EFFLUENT TEMP (AVERAGE)	42	DEG. F.
EFFLUENT DISSOLVED OXYGEN (AVERAGE)	9.05	MG/L
EFFLUENT DISSOLVED OXYGEN (MIN.)	6.42	MG/L
EFFLUENT DISSOLVED OXYGEN (MAX.)	13.19	MG/L

FOR APPROVALS:

PLANT MANAGER	C. FREEMAN
ENVIRONMENTAL TECHNICIAN	R. PENTZ

COPIES:

SITE TECHNICAL MANAGER	M. MOSER
EFFLUENT TREATMENT PLANT COORDINATOR	R. OLDHAM
SITE ENGINEER FILE COPY	L . GERMER

ORIGINAL:

CHIEF OPERATOR-BOROUGH	D. BAIR

MARS snackfood US

295 Brown Street
Elizabethtown, PA 17022
(717) 367-1500 Phone
(717) 367-0311 Fax

PROCESS EFFLUENT PRETREATMENT FACILITY MONTHLY OPERATION SUMMARY REPORT SUBMITTED TO THE ELIZABETHTOWN BOROUGH

MONTH OF: **FEBRUARY 2015**

EFFLUENT TOTAL GALLONS	1,257,780	GAL.
DAILY EFFLUENT AVERAGE FLOW	44,921	GAL
EFFLUENT PH (MIN.)	7.33	PH
EFFLUENT PH (MAX.)	8.47	PH
EFFLUENT SUSPENDED SOLIDS (AVERAGE)	26	MG/L
EFFLUENT SETTEABLE SOLIDS (AVERAGE)	0.0	MG/L
EFFLUENT COD (AVERAGE)	155	MG/L
EFFLUENT BOD (AVERAGE)	18	MG/L
EFFLUENT TEMP (AVERAGE)	38	DEG. F.
EFFLUENT DISSOLVED OXYGEN (AVERAGE)	9.28	MG/L
EFFLUENT DISSOLVED OXYGEN (MIN.)	5.60	MG/L
EFFLUENT DISSOLVED OXYGEN (MAX.)	10.94	MG/L

FOR APPROVALS:

PLANT MANAGER	C. FREEMAN
ENVIRONMENTAL TECHNICIAN	R. PENTZ

COPIES:

SITE TECHNICAL MANAGER	M. MOSER
EFFLUENT TREATMENT PLANT COORDINATOR	R. OLDHAM
SITE ENGINEER FILE COPY	L . GERMER

ORIGINAL:

CHIEF OPERATOR-BOROUGH	D. BAIR

MARS snackfood US

295 Brown Street
Elizabethtown, PA 17022
(717) 367-1500 Phone
(717) 367-0311 Fax

PROCESS EFFLUENT PRETREATMENT FACILITY MONTHLY OPERATION SUMMARY REPORT SUBMITTED TO THE ELIZABETHTOWN BOROUGH

MONTH OF: **MARCH 2015**

EFFLUENT TOTAL GALLONS	1,482,622	GAL.
DAILY EFFLUENT AVERAGE FLOW	47.827	GAL
EFFLUENT PH (MIN.)	7.22	PH
EFFLUENT PH (MAX.)	8.56	PH
EFFLUENT SUSPENDED SOLIDS (AVERAGE)	24	MG/L
EFFLUENT SETTEABLE SOLIDS (AVERAGE)	0.0	MG/L
EFFLUENT COD (AVERAGE)	177	MG/L
EFFLUENT BOD (AVERAGE)	13	MG/L
EFFLUENT TEMP (AVERAGE)	45	DEG. F.
EFFLUENT DISSOLVED OXYGEN (AVERAGE)	8.43	MG/L
EFFLUENT DISSOLVED OXYGEN (MIN.)	6.82	MG/L
EFFLUENT DISSOLVED OXYGEN (MAX.)	11.50	MG/L

FOR APPROVALS:

PLANT MANAGER	C. FREEMAN CAF
ENVIRONMENTAL TECHNICIAN	R. PENTZ

COPIES:

SITE TECHNICAL MANAGER	M. MOSER
EFFLUENT TREATMENT PLANT COORDINATOR	R. OLDHAM
SITE ENGINEER FILE COPY	L . GERMER

ORIGINAL:

CHIEF OPERATOR-BOROUGH	D. BAIR

MARS snackfood US

295 Brown Street
Elizabethtown, PA 17022
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(717) 367-0311 Fax

PROCESS EFFLUENT PRETREATMENT FACILITY MONTHLY OPERATION SUMMARY REPORT SUBMITTED TO THE ELIZABETHTOWN BOROUGH

MONTH OF: APRIL 2015

EFFLUENT TOTAL GALLONS	1,388,003	GAL.
DAILY EFFLUENT AVERAGE FLOW	46.267	GAL
EFFLUENT PH (MIN.)	7.06	PH
EFFLUENT PH (MAX.)	7.80	PH
EFFLUENT SUSPENDED SOLIDS (AVERAGE)	65	MG/L
EFFLUENT SETTEABLE SOLIDS (AVERAGE)	0.0	MG/L
EFFLUENT COD (AVERAGE)	199	MG/L
EFFLUENT BOD (AVERAGE)	16	MG/L
EFFLUENT TEMP (AVERAGE)	55	DEG. F.
EFFLUENT DISSOLVED OXYGEN (AVERAGE)	7.60	MG/L
EFFLUENT DISSOLVED OXYGEN (MIN.)	5.29	MG/L
EFFLUENT DISSOLVED OXYGEN (MAX.)	9.22	MG/L

FOR APPROVALS:

PLANT MANAGER	C. FREEMAN CAF
ENVIRONMENTAL TECHNICIAN	R. PENTZ RED

COPIES:

SITE TECHNICAL MANAGER	M. MOSER
EFFLUENT TREATMENT PLANT COORDINATOR	R. OLDHAM
SITE ENGINEER FILE COPY	L . GERMER

ORIGINAL:

CHIEF OPERATOR-BOROUGH	D. BAIR

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Elizabethtown, PA 17022
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PROCESS EFFLUENT PRETREATMENT FACILITY MONTHLY OPERATION SUMMARY REPORT SUBMITTED TO THE ELIZABETHTOWN BOROUGH

MONTH OF: MAY 2015

EFFLUENT TOTAL GALLONS	1,617,118	GAL.
DAILY EFFLUENT AVERAGE FLOW	53.904	GAL
EFFLUENT PH (MIN.)	7.19	PH
EFFLUENT PH (MAX.)	7.67	PH
EFFLUENT SUSPENDED SOLIDS (AVERAGE)	41	MG/L
EFFLUENT SETTEABLE SOLIDS (AVERAGE)	0.0	MG/L
EFFLUENT COD (AVERAGE)	142	MG/L
EFFLUENT BOD (AVERAGE)	11	MG/L
EFFLUENT TEMP (AVERAGE)	67	DEG. F.
EFFLUENT DISSOLVED OXYGEN (AVERAGE)	7.47	MG/L
EFFLUENT DISSOLVED OXYGEN (MIN.)	5.15	MG/L
EFFLUENT DISSOLVED OXYGEN (MAX.)	8.70	MG/L

FOR APPROVALS:

PLANT MANAGER — C. FREEMAN CF

ENVIRONMENTAL TECHNICIAN — R. PENTZ

COPIES:

SITE TECHNICAL MANAGER — M. MOSER

EFFLUENT TREATMENT PLANT COORDINATOR — R. OLDHAM

SITE ENGINEER FILE COPY — L . GERMER

ORIGINAL:

CHIEF OPERATOR-BOROUGH — D. BAIR

MARS snackfood US

295 Brown Street
Elizabethtown, PA 17022
(717) 367-1500 Phone
(717) 367-0311 Fax

PROCESS EFFLUENT PRETREATMENT FACILITY MONTHLY OPERATION SUMMARY REPORT SUBMITTED TO THE ELIZABETHTOWN BOROUGH

MONTH OF: JUNE 2015

EFFLUENT TOTAL GALLONS	1,535,748	GAL.
DAILY EFFLUENT AVERAGE FLOW	51,192	GAL
EFFLUENT PH (MIN.)	6.95	PH
EFFLUENT PH (MAX.)	7.63	PH
EFFLUENT SUSPENDED SOLIDS (AVERAGE)	31	MG/L
EFFLUENT SETTEABLE SOLIDS (AVERAGE)	0.0	MG/L
EFFLUENT COD (AVERAGE)	119	MG/L
EFFLUENT BOD (AVERAGE)	6	MG/L
EFFLUENT TEMP (AVERAGE)	72	DEG. F.
EFFLUENT DISSOLVED OXYGEN (AVERAGE)	7.41	MG/L
EFFLUENT DISSOLVED OXYGEN (MIN.)	3.78	MG/L
EFFLUENT DISSOLVED OXYGEN (MAX.)	8.99	MG/L

FOR APPROVALS:

PLANT MANAGER — C. FREEMAN CGF

ENVIRONMENTAL TECHNICIAN — R. PENTZ

COPIES:

SITE TECHNICAL MANAGER — M. MOSER

EFFLUENT TREATMENT PLANT COORDINATOR — R. OLDHAM

SITE ENGINEER FILE COPY — L . GERMER

ORIGINAL:

CHIEF OPERATOR-BOROUGH — D. BAIR

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PROCESS EFFLUENT PRETREATMENT FACILITY MONTHLY OPERATION SUMMARY REPORT SUBMITTED TO THE ELIZABETHTOWN BOROUGH

MONTH OF: JULY 2015

EFFLUENT TOTAL GALLONS	1,584,125	GAL.
DAILY EFFLUENT AVERAGE FLOW	52.804	GAL
EFFLUENT PH (MIN.)	7.16	PH
EFFLUENT PH (MAX.)	7.72	PH
EFFLUENT SUSPENDED SOLIDS (AVERAGE)	26	MG/L
EFFLUENT SETTEABLE SOLIDS (AVERAGE)	0.0	MG/L
EFFLUENT COD (AVERAGE)	95	MG/L
EFFLUENT BOD (AVERAGE)	4	MG/L
EFFLUENT TEMP (AVERAGE)	74	DEG. F.
EFFLUENT DISSOLVED OXYGEN (AVERAGE)	7.58	MG/L
EFFLUENT DISSOLVED OXYGEN (MIN.)	4.83	MG/L
EFFLUENT DISSOLVED OXYGEN (MAX.)	8.16	MG/L

FOR APPROVALS:

PLANT MANAGER	C. FREEMAN	CGF
ENVIRONMENTAL TECHNICIAN	N. HEGEMAN	NRH

COPIES:

SITE TECHNICAL MANAGER	M. MOSER
EFFLUENT TREATMENT PLANT COORDINATOR	R. OLDHAM
SITE ENGINEER FILE COPY	L . GERMER

ORIGINAL:

CHIEF OPERATOR-BOROUGH	D. BAIR

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PROCESS EFFLUENT PRETREATMENT FACILITY MONTHLY OPERATION SUMMARY REPORT SUBMITTED TO THE ELIZABETHTOWN BOROUGH

MONTH OF: AUGUST 2015

EFFLUENT TOTAL GALLONS	1,647,431	GAL.
DAILY EFFLUENT AVERAGE FLOW	53,143	GAL
EFFLUENT PH (MIN.)	7.24	PH
EFFLUENT PH (MAX.)	7.95	PH
EFFLUENT SUSPENDED SOLIDS (AVERAGE)	35	MG/L
EFFLUENT SETTEABLE SOLIDS (AVERAGE)	0.0	MG/L
EFFLUENT COD (AVERAGE)	110	MG/L
EFFLUENT BOD (AVERAGE)	8	MG/L
EFFLUENT TEMP (AVERAGE)	73	DEG. F.
EFFLUENT DISSOLVED OXYGEN (AVERAGE)	7.41	MG/L
EFFLUENT DISSOLVED OXYGEN (MIN.)	4.42	MG/L
EFFLUENT DISSOLVED OXYGEN (MAX.)	8.49	MG/L

FOR APPROVALS:

PLANT MANAGER	C. FREEMAN CGF
ENVIRONMENTAL TECHNICIAN	N. HEGEMAN NRH

COPIES:

SITE TECHNICAL MANAGER	M. MOSER
EFFLUENT TREATMENT PLANT COORDINATOR	C. SOWERS
SITE ENGINEER FILE COPY	L . GERMER

ORIGINAL:

CHIEF OPERATOR-BOROUGH	D. BAIR

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(717) 367-0311 Fax

PROCESS EFFLUENT PRETREATMENT FACILITY MONTHLY OPERATION SUMMARY REPORT SUBMITTED TO THE ELIZABETHTOWN BOROUGH

MONTH OF: SEPTEMBER 2015

EFFLUENT TOTAL GALLONS	1,743,404 GAL.
DAILY EFFLUENT AVERAGE FLOW	58,113 GAL
EFFLUENT PH (MIN.)	7.06 PH
EFFLUENT PH (MAX.)	8.03 PH
EFFLUENT SUSPENDED SOLIDS (AVERAGE)	43 MG/L
EFFLUENT SETTEABLE SOLIDS (AVERAGE)	0.0 MG/L
EFFLUENT COD (AVERAGE)	123 MG/L
EFFLUENT BOD (AVERAGE)	12 MG/L
EFFLUENT TEMP (AVERAGE)	70 DEG. F.
EFFLUENT DISSOLVED OXYGEN (AVERAGE)	7.46 MG/L
EFFLUENT DISSOLVED OXYGEN	5.48 MG/L
EFFLUENT DISSOLVED OXYGEN	8.11 MG/L

FOR APPROVALS:

PLANT MANAGER	C. FREEMAN
ENVIRONMENTAL TECHNICIAN	N. HEGEMAN

COPIES:

SITE TECHNICAL MANAGER	M. MOSER
EFFLUENT TREATMENT PLANT COORDINATOR	C. SOWERS
SITE ENGINEER FILE COPY	L . GERMER

ORIGINAL:

CHIEF OPERATOR-BOROUGH	D. BAIR

WW TP 17173670964 717-361-4618 p.2

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Elizabethtown, PA 17022
(717) 367-1500 Phone
(717) 367-0311 Fax

PROCESS EFFLUENT PRETREATMENT FACILITY MONTHLY OPERATION SUMMARY REPORT SUBMITTED TO THE ELIZABETHTOWN BOROUGH

MONTH OF: OCTOBER 2015

EFFLUENT TOTAL GALLONS	1,886,170 GAL.
DAILY EFFLUENT AVERAGE FLOW	60,844 GAL
EFFLUENT PH (MIN.)	7.08 PH
EFFLUENT PH (MAX.)	7.92 PH
EFFLUENT SUSPENDED SOLIDS (AVERAGE)	64 MG/L
EFFLUENT SETTEABLE SOLIDS (AVERAGE)	0.0 MG/L
EFFLUENT COD (AVERAGE)	143 MG/L
EFFLUENT BOD (AVERAGE)	16 MG/L
EFFLUENT TEMP (AVERAGE)	59 DEG. F.
EFFLUENT DISSOLVED OXYGEN (AVERAGE)	7.82 MG/L
EFFLUENT DISSOLVED OXYGEN	5.06 MG/L
EFFLUENT DISSOLVED OXYGEN	8.64 MG/L

FOR APPROVALS:

PLANT MANAGER	C. FREEMAN
ENVIRONMENTAL TECHNICIAN	N. HEGEMAN

COPIES:

SITE TECHNICAL MANAGER	M. MOSER
EFFLUENT TREATMENT PLANT COORDINATOR	C. SOWERS
SITE ENGINEER FILE COPY	L . GERMER

ORIGINAL:

CHIEF OPERATOR-BOROUGH	D. BAIR

WW TP 17173670964 717-361-4618 p.1

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US

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Elizabethtown, PA 17022
(717) 367-1500 Phone
(717) 367-0311 Fax

PROCESS EFFLUENT PRETREATMENT FACILITY MONTHLY OPERATION SUMMARY REPORT SUBMITTED TO THE ELIZABETHTOWN BOROUGH

MONTH OF: NOVEMBER 2015

EFFLUENT TOTAL GALLONS	1,365,873	GAL.
DAILY EFFLUENT AVERAGE FLOW	45.529	GAL
EFFLUENT PH (MIN.)	6.98	PH
EFFLUENT PH (MAX.)	7.79	PH
EFFLUENT SUSPENDED SOLIDS (AVERAGE)	66	MG/L
EFFLUENT SETTEABLE SOLIDS (AVERAGE)	0.0	MG/L
EFFLUENT COD (AVERAGE)	132	MG/L
EFFLUENT BOD (AVERAGE)	10	MG/L
EFFLUENT TEMP (AVERAGE)	54	DEG. F.
EFFLUENT DISSOLVED OXYGEN (AVERAGE)	7.76	MG/L
EFFLUENT DISSOLVED OXYGEN (MIN.)	6.05	MG/L
EFFLUENT DISSOLVED OXYGEN (MAX.)	9.98	MG/L

FOR APPROVALS:

PLANT MANAGER	C. FREEMAN CJF
ENVIRONMENTAL TECHNICIAN	N. HEGEMAN NRH

COPIES:

SITE TECHNICAL MANAGER	M. MOSER
EFFLUENT TREATMENT PLANT COORDINATOR	C. SOWERS
SITE ENGINEER FILE COPY	L . GERMER

ORIGINAL:

CHIEF OPERATOR-BOROUGH	D. BAIR

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snackfood
US

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(717) 367-0311 Fax

PROCESS EFFLUENT PRETREATMENT FACILITY MONTHLY OPERATION SUMMARY REPORT SUBMITTED TO THE ELIZABETHTOWN BOROUGH

MONTH OF: DECEMBER 2015

EFFLUENT TOTAL GALLONS	1,465,400	GAL.
DAILY EFFLUENT AVERAGE FLOW	47.271	GAL
EFFLUENT PH (MIN.)	0.00	PH
EFFLUENT PH (MAX.)	7.93	PH
EFFLUENT SUSPENDED SOLIDS (AVERAGE)	31	MG/L
EFFLUENT SETTEABLE SOLIDS (AVERAGE)	0.0	MG/L
EFFLUENT COD (AVERAGE)	87	MG/L
EFFLUENT BOD (AVERAGE)	10	MG/L
EFFLUENT TEMP (AVERAGE)	195	DEG. F.
EFFLUENT DISSOLVED OXYGEN (AVERAGE)	5.93	MG/L
EFFLUENT DISSOLVED OXYGEN (MIN.)	0.00	MG/L
EFFLUENT DISSOLVED OXYGEN (MAX.)	9.77	MG/L

FOR APPROVALS:

PLANT MANAGER	C. FREEMAN CAF
ENVIRONMENTAL TECHNICIAN	N. HEGEMAN NJH

COPIES:

SITE TECHNICAL MANAGER	M. MOSER
EFFLUENT TREATMENT PLANT COORDINATOR	C. SOWERS
SITE ENGINEER FILE COPY	L . GERMER

ORIGINAL:

CHIEF OPERATOR-BOROUGH	D. BAIR

ATTACHMENT 7

Flow Meter Calibration Reports

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
5/14/2015

User
ElizabethTown Borough
600 S. Hanover St.
Elizabethtown, Pa. 17022
Attn Denny Baix

Job Site
ElizabethTown WWTP

Instrument Model No.
Milltronics
Multiranger Plus

Instrument S/N
12003114?VQ

Instrument Loop
Bossler Flow Meter

Input Type
Ultrasonic

Primary Signal Producer
10in Palmer - Bowlus Flume

Calibrated Range
0-0.7234 MGD

Instrument Settings

Found

Zero	Span
29.875 in	0.7234 MGD

Changed To

Zero	Span
N/A	N/A

Calibration Data

Input %	Input Value		Output Value		% Error After Calibration
0 %	0.00	MGD	4.00	mADC	0.00%
50 %	0.36	MGD	12.01	mADC	0.08%
100 %	0.72	MGD	20.02	mADC	0.10%

Equipment Used Multimeter Stick Rule Isco Standards Book

Adjustments / Actions Taken : None

Comments :

Service Representative Anthony Gibbs

Date 5/14/2015

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
5/14/2015

User
Elizabethtown Borough
600 S. Hanover St.
Elizabethtown, Pa. 17022
Attn Denny Bair

Job Site
Elizabethtown WWTF

Instrument Model No.
Endress-Hauser FMU90

Instrument S/N
K3004315DE6

Instrument Loop
Total Influent Meter

Input Type
Ultrasonic

Primary Signal Producer
3ft Parshall Flume

Calibrated Range
0-14.63 MGD

Instrument Settings

Found

Zero	Span
3.590 ft.	14.63 MGD

Changed To

Zero	Span
N/A	N/A

Calibration Data

Input %	Input Value		Output Value		% Error After Calibration
0 %	0.00	MGD	4.00	mADC	0.00%
50 %	7.32	MGD	12.00	mADC	0.00%
100 %	14.63	MGD	20.00	mADC	0.00%

Equipment Used Multimeter Stick Rule Isco Standards Book

Adjustments / Actions Taken : None

Comments :

Service Representative Anthony Grbas

Date 5/14/2015

215 N. Main Street - Souderton,Pa 18964 - 215-721-4840 - Fax 215-721-4923

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
5/14/2015

User
Elizabethtown Borough
600 S. Hanover St.
Elizabethtown, Pa. 17022
Attn Denny Bair

Job Site
Elizabethtown WWTF

Instrument Model No.
Milltronics
Multiranger Plus

Instrument S/N
170301170VQ

Instrument Loop
Plant Overflow Meter

Input Type
Ultrasonic

Primary Signal Producer
Rectangular Weir

Calibrated Range
0-20.00 MGD

Instrument Settings

Found		Changed To	
Zero	Span	Zero	Span
29.62 in	20.00 MGD	N/A	N/A

Calibration Data

Input %	Input Value		Output Value		% Error After Calibration
0 %	0.00	MGD	4.00	mADC	0.00%
50 %	10.00	MGD	12.01	mADC	0.08%
100 %	20.00	MGD	20.02	mADC	0.10%

Equipment Used Multimeter Stick Rule Isco Standards Book

Adjustments / Actions Taken : None

Comments :

Service Representative Anthony Grbas

Date 5/14/2015

215 N. Main Street - Souderton,Pa 18964 - 215-721-4840 - Fax 215-721-4923

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
5/14/2015

User
Elizabethtown Borough
600 S. Hanover St.
Elizabethtown, Pa. 17022
Attn Denot Bair

Job Site
Elizabethtown WWTP

Instrument Model No.
Endress Hauser FMU90

Instrument S/N

Instrument Loop
Miller Flow Meter

Input Type
Ultrasonic

Primary Signal Producer
9in Parshall Flume

Calibrated Range
0-4.385 MGD

Instrument Settings

Found		Changed To	
Zero	Span	Zero	Span
31.25 in	4.385 MGD	N/A	N/A

Calibration Data

Input %	Input Value		Output Value		% Error After Calibration
0 %	0.00	MGD	4.00	mADC	0.00%
50 %	2.19	MGD	12.00	mADC	0.00%
100 %	4.39	MGD	20.00	mADC	0.00%

Equipment Used Multimeter Stick Rule Isco Standards Book

Adjustments / Actions Taken : None

Comments :

Service Representative Anthony Grbas

Date 9/30/2014

215 N. Main Street - Souderton,Pa 18964 - 215-721-4840 - Fax 215-721-4923

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
5/14/2015

User
Elizabethtown Borough
600 S. Hanover St.
Elizabethtown, Pa. 17022
Attn Denny Bair

Job Site
Elizabethtown WWTP

Instrument Model No.
MilltronicsOCM3

Instrument S/N
021105106XY

Instrument Loop
Plant Effluent Meter

Input Type
Ultrasonic

Primary Signal Producer
60in Constricted Rectangular Weir

Calibrated Range
0-18.57 MGD

Instrument Settings

Found		Changed To	
Zero	Span	Zero	Span
43.91 in	18.57 MGD	N/A	N/A

Calibration Data

Input %	Input Value		Output Value		% Error After Calibration
0 %	0.00	MGD	4.00	mADC	0.00%
50 %	9.29	MGD	12.01	mADC	0.09%
100 %	18.57	MGD	20.02	mADC	0.10%

Equipment Used Multimeter Stick Rule Isco Standards Book

Adjustments / Actions Taken : None

Comments :

Service Representative Anthony Grbas

Date 5/14/2015

215 N. Main Street - Souderton,Pa 18964 - 215-721-4840 - Fax 215-721-4923

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
5/14/2015

User
Elizabethtown Borough
600 S. Hanover St.
Elizabethtown, Pa. 17022
Attn Denny Bair

Job Site
Elizabethtown WWTP

Instrument Model No.
Milltronics OCM3

Instrument S/N
070103MJTV

Instrument Loop
Canoy Influent Meter

Input Type
Ultrasonic

Primary Signal Producer
18in Parshall Flume

Calibrated Range
0-11.26 MGD

Instrument Settings

Found		Changed To	
Zero	Span	Zero	Span
37.00 in	11.26 MGD	N/A	N/A

Calibration Data

Input %	Input Value		Output Value		% Error After Calibration
0 %	0.00	MGD	4.00	mADC	0.00%
50 %	5.63	MGD	12.02	mADC	0.17%
100 %	11.26	MGD	20.03	mADC	0.15%

Equipment Used Multimeter Stick Rule Isco Standards Book

Adjustments / Actions Taken : None

Comments :

Service Representative Anthony Grbas

Date 5/14/2015

215 N. Main Street - Souderton,Pa 18964 - 215-721-4840 - Fax 215-721-4923

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
5/14/2015

User
Elizabethtown Borough
600 S. Hanover St.
Elizabethtown, Pa. 17022
Attn Denny Bair

Job Site
Elizabethtown WWTP

Instrument Model No.
Milltronics OCM3

Instrument S/N
020501101PB

Instrument Loop
Canoy Creek Flow Meter

Input Type
Ultrasonic

Primary Signal Producer
120in Rectangular Weir

Calibrated Range
0-38.35 MGD

Instrument Settings

Found		Changed To	
Zero	Span	Zero	Span
84.10 in	38.35 MGD	N/A	N/A

Calibration Data

Input %	Input Value		Output Value		% Error After Calibration
0 %	0.00	MGD	4.00	mADC	0.00%
50 %	19.18	MGD	12.01	mADC	0.08%
100 %	38.35	MGD	20.01	mADC	0.05%

Equipment Used Multimeter Stick Rule Taco Standards Book

Adjustments / Actions Taken :

Comments :
Note at flows over 10in (16.24 MGD) the weir starts to surcharge and the readings will be incorrect.

