Lancaster County, Pennsylvania

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Report

Borough of Elizabethtown

2014 Annual Chapter 94 Report

March 2015

CDM Smith

Lancaster County, Pennsylvania

Report

Borough of Elizabethtown

2014 Annual Chapter 94 Report

Prepared by:

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Permittee:

Roni Ryan
Borough of Elizabethtown
600 South Hanover Street
Elizabethtown, PA 17022

March 2015

CDM Smith

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

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

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 S. Hanover St.**	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:	**CDM Smith 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 (**FIGURE 1**)
   ☒ DEP Chapter 94 Spreadsheet used (**TABLE 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 (**FIGURE 2**)
   ☒ DEP Chapter 94 Spreadsheet used (**TABLE 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))

   Utilized the DEP Chapter 94 Spreadsheet

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 **(APPENDIX C)**

☒ List summarizing each extension or project attached (TABLE 3)

☒ Schedules describing how each project will be completed over time and effects attached (TABLE 3)

Comments:

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))

Included within the body of the report.

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:

Surcharging of Radio Road Interceptor, see Corrective Action Plan in the body of the report.

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 (**APPENDIX A & D**)

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 (TABLE 4)
☐ Industrial pretreatment report as required in an NPDES permit attached (-)

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 (INCLUDED IN THE BODY OF THE REPORT)

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 (N/A)

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 (APPENDIX B)

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, Borough Manager	R. Ryan
Name of Responsible Official	Signature
717-367-1700	**3/30/2015**
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).

Randall L. Henne, P.E., BCEE	Randall L. Henne
Name of Preparer	Signature
717-560-7500	**3/30/2015**
Telephone No.	Date

Contents

Sections

Appendices

Tables and Figures

GENERAL

The Borough of Elizabethtown operates a 4.5 million-gallon per day (MGD) wastewater treatment plant (WWTP) located at the intersection of Amosite and Bainbridge Roads in West Donegal Township, just west of the Borough. The treatment process utilizes screening, grit removal, an anaerobic selector and alum addition for phosphorus removal, an oxidation ditch, secondary clarification, hypochlorite disinfection, dechlorination and cascade aeration. The plant discharges treated effluent primarily to the Susquehanna River approximately five miles away through a 20-inch diameter gravity outfall sewer. A portion of the treated effluent is utilized by the Lancaster County Resource Recovery Facility as a cooling water source. A secondary outfall discharges treated effluent to the Conoy Creek at the plant location. Sludge is thickened, aerobically digested, dewatered and disposed of via incineration. A detailed inspection report on the treatment plant is included in Appendix A to this report.

Influent and effluent flow meter calibration reports can be seen in Appendix B. A sewer index map of the Borough's conveyance system to the treatment plant is shown in Appendix C. The plant also provides wastewater treatment for sewage generated from Elizabethtown Regional Sewer Authority and the Masonic Homes. A separate ERSA report is included in Appendix D.

HYDRAULIC LOADING

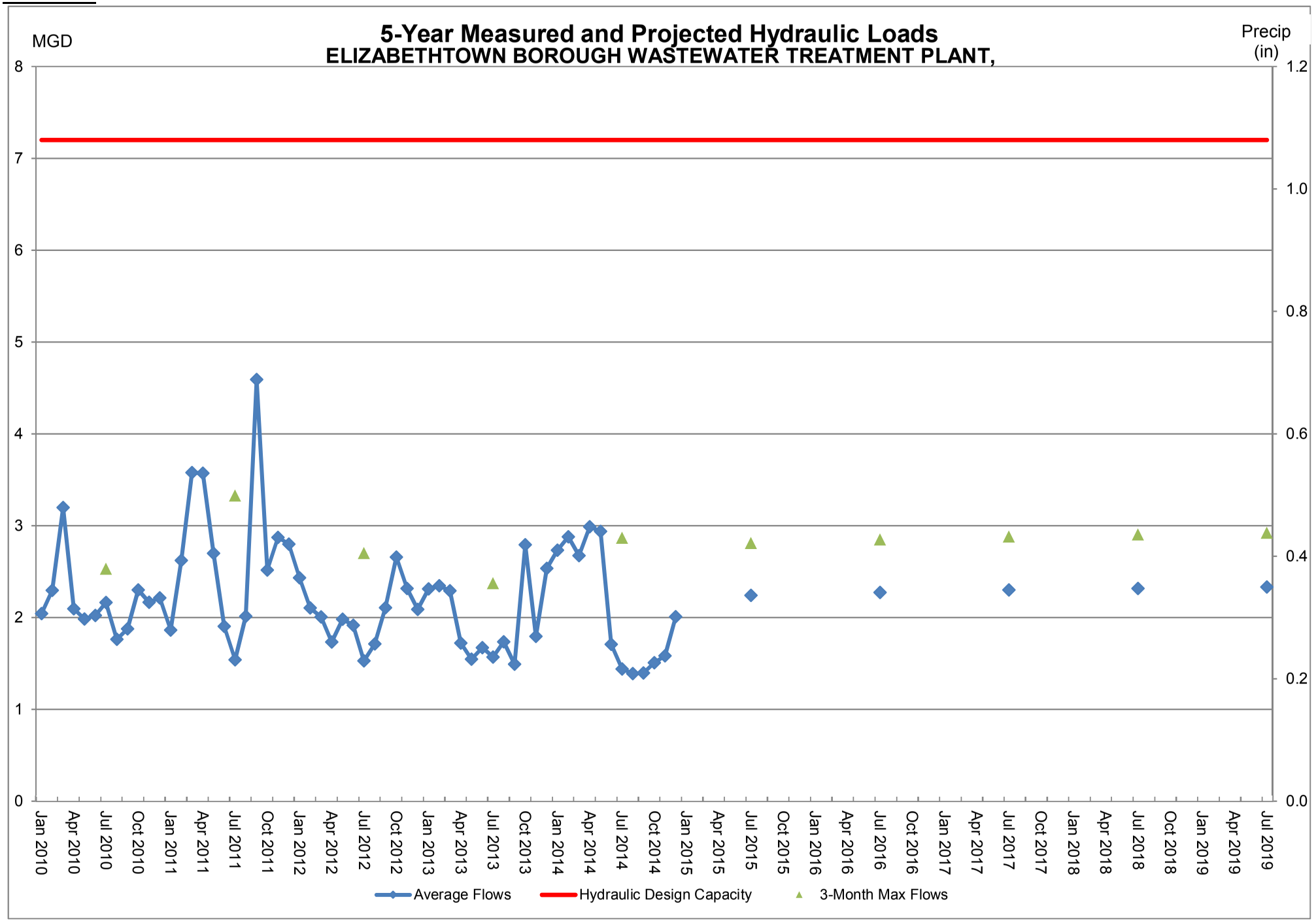
The current design hydraulic loading for the treatment plant is 4.5 MGD on an average daily basis and 7.2 MGD on a maximum monthly basis. The design of the plant was based upon maximum monthly loadings. The hydraulic loading graph, shown as Figure 1, was prepared from flow measurements continuously recorded at the treatment plant. This figure shows monthly average, annual average, 3-month maximum flows for the past five years, projected annual average and 3-month maximum flows for the next five years, and the design flow for the facility.

The flows shown in Figure 1 represent the combined flows from all of the contributing municipalities. The recorded annual average flow for 2014 was 2.104 MGD. The hydraulic loading information is also shown in PADEP Chapter 94 Spreadsheet (Table 1).

Flow projections were developed from anticipated sewer connection information obtained from the contributing municipalities. Table 2 shows the anticipated connections over the next five years for each community. The anticipated connections were multiplied by the average flow per EDU over the previous five years to obtain the annual increase in projected flows. This increase was then added to the average annual flow averaged from 2010, 2011, 2012, 2013, and 2014 within Table 1 to obtain projected flows beginning with the year 2015. More detailed breakdowns of projected connections for ERSA are included in its individual report. Projected connections for each development in the Borough are summarized in Table 3.

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 3-month maximum to annual average flow ratio for each of the previous five years. The average of these ratios was then applied to the projected annual flows for the years 2015 through 2019 to obtain the respective projected 3-month maximum flows.