Service Representative Anthony Orbas

Date 5/14/2015

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
12/21/2015

User
Elizabethtown Borough
600 S. Hanover St.
Elizabethtown, Pa. 17022
Attn Denny Bair

Job Site
Elizabethtown WWTP

Instrument Model No.
Milltronics
Multiranger Plus

Instrument S/N
120301170VQ

Instrument Loop
Plant Overflow Meter

Input Type
Ultrasonic

Primary Signal Producer
Rectangular Weir

Calibrated Range
0-20.00 MGD

Instrument Settings

Found		Changed To	
Zero	Span	Zero	Span
29.62 in	20.00 MGD	N/A	N/A

Calibration Data

Input %	Input Value		Output Value		% Error After Calibration
0 %	0.00	MGD	4.00	mADC	0.00%
50 %	10.00	MGD	12.01	mADC	0.08%
100 %	20.00	MGD	20.02	mADC	0.10%

Equipment Used Multimeter Stick Rule Isco Standards Book

Adjustments / Actions Taken : None

Comments :

Service Representative Anthony Grbas Date 12/21/2015

215 N. Main Street - Souderton,Pa 18964 - 215-721-4840 - Fax 215-721-4923

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
12/21/2015

User
Elizabethtown Borough
600 S. Hanover St.
Elizabethtown, Pa. 17022
Attn Denny Bair

Job Site
Elizabethtown WWTP

Instrument Model No.
Milltronics OCM3

Instrument S/N
021105106XY

Instrument Loop
Plant Effluent Meter

Input Type
Ultrasonic

Primary Signal Producer
60in Constricted Rectangular Weir

Calibrated Range
0-18.57 MGD

Instrument Settings

Found		Changed To	
Zero	Span	Zero	Span
43.91 in	18.57 MGD	N/A	N/A

Calibration Data

Input %	Input Value		Output Value		% Error After Calibration
0 %	0.00	MGD	4.00	mADC	0.00%
50 %	9.29	MGD	12.01	mADC	0.08%
100 %	18.57	MGD	20.02	mADC	0.10%

Equipment Used Multimeter Stick Rule Isco Standards Book

Adjustments / Actions Taken : None

Comments :

Service Representative Anthony Grbas Date 12/21/2015

215 N. Main Street - Souderton,Pa 18964 - 215-721-4840 - Fax 215-721-4923

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
12/21/2015

User
Elizabethtown Borough
600 S. Hanover St.
Elizabethtown, Pa. 17022
Attn Denny Bair

Job Site
Elizabethtown WWTP

Instrument Model No.
Milltronics OCM3

Instrument S/N
020501101PB

Instrument Loop
Canoy Creek Flow Meter

Input Type
Ultrasonic

Primary Signal Producer
120in Rectangular Weir

Calibrated Range
0-38.35 MGD

Instrument Settings

Found		Changed To	
Zero	Span	Zero	Span
84.10 in	38.35 MGD	N/A	N/A

Calibration Data

Input %	Input Value		Output Value		% Error After Calibration
0 %	0.00	MGD	4.00	mADC	0.00%
50 %	19.18	MGD	12.01	mADC	0.08%
100 %	38.35	MGD	20.01	mADC	0.05%

Equipment Used Multimeter Stick Rule Isco Standards Book

Adjustments / Actions Taken :

Comments :
Note at flows over 10in (16.24 MGD) the weir starts to surcharge and the readings will be incorect.

Service Representative Anthony Grbas **Date** 12/21/2015

215 N. Main Street - Souderton,Pa 18964 - 215-721-4840 - Fax 215-721-4923

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
12/21/2015

User
Elizabethtown Borough
600 S. Hanover St.
Elizabethtown, Pa. 17022
Attn Denny Bair

Job Site
Elizabethtown WWTP

Instrument Model No.
Endress-Hauser FMU90

Instrument S/N
K30043150E6

Instrument Loop
Total Influent Meter

Input Type
Ultrasonic

Primary Signal Producer
3ft Parshall Flume

Calibrated Range
0-14.63 MGD

Instrument Settings

Found		Changed To	
Zero	Span	Zero	Span
3.590 ft	14.63 MGD	N/A	N/A

Calibration Data

Input %	Input Value		Output Value		% Error After Calibration
0 %	0.00	MGD	4.00	mADC	0.00%
50 %	7.32	MGD	12.00	mADC	0.00%
100 %	14.63	MGD	20.00	mADC	0.00%

Equipment Used Multimeter Stick Rule Isco Standards Book

Adjustments / Actions Taken : None

Comments :

Service Representative Anthony Grbas **Date** 12/21/2015

215 N. Main Street - Souderton,Pa 18964 - 215-721-4840 - Fax 215-721-4923

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
12/21/2015

User
Elizabethtown Borough
600 S. Hanover St.
Elizabethtown, Pa. 17022
Attn Dennt Bair

Job Site
Elizabethtown WWTP

Instrument Model No.
Endress Hauser FMU90

Instrument S/N

Instrument Loop
Miller Flow Meter

Input Type
Ultrasonic

Primary Signal Producer
9in Parshall Flume

Calibrated Range
0-4.385 MGD

Instrument Settings

Found		Changed To	
Zero	Span	Zero	Span
31.25 in	4.385 MGD	N/A	N/A

Calibration Data

Input %	Input Value		Output Value		% Error After Calibration
0 %	0.00	MGD	4.00	mADC	0.00%
50 %	2.19	MGD	12.00	mADC	0.00%
100 %	4.39	MGD	20.00	mADC	0.00%

Equipment Used Multimeter Stick Rule Isco Standards Book

Adjustments / Actions Taken : None

Comments :

Service Representative Anthony Grbas

Date 12/21/2015

215 N. Main Street - Souderton,Pa 18964 - 215-721-4840 - Fax 215-721-4923

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
12/21/2015

User
Elizabethtown Borough
600 S. Hanover St.
Elizabethtown, Pa. 17022
Attn Denny Bair

Job Site
Elizabethtown WWTP

Instrument Model No.
Milltronics OCM3

Instrument S/N
070103MITV

Instrument Loop
Canoy Influent Meter

Input Type
Ultrasonic

Primary Signal Producer
18in Parshall Flume

Calibrated Range
0-11.26 MGD

Instrument Settings

Found		Changed To	
Zero	Span	Zero	Span
37.00 in	11.26 MGD	N/A	N/A

Calibration Data

Input %	Input Value		Output Value		% Error After Calibration
0 %	0.00	MGD	4.00	mADC	0.00%
50 %	5.63	MGD	12.02	mADC	0.17%
100 %	11.26	MGD	20.03	mADC	0.15%

Equipment Used Multimeter Stick Rule Isco Standards Book

Adjustments / Actions Taken : None

Comments :

Service Representative Anthony Grbas Date 12/21/2015

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
12/21/2015

User
Elizabethtown Borough
600 S. Hanover St.
Elizabethtown, Pa. 17022
Attn Denny Bair

Job Site
Elizabethtown WWTP

Instrument Model No.
Milltronics
Multiranger Plus

Instrument S/N
120031147VQ

Instrument Loop
Bossler Flow Meter

Input Type
Ultrasonic

Primary Signal Producer
10in Palmer - Bowlus Flume

Calibrated Range
0~0.7234 MGD

Instrument Settings

Found		Changed To	
Zero	Span	Zero	Span
29.875 in	0.7234 MGD	N/A	N/A

Calibration Data

Input %	Input Value		Output Value		% Error After Calibration
0 %	0.00	MGD	4.00	mADC	0.00%
50 %	0.36	MGD	12.01	mADC	0.08%
100 %	0.72	MGD	20.02	mADC	0.10%

Equipment Used Multimeter Stick Rule Isco Standards Book

Adjustments / Actions Taken : None

Comments :

Service Representative Anthony Grbas Date 12/21/2015

ATTACHMENT 8

Elizabethtown Regional Sewer Authority (ERSA) Report

Lancaster County, Pennsylvania

Report

Elizabethtown Regional Sewer Authority

2015 Annual Chapter 94 Report

March 2016

CDM Smith

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GENERAL

In January of 2012 West Donegal Township Authority (WDTA) and Mount Joy Township Authority (MJTA) combined their respective sanitary sewer systems to form the Elizabethtown Regional Sewer Authority (ERSA). ERSA provides wastewater conveyance services to portions of West Donegal Township, Mount Joy Township and a small portion of Conoy Township. The Authority's facilities consist of gravity sewers ranging in size from 8-in through 15-in, low pressure sewer mains ranging in size from 2-in through 3-in, force mains ranging in size from 4-in through 10-in, three metering chambers and fifteen sewage pumping stations originally designed for average daily flows of 20 to 980 gallons per minute (GPM). Wastewater from the ERSA service area is treated at the Borough of Elizabethtown Wastewater Treatment Plant (WWTP) located near the intersection of Amosite and Bainbridge Roads in West Donegal Township.

In 2015, Elizabethtown Regional Sewer Authority completed construction of and relocated to a new office building at 235 ERSA Drive in Mount Joy Township.

HYDRAULIC LOADING

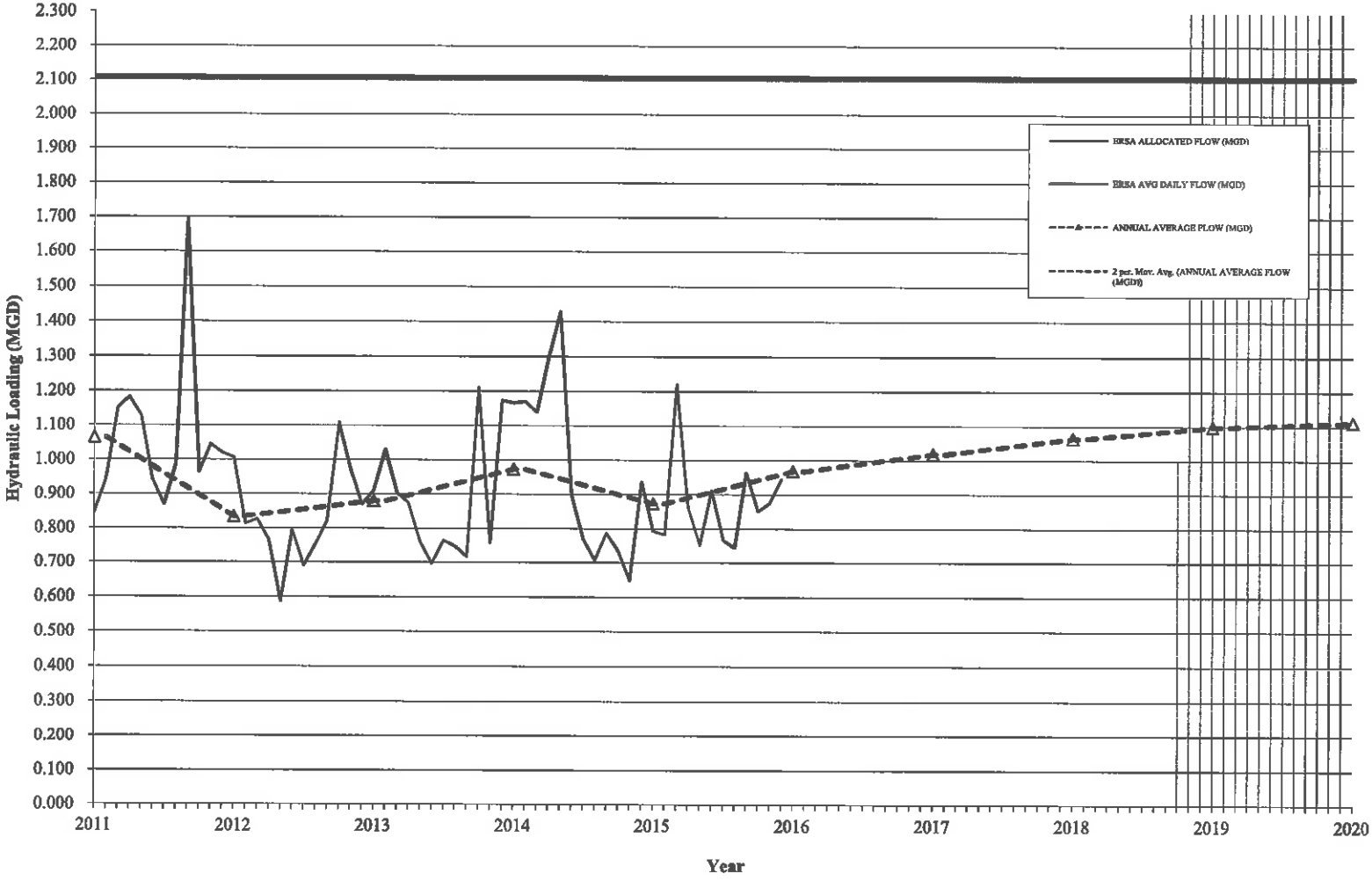
The hydraulic loading graph was prepared from flow measurements that were continuously recorded at the Turnpike Road No. 2, Miller Road, Bossler Road No. 2 pumping stations and the Mill Road, Kiwanis and Radio Road metering chambers. Figure 1 shows the average daily flows and annual average flows for the past five years, annual average projected flows for the next five years and the ERSA allocated flow at the Elizabethtown Borough WWTP. These flows are also summarized in Table 1. The annual average daily ERSA flow for 2015 was 0.872 million gallons per day (MGD). The base flow used in the future flow projections is an average of the average daily flows over the last five years. This approach was taken to limit the fluctuation in flows based on wet or dry weather and provide the most accurate representation of future flows.