FIGURE 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 2010
Apr 2010
Jul 2010
Oct 2010
Jan 2011
Apr 2011
Jul 2011
Oct 2011
Jan 2012
Apr 2012
Jul 2012
Oct 2012
Jan 2013
Apr 2013
Jul 2013
Oct 2013
Jan 2014
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Oct 2014
Jan 2015
Apr 2015
Jul 2015
Oct 2015
Jan 2016
Apr 2016
Jul 2016
Oct 2016
Jan 2017
Apr 2017
Jul 2017
Oct 2017
Jan 2018
Apr 2018
Jul 2018
Oct 2018
Jan 2019
Apr 2019
Jul 2019
Average Flows
Hydraulic Design Capacity
3-Month Max Flows

TABLE 1

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

PADEP Chapter 94 Spreadsheet
Sewage Treatment Plants

Reporting Year: 2014

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: 8,650 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	2010	2011	2012	2013	2014
January	2.044	1.864	2.433	2.311	2.734
February	2.297	2.622	2.105	2.347	2.879
March	3.198	3.578	2.007	2.291	2.675
April	2.096	3.572	1.734	1.721	2.989
May	1.985	2.698	1.982	1.547	2.938
June	2.023	1.905	1.915	1.673	1.709
July	2.164	1.54	1.528	1.569	1.44
August	1.764	2.013	1.712	1.736	1.389
September	1.877	4.591	2.107	1.492	1.396
October	2.3	2.517	2.659	2.792	1.509
November	2.165	2.873	2.316	1.795	1.584
December	2.214	2.8	2.089	2.535	2.008
Annual Avg	2.177	2.714	2.049	1.984	2.104
Max 3-Mo Avg	2.53	3.327	2.702	2.374	2.867
Max : Avg Ratio	1.16	1.23	1.32	1.20	1.36
Existing EDUs	11,091.0	11,200.0	11,257.0	11,429.0	11,464.0
Flow/EDU (GPD)	196.3	242.3	182.0	173.6	183.5
Flow/Capita (GPD)	56.1	69.2	52.0	49.6	52.4
Exist. Overload?	**NO**	**NO**	**NO**	**NO**	**NO**

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

Month	2010	2011	2012	2013	2014
January	2,365	2,979	3,329	3,556	3,147
February	2,839	3,209	3,438	3,443	3,204
March	3,355	2,766	3,273	3,438	3,214
April	3,239	2,958	3,395	3,040	3,443
May	3,298	3,029	3,440	2,915	3,272
June	2,953	2,613	2,767	3,266	2,833
July	2,891	2,812	2,929	2,809	2,512
August	2,628	2,977	2,708	2,740	2,597
September	2,923	3,599	2,880	2,762	2,655
October	2,912	3,268	3,187	2,778	2,735
November	3,805	3,791	3,160	3,503	3,087
December	3,307	3,585	3,603	3,594	3,457
Annual Avg	3,043	3,132	3,176	3,154	3,013
Max Mo Avg	3,805	3,791	3,603	3,594	3,457
Max : Avg Ratio	1.25	1.21	1.13	1.14	1.15
Existing EDUs	11,091	11,200	11,257	11,429	11,464
Load/EDU	0.274	0.280	0.282	0.276	0.263
Load/Capita	0.078	0.080	0.081	0.079	0.075
Exist. Overload?	**NO**	**NO**	**NO**	**NO**	**NO**

Projected Flows for Next Five Years (MGD)

	2015	2016	2017	2018	2019
New EDUs	186.0	159.0	136.0	90.0	77.0
New EDU Flow	0.0364	0.0311	0.0266	0.0176	0.0151
Proj. Annual Avg	2.242	2.2731	2.2997	2.3173	2.3324
Proj. Max 3-Mo Avg	2.81	2.849	2.882	2.904	2.923
Proj. Overload?	**NO**	**NO**	**NO**	**NO**	**NO**

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

	2015	2016	2017	2018	2019
New EDUs	186	159	136	90	77
New EDU Load	51.146	43.722	37.397	24.748	21.173
Proj. Annual Avg	3,155	3,198	3,236	3,261	3,282
Proj. Max Avg	3,711	3,763	3,807	3,836	3,861
Proj. Overload?	**NO**	**NO**	**NO**	**NO**	**NO**

Show Precipitation Data on Hydraulic Graph?

Total Monthly Precipitation for Past Five Years (Inches)

Month	2010	2011	2012	2013	2014
January	1.69	2.05	3.24	3.55	2.64
February	1.88	2.95	2.24	1.37	3.72
March	3.53	4.52	1.56	2.4	3.97
April	1.8	6.36	2.36	1.83	5.72
May	4.99	4.05	6.4	2.53	3.56
June	4.19	4.34	4.12	5.46	3.55
July	6.11	3.22	6.85	3.7	3.88
August	1.49	8.17	4.5	4.16	1.86
September	6.24	16.13	7.18	1.71	3.13
October	3.23	3.88	7.59	10.58	3.14
November	2.58	4.25	1.28	2.32	2.7
December	1.52	3.37	2.52	4.16	3.51

BOROUGH OF ELIZABETHTOWN
2014 ANNUAL CHAPTER 94 REPORT

TABLE 2: PROJECTED CONNECTIONS

						Projected				
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Elizabethtown Borough	Connections:	9	5	4	13	13	26	42	29	25	28
	Disconnections:	0	0	0	0	1	0	0	0	0	0
	NET GAIN:	9	5	4	13	12	26	42	29	25	28
Additional Connections for:											
Elizabethtown Regional Sewer Authority:		31	104	53	159	23	160	117	107	65	49
TOTAL ADDITIONAL EDUs:		40	109	57	172	35	186	159	136	90	77

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

BOROUGH OF ELIZABETHTOWN
2014 ANNUAL CHAPTER 94 REPORT

TABLE 3: PROJECTED FUTURE CONNECTIONS

Development	Total Planned EDUs	EDUs In Service 1/1/2014	EDUs Connected 2014	EDUs Remaining 12/31/2014	2015	2016	2017	2018	2019
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	44	8	90	15	26	17	16	24
Brookridge II	15	0	5	10	6	4	0	0	0
Sycamore Square	8	4	0	4	1	1	1	1	1
Miscellaneous	16	0	-1	17	4	4	3	3	3
Total EDUs	307	75	12	220	26	42	29	25	28

ORGANIC LOADING

The organic loading graph, shown as Figure 2, was prepared using influent BOD-5 data collected and analyzed by the Borough's treatment plant 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 is also summarized in Table 1.

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 connection times the average BOD-5 per person over the previous five years. This annual increase was then added to the average of previous five year's loading to obtain projected loadings. The current design organic loading for this treatment plant is 7,500 pounds of BOD per day on an average daily basis and 8,650 pounds of BOD per day on a maximum monthly basis.

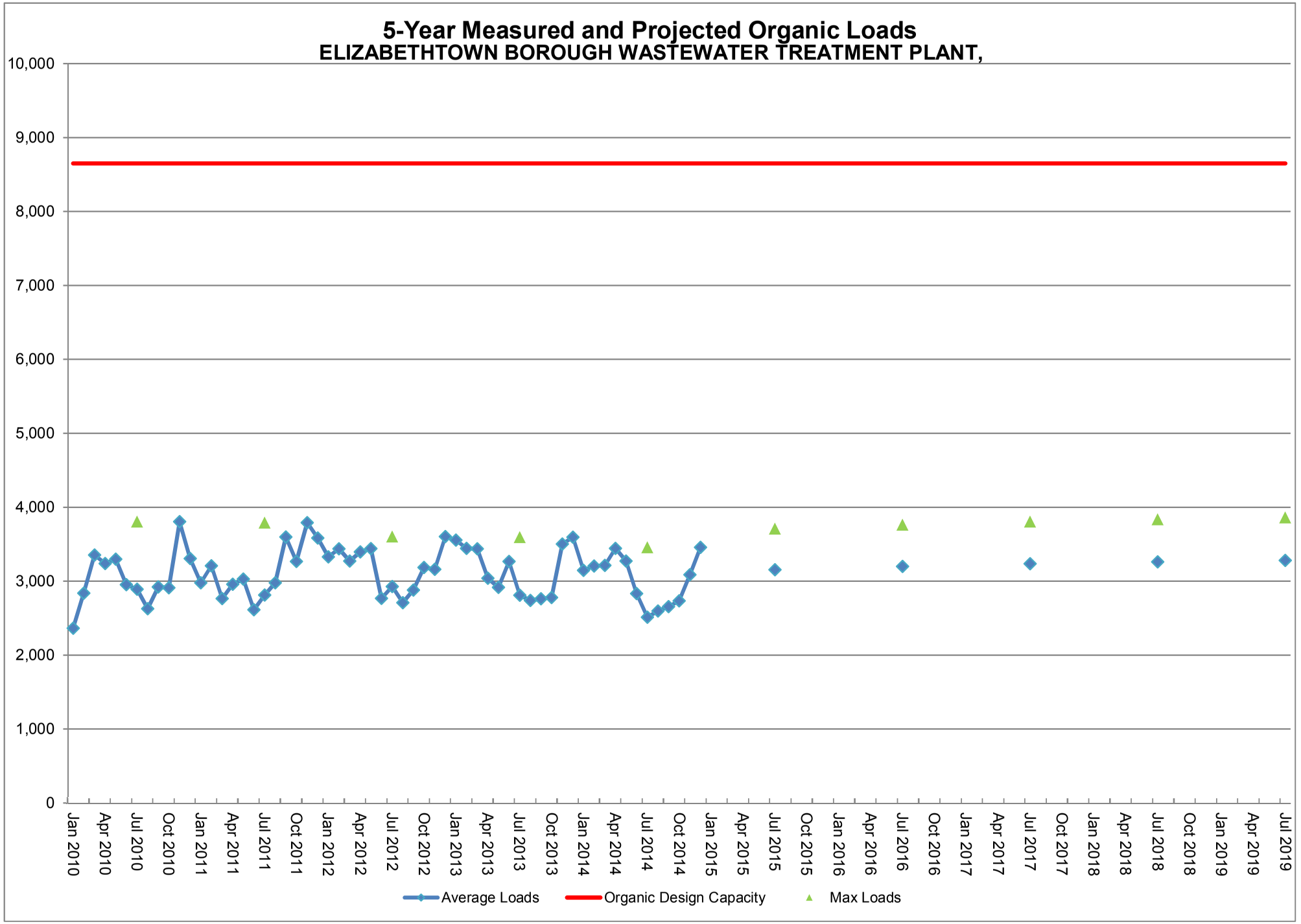
The projected maximum month organic loadings were determined by first finding maximum month to average month loading ratio over the average annual loading for the past five years. This percentage increase was then applied to the projected annual organic loading for the years 2015 through 2019 to obtain the respective projected maximum month organic loading. As shown in Figure 2, the projected maximum monthly organic loading is not expected to exceed the plant's design organic loading of 8,650 pounds of BOD per day during the next five years.

PLAN TO REDUCE ANY PROJECTED OVERLOAD CONDITIONS

Based on the 2014 maximum monthly flow of 2.989 MGD, the remaining hydraulic capacity for the Borough's system is 4.211 MGD. This is equivalent to 12,031 EDUs based on 350 GPD/EDU which is more than the total number of EDUs projected to be connected for the next five years by the two contributing municipalities. The facility has experienced elevated flows during significant rain events. The primary reason for these higher flows is the contribution of I/I during extremely wet periods. The Borough is continuing a long term I/I identification and removal program to reduce peak flow occurrences. Details on this program are addressed in the Condition of the Sewer System section of this report.

If it is assumed that the organic loading to the system remains the same regardless of the hydraulic loading, the remaining organic capacity, based on 2014 figures, would be 5,637 pounds per day of BOD-5 under annual average loading conditions and 5,193 pounds per day under maximum monthly conditions. Under annual average daily loading conditions, this represents 9,474 additional available EDUs assuming 3.5 persons per EDU times 0.17 pounds BOD-5 per person per day. This is also more than the total number of EDUs projected to be connected for the next five years by the two contributing municipalities.

FIGURE 2


5-Year Measured and Projected Organic Loads
ELIZABETHTOWN BOROUGH WASTEWATER TREATMENT PLANT,
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
Jan 2010
Apr 2010
Jul 2010
Oct 2010
Jan 2011
Apr 2011
Jul 2011
Oct 2011
Jan 2012
Apr 2012
Jul 2012
Oct 2012
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Jan 2016
Apr 2016
Jul 2016
Oct 2016
Jan 2017
Apr 2017
Jul 2017
Oct 2017
Jan 2018
Apr 2018
Jul 2018
Oct 2018
Jan 2019
Apr 2019
Jul 2019
Average Loads
Organic Design Capacity
Max Loads

INDUSTRIAL WASTES

A copy of the Borough's most recent Industrial Waste Ordinance was included in the 1990 Annual Report.

Permitted establishments are monitored on a regular basis under the Borough's Industrial Waste Ordinance to regulate organic loadings. The Borough plans to continue inspection 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 be considered a problem.

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 waste 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 analysis of the Masterfoods USA discharge for 2014 is summarized in Table 4.

ERSA is responsible for monitoring and administering commercial and industrial dischargers in its sewer system. Refer to the ERSA Chapter 94 Report in Appendix D for additional information relative to its industrial waste programs.

SEWER EXTENSIONS

There were two extensions to the Borough's sewer system in 2014, Brookridge Phase II and Conoy Crossing Phase 2A totaling 1,961 LF. A total of 13 connections and one disconnection were made to the Borough's portion of the sewer system during 2014.

During calendar year 2014, 23 EDUs were connected to the ERSA service area. The number of EDUs now being serviced is approximately 4,928 EDUs. There was one extension to the Authority's system during 2014: Featherton Crossing Phase 3. An index map showing the ERSA sewer system is included in its Chapter 94 Report attached as Appendix D.

INFILTRATION AND INFLOW PROGRAM STATUS REPORT

The Borough has been conducting an I/I elimination program since 1996. The I/I elimination efforts conducted during 2014 are detailed below.

The Borough replaced 7 sewer laterals totaling 128 LF, replaced or repaired 2,377 LF of sewer main and televised 12,378 LF of sewer lines in 2014 as summarized in Table 5-A. The Borough

BOROUGH OF ELIZABETHTOWN
2014 ANNUAL CHAPTER 94 REPORT

TABLE 4: INDUSTRIAL WASTE MONITORING

MASTERFOODS USA

MONTH	Effluent COD (mg/l)	Effluent BOD (mg/l)	pH RANGE	TSS (mg/l)	FLOW (gpd)
January	179	27	6.73 - 8.01	93	64,782
February	205	32	7.15 - 7.91	30	59,938
March	165	22	7.45 - 8.03	31	59,228
April	139	11	7.17 - 8.42	27	39,320
May	152	15	6.91 - 8.12	30	51,923
June	147	9	7.15 - 7.88	40	55,463
July	151	17	7.32 - 8.26	65	44,620
August	142	15	7.03 - 7.91	61	64,085
September	140	16	7.11 - 8.10	83	60,538
October	135	11	7.32 - 7.85	65	69,293
November	137	22	7.19 - 8.13	63	54,291
December	144	12	7.71 - 8.31	29	41,350
2014 Average	153	17	7.19 - 8.08	51	55,402
2013 Average	217	34	6.83 - 7.89	110	69,649
% Increase/Decrease from previous year	-30%	-49%		-53%	-20%
2014 Maximum	205	32	6.73 - 8.42	93	69,293

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.

also rehabilitated 24 manholes with concrete sealant, replaced 22 manhole frames and 25 manhole covers, installed 4 risers and 1 manhole was replaced, all of which is summarized in Table 5-B. The Borough has performed miscellaneous "as needed" work throughout the year and continues to maintain their rights-of-way.

The Borough recognizes that I/I is still an issue for its system. The Borough intends to continue an I/I program that includes routine investigation and rehabilitation. The I/I program will continue to be coordinated with the Borough's street repaving program.

In 2015 the Borough plans to repair sections of sewer main and laterals that have been identified as sources of I/I from television and visual inspections in 2014. The targeted areas for 2015 repairs include Ridgeview Avenue, Mount Joy Street, South Mount Joy Street, and Briarcliff Road. Additionally, the Borough plans on beginning an evaluation of the Radio Road Interceptor in 2015. These areas are highlighted on the Elizabethtown sewer index map included as Appendix C.

Discussion on the condition of the ERSA sewer system is included in its Chapter 94 report attached to this report.

CONDITION OF THE SEWER SYSTEM

The Borough's sewer system is in fair condition. During wet weather events, significant I/I is experienced. The Borough began a long term I/I identification and removal program in 1996. It is the intent of the Borough to include a status report of their I/I program each year as part of the Chapter 94 Report.

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 at least those main sewer lines that are downstream of ERSA's seven connection points from Mount Joy Township. This enables the Borough to keep track of the conveyance capacity available for each interceptor downstream of the seven connection points.

ERSA's West Donegal Township flow enters the Borough's sewer system by means of three pumping stations and by gravity for 13 unmetered EDUs. ERSA's West Donegal Township flow is primarily pumped to the WWTP and does not go through the Borough's sewer system. However, the Borough keeps track of current and projected EDUs and flows for the West Donegal Township four connection points to make sure they stay within their treatment capacity allocation.