FUTURE CONNECTIONS

Table 2 lists all of the current or proposed developments that currently have plans on file with ERSA and the status of each development that has been granted capacity by ERSA as of the end of 2015. Table 3 presents projected future connections for the Authority.

Table 3 summarizes the projected connections for the ERSA system over the next five years. The projected annual growth rate as shown in Table 1 was obtained from the projections indicated on Table 3. The ERSA EDU has been calculated as 235 gpd, in accordance with Act 57 regulations. For planning purposes, the Authority is using 275 gpd/EDU, which is slightly conservative when compared with actual flows (170-200 gpd/EDU). This annual increase was then added to the previous year's flow to obtain projected flows beginning with the year 2016.

ELIZABETHTOWN REGIONAL SEWER AUTHORITY
2015 CHAPTER 94 REPORT



HYDRAULIC LOADING **FIGURE 1**

CDM Smith

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TABLE 1

ELIZABETHTOWN REGIONAL SEWER AUTHORITY
HYDRAULIC LOADING

Month	YEAR	TURNPIKE ROAD NO. 2 FLOW (MG)	MILLER ROAD FLOW (MG)	BOSSLER ROAD NO. 2 FLOW (MG)	MILL RD. METER FLOW (MG)	KIWANIS METER FLOW (MG)	RADIC RD. METER FLOW (MG)	UNMETERED CUSTOMERS (MG)	TOTAL ERSA MONTHLY FLOW (MG)	DAYS/ MONTH	ERSA AVG DAILY FLOW (MGD)	ANNUAL AVERAGE FLOW (MGD)	ERSA ALLOCATED FLOW (MGD)	ANNUAL GROWTH RATE (EDUs/YEAR)	PROJECTED GROWTH RATE (EDUs/YEAR)
January	2011	2.993	9.828	2.420	2.495	4.555	4.756	1.009	26.172	31.000	0.844	1.064	2.108	194	
February		2.065	9.721	2.932	2.255	4.238	4.365	0.911	26.397	28.000	0.943		2.108		
March		3.288	14.852	4.602	2.495	4.659	4.766	1.009	35.673	31.000	1.151		2.108		
April		3.319	13.530	4.562	2.382	4.924	5.387	0.966	35.470	30.000	1.182		2.108		
May		2.769	12.594	5.286	2.461	5.088	5.567	0.958	34.973	31.000	1.128		2.108		
June		1.449	10.095	3.168	2.382	4.924	5.387	0.966	28.281	30.000	0.943		2.108		
July		0.996	9.293	2.331	2.320	5.959	6.017	0.983	26.898	31.000	0.868		2.108		
August		1.689	10.739	2.932	2.322	5.959	6.017	0.983	30.629	31.000	0.988		2.108		
September		4.342	27.172	4.488	2.245	5.767	5.823	0.951	50.787	30.000	1.693		2.108		
October		3.177	9.404	3.911	2.255	5.183	4.984	0.987	29.902	31.000	0.965		2.108		
November		3.477	10.815	4.064	2.182	5.016	4.823	0.956	31.332	30.000	1.044		2.108		
December		2.706	10.932	4.538	2.255	5.183	4.984	0.987	31.625	31.000	1.020		2.108		
January	2012	2.537	10.004	4.339	2.424	4.325	5.555	0.987	31.201	31.000	1.006	0.834	2.108	53	
February		1.693	7.625	3.174	1.912	3.167	5.259	0.524	23.557	29.000	0.812		2.108		
March		2.028	8.122	3.523	2.008	3.527	5.431	0.987	25.625	31.000	0.827		2.108		
April		1.505	7.643	2.645	1.946	3.167	4.844	0.982	22.972	30.000	0.766		2.108		
May		1.945	9.955	3.142	2.343	3.849	5.256	1.014	18.205	31.000	0.587		2.108		
June		1.514	8.121	2.784	1.822	3.770	4.575	0.982	23.858	30.000	0.795		2.108		
July		1.262	7.926	2.429	1.742	2.857	4.206	0.987	21.389	31.000	0.690		2.108		
August		1.585	8.457	2.565	1.839	3.416	4.474	0.985	23.327	31.000	0.752		2.108		
September		1.782	8.752	2.502	1.680	4.629	4.353	0.956	24.633	30.000	0.821		2.108		
October		2.572	11.558	3.518	2.534	6.305	5.428	0.960	34.370	31.000	1.109		2.108		
November		1.966	10.889	3.085	1.886	5.370	5.161	0.929	29.261	30.000	0.975		2.108		
December		2.068	8.801	3.179	2.120	4.685	5.126	0.960	26.938	31.000	0.869		2.108		
January	2013	2.088	9.434	3.195	2.115	5.301	5.112	0.960	28.193	31.000	0.909	0.879	2.108	159	
February		2.478	8.615	3.652	2.118	5.442	5.488	0.967	29.853	29.000	1.031		2.108		
March		2.516	9.574	3.739	1.991	4.933	5.207	0.960	28.000	31.000	0.903		2.108		
April		1.752	9.843	3.200	2.055	4.179	5.254	0.929	26.210	30.000	0.874		2.108		
May		1.579	9.242	2.879	1.933	3.225	4.643	0.960	23.559	31.000	0.760		2.108		
June		1.808	7.185	1.730	1.732	3.235	4.230	0.929	20.893	30.000	0.696		2.108		
July		2.209	8.597	1.762	1.985	3.546	4.639	0.977	23.705	31.000	0.765		2.108		
August		2.315	8.128	1.702	1.815	3.706	4.553	0.977	23.344	31.000	0.747		2.108		
September		2.029	7.946	1.495	1.721	3.321	4.026	0.946	21.483	30.000	0.716		2.108		
October		3.554	13.626	2.370	2.419	8.231	6.925	1.020	37.541	31.000	1.211		2.108		
November		1.248	7.321	2.934	1.603	4.544	3.992	0.987	22.725	30.000	0.758		2.108		
December		2.944	11.744	4.485	2.467	7.093	6.598	1.020	36.385	31.000	1.174		2.108		
January	2014	2.733	11.143	4.697	2.421	7.492	6.583	1.085	36.154	31.000	1.166	0.973	2.108	23	
February		2.729	10.579	4.125	2.227	6.232	5.926	0.986	32.778	28.000	1.171		2.108		
March		2.968	11.022	4.496	2.385	6.961	6.403	1.085	35.329	31.000	1.139		2.108		
April		3.666	12.622	5.139	2.546	7.178	7.346	0.982	38.819	30.000	1.294		2.108		
May		3.777	14.851	5.952	2.766	8.349	8.460	1.014	44.310	31.000	1.429		2.108		
June		1.981	9.356	3.457	1.909	3.662	5.489	0.982	26.905	30.000	0.897		2.108		
July		1.226	8.582	2.722	1.967	3.275	4.828	1.004	23.809	31.000	0.768		2.108		
August		0.968	8.306	2.386	1.595	3.101	4.598	1.004	21.862	31.000	0.705		2.108		
September		0.890	9.199	2.682	1.677	3.679	4.732	0.971	23.599	30.000	0.787		2.108		
October		0.953	8.499	2.533	1.659	3.493	4.654	0.949	22.732	31.000	0.733		2.108		
November		0.840	7.416	2.263	1.326	2.829	3.831	0.919	19.423	30.000	0.647		2.108		
December		1.883	9.530	3.159	2.255	4.892	6.361	0.949	29.009	31.000	0.937		2.108		
January	2015	1.523	8.392	2.677	1.951	4.123	4.989	0.928	24.582	31.000	0.793	0.872	2.108	19	
February		1.153	8.153	2.352	1.822	3.212	4.351	0.838	21.920	28.000	0.783		2.108		
March		3.289	11.355	4.454	2.751	7.200	7.810	0.928	37.816	31.000	1.220		2.108		
April		1.674	8.525	3.014	2.032	4.603	5.126	0.903	25.875	30.000	0.862		2.108		
May		1.066	9.412	2.617	1.859	3.853	4.573	0.933	23.231	31.000	0.751		2.108		
June		1.701	9.864	3.262	2.298	4.420	5.283	0.903	27.373	30.000	0.912		2.108		
July		1.183	8.578	2.552	1.806	3.992	4.618	0.977	23.755	31.000	0.766		2.108		
August		1.046	8.612	1.537	1.818	4.156	4.863	0.977	23.005	31.000	0.743		2.108		
September		1.033	8.146	2.409	1.765	5.095	5.532	0.945	28.929	30.000	0.964		2.108		
October		1.513	8.520	2.731	1.943	5.346	5.393	0.928	26.371	31.000	0.851		2.108		
November		1.413	9.153	2.676	1.748	5.109	5.286	0.898	26.231	30.000	0.874		2.108		
December		2.068	10.149	2.552	2.100	5.712	5.786	0.928	29.294	31.000	0.945		2.108		
	2016											0.968	2.108		160
	2017											1.018	2.108		181
	2018											1.064	2.108		167
	2019											1.099	2.108		126
	2020											1.112	2.108		49

1 EDU = 275 gpd

Notes: (1) The projected annual average flow for 2016 was calculated based on annual flow averaged from 2011, 2012, 2013, 2014 and 2015.