BOROUGH OF ELIZABETHTOWN
2014 ANNUAL CHAPTER 94 REPORT
TABLE 5-A: Sewer Main Repair/Televising & Lateral Repair

Drainage Area	Street	MH	MH	Length of Main Televised (ft)	Length of Main Repaired (ft)	Flushed	Wye Replaced	Laterals Televised	Laterals Replaced	
									No.	Length (ft)
A	Acorn Ln.	A6	A5	156						
		A5	A4	279						
		A4	A3	262						
		A3	A2	102						
	Briarcliff Rd.	A15	A12	355	355	X				
		A14	A13	238		X				
		A13	A12	131		X				
		A12	A11	197		X				
		A11	A8	260		X				
	Easement	A26	A25	155		X				
		A25	A1	91		X				
	Oak Manor PS	A1	A2	54		X				
		A1	OMPS			X				
	Ridgeview Ave.	A19	A18	247		X		2		
		A18	A15	304		X				
		A17	A16	235		X				
		A16	A15	235		X				
	S. Mt. Joy St.	A32	A31	213		X				
		A31	A30	394		X				
		A30	A29	323		X				
		A29	A28	234		X				
		A28	A27	255		X				
		A27	A26	251		X				
		A32	ERSA	96		X				
		A10	A9	208						
		A9	A8	238						
		A8	A7	208						
B	S. Hanover St.	B5	B4					1		
	Groff Ave.	B43	B42	201						
		B42	B41					1		
		B41	B40	368				1	1	16
		B40	B39					1		
		B39	B38	300		X				
		B38	B37		9.4		1	1	1	24
		B37	B36		8		1	3	1	23
		B32	B33			X				
	Ridge Rd.	B29	B28	322	322	X				
C	S. Market St.	C83	C82					1		
D	College St.	D54	D2					3		
	E. Bainbridge St.	D29	D28					1		
		D28	D27					1	1	11.3
	Verndant Ally	D36	D35	172						
E	Hummelstown Rd.	E25	E15	335	335	X				
	E. Willow St.	E20	E19	263	28.2	X	2	2		
		E13	E3					1		
G	Lime St.	G29	G28			X				
		G28	G27	197	15	X				
		G27	G26	391						
		G26	G25	166						
	Spring Garden St.	G43	G42	246	54		1	1		
		G42	G45	38	15.5					
		G17	G16	267	15	X				
		G12	G11	315	13		1	1		
	Sunrise Blvd.	G59	G60			X				
		G58	G59			X				
		G45	G42	36		X				

BOROUGH OF ELIZABETHTOWN
2014 ANNUAL CHAPTER 94 REPORT
TABLE 5-A: Sewer Main Repair/Televising & Lateral Repair

Drainage Area	Street	MH	MH	Length of Main Televised (ft)	Length of Main Repaired (ft)	Flushed	Wye Replaced	Laterals Televised	Laterals Replaced	
									No.	Length (ft)
H	N. Locust St.	H6	H5					1		
	N. Mt. Joy St.	H50	H49					1		
	Watercress Ln.	H46	H45	257	256.6		6			
		H45	H45A	108	107.8		2		1	10
		H45A	H44	150			3			
		H43	H44	379	25					
		H43	H42	396	395.9		10		2	44
		H42	H41	243		X				
		H41	H40	252	83.1		2	2		
J	Brown St. and Wilson Ave.	J43	J42	317		X				
	S. Market St.	J17	J15					2		
	E. Park St.	J25	J24	304	8		2	2		
L	E High St.	L50	L49					1		
	N. Market St.	L46	L31					1		
		L34	L33	188		X				
		L33	L31			X				
		L32	L31	119		X				
		L31	L30			X				
M	N. Market St.	M64	M63					1		
	N. Spruce St.	M30	M29					1		
	W. Willow St.	M55	M54					1		
N	E. High St.	N29	N28					1		
		N24	N22					1		
		N16	N17			X				
	School Ln.	N22	N23			X				
	S. Spruce St.	N14	N12	330	330	X				
		N11	N2					1		
		N2	N1			X				
R	Northfield Dr.	R36	R35	207						
		R34	R35	87						
		R34	R33	74						
		R33	R22A	311						
TOTAL		***88***		***12,378***	***2,377***	***40***	***11***	***37***	***7***	***128***

BOROUGH OF ELIZABETHTOWN
2014 ANNUAL CHAPTER 94 REPORT
TABLE 5-B: Manhole Rehabilitation

Manholes Rehabilitated	
Total:	***24 Manholes***
S. Spruce St.	B13, B15, B16, B17
Locust St.	B21, B22
Lemon St.	B23
Ridge Rd.	B25, B26, B27, B28, B30, B31
Groff Ave.	B32, B33, B38
N. Hanover St.	M14, M15, M16
Linden Ave.	M45
Verdant Aly.	D34
Mulberry St.	E7
Holly St.	H28

Manhole Frames & Covers Replaced	
Total:	***22 frames & 25 covers***
Brown St.	J42, J46, J47, J48
Watercress Ln.	H39, H40, H41, H42, H43, H44, H45, H46
Sunrise Blvd.	G45
Grandview Cir.	G15
Spring Garden	G42, G43, G44, G14, G13, G12, G11, G17
High St.	J13, N15, N16
* Covers Only	

Manhole Risers Installed	
Total:	***4 risers***
Watercress Ln.	H45-1
Fieldstone Ln.	R30, R31
Sunrise Blvd.	G58

New Manhole Installations	
Total:	***1Manhole***
Watercress Ln.	H45A

Radio Road Interceptor Corrective Action Plan

The Borough of Elizabethtown 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 inspections completed by Borough staff identified the following:

- Rainfall events greater than 5 inches typically result in surcharging
- Rainfall events from 3 to 5 inches and high groundwater table typically cause surcharging
- 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. Only 10 to 50 equivalent dwelling units (EDUs) are projected to be connected over the next 5 years that would impact the interceptor.

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 tributary collection system to determine the best course of action. The phases of this project are broken down into interceptor sections identified by the following tributary manholes (see sewer index map in Appendix C):

- 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 vactor/jet truck, CCTV inspection truck, and portable flow meters. Where sections of sewer interceptor become too large or complex for the Borough staff/equipment, they 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 the Elizabethtown Regional Sewer Authority (ERSA) to perform I/I investigation and reduction in its 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:

- Review and verify its EDU count tributary to the Radio Road Interceptor
- Monitor actual flows in the interceptor with portable flow meters to assess existing flows and peaks

- Determine future capacity requirements in the interceptor for the Borough and Mount Joy Township
- Determine if capacity needs can be achieved with I/I reduction and/or interceptor expansion.

The Borough intends to complete Phase 1 of the I/I investigation by the summer of 2015 and then start on Phase 2. The schedule will be dependent on weather conditions to obtain useful data. The Borough also intends to assess the future capacity needs in the interceptor in 2015. Then the Borough will provide an update in the 2015 Chapter 94 Report on the CAP progress. Ultimately, the Borough anticipates developing and implementing a plan to alleviate the projected hydraulic overload condition within the next five years through I/I reduction and/or interceptor expansion. This phased program will be monitored, evaluated and potentially modified as the Borough deems appropriate to best achieve the overall goals of the program.

CONDITION OF THE SEWAGE PUMPING STATIONS

There are a total of 16 pumping stations within the overall Elizabethtown service area. Of the 16 pumping stations, one is owned and maintained by the Borough and 15 by ERSA.

The average daily flows and the projected 2-year flows for all of the stations are shown in Table 6. All of the stations are reported to be in good condition and are currently operating within their capacities. When the projected 2-year maximum flows are compared with the capacity of each of the stations, it can be seen that all of the pumping stations are projected to be within their design capacities with the exception of ERSA's Bossler Road No. 2 pumping station. This station upgrade is currently under construction and is scheduled to be completed in 2015. Discussions on the condition and maintenance items performed during 2014 at the ERSA pumping stations are noted in the ERSA Chapter 94 report attached.

Run time hour meters are used to monitor flows at the Borough's Oak Manor Pumping Station. Flows experienced at this station during 2014 were well below its capacity. Table 7 summarizes the average daily flows for each month of 2014.

CONDITION OF THE SEWAGE TREATMENT PLANT

The last upgrade and expansion of the Borough's WWTP was completed at the end of 2002. This project involved the replacement or demolition of the majority of the plant equipment and structures as well as the construction and installation of new equipment and structures. The treatment plant was converted from trickling filters to an oxidation ditch treatment process. The treatment plant is performing well, and only routine operation and maintenance is anticipated for 2015.

BOROUGH OF ELIZABETHTOWN
2014 ANNUAL CHAPTER 94 REPORT

TABLE 6: 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	0.077	0.192
ERSA (2)	Hershey Road	0.348	0.097	0.241
	Mill Road	0.288	0.059	0.147
	Schwanger Road	1.411	0.106	0.319
	Aberdeen	0.288	0.034	0.086
	Conewago	0.071	0.005	0.013
	Bossler Road No. 1	0.304	0.030	0.127
	Turnpike Road No. 1	0.248	0.016	0.012
	Wilkens Street	0.232	0.020	0.132
	Turnpike Road No. 2	0.301	0.067	0.246
	Bossler Road No. 2	0.370	0.117	0.548
	Pioneer Hills	0.212	0.012	0.032
	Nolt Road	0.288	0.079	0.222
	Colebrook Road	0.829	0.127	0.344
	Cameron Street	0.946	0.134	0.363
	Miller Road	1.117	0.331	0.946

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.
(2) ERSA pump capacties are based on drawdown testing in 2009, 2012, January 2015 and design pump capacities.
Projected 2-year flow is a maximum hourly flow.