TABLE 2

ELIZABETHTOWN REGIONAL SEWER AUTHORITY
DEVELOPMENT STATUS REPORT

Development	Total EDUs	Permits Issued	EDUs In Service	Estimated Capacity (GPD)	Unused Capacity (GPD)	Pumping Station/ Connection Point
Timber Villa						
- Assisted Living	30	0	0	8,250	8,250	Boss. 2
- Other Units	2	2	2	550	0	Boss. 2
M. Wenger Trust - Rheems Fire Co.	3	0	0	825	825	Miller
M. Wenger Trust - Marlin Winters	3	0	0	825	825	Miller
Donegal Meadows	84	82	82	23,100	550	Nolt
Ed Hixon Subdivision	6	4	3	1,650	825	Nolt
Maple Glen	70	70	65	19,250	1,375	Boss. 1
Conoy Crossing	20	0	0	5,500	5,500	
David Good Subdivision	7	6	6	1,925	275	
West Ridge Road Subdivision	6	6	6	1,650	0	Miller
Wenger Feeds	2	2	0	550	550	Cam.
West Ridge Estates Lot #111	2	1	1	550	275	Miller
Woods Edge	58	42	38	15,950	5,500	Miller
Bishop Woods (formerly Donegal Woods)	114	24	17	31,350	26,675	Boss.1/Wilkens
Summitt at Stone Mill	23	8	15	6,325	2,200	Miller
Sylvester Walters	4	0	0	1,100	1,100	Pioneer Hills
Dave Abel Property	4	2	2	1,100	550	
Shellenberger Property	3	0	1	825	550	Colebrook
Stoney Brook	317	11	9	87,175	84,700	Miller
Shady Oak II	92	-	51	25,300	11,275	Conn. Pt. 8
Timber Ridge	6	-	6	1,650	0	Hershey
Bear Creek Elementary School	69	-	69	18,975	0	Conn. Pt. 4
Farmbrook	46	46	46	12,650	0	Schwanger
Featherton Crossing	238	143	117	65,450	33,275	Schwanger
Lupine Meadows	20	20	20	5,500	0	Schwanger
Rock Hall	27	27	27	7,425	0	Hershey
Elizabethtown Crossing	193	0	0	53,075	53,075	Hershey
Sheaffer Ridge Condos	18	2	7	4,950	3,025	Schwanger
Miscellaneous Bossler #1	3	3	2	825	275	Boss. 1
Miscellaneous Bossler #2	1	1	0	275	275	Boss. 2
Miscellaneous Colebrook	3	3	3	825	0	Colebrook
Miscellaneous Hershey	3	3	3	825	0	Hershey
Miscellaneous Miller Residential	59	59	52	16,225	1,925	Miller
Additional Miller Nonresidential	11 (1)	11	7	3,025	1,100	Miller
Miscellaneous Turnpike #1	1	1	0	275	275	Turnpike 1
Miscellaneous Wilkens	1	1	0	275	275	Wilkens
Miscellaneous Connection Points	7	4 (2)	6	1,925	275	
	1,556	584	663	427,900	245,575	

Notes:

(1) EDUs represent 3 EDUs from Longenecker's Hatchery; 1 EDU from Risser Automotive; 1 EDU from Nitrate Removal System added to Lot 15 of Timber Villa; 1 EDU from home salon; 1 EDU for Waste Management office; 1 EDU for Kettering Medical office; 1 EDU for Companion Animal Hospital; 1 EDU for Member's 1st FCU.

(2) Permit #4046 for Ironstone Ranch represents 4 EDUs

(3) Flow is based upon 275 gpd/EDU.

TABLE 3

ELIZABETHTOWN REGIONAL SEWER AUTHORITY
PROJECTED FUTURE CONNECTIONS

Development	Total Planned EDUs	EDUs In Service 1/1/2015	EDUs Remaining 1/1/2015	EDUs Connected 2015	EDUs Remaining 12/31/2015	Projected EDU Connections 2016	2017	2018	2019	2020
Timber Villa - ALP	30	0	30	0	30	30	--	--	--	--
Timber Villa - Other Units	2	2	0	0	0	--	--	--	--	--
M. Wenger Trust - Rheems Fire Co.	3	0	3	0	3	3	--	--	--	--
M. Wenger Trust - Marlin Winters	3	0	3	0	3	3	--	--	--	--
Donegal Meadows	84	82	2	0	2	2	--	--	--	--
Ed Hixon Subdivision	6	3	3	0	3	1	1	1	--	--
Maple Glen	70	65	5	0	5	5	--	--	--	--
Conoy Crossing	20	0	20	0	20	10	10	--	--	--
David Good Property	7	6	1	0	1	1	--	--	--	--
West Ridge Road Subdivision	6	6	0	0	0	--	--	--	--	--
Wenger Feeds	2	0	2	0	2	2	--	--	--	--
West Ridge Estates Lot #111	2	1	1	0	1	1	--	--	--	--
Woods Edge	58	34	24	4	20	8	8	4		--
Bishop Woods (formerly Donegal Woods)	114	12	102	5	97	10	12	12	12	12
Summitt at Stone Mill	23	14	9	1	8	5	3	--	--	--
Sylvester Walters	4	0	4	0	4	4	--	--	--	--
Dave Abel Property	4	2	2	0	2	2	--	--	--	--
Shellenberger Property	3	1	2	0	2	2	--	--	--	--
Stoney Brook	317	9	308	0	308	10	20	31	31	31
Shady Oak II	92	51	41	0	41	16	16	9	--	--
Timber Ridge	6	6	0	0	0	--	--	--	--	--
Bear Creek Elementary School	69	69	0	0	0	--	--	--	--	--
Farmbrook	46	46	0	0	0	--	--	--	--	--
Featherton Crossing	238	114	124	3	121	36	36	36	13	--
Lupine Meadows	20	20	0	0	0	--	--	--	--	--
Rock Hall	27	27	0	0	0	--	--	--	--	--
Elizabethtown Crossing	193	0	193	0	193	--	65	64	64	--
Sheaffer Ridge Condos	18	7	11	0	11	3	4	4	--	--
Miscellaneous Bossler #1	3	2	1	0	1	--	--	--	--	--
Miscellaneous Bossler #2	1	0	1	0	1	--	--	--	--	--
Miscellaneous Colebrook	3	2	1	1	0	--	--	--	--	--
Miscellaneous Hershey	3	2	1	1	0	--	--	--	--	--
Miscellaneous Miller Residential	59	51	8	1	7	6	6	6	6	6
Additional Miller Nonresidential (1)	11	7	4	0	4	--	--	--	--	--
Miscellaneous Turnpike #1	1	0	1	0	1	--	--	--	--	--
Miscellaneous Wilkens	1	0	1	0	1	--	--	--	--	--
Miscellaneous Connection Points	7	3	4	3	1	--	--	--	--	--
Total EDUs	1556	644	912	19	893	160	181	167	126	49

Notes:
(1) EDUs represent 3 EDUs from Longenecker's Hatchery;1 EDU from Risser Automotive;1 EDU from Nitrate Removal System added to Lot 15 of Timber Villa; 1 EDU from home salon; 1 EDU for Waste Management office; 1 EDU for Kettering Medical office; 1 EDU for Companion Animal Hospital; 1 EDU for Member's 1st FCU.
(2) Flow is based upon 275 gpd/EDU.

PLAN TO REDUCE PROJECTED OVERLOAD CONDITIONS

Sewage Treatment Capacity Allocation

The Authority participated in the upgrade and expansion of the Elizabethtown Borough WWTP from 3.0 MGD to 4.5 MGD. The expansion project provided for an increase in the reserved capacity for ERSA to its current 2.108 MGD (0.811MGD from the former WDTA and 1.297 MGD from the former MJTA). The plant expansion eliminated the projected overload condition and allowed the Authority to grant capacity for future requests. Figure 1 shows that projected annual average ERSA flows will not exceed the 2,108,000 GPD hydraulic capacity allocation during the next five years.

WDTA and MJTA both negotiated an amendment to their respective Intermunicipal Agreements with Elizabethtown Borough. The intent of this amendment was to incorporate provisions related to new nitrogen and phosphorous nutrient loading requirements associated with the Borough's NPDES permit. As a result of the formation of ERSA and the merger of the two Authorities has been completed, a consolidated agreement with Elizabethtown Borough will be negotiated in the near future. At this time, ERSA projects that it will not exceed its allocation at the treatment plant or its conveyance allocations with the Elizabethtown Borough system during the next five years.

In recent years, the Borough of Elizabethtown identified a projected hydraulic overload within its Radio Road Interceptor. It is worth noting that ERSA has a conveyance allocation within this Interceptor (noted as Connection Point #3), and recent flow records indicate that the Authority is well within its average daily flow conveyance allocation, and ERSA has been made aware of several hundred EDUs worth of potential development tributary to this interceptor. ERSA understands that the Borough has initiated a flow monitoring study to confirm existing peak hourly flows in the Radio Road Interceptor and the distribution of those flows amongst the Borough and ERSA collection systems. It is anticipated that the Borough and ERSA will determine what repairs and improvements are required to meet long-term development needs once the flow monitoring study has been completed.

Infiltration and Inflow Program Status Report

ERSA is no longer under the CAP, but continues to perform I/I investigation and elimination work. Attachment 1 contains a report on the I/I removal activities in progress.

During 2009, the Authority investigated I/I in the Bossler Road No. 1 drainage basin by visually inspecting the manholes for signs of I/I. Based upon wet weather flows, the Authority then focused additional I/I investigation efforts within the Bossler Road No.1 drainage basin in 2010 which led to the cleaning and televising of approximately 4,700 linear feet of truss pipe that was installed in the late 1970s. After reviewing the televising results, the Authority then rehabilitated approximately 4,350 linear feet of pipe with cured-in-place pipe (CIPP).

In 2011 the Authority purchased a portable flow monitoring device and investigated approximately 9,000 LF of truss pipe for sources of I/I within the Turnpike Road No. 2 basin. Based on the investigation the Authority rehabilitated approximately 6,642 LF of deficient sections of truss pipe using CIPP similar to the 2010 project performed in Bossler Road No. 1

drainage area. In addition to the mainline, this project also rehabilitated approximately 83 laterals with "top-hat" repairs. The authority also had manholes along Buckingham Boulevard coated in 2011 to prevent additional corrosion and I/I.

Future Planning Needs

ERSA participated with the Borough of Elizabethtown to expand the Elizabethtown WWTP. There is an Intermunicipal Agreement amongst the parties that established the various contributions to be made by each of the parties for the upgrade and expansion of the treatment plant. Additional treatment capacity secured by ERSA in the Elizabethtown WWTP will provide sufficient hydraulic capacity for projected growth within West Donegal and Mount Joy Townships. ERSA also continues to work toward the identification and reduction of excessive I/I.

During Fall 2004, the Authority completed construction of a force main project that diverted flow from the Bossler Road No. 1 pumping station away from the Turnpike Road No. 1 and No. 2 pumping stations. Approximately 1,380 feet of force main were installed to convey the diverted flow to the Bossler Road No. 2 drainage basin. As a result of this project, overflow conditions previously experienced at the Turnpike Road No. 2 pumping station have been eliminated. In addition, the pumping capacity of the Bossler Road No. 1 pumping station was increased as a result of a reduction in headloss from pipe friction. This increase in pumping capacity has improved the ability of the Bossler Road No. 1 pumping station to convey wet weather flows. The original force main from the Bossler Road No. 1 pumping station to the Turnpike Road No. 1 drainage basin can still be utilized to provide flexibility in operations and maintenance.

The Authority has also initiated the development of a capital improvement plan to address the need for upgrading sewage conveyance facilities. The Authority performed an initial evaluation of the impact of projected sewage flows identified in the Township's draft Act 537 Plan. As a result of this evaluation, the Authority identified three pumping stations that require expansion: Bossler Road No. 1, Bossler Road No. 2, and Miller Road. In addition, the Authority recognizes that the age of many of the Authority's other pumping stations warrants a more complete review of the condition of those facilities to determine if upgrades are necessary. Therefore, the Authority is in the process of evaluating potential upgrades to extend the useful life of these pumping stations. Following the merger and formation of ERSA, the Authority updated its capital improvements plan in 2012 to reflect the future needs for the combined service area. The Authority intends to reevaluate the capital improvement plan on a regular basis as development dictates.

During 2005, the Authority executed a developer's agreement for the proposed Bishop Woods (formerly Donegal Woods) development and is in the beginning stages of construction. The agreement includes provisions for significant upgrades and expansions of the Bossler Road No. 1 and No. 2 pumping stations and respective force mains, as well as the expansion of a section of gravity sewer interceptor. However, the concept of the Bishop Woods development was revised during 2009 to a significantly smaller project (460 units reduced to 114 units). As a result, it was not financially viable to proceed with the same concept for the expansion of Authority facilities. Therefore, the Authority negotiated revised developer's agreements for the

Bishop Woods and Timber Villa -ALP projects, which included provisions for smaller scale, phased upgrades and expansions to the Bossler Road No. 1, Bossler Road No. 2 and Turnpike Road No. 2 pumping stations. Improvements to the Bossler Road No. 2 pumping station, which were required prior to the construction of the Timber Villa-ALP project and the completion of the first phase of Bishop Woods (approximately 31 EDUs), were completed in 2015. Prior to the construction of the second phase of Bishop Woods (approximately 45 EDUs), the Authority will make improvements to the Turnpike Road No. 2 Pumping Station. Finally, prior to the construction of the final 39 EDUs of Bishop Woods, the Authority will make improvements to the Bossler Road No. 1 Pumping Station.

In 2006 the Authority constructed a new 10-inch force main for the Schwanger Road Pumping Station, which was put into service in 2007 and discharges to the Kiwanis metering chamber. Additionally, due to the increased pressure to develop the area within the Schwanger Road Pump Station drainage basin, the Schwanger Road Pump Station expansion project was completed in late 2007. The upgraded pump station facility is currently operational with an expanded capacity of 1.4 MGD. This expansion will address the growth in the Schwanger Road Drainage basin in the next 20 years.

In 2010 the 6-inch ductile iron pipe (DIP) force main from Hershey Road Pumping Station failed at two (2) locations along S.R. 743 near Route 283. Both failures were repaired, but an investigation found DIP corrosion on the pipe exterior which led to ERSA's decision to contract for replacement of approximately 900 feet of force main and 1,200 feet of 8-inch gravity sewer primarily within PennDOT right-of-way of Route 283. Construction began in 2010 and was completed in 2011.