BOROUGH OF ELIZABETHTOWN
2014 ANNUAL CHAPTER 94 REPORT

TABLE 7: OAK MANOR PUMPING STATION FLOWS
YEAR 2014

Month	Average Daily Flow (gpd)
January	88,490
February	104,991
March	96,852
April	122,976
May	107,094
June	56,880
July	53,861
August	54,975
September	56,088
October	55,603
November	56,448
December	67,378
2014 Average	76,612
2013 Average	66,694
% Increase/Decrease from previous year	14.87%
Maximum	122,976

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

An annual report on the condition of the Borough's wastewater treatment facilities and the Oak Manor Pumping Station is included in Appendix A of this report. Influent and effluent flow meter calibration reports are included in Appendix B.

FUTURE PLANNING NEEDS

The Borough will continue its I/I program. Of particular importance is the detailed capacity evaluation of the Radio Road Interceptor that the Borough is starting in 2015 to develop a more aggressive I/I removal program or to develop a plan to upgrade/expand the interceptor. The Borough will continue to track capacity requests in this interceptor to make sure it does not become overloaded.

The Borough will continue to maintain and update its sewer system capacity model to identify projected hydraulic overloads.

SUMMARY

The Borough of Elizabethtown's wastewater collection, conveyance and treatment facilities are in relatively good condition. Infiltration and inflow is still a concern and the respective municipalities are investigating and repairing their systems to reduce wet weather flows. Some of the problems have been remedied and other appropriate repairs will be made as additional problems are discovered. The Borough's facilities have adequate capacity to meet the future growth anticipated in the next five years.

APPENDIX A

BOROUGH OF ELIZABETHTOWN
Lancaster County, Pennsylvania

ANNUAL REPORT
ON THE CONDITION OF THE WASTEWATER TREATMENT FACILITIES
February 2015

Introduction

On February 11, 2015, Dennis Bair, Elizabethtown Wastewater Treatment Plant Superintendent, and Dennis Michael and Stephanie Countess of CDM Smith Inc. inspected the Borough's Wastewater Treatment Plant and 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 the 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. During 2014, the average daily flow was 2.104 MGD and the maximum monthly flow recorded was 2.989 MGD. The treatment plant's influent and effluent flow meters are calibrated semiannually. The calibration reports for the various flow meters are attached as Appendix B. During 2014, the Miller Road flow meter and the Conoy Creek Meter which are located at the treatment plant, were replaced.

The Borough and 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 on ERSA's efforts to investigate and remediate their collection and conveyance systems can be found in its respective report. In 2013 the Borough sold its current sewer flush truck and replaced it with a new flush and vacuum truck to better aid sewer cleaning and flushing activities.

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

Headworks

Prior to entering the treatment plant, each of the main influent lines are metered using flumes and ultrasonic flow meters. As wastewater enters the treatment plant it 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 material back into the wastewater stream before being compacted and placed into small containers. The contents of these containers are then transferred to 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, wastewater enters a vortex grit chamber where settleable matter, such as sand, gravel and organic solids are removed. The grit is pumped from the chamber, passed through a grit classifier and is then discharged to a dumpster. An enclosure was constructed in 2004 around the Pista Grit Removal System control panels and above ground equipment to minimize freezing problems that had been occurring. This structure has proved to be effective with no freezing problems reported since that time.

After leaving the grit chamber, the wastewater flows through another flume and ultrasonic flow meter that measures the total influent flow.

Overall, the headworks system is functioning well. All influent flow meters are calibrated semiannually. During 2014, the drive unit was replaced on one of the mechanical screens and the Borough hired Heisey Mechanical to replace the lower bearings, sleeves and cleaning rakes on both mechanical screen units. Also during 2014, the Pista Grit pinch valve was replaced, the drive unit was serviced and the grit classifier drive unit was serviced. The interior areas of the headworks building were repainted during 2014.

Influent Pumping Station

After leaving the headworks area, the wastewater flows into the influent pump station wetwell. The wastewater is then pumped via one of four pumps to the anaerobic selector located at the head of the oxidation ditch.

Overall the influent pumping station is operating well. During 2012 the control panel for the influent pumps was updated with new controls. In 2013, the bearings were replaced on influent pumps #2 and #3. In 2013 the flap valve for Pump #1 broke loose and was removed and not replaced. It is recommended that the flap valves for the remaining pumps also be inspected in order to verify their condition and remove if necessary. During 2014 all of the influent pumps were serviced.

Since the paint on the walls of the Influent Pumping Station is beginning to crack and peel off, the Borough hopes to repaint the interior of this building during 2015.

Anaerobic Selector/Oxidation Ditch

Wastewater flows from the influent pumping station enter 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 being used. There are 3 mixers in the anaerobic selectors. The Borough replaced two of the original submersible mixers with surface mixers in 2009, and replaced the third mixer with a surface mixer in 2010. In 2013 surface mixers #2 and #3 were pulled, cleaned, and repaired as needed.

After passing through the anaerobic selector, the wastewater enters the oxidation ditch. There are two oxidation ditches that are operated with Kruger's Biodenipho™ process. These two ditches are operated in four phases: denitrification-nitrification, nitrification-nitrification, nitrification-denitrification and nitrification-nitrification. There are 5 mechanical aerators (rotors) and 6 anoxic (submersible) mixers in each of the ditches. There are 2 adjustable weirs at the influent end and 4 adjustable weirs at the effluent end of the ditches to distribute and discharge flow depending on the phase of operation. During 2011 and 2012 the effluent weir operators were repaired after they suffered damage from a lightning strike which created hot spots on the circuit boards. This affected their proper positioning. The two larger effluent weirs were serviced in 2011, and the two smaller weirs were serviced in 2012. In 2013 the Borough replaced Mixer #1 in Ditch #2 with a new mixer, replaced the dissolved oxygen sensors, and serviced all rotors for both oxidation ditches. During 2014, the Borough installed sump pumps in the oxidation ditches service sumps instead of doing a manual pump out on a regular basis. The sump pumps are removed during the winter months to prevent freezing issues. Due to periodic maintenance issues, the Borough is hoping to replace the last two submersible mixers in the ditch during 2015.

The oxidation ditch system is the main treatment unit at the plant and appears to be operating very well.

Secondary Clarifiers

After leaving the oxidation ditch, the wastewater enters a distribution box that conveys the wastewater to one of two secondary clarifiers. In these units, the activated sludge from the oxidation ditch settles to the bottom of the clarifiers. Return activated sludge is recycled back to the first anaerobic selector tank. Excess sludge (waste activated sludge) is removed from the secondary clarifiers for thickening, digestion, dewatering and disposal.

The clarifiers are reported to be working well. During 2014, the operators serviced the drive units for Secondary Clarifiers #1 and #2. During 2013, the scum collector wiper blade arms were modified to be more perpendicular with the clarifier wall. Additionally, all piping within the RAS dry well was painted during 2013. All three RAS pumps were serviced during 2014 and the RAS dry well sump pumps were replaced. During 2015, the Borough operators hope to modify the Secondary Clarifier skimmers to further increase scum removal efficiency.

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

From the secondary clarifiers, the treated wastewater 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 0.50 mg/l or less. 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 sodium bisulfite if needed to dechlorinate the treated effluent. In 2012 the sodium hypochlorite mixer for the chlorine contact tank was replaced with a pump, and the hypochlorite pump control panel circuitry was replaced.

The treated wastewater flow is measured at the end of the chlorine contact tank before it enters the cascade aeration basin and leaves the facility through the outfall sewer to the Susquehanna River. A second outfall was constructed in 2002 as part of the upgrade and expansion project that discharges directly to Conoy Creek when the effluent rate exceeds approximately 6 MGD (the capacity of the Susquehanna River outfall line). Any flow discharged through this second outfall is metered and discharged in accordance with permit requirements. Both effluent flow meters and the meter to monitor flows in the Conoy Creek are calibrated semiannually.

Chemical Feed Systems

Several chemical feed systems were installed as part of the plant upgrade and expansion in 2002. The alum feed system is used for phosphorus removal and consists of two fiberglass tanks and two metering pumps. In 2013 the alum feed pumps were rebuilt and the alum piping inside the alum storage room was replaced.

The sodium hypochlorite feed system is used for disinfection and consists of two polyethylene tanks installed in 2010 (replacing the original fiberglass tanks) and two metering pumps. All piping in the chemical room for the sodium hypochlorite system was also replaced in 2010. The sodium bisulfite system is used for dechlorination, on an as-needed basis. This system consists of two fiberglass tanks and two metering pumps. To date the operators have not needed to use the sodium bisulfite system for dechlorination.

There are two polymer feed systems used for the sludge thickening and dewatering processes. One polymer system consists of a polymer wetting system with a metering pump, mixing tank and polymer

solution metering pumps which is used for the rotary drum thickeners. Due to some cracks and leakage from the thickener system polymer mixing tank, it was replaced with a new stainless steel tank during 2014. The second polymer system is for the belt filter press and consists of tanks, mixers, and metering pumps. Both polymer systems are now reported to be working well.