The Authority has also identified that its Miller Road PS will need to eventually be expanded to accommodate all tributary development located in West Donegal and Mount Joy Townships. Based upon current development trends in the ERSA system, it is anticipated that the Authority will begin planning and design of the improvements to the Miller Road PS and force main within the next two years.

As noted above, the Authority has been informed of potential development that would be tributary to the Borough of Elizabethtown's Radio Road Interceptor, a facility presently under Corrective Action Plan by the Borough. Available flows indicate that ERSA can accommodate projected development within its conveyance allocation in the Radio Road Interceptor. The Borough is currently performing a flow monitoring study to confirm actual peak hour flow contributions to the Interceptor from the ERSA and Borough systems, respectively. In addition, depending on how the projected development connects to the existing ERSA system, it is also possible that the Hershey Road Pumping Station would be impacted and require improvement. ERSA will continue to monitor the projected development and the Borough's flow monitoring study as part of its own planning efforts.

INDUSTRIAL WASTE REPORT

WDTA was requested by the Borough of Elizabethtown to provide a status report on the Authority's Industrial Waste Program and a list of current industrial waste permittees. During its formation, the Authority originally adopted an Industrial Waste Resolution, modeled after the Borough's Industrial Waste Ordinance in place at that time. WDTA also agreed to adopt a revised Industrial Waste Permit/Application Program similar to the latest version currently used in the Borough. WDTA identified and met with potential industrial waste dischargers. The industrial facilities did not contribute wastes that the Authority found to be harmful or have any deleterious effect upon the wastewater conveyance or treatment system. MJTA incorporated the Borough of Elizabethtown Industrial Ordinance by resolution in 2006.

Currently under the jurisdiction of ERSA, new non-residential customers with the potential to discharge industrial waste are required to provide information relative to the nature of their business and characteristics of the waste. Following a review of the application, the Authority will determine whether an Industrial Waste Permit is required. In the event a permit is issued, it will specify the nature and frequency of sampling required to insure compliance with the industrial waste program. The permitted user will then submit quarterly reports to the Authority, who in turn will provide the Borough with an annual summary of industrial waste reports. Should the Borough revise their current industrial waste ordinance, the Authority will review and update their resolution to be consistent with the Borough's prior to implementation.

EXTENSIONS TO THE SEWER SYSTEM DURING 2015

There were no extensions to the Authority's system during 2015. The Authority anticipates the construction of sewer extensions for the Sylvester Walters, Timber Villa, StoneyBrook Phase 1B and Featherton Crossing Phase 2B developments in 2016.

NEW CONNECTIONS

During calendar year 2015, 19 EDUs were connected to the ERSA service area. The number of EDUs now being serviced is approximately 4,947 EDUs as of the end of 2015.

Table 2 includes a listing of all of the developments which currently have preliminary or final development plans on file with ERSA and proposed developments that have requested capacity. This table is updated on a regular basis and is provided as part of this report.

SEWER SYSTEM MONITORING

The ERSA wastewater conveyance system includes fifteen sewage pumping stations and four meter pits. All sewage flows from the Nolt Road, Colebrook Road, Cameron Street, and Pioneer Hills pumping stations are discharged to the Miller Road pumping station. All flows from the Turnpike Road No. 1 and Wilkens Street pumping stations are discharged to Turnpike Road No. 2 pumping station. The majority of the flow from the Bossler Road No. 1 pumping station is discharged to the Bossler Road No. 2 pumping station, but a portion of the flow is conveyed to the Turnpike Road No. 1 pumping station. Wastewater from the Miller Road and Bossler Road No. 2 pumping stations are pumped directly to the Elizabethtown WWTP. Flow from Conewago Pumping Station goes to Aberdeen Pumping Station, which goes to Hershey Road Pumping Station, which goes to the Radio Road metering chamber. Wastewater from Turnpike Road No. 2 pumping station is pumped to the Masonic Village interceptor for conveyance to the Elizabethtown WWTP. The total flow from ERSA service area is determined by combining flow meter readings from the Miller Road, Turnpike Road No. 2, Bossler Road No. 2, Mill Road, Radio Road and Kiwanis meter readings; and unmetered connections. Flows are also metered at the Schwanger Road and Hershey Road Pumping Stations. The Authority's system operators record these flow meter readings on a daily basis.

Flows at 10 of the pumping stations are not metered. Estimates of flows from these stations were made using pump run hour meter readings and the pumping capacities of the pumps at the various stations. Table 4 summarizes the average daily and maximum monthly average pumping station flows for 2015, the pumping capacities, and the projected 2-year maximum hourly flow for each of the pumping stations. A peaking factor had to be established before the 2-year maximum hourly flow could be calculated. For the Bossler Road No. 1, Bossler Road No. 2, Turnpike Road No. 1, Turnpike Road No. 2, Wilkens Street, and Miller Road pumping stations, a peaking factor was estimated based on historical flows records. A peaking factor of 2.5 was assumed for the remaining stations. The projected 2-year maximum hourly flow for each station was obtained in the following manner. First, the number of EDUs projected to be connected over the next two years was determined for each development in Table 3. The total number of EDUs over the next two years entering a particular pumping station was multiplied by 275 GPD per EDU to obtain the projected two year increase in flow at each pumping station. The 2-year increase was then added to the average daily flows to obtain a 2-year average daily flow. Next, the 2-year average daily flow was multiplied by the peaking factor to obtain the projected 2-year maximum hourly flow.

As can be seen on Table 4, the projected 2-year peak hourly flow at the Wilkens Street, Turnpike Road No. 2, Nolt Road and Miller Road pumping stations are approaching or exceeding the respective tested capacities of the stations. As stated above, the Authority made improvements to the Bossler Road No. 2 pumping station in 2015 which increased the design capacity to meet the 2-year peak hourly flows from tributary projects included in the flow projections. In the Nolt Road drainage basin the Authority conducted an I/I investigation in 2013 and concluded the major source of excessive flow is due to homeowner sump pumps. It should be noted that the Nolt Road drainage basin will effectively be "built" out upon connection of the current development projects in that basin, which is projected to occur over the next three years. In addition, the Authority will continue to monitor the Wilkens Street, Miller Road and Turnpike

Road No. 2 pumping stations and coordinate its expansions with proposed development in West Donegal and Mount Joy Townships.

As stated previously, the Authority recognizes that additional I/I removal efforts are necessary. During 2004, the Authority initiated a sewer inspection program whereby a portion of the system is visually inspected each year. This program includes the televising of sewer mains and laterals and wet-weather manhole inspections. The Authority also coordinated the areas to be televised with the Township's road paving program so that sewers located within identified roads are inspected prior to repaving. The drainage basins for the Bossler Road No. 1, Turnpike Road No. 1, Turnpike Road No. 2, and Wilkens Street pumping stations were televised in 2005. In 2006, the Nolt Road and Colebrook Road basins, and a portion of the Miller Road basin, were televised. Significant portions of the Miller Road and the Cameron Street basins were televised during 2007, as well as small sections of the sewer within Pioneer Hills and Bossler Road No. 1 basins. Some additional sections of sewer within the Miller Road basin were televised. The Authority televised all of the original truss sewers in the Turnpike Road No. 2 basin during 2011 in preparation of the discussed CIPP rehabilitation project completed in 2011. In 2016 additional I/I investigations are scheduled to take place in the Hershey Road drainage area, as well as manhole inspections throughout the system.

TABLE 4

ELIZABETHTOWN REGIONAL SEWER AUTHORITY
RECORDED PUMPING STATION FLOWS

PUMPING STATION	DESIGN PUMP CAPACITY (MGD)	(GPM)	TESTED PUMP CAPACITY (MGD)	(GPM)		2015 AVERAGE DAILY FLOW (MGD)	2015 MAX. MONTHLY AVERAGE (MGD)	PROJECTED 2-YEAR MAX. HOURLY FLOW (MGD)	
Mill Road	0.288	200	-	-	(4)	0.062	0.079	0.155	
Aberdeen	0.130	90	0.288	200	(1)	0.037	0.048	0.093	
Conewago	0.029	20	0.071	49	(1)	0.004	0.007	0.011	
Hershey Road	0.259	180	-	-	(4)	0.089	0.123	0.266	Y
Schwanger Road	1.411	980	-	-	(3)	0.099	0.139	0.302	
Bossler Road No. 1	0.295	205	0.304	211	(1)	0.037	0.062	0.154	
Turnpike Road No. 1	0.158	110	0.248	172	(1)	0.011	0.018	0.034	
Wilkens Street	0.144	100	0.232	161	(1)	0.014	0.024	0.098	
Turnpike Road No. 2	0.243	169	0.301	209	(1)	0.051	0.106	0.228	
Bossler Road No. 2	0.576	400	-	-	(2)	0.090	0.142	0.391	
Pioneer Hills	0.288	200	0.212	147	(1)	0.012	0.019	0.033	
Nolt Road	0.144	100	0.288	200	(1)	0.076	0.090	0.215	
Colebrook Road	0.576	400	0.829	576	(1)	0.124	0.142	0.336	
Cameron Street	0.742	515	0.946	657	(1)	0.137	0.154	0.369	
Miller Road	1.022	710	1.117	776	(1)	0.295	0.366	0.852	

Notes:
(1) Tested pump capacity performed on January 20-21 and February 27, 2015.
(2) Pump capacity test not performed since pumping station upgrade in December, 2015.
(3) Schwanger Rd pump capacity test not completed because of the low amount of capacity being used and this station monitors flow via a totalizer instead of pump hours.
(4) Insufficient wet well data available to complete accurate capacity tests for Mill Road and Hershey Road pumping stations.

MAINTENANCE, REPAIR AND REHABILITATION

The ERSA system operators perform normal operation and maintenance of all pumping stations and a summary of recent repair efforts can be found in Attachment 3. It should be noted that several of the Authority's pumping stations are at or near their predicted design life. Though maintenance and major repair items have been limited to date, the frequency of repairs has been increasing, and there is the potential for major repair and rehabilitation items as the pumping stations continue to age. The Authority should expect to spend more time and money to maintain the aging pumping stations and collection system. As stated previously, the Authority has evaluated the pumping stations to identify the need for upgrade and expansion of facilities and is continuing its I/I identification and removal program. Continued maintenance beyond this program is critical to the overall effectiveness of the system.

In 2010 the Hershey Road pumping station force main failed at two locations along S.R. 743 near Rt. 283. Both failures were repaired, but an investigation found DIP corrosion on the pipe exterior which led to the decision to contract for replacement of approximately 900 feet of force main and 1,200 feet of 8-inch gravity sewer primarily within the PennDOT right-of-way of Rt. 283. Construction was completed in March of 2011 and a flow meter was installed at the Hershey Road pumping station in April.

In October 2013, a section of the Miller Road Pumping Station force main ruptured, resulting in a sewage release. A similar failure event occurred on April 30, 2014. In both cases, the problematic section of ductile iron force main was repaired, and the release was cleaned up and reported to PADEP. The Authority continues to monitor the operation of the station. As discussed elsewhere in this report, the Authority's long-term plan is to expand the Miller Road Pumping Station and replace the existing force main with a larger pipe.

Preliminary indications are that the CIPP project in 2011 in the Turnpike Road No. 2 basin has helped to mitigate wet weather flows in that basin, as was noticed at the Bossler Road No. 1 pumping station as a result of the 2010 CIPP rehabilitation project. Future I/I work being considered includes laterals within Bossler No. 1 and Turnpike No. 2 drainage basins, the Nolt Ave. drainage basin, the Mount Gretna Road area, and manhole inspections throughout the system.

In 2015, ERSA completed construction of and relocated to a new office and maintenance facility that centralizes day-to-day operation of the system near the geographic center of its service area.

CONDITION OF THE WASTEWATER COLLECTION SYSTEM

The majority of the ERSA wastewater collection system was constructed from the late 1970's to the late 1980's and is generally in fair to good condition. Certain parts of the sewer system have experienced infiltration and inflow problems during excessive wet weather periods. The Authority's I/I program is discussed in a previous section of this report.

CONDITION OF THE PUMPING STATIONS

All of the pumping stations in the ERSA service area are in fair to good condition. Extreme weather events in recent years have raised the average daily flows at the pumping stations, and without adjusting peaking factors a few of the pumping stations are nearing their tested pump capacity in the next two years. The Authority has plans to upgrade and expand several stations in conjunction with ongoing development, and all stations will continue to be monitored. It appears that the CIPP lining project in the Turnpike Road No. 2 drainage has helped to address earlier overload condition at the Turnpike Road No. 2 Pumping Station, but the Authority will continue to pursue manhole rehabilitation and potentially service line inspections to further improve the condition of the facilities. An Annual Report on Condition of Sewerage Facilities is included in Attachment 3 of this report.