Although the Borough does not currently require sodium bisulfite to meet its permit limits on chlorine residual, the sodium bisulfite system should be cleaned and kept operational. The bisulfite chemical in these tanks, piping, etc. has been there for a number of years and has crystallized. The suggested cleaning measures should be taken to make the system more reliable. The Borough operators should consider purchasing only small quantities of sodium bisulfite to prevent crystallization related problems. In 2013 the controls were replaced for the chlorination/dechlorination system.

The paint in the chemical building rooms was peeling off the walls and ceiling. The Borough anticipates re-painting these rooms in the near future.

Sludge Production and the Digester System

The waste sludge that settles out in the secondary clarifiers is pumped to a pair of rotary drum thickeners. These thickeners were installed as part of the plant upgrade and expansion in 2002 and have operated well since that time. In 2013, the dive sprocket, drive chain and idler were replaced on the thickeners and the Thickener Feed Pumps had internal deposits and debris removed. During 2014, the drive motor and gearbox on Thickener #1 were replaced. The walls and ceilings in the thickener and polymer rooms were repainted during 2013.

The thickened sludge is then pumped by double disc pumps to an aerobic digester system for further processing. In 2013 new VFDs for the Sludge Pumps were installed. There are three submersible mixers in the digester and three positive displacement blowers supply air through course bubble diffusers. In 2012, two of the three submersible mixers were taken out of service and not replaced when it was observed that only one mixer was required to maintain adequate mixing of sludge in the digester. The remaining submersible mixer received a new propellor and the removed mixers are available as spares. During 2014, all digester blowers were serviced.

Digested sludge is eventually pumped via one of two positive cavity pumps to the belt filter press for dewatering. The belt filter press is usually operated only a few days each week. The volume of sludge being processed is measured with a Doppler type flow meter located on 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. In 2013 new dewatering belts and scraper blades were installed. In 2014, the belt filter press hydraulic unit was serviced.

Plant Water System

Most treatment plants are designed to utilize the plant effluent as a water source where potable water is not required (hosing clarifiers, chemical dilution water, etc.). The majority of the non-potable plant water piping and new pumps were installed as part of the plant upgrade and expansion completed in 2002. Two new potable water system pressure tanks and additional piping were also installed for the well water system as part of the upgrade and expansion. During 2011 all process water (non-potable) pumps were repaired for various maintenance issues and new gauges for all three pumps were installed. The building housing the plant water system was flooded in September of 2011 during an extreme wet weather condition. As a result of the flooding, the basement walls and piping were re-painted, the process water pumps control panel was replaced, as was the ventilation control panel. During 2014, the well water pump and its wiring was replaced. During 2015, the Borough hopes to modify the plant water system pumps to change them from a vertical to a horizontal mounting position in an effort to reduce the amount of vibration observed on the pumps and the connected piping. It is hoped that this change will reduce the amount of maintenance needed on the pumps and connected piping.

Emergency Power

The plant has a back-up generator that is capable of operating the entire wastewater treatment facility during a power outage. Louver actuator gears were repaired, batteries replaced, and a transfer switch to allow the plant to "shed power" during PPL declared emergencies or high power consumption times was installed during 2010. 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 be available during power outages. The generator system is also exercised on a weekly basis to make sure it is working properly. During 2014 the transfer switch and generator system were operating well.

Oak Manor Pumping Station

This station is a wet well/dry well type pumping station that includes two Gorman-Rupp Series T-4 pumps. The pumps have been working well. This pumping station has a design flow capacity of 275 gallons per minute (gpm) or 396,000 gallons per day (gpd). The tested flow capacity is 360 gpm or 518,400 gpd. Average daily flow at this station during 2014 was 76,612 gpd with a maximum monthly flow rate of 122,976 gpd. These flows are based on pump run times.

An increase in the amount of pump run time during wet weather periods indicates that the sewers flowing to this station are subject to infiltration and inflow (I/I). The Borough is continuing to investigate the contributory sewers to determine sources of the I/I.

The station's Muffin Monster comminutor was replaced in 2008. In 2013 the battery and cables were replaced for the emergency generator and both pumps were serviced. The Borough hopes to paint the dry well walls and service the comminutor during 2015. The Borough also hopes to do some repairs to the pumping station grounds and fencing during 2015.

Sewer Maintenance

The Borough maintain 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 the repair of sewer line breaks or leaks. The Borough also keeps some appropriate sized pipe and pipe repair items in stock for emergency sewer line repairs. In addition, the Borough keeps manhole risers, grade rings, and manhole inserts in stock at the treatment plant.

Safety

It is recommended that treatment plant personnel receive instruction on safety issues on a regular basis. All plant personnel should be familiar with the use of gas detectors, self-contained breathing apparatus, confined space entry procedures, etc. It is a good idea to schedule monthly meetings to discuss safety items. Safety equipment suppliers are often willing to come to the plant to demonstrate or review the use of their safety equipment. It is also recommended that an annual inspection be made of all safety equipment to be sure it is operational. The plant confined space entry equipment was replaced in 2011 with a new tripod and retrieval system. During 2014, the Borough tested the eye wash stations and emergency shower facilities to flush any built up debris that may have accumulated because of non-use. The Borough staff has indicated that safety equipment is tested on a regular basis and that personal protective equipment is issued to all staff.

Summary

Overall the treatment plant is in excellent condition. The equipment is operating as designed and the plant is producing an excellent effluent. The Elizabethtown treatment facility is meeting all of its NPDES discharge permit requirements.

Recommendations

- I/I continues to be a concern at the treatment plant and in the conveyance systems. Investigations should continue to identify sources of the infiltration and inflow. The appropriate repairs should be made as funds are made available.
- The Borough should continue the safety training program for treatment plant personnel. Actual hands-on use of safety equipment during the training is encouraged.

- The operations staff should continue to maintain equipment on a preventative and as-needed basis.
- Chemical Building and Influent Pumping Station inside walls and ceilings should be repainted.
- The sodium bisulfite system should be cleaned to remove the crystallized material.

APPENDIX B

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
3/12/2014

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

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

Zero	Span
84.10 in	38.35 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 %	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 3/12/2014

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

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
3/12/2014

User
Elizabethtown Borough
600 S. Hanover St.
Elizabethtown, Pa. 17022

Attn

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

Zero	Span
29.62 in	20.00 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 %	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 3/12/2014

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

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
3/12/2014

User
Elizabethtown Borough
600 S. Hanover St.
Elizabethtown, Pa. 17022

Job Site
Elizabethtown WWTP

Attn

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

Zero	Span
31.25 in	4.385 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 %	2.19	MGD	12.01	mADC	0.08%
100 %	4.39	MGD	20.02	mADC	0.10%

Equipment Used Multimeter Stick Rule Isco Standards Book

Adjustments / Actions Taken : Startup

Comments :

Service Representative Anthony Grbas

Date 3/12/2014

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

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
3/12/2014

User
Elizabethtown Borough
600 S. Hanover St.
Elizabethtown, Pa. 17022

Job Site
Elizabethtown WWTP

Attn

Instrument Model No.
Milltronics
Multiranger Plus

Instrument S/N
120601147VQ

Instrument Loop
Masonic Homes Flow Meter

Input Type
Ultrasonic

Primary Signal Producer
18in Palmer - Bowlus Flume

Calibrated Range
0-2.719 MGD

Instrument Settings

Found

Zero	Span
28.375in	2.714 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 %	1.36 MGD	12.02 mADC	0.17%
100 %	2.72 MGD	20.04 mADC	0.20%

Equipment Used Multimeter Stick Rule Isco Standards Book

Adjustments / Actions Taken : None

Comments :

Service Representative Anthony Grbas

Date 3/12/2014

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

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
3/12/2014

User
Elizabethtown Borough
600 S. Hanover St.
Elizabethtown, Pa. 17022

Attn

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

Zero	Span
43.91 in	18.57 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 %	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 3/12/2014

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

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
3/12/2014

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

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

Zero	Span
37.00 in	11.26 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 %	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 3/12/2014

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

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
3/12/2014

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

Job Site
Elizabethtown WWTP

Instrument Model No.
Milltronics
Multiranger Plus

Instrument S/N
120030114VQ

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 3/12/2014

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

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
9/30/2014

User
Elizabethtown Borough
600 S. Hanover St.
Elizabethtown, Pa. 17022

Attn

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

Zero	Span
29.62 in	20.00 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 %	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 9/30/2014

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

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
9/30/2014

User
Elizabethtown Borough
600 S. Hanover St.
Elizabethtown, Pa. 17022

Attn

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	12.01	mADC	0.08%
100 %	4.39	MGD	20.02	mADC	0.10%

Equipment Used Multimeter Stick Rule Isco Standards Book

Adjustments / Actions Taken : Startup

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
9/30/2014

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

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

Zero	Span
43.91 in	18.57 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 %	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 9/30/2014

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

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
9/30/2014

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

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

Zero	Span
37.00 in	11.26 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 %	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 9/30/2014

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

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
9/30/2014

User
Elizabethtown Borough
600 S. Hanover St.
Elizabethtown, Pa. 17022

Attn

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

Zero	Span
84.10 in	38.35 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 %	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 9/30/2014