Attachment 1

I/I Identification and Removal Program

Elizabethtown Regional Sewer Authority

I/I IDENTIFICATION AND REMOVAL PROGRAM

I/I Removal Plan Update – March 2016

Manhole Inspections and Repairs

The Authority has installed manhole inserts at key locations that were witnessed to have substantial inflow during rain events. The Authority's long-term goal is to install inserts in all manholes located in paved areas.

The Authority performed a post-rehabilitation flow monitoring program in 2003 in conjunction with the CAP. The results of the post-rehabilitation flow monitoring indicated that certain parts of the sewer system require further I/I investigation and rehabilitation. Therefore, the Authority performed additional wet weather manhole inspections to identify areas of excessive I/I. During 2003, the Authority identified and repaired seven leaking manholes discovered in the Bossler Road No. 1 and Turnpike Road No. 2 basins. During 2004, the Authority repaired six leaking manholes identified in the Nolt Road drainage basin. The Authority monitored I/I in the Bossler Road No. 1 drainage basin during 2009 by visually inspecting the manholes.

The Authority intends to continue to inspect manholes for defects and incorporate repairs into a rehabilitation project during 2016.

House Inflow Inspections

Authority personnel plan to perform house inspections to confirm that illegal connections have been disconnected. In order to enforce sump pump removal, the Authority adopted a resolution that prohibits discharge of any source other than permitted sanitary sewer to the Authority conveyance system and imposes financial penalties that increase with each quarter that an illegal discharge is not properly terminated. In 2013, the Authority focused house inflow inspections in the Nolt Road drainage area after experiencing increased wet-weather loading in that basin.

Sewer Televising and Repair

The Authority has a sewer televising program in which they annually televise a section of the sewer system so that every 5 to 10 years, the entire sewer system is televised. As a result of this televising, the Authority identifies areas where sewer line remedial activities are required. The Authority performed some of the critical repairs during 2001, including three leaking sewer laterals in the Bossler No. 1 basin, a leaking joint in the Turnpike No. 2 basin, and the installation of a watertight manhole riser in the Turnpike No. 2 basin.

The Authority completed additional remedial activities during 2002 in conjunction with the manhole raising described above, including approximately 140 linear feet of sewer repairs in the Bossler Road No. 1 and Miller Road drainage basins.

The Authority purchased a mini camera in 2000 for the purpose of investigating leaking laterals and suspected problematic laterals. Inspection personnel have been trained on the proper use of the camera, and the Authority has begun a lateral televising plan. The Authority has televised all of the laterals in the Bossler Road No. 1, Wilkens Street drainage basins and a portion of laterals in the Miller Road and Turnpike Road No. 2 drainage basin.

As stated previously, the Authority performed additional wet weather manhole inspections during 2003 and 2004 following post-rehabilitation flow monitoring. As a result of these inspections, the Authority identified and repaired a significant leak caused by a broken sewer end cap. In addition, the Authority repaired two leaking laterals that were identified.

The Authority televised the entire Nolt Road drainage basin during 2004. In 2005 the Authority televised the Bossler Road No. 1, Turnpike Road No. 1, Turnpike Road No. 2, and Wilkens drainage basins. In 2006 the Authority televised the Nolt Road and Colebrook Road drainage basins, and part of Miller Road drainage basin. As a result of this work, the Authority identified sewers in need of rehabilitation and replaced 700 feet of 12-inch sewer pipe on Anchor Road during 2007.

In 2007, the Authority televised approximately 18,000 feet of the Cameron Street and approximately 9,000 feet of Miller Road drainage basins. In 2008, the Authority televised sections of sewer located within roads identified for re-paving during 2009. The Authority evaluated the inspection reports, but no obvious sources of I/I were identified.

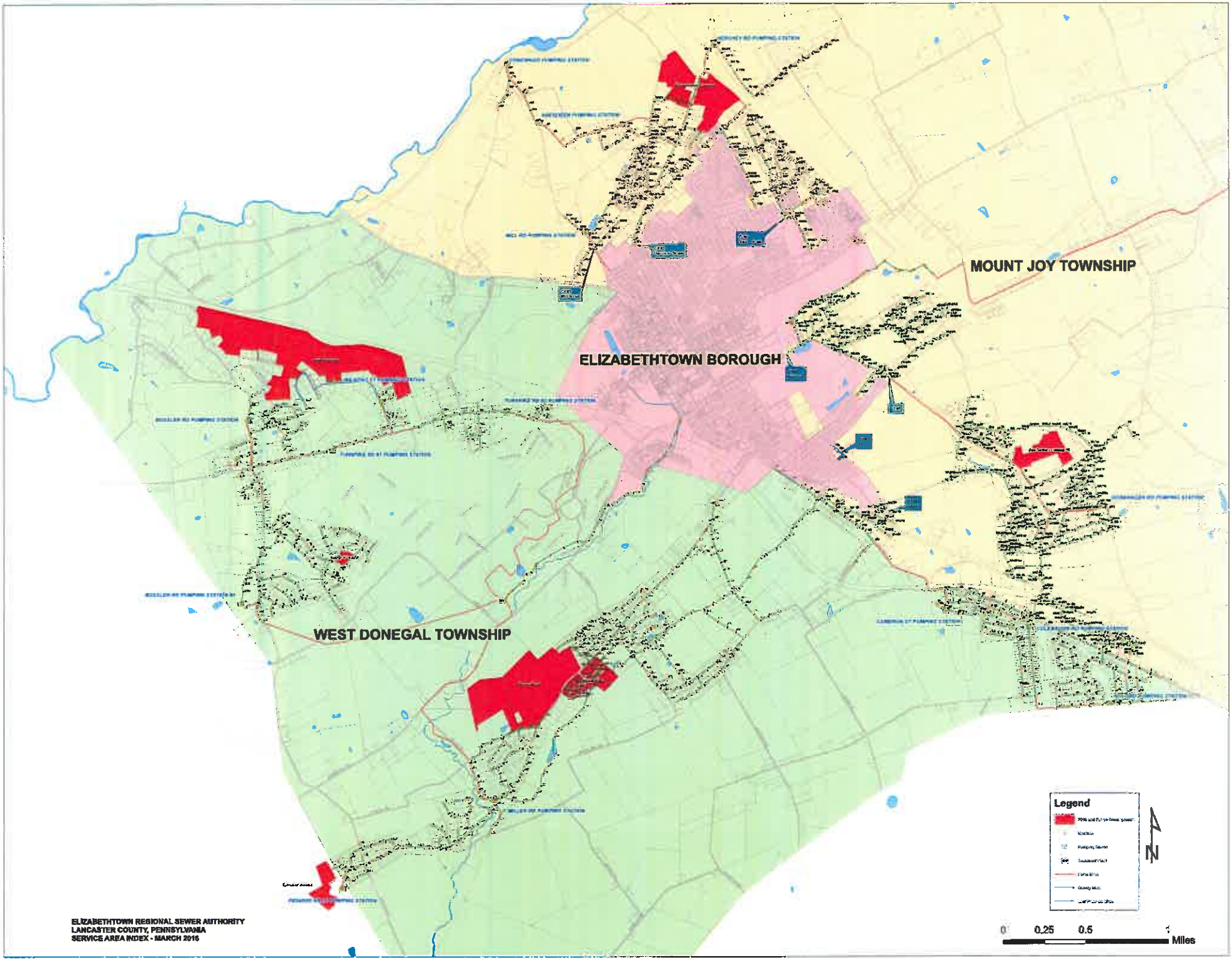
In 2010 the Authority televised approximately 4,700 linear feet of truss pipe in the Bossler No. 1 drainage basin. Based upon the results of the televising, the Authority rehabilitated approximately 4,350 linear feet of pipe with cured-in-place pipe (CIPP) which has shown to have significantly reduced I/I within the drainage basin.

In 2011 the Authority purchased a portable flow monitoring device, a "flow poke," to monitor I/I in the entire Turnpike Road No. 2 drainage basin. Based on this I/I investigation the Authority rehabilitated approximately 6,642 LF of truss pipe and 85 laterals utilizing CIPP technology which has shown reduction in I/I throughout the basin.

In late 2013 and early 2014, the Authority investigated the flow in the sewers along Mt. Gretna Road and within the Nolt Ave. Pumping Station drainage basin to develop a sense of the I/I present in the area and make repair decisions based on the findings of the investigation. Preliminary indications are that there are likely sources of I/I in the sewers in and around Mt. Gretna Road. In 2016, additional I/I investigations are scheduled to take place in this area and elsewhere within the Hershey Road drainage area.

Attachment 2

Master Sewer Index Map



ELIZABETHTOWN REGIONAL SEWER AUTHORITY
LANCASTER COUNTY, PENNSYLVANIA
SERVICE AREA INDEX - MARCH 2016

Attachment 3

Annual Report on the Condition of Sewerage Facilities

ELIZABETHTOWN REGIONAL AUTHORITY

Lancaster County, Pennsylvania

Annual Report on the Condition of Sewerage Facilities

March 2016

GENERAL

On February 26, 2016, Byrne Remphrey and Jeff Eveland of CDM Smith Inc. reviewed the condition of the Elizabethtown Regional Sewer Authority's pumping stations and sewer system. The following report summarizes the review.

PUMPING STATIONS

Mill Road

This station is in good condition and operating satisfactorily. The 2015 average daily flow at this station was 0.062 MGD and the maximum monthly average flow was 0.079 MGD. The design capacity of this station is 0.288 MGD.

- The Authority completed the following items during 2015:

    1. Both check valves cleaned once.
    2. Transducer replaced.
    3. Installed OmniSite alarm monitoring system.

- There is some minor corrosion on dry well floor.
- The sump pump housing previously showed evidence of cracking. This should continue to be monitored.

Aberdeen

This station is in good condition and operating satisfactorily. The 2015 average daily flow at this station was 0.037 MGD and the maximum monthly average flow was 0.048 MGD. The tested capacity of this station is 0.288 MGD.

- The Authority completed the following items during 2015:

    1. Installed OmniSite alarm monitoring system.

- The valve pit has minor I/I and should be marked for repair.
- The valve pit should be cleaned, and piping should be painted.
- Building siding has some cracking and mildew buildup.

Conewago

This station is in good condition and operating satisfactorily. The 2015 average daily flow at this station was 0.004 MGD and the maximum monthly average flow was 0.007 MGD. The tested capacity of this station is 0.071 MGD.

- The Authority completed the following items during 2015:

    1. Installed OmniSite alarm monitoring system.

- Some wood supports on the roof of the outdoor enclosure are warped.
- The gap beneath the fence should be fixed for security purposes.
- Water was present in the bottom of the RTUC panel. The panel should be made water-tight.

Hershey Road

This station is in good condition and operating satisfactorily. The 2015 average daily flow at this station was 0.089 MGD and the maximum monthly average flow was 0.123 MGD. The design capacity of this station is 0.348 MGD.

- The Authority completed the following items during 2015:

    1. Pump #2 rebuilt.
    2. Installed OmniSite alarm monitoring system.

- There is some minor corrosion on dry well floor, pump stands and housing.
- Dry well lid should be painted.
- Evidence of system I/I observed at wet well.

Schwanger Road

This station is in good condition and operating satisfactorily. The 2015 average daily flow at this station was 0.099 MGD and the maximum monthly average flow was 0.139 MGD. The design capacity of this station is 1.411 MGD.

- The Authority completed the following items during 2015:

    1. Replaced genset battery.
    2. Installed OmniSite alarm monitoring system.

- Discharge line for pumps #3 and #4 has a small leak.

Bossler Road No. 1

This station is in good condition and operating satisfactorily. The 2015 average daily flow at this station was 0.037 MGD and the maximum monthly average flow was 0.062 MGD. The tested capacity of this station is 0.304 MGD.

- The Authority completed the following items during 2015:

    1. Both check valves cleaned four times.
    2. Compressor diaphragms, air filters (twice per year), and snubbers replaced.
    3. Replaced both air compressors.

- Some mortar is missing along top of concrete wet well.
- Some floor corrosion is present in dry well. Cathodic protection replacement should be considered.
- There are gaps at bottom of the site fencing along the back.
- There is ground washout beneath the site fencing to the right of the driveway.

Turnpike Road No. 1

This station is in good condition and operating satisfactorily. The 2015 average daily flow at this station was 0.011 MGD and the maximum monthly average flow was 0.018 MGD. The tested capacity of this station is 0.248 MGD.

- The Authority completed the following items during 2015:

    1. Both check valves cleaned twice.
    2. Compressor diaphragms, air filters (twice per year), and snubbers replaced.
    3. Installed flooding float.
    4. LRM installed high level float.

- Some mortar is missing along top of concrete wet well.
- Some minor floor corrosion is present in dry well. Cathodic protection replacement should be considered.
- There are gaps at bottom of the site fencing along back left corner due to significant ground washout.
- Generator exhaust needs fine screen.
- A leaking/hissing sound from pump #1 was observed during inspection.
- Wet well lock is broken.
- In the dry well, the electrical conduit for the ultrasonic wet well needs to be re-caulked (leaking is evident).

Wilkens Street

This station is in good condition and operating satisfactorily. The 2015 average daily flow at this station was 0.014 MGD and the maximum monthly average flow was 0.024 MGD. The tested capacity of this station is 0.232 MGD.

- The Authority completed the following items during 2015:

    1. Both check valves cleaned four times.
    2. Compressor diaphragms, air filters (twice per year), and snubbers replaced.
    3. Installed flooding float.
    4. Replaced rotor cap on generator.
    5. Installed new generator thermostat.

- There is ground washout beneath the site fencing to the left of the entrance.
- Wet well lock is broken.
- Due to recent overflow at Turnpike Road No. 2, the wet well level settings had been adjusted to maximize storage. During the inspection, flow was observed backing up into the influent pipe. The wet well level settings should be returned to normal.

Turnpike Road No. 2

This station is in good condition and operating satisfactorily. The 2015 average daily flow at this station was 0.051 MGD and the maximum monthly average flow was 0.106 MGD. The tested capacity of this station is 0.301 MGD.

- The Authority completed the following item during 2015:

    1. Both check valves cleaned four times.
    2. Compressor diaphragms, air filters (twice per year), and snubbers replaced.
    3. Installed flooding float.
    4. Replaced dehumidifier in drywell.
    5. LRM installed ultrasonic flow meter.
    6. Installed uninterruptible power supply (UPS).

- Some floor corrosion is present in dry well. Cathodic protection replacement should be considered.
- There is ground washout beneath the site fencing at a few areas.

Bossler Road No. 2

This station is in good condition and operating satisfactorily. The 2015 average daily flow at this station was 0.090 MGD and the maximum monthly average flow was 0.142 MGD. The tested capacity of this station is 0.370 MGD.

- The Authority completed the following items during 2015:

    1. Replaced genset battery.
    2. New generator control board installed.
    3. Replaced chart recorder.
    4. Pump station upgrade included new controls, pumps, and bypass assembly.

- Past reports have noted an infiltration leak under the valve pit drain pipe penetration into the wet well. This should be monitored and grouted if it continues to be a problem.
- There is a sinkhole in the driveway, and grass is torn up in some locations.
- Flow meter pit needs minor cleaning.
- Valve pit lock is broken.

Pioneer Hills

This station is in good condition and operating satisfactorily. The 2015 average daily flow at this station was 0.012 MGD and the maximum monthly average flow was 0.019 MGD. The tested capacity of this station is 0.212 MGD.

- The Authority completed the following items during 2015:

    1. Pump #1 check valve cleaned once.
    2. Compressor diaphragms, air filters (twice per year), and snubbers replaced.
    3. Replaced battery for generator.
    4. Replaced hour meter on generator.

- There is ground washout beneath the site fencing to the left of the entrance.
- Wet well lock is broken.

Nolt Road

This station is in good condition and operating satisfactorily. The 2015 average daily flow at this station was 0.076 MGD and the maximum monthly average flow was 0.090 MGD. The tested capacity of this station is 0.288 MGD.

- The Authority completed the following items during 2015:

    1. Both check valves cleaned three times.
    2. Compressor diaphragms, air filters (twice per year), and snubbers replaced.

- Underneath the pump #2 discharge line is a small wet spot, and a squeaking sound is observed when the pump turns off.

Colebrook Road

This station is in good condition and operating satisfactorily. The 2015 average daily flow at this station was 0.124 MGD and the maximum monthly average flow was 0.142 MGD. The tested capacity of this station is 0.829 MGD.

- The Authority completed the following items during 2015:

    1. Compressor diaphragms, air filters (twice per year), and snubbers replaced.
    2. Replaced rotor cap on generator.

3. Replaced alternator on generator.
4. Replaced sump pump
5. Installed flooding float.
6. Air compressor #2 replaced.
7. LRM installed ultrasonic flow meter.
8. Installed uninterruptible power supply (UPS).

- Significant floor corrosion present in dry well. Cathodic protection replacement should be considered.
- Indicator light bulbs in panel should be replaced.

Cameron Street

This station is in good condition and operating satisfactorily. The 2015 average daily flow at this station was 0.137 MGD and the maximum monthly average flow was 0.154 MGD. The tested capacity of this station is 0.946 MGD.

- The Authority completed the following items during 2015:

1. Both check valves cleaned once.
2. Compressor diaphragms, air filters (twice per year), and snubbers replaced.
3. Replaced control board for transfer switch.
4. Air compressor #1 replaced.
5. Installed barb-wire string catcher.
6. Pulled pump #2 and removed debris and rags.

- Check valve #2 needs touch-up paint.
- Significant floor corrosion present in dry well. Cathodic protection replacement should be considered.
- The site fencing near the baseball field is bent up. This should be fixed for security purposes.

Miller Road

This station is in good condition and operating satisfactorily. The 2015 average daily flow at this station was 0.295 MGD and the maximum monthly average flow was 0.366 MGD. The tested capacity of this station is 1.117 MGD.

- The Authority completed the following items during 2015:

1. Compressor diaphragms, air filters (twice per year), and snubbers replaced.
2. Cleared rags blockage after pumps #1 and #2 failures.
3. Installed barb-wire string catcher.
4. Installed flooding float.
5. Air compressor #1 replaced.
6. Replaced generator battery.
7. Replaced block heater on generator.

8. Removed and repaired wet well grate (November); wet well is skimmed weekly until the grate is replaced.

- Wet well lock is broken.

All Pumping Stations

Overall, the pumping stations are fairly well maintained. The stations are checked on a regular basis. The pump station dry wells and the generator buildings are clean or are in the process of being cleaned. All of the flow meters were calibrated in April. The Authority has a contract with an outside firm to perform generator maintenance and service, including changing generator oil and antifreeze. The Authority replaces generator fuel hoses, oil pans, etc. as needed and installed screening over all fuel vent lines in 2008 to prevent problems with insects. In order to provide better security, the Authority replaced many of the locks in 2009 and cleared brush and vines from the fencing at each pump station as needed; most recently in 2011. In 2013 the Authority added "No Trespassing" signs to all Mount Joy Township Authority pumping stations.

At all the steel tank dry well pumping stations the Authority intends on performing reconditioning work on the dry well floors because of corrosion concerns, specifically at the Cameron St. and Colebrook Rd. pumping stations. Cathodic protection was originally provided when the pumping stations began operation but is likely no longer present and will be investigated as a preventative/remedial option.

It is recommended that the following be performed on a regular basis:

- Vacuum cleaning of the wet wells to remove grease, grit, and other deposits. The operators use a degreaser regularly to minimize grease buildup. All wet wells were vacuum cleaned twice during 2015 (March and July). Certain wet wells may require more frequent cleaning to minimize buildup of grease and debris.

- Pumping station capacity tests. These tests will confirm pumping capacities, evaluate the efficiency of each pump, and provide a basis of comparison for maintenance purposes. A drop in pumping capacity often signals a problem in the pump or elsewhere in that system. Pump capacity tests were performed at 13 of the 15 pumping stations during January and February 2015. A capacity test at Bossler Road No. 2 was not performed due to the impending upgrade in 2015. Drawdown capacity tests should be performed again in 2017.

- It is important that the measuring flumes at the metered pumping stations be kept clean of debris. The buildup of debris will result in recording artificially high flows.

The following items are not critical but can be completed on a time available basis:

- Portions of the older pumping stations such as the concrete meter pits and wet wells are showing signs of decay. It is recommended that a concrete sealer be applied or the concrete be rehabilitated, as appropriate.

- The original pumping station dry wells are beginning to show signs of leaking at the seams in the metal. These seams should be resealed if water seepage into the dry wells becomes a problem.

- Several of the stations do not have mesh covering the generator exhaust pipe. Mesh covering should be installed to prevent animals and debris from entering.

- The firm responsible for maintenance of the generator recommended replacement of the generator battery tenders to improve battery life. The Authority has replaced some of the tenders and should monitor the battery performance and consider replacement of others as needed.

It should also be noted that the Authority is currently in the process of evaluating potential upgrades to pumping stations not slated for expansion or abandonment. The intent of these upgrades would be to significantly extend the useful life of the stations. Anticipated improvements would include upgrade of existing controls and replacement of cathodic protection for the buried steel dry wells. Once the upgrades have been identified, the Authority plans to incorporate that work into its long-term capital improvement plan.

METER PITS

The Authority has four meter pits throughout the system: Radio Road, Foxbury, Kiwanis, and Bradfield meter pits. These pits consist of a measuring flume and an ultrasonic level sensor. All meter pits are operating satisfactorily. The Foxbury meter pit was affected by a lightning strike in 2012 and was replaced. The control box at Radio Road is rusted along the corners and showing signs of moisture within. Replacement of this control box should be considered.

SEWER SYSTEM REVIEW

Upon reviewing the sewer system with the operators, the following items were noted:

- During 2005 and 2006, the Authority located and replaced all of the air release valves on the force mains. Air release valves should be back flushed and checked for proper operation on a yearly basis. The Authority may wish to purchase a spare valve to replace an existing valve when it needs to be removed for maintenance.

- The Authority has an I/I program that is discussed in the Chapter 94 report. It is very important that this program continues and that the appropriate repairs are made to the system. Defects in a sewer system will only get worse with time if not repaired.

- In 2004, the Authority began a televising inspection program whereby a portion of the system is inspected each year. The Authority is urged to continue with the physical inspection of at least 10%-20% of the sewer system every year. This inspection should include televising, walking the length of every sewer in a particular area, and noting the condition of the manholes, manhole lids, sinkholes or stream banks near the line, etc. Manhole inserts should be installed in manholes that

might be exposed to large volumes of stormwater. If not already installed, watertight manhole lids should be installed in manholes that are subject to inundation from streams.

- The Authority collection system includes two inverted siphons within the Miller Road drainage basin. These sections of sewer have periodically clogged. Therefore, they should be inspected on a regular basis and flushed as needed to remove grease buildup.

- In 2006, the Authority constructed a new 10-inch force main for the Schwanger Road pumping station. The new force main was placed into service in 2007, and discharges to the Kiwanis metering chamber.

- Due to increased pressure to develop the area within the Schwanger Road Pump Station drainage basin, the Authority completed the Schwanger Road Pump Station expansion project in late 2007. The upgraded pump station facility is currently operational with an expanded capacity of 1.4 MGD. This expansion will address growth in the Schwanger Road drainage basin for the next 20 years.

- In 2007, the Aberdeen Pumping Station was upgraded with the addition of a new natural gas powered stand by generator. The new generator replaced the old Army surplus generator that was used as the stand by for emergencies.

- In 2009, the Mill Road Pumping Station was rehabilitated with two new replacement pumps.

- In 2010, the 2010 Cured-In-Place Pipe (CIPP) Project was completed in order to remove I/I from the the Bossler Road No. 1 Pumping Station drainage basin. It is recommended that top hats and manhole rehabilitation be considered in the future for additional I/I reduction in this drainage basin.

- The Hershey Road Sewer Replacement project included installation of a flow meter for the 6-inch force main for continuous monitoring of flows from the Hershey Road Pumping Station. This was completed in April of 2011.

- The Authority has completed the 2011 Sanitary Sewer Pipe Lining project which took place in the Turnpike Road #2 drainage basin. This project utilized CIPP lining technology, much like the 2010 project, except that leaking laterals were addressed by installing Top Hat repairs at each active connection. Manhole rehabilitation should be considered for additional I/I reduction. It is recommended that other drainage basins are inspected for I/I reduction benefits of CIPP lining in the future years.

- Post rehabilitation videos of the 2011 Sanitary Sewer Pipe Lining did show much clear flow coming from up the lateral, beyond the extents of the Top Hat repairs. This I/I could be attributed to defects in the homeowner's lateral and home gutters and sump pumps connected directly into the sanitary sewer system. It is recommended

that these laterals be investigated to find the source of I/I and request repair or disconnection of unapproved I/I contributions.

- In December 2011, the emergency generator at the Turnpike Road No. 1 Pumping Station broke and was in need of replacement. The Authority completed the replacement in May of 2012.

- In 2013 and 2014, the Authority investigated the flow in sewers along Mt. Gretna Road and within the Nolt Ave. Pumping Station drainage basin using visual inspection of manholes, flow analysis with ISCO flow meter, and CCTV inspection to develop a sense of the I/I present in the area.

- In 2016, the Authority plans to further investigate manholes in the collection system to identify sources of I/I for removal and issue a contract for manhole repairs.