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

LRM, Inc

Instrumentation & Disinfection Systems

Calibration Date
9/30/2014

User
Elizabethtown Borough
600 S. Hanover St.
Elizabethtown, Pa. 17022

Job Site
Elizabethtown WWTP

Attn

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

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 :
Replaced meter electronics

Service Representative Anthony Grbas

Date 9/30/2014

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

APPENDIX C

MOUNT JOY TOWNSHIP

BROOKRIDGE II
(10 EDUs)

ERSA CONN. PT. 2 (UNMETERED)

ERSA 4" FORCE MAIN CONN. PT. 1 (UNMETERED)

6" FORCE MAIN FROM CHILDREN'S HOME (UNMETERED)

ERSA RADIO RD. METER CHAMBER CONN. PT. 3

ERSA RADIO RD. METER CHAMBER CONN. PT. 3

VILLAGE GREEN
(64 EDUs)

ERSA KIWANIS BLVD. CONN. PT. 4 (METERED)

ELIZABETHTOWN COLLEGE
(17 EDUs)

ERSA CONN. PT. 5 (UNMETERED)

LEMON STREET EXTENSION
(6 EDUs)

ERSA CONN. PT. 7 (UNMETERED)

ERSA CONN. PT. 6 (UNMETERED)

SYCAMORE SQUARE
(4 EDUs)

CONOY CROSSING DEVELOPMENT
(90 EDUs)

WESTMINSTER DEVELOPMENT
(8 EDUs)

MASONIC VILLAGE CONOY METER FLOW

MATCH LINE THIS SHEET

MASONIC VILLAGE – METERED (INCLUDES METERED FLOW FROM ERSA'S TURNPIKE ROAD NO. 2 PUMPING STATION)

FLOW METERING CHAMBER NO. 2

ERSA 6" FORCE MAIN FROM BOSSLER RD. NO. 2 PUMPING STATION (METERED)

FLOW METERING CHAMBER NO. 1

BOROUGH OF ELIZABETHTOWN WASTEWATER TREATMENT PLANT

MAIN INTERCEPTOR (METERED)

MASONIC VILLAGE PATTON METER FLOW

ERSA 10" FORCE MAIN FROM MILLER RD. PUMPING STATION (METERED)

OAK MANOR PUMPING STATION

ERSA CONN. PT. 7 (UNMETERED)

MATCH LINE THIS SHEET

MOUNT JOY TOWNSHIP

BOROUGH OF ELIZABETHTOWN

SUMMARY OF NEW DEVELOPMENTS

DEVELOPMENT	TOTAL EDUs	EDUs CONNECTED BEFORE 2014	EDUs CONNECTED IN 2014	REMAINING EDUs
ELIZABETHTOWN COLLEGE	22	5	0	17
WESTMINSTER	10	2	0	8
VILLAGE GREEN	64	0	0	64
LEMON STREET EXTENSION	6	0	0	6
CONOY CROSSING	142	44	8	90
ELIZABETHTOWN SCHOOL	20	17	0	3
CONTINENTAL PRESS	4	3	0	1
SYCAMORE SQUARE	8	4	0	4
BROOK RIDGE II	15	0	5	10

LEGEND

- SUBDRAINAGE AREA LIMITS
- (A) SUBDRAINAGE AREA DESIGNATION
- PUMPING STATION
- SANITARY SEWER LINE AND MANHOLE
- ABANDONED SANITARY SEWER LINE AND MANHOLE
- FUTURE DEVELOPMENT
- COMPLETED DEVELOPMENT
- AREAS FOR POTENTIAL SEWER REPAIRS
- RADIO ROAD INTERCEPTOR STUDY

NOTE: ALL PIPE DIAMETERS ARE 8" UNLESS OTHERWISE NOTED

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: A. SMITH
DRAWN BY: C. MILLER
SHEET CHK'D BY: A. SMITH
CROSS CHK'D BY: R. HENNE
APPROVED BY:
DATE: MARCH 2015

CDM Smith
205 Granite Run Drive, Suite 350
Lancaster, PA 17601
Tel: (717) 560-7500

BOROUGH OF ELIZABETHTOWN
LANCASTER, PENNSYLVANIA

2014 CHAPTER 94 REPORT

SEWER INDEX MAP

PROJECT NO. 5341-96010
FILE NAME: CSPSRC01.dwg

APPENDIX
C-1

APPENDIX D

Lancaster County, Pennsylvania

Report

Elizabethtown Regional Sewer Authority

2014 Annual Chapter 94 Report

March 2015

CDM Smith

Contents

Sections

Attachments

Tables and Figures

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 2014, Elizabethtown Regional Sewer Authority began construction of a new office building at 143 E. Harrisburg Ave in Mount Joy Township. The authority will relocate from its current location when construction is complete in 2015.

HYDRAULIC LOADING

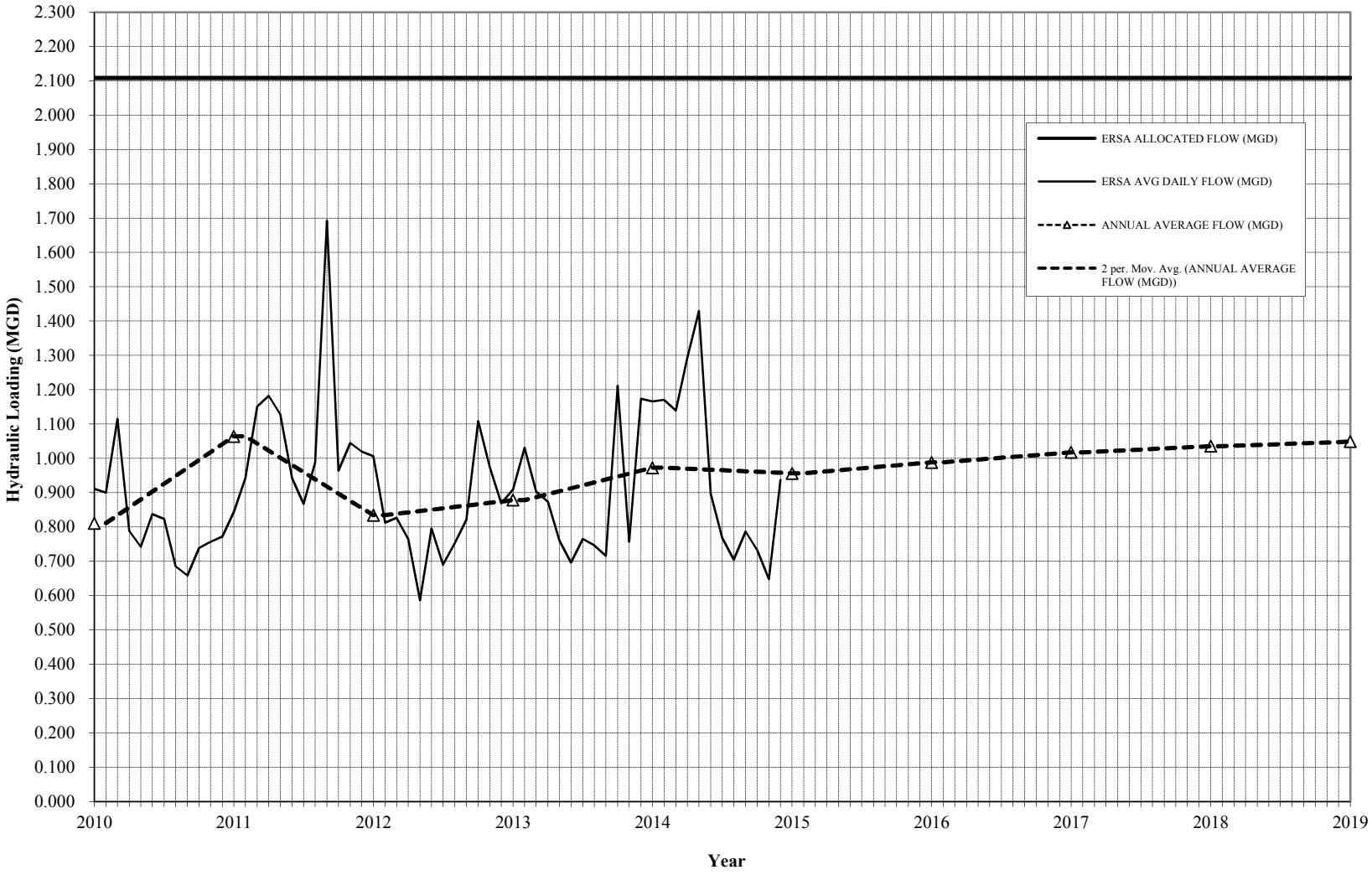
The hydraulic loading graph was prepared from flow measurements that were continuously recorded at the Turnpike Road No. 2, Miller Road, Bossler Road No. 2 pumping stations and the Mill Road, Kiwanis and Radio Road metering chambers. Figure 1 shows the average daily flows and annual average flows for 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 2014 was 0.973 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 2014. 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 consistent 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 2015.

ELIZABETHTOWN REGIONAL SEWER AUTHORITY
2014 CHAPTER 94 REPORT



HYDRAULIC LOADING **FIGURE 1**

CDM Smith

pw\\:camxmsvr01:PW_XM1\Documents\120720\89546\02 Project Information\07 General Consulting\Chapter 94 Reports\2014\Table 1_2014.xls

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)	RADIO 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	2010	2.192	10.282	3.600	1.758	4.361	5.094	0.965	28.252	31.000	0.911	0.811	2.108	31	
February		1.840	9.715	2.661	1.587	3.939	4.601	0.871	25.215	28.000	0.901		2.108		
March		3.539	13.437	5.407	1.758	4.361	5.094	0.965	34.560	31.000	1.115		2.108		
April		1.707	9.963	2.983	1.534	2.896	3.618	0.961	23.661	30.000	0.789		2.108		
May		1.529	9.435	2.750	1.585	2.992	3.739	0.993	23.022	31.000	0.743		2.108		
June		1.389	11.770	2.963	1.534	2.896	3.618	0.961	25.130	30.000	0.838		2.108		
July		1.398	12.997	2.510	1.648	2.755	3.248	0.983	25.540	31.000	0.824		2.108		
August		1.058	9.167	2.381	1.648	2.755	3.248	0.983	21.240	31.000	0.685		2.108		
September		0.988	8.264	2.145	1.595	2.666	3.144	0.951	19.752	30.000	0.658		2.108		
October		1.400	9.113	2.466	2.051	3.277	3.619	0.956	22.882	31.000	0.738		2.108		
November		1.136	9.414	2.571	1.985	3.171	3.502	0.925	22.703	30.000	0.757		2.108		
December		1.425	10.164	2.564	2.051	3.277	3.502	0.956	23.939	31.000	0.772		2.108		
January	2011	0.993	9.828	2.420	2.496	4.659	4.766	1.009	26.172	31.000	0.844	1.064	2.108	104	
February		2.065	9.721	2.932	2.255	4.208	4.305	0.911	26.397	28.000	0.943		2.108		
March		3.288	14.852	4.602	2.496	4.659	4.766	1.009	35.673	31.000	1.151		2.108		
April		3.319	13.530	4.962	2.382	4.924	5.387	0.966	35.470	30.000	1.182		2.108		
May		2.760	12.894	5.206	2.461	5.088	5.567	0.998	34.973	31.000	1.128		2.108		
June		1.449	10.005	3.168	2.382	4.924	5.387	0.966	28.281	30.000	0.943		2.108		
July		0.996	8.293	2.331	2.320	5.959	6.017	0.983	26.898	31.000	0.868		2.108		
August		1.689	10.730	2.932	2.320	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		2.746	10.932	4.538	2.255	5.183	4.984	0.987	31.625	31.000	1.020		2.108		
January	2012	2.537	10.034	4.339	2.424	4.325	6.555	0.987	31.201	31.000	1.006	0.834	2.108	53	
February		1.697	7.626	3.174	1.912	3.167	5.059	0.924	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	7.943	2.645	1.946	3.107	4.844	0.982	22.972	30.000	0.766		2.108		
May		1.945	0.855	3.142	2.143	3.849	5.256	1.014	18.205	31.000	0.587		2.108		
June		1.714	8.111	2.784	1.822	3.770	4.675	0.982	23.858	30.000	0.795		2.108		
July		1.262	7.926	2.429	1.742	2.837	4.206	0.987	21.389	31.000	0.690		2.108		
August		1.585	8.457	2.569	1.839	3.416	4.474	0.987	23.327	31.000	0.752		2.108		
September		1.782	8.732	2.502	1.680	4.629	4.353	0.956	24.633	30.000	0.821		2.108		
October		2.572	11.558	3.618	2.534	6.701	6.428	0.960	34.370	31.000	1.109		2.108		
November		1.966	10.889	3.085	1.860	5.370	5.161	0.929	29.261	30.000	0.975		2.108		
December		2.068	8.801	3.178	2.120	4.685	5.126	0.960	26.938	31.000	0.869		2.108		
January	2013	2.088	9.434	3.185	2.115	5.301	5.110	0.960	28.193	31.000	0.909	0.879	2.108	159	
February		2.478	8.819	3.650	2.118	5.442	5.488	0.867	28.863	28.000	1.031		2.108		
March		2.516	8.674	3.739	1.991	4.913	5.207	0.960	28.000	31.000	0.903		2.108		
April		1.752	8.840	3.200	2.056	4.179	5.254	0.929	26.210	30.000	0.874		2.108		
May		1.579	8.242	2.879	1.933	3.326	4.648	0.960	23.568	31.000	0.760		2.108		
June		1.808	7.188	1.730	1.732	3.296	4.200	0.929	20.883	30.000	0.696		2.108		
July		2.200	8.597	1.760	1.985	3.546	4.639	0.977	23.705	31.000	0.765		2.108		
August		2.315	8.128	1.702	1.813	3.706	4.503	0.977	23.144	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	13.026	2.370	2.411	8.231	6.929	1.020	37.541	31.000	1.211		2.108		
November		1.248	7.521	2.934	1.600	4.544	3.892	0.987	22.725	30.000	0.758		2.108		
December		2.944	11.744	4.489	2.497	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	6.212	5.926	0.980	32.778	28.000	1.171		2.108		
March		2.968	11.022	4.496	2.385	6.961	6.403	1.085	35.320	31.000	1.139		2.108		
April		3.666	12.022	5.139	2.546	7.118	7.346	0.982	38.819	30.000	1.294		2.108		
May		3.777	14.851	5.092	2.766	8.349	8.460	1.014	44.310	31.000	1.429		2.108		
June		1.981	9.386	3.497	1.909	3.662	5.489	0.982	26.905	30.000	0.897		2.108		
July		1.226	8.982	2.727	1.767	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	4.503	1.004	21.862	31.000	0.705		2.108		
September		0.890	9.166	2.482	1.677	3.679	4.732	0.971	23.599	30.000	0.787		2.108		
October		0.953	8.499	2.533	1.650	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	2.265	4.892	6.361	0.949	29.039	31.000	0.937		2.108		
	2015											0.956	2.108		160
	2016											0.988	2.108		117
	2017											1.018	2.108		107
	2018											1.036	2.108		65
	2019											1.049	2.108		49

1 EDU = 275 gpd

Notes: (1) The projected annual average flow for 2014 was calculated based on annual flow averaged from 2010, 2011, 2012, 2013 and 2014.

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		34	15,950	6,600	Miller
Bishop Woods (formerly Donegal Woods)	114		17		12	31,350	28,050	Boss.1/Wilkens
Summitt at Stone Mill	23		8		14	6,325	2,475	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		9		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		131		114	65,450	34,100	Schwanger
Lupine Meadows	20		20		20	5,500	0	Schwanger
Rock Hall	27		27		27	7,425	0	Hershey
Sheaffer Ridge Condos	18		-		7	4,950	3,025	Schwanger
Miscellaneous Bossler #1	2		3		2	550	0	Boss. 1
Miscellaneous Colebrook	2		3		2	550	0	Colebrook
Miscellaneous Hershey	2		2		2	550	0	Hershey
Miscellaneous Miller Residential	58		58		51	15,950	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 Connection Points	3		2	(2)	3	825	0	
	1,353		555		644	372,075	194,975	

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 2 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 1/1/2014	EDUs Remaining 1/1/2014	EDUs Connected 2014	EDUs Remaining 12/31/2014	Projected EDU Connections 2015	2016	2017	2018	2019
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	26	32	8	24	8	8	8		--
Bishop Woods (formerly Donegal Woods)	114	10	104	2	102	10	12	12	12	12
Summitt at Stone Mill	23	13	10	1	9	5	4	--	--	--
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	111	127	3	124	36	36	36	16	--
Lupine Meadows	20	20	0	0	0	--	--	--	--	--
Rock Hall	27	27	0	0	0	--	--	--	--	--
Sheaffer Ridge Condos	18	7	11	0	11	3	4	4	--	--
Miscellaneous Bossler #1	2	0	2	2	0	--	--	--	--	--
Miscellaneous Colebrook	2	2	0	0	0	--	--	--	--	--
Miscellaneous Hershey	2	0	2	2	0	--	--	--	--	--
Miscellaneous Miller Residential	58	49	9	2	7	6	6	6	6	6
Additional Miller Nonresidential (1)	11	7	4	0	4	--	--	--	--	--
Miscellaneous Turnpike #1	1	0	1	0	1	--	--	--	--	--
Miscellaneous Connection Points	3	0	3	3	0	--	--	--	--	--
Total EDUs	1353	621	732	23	709	160	117	107	65	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.

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 will 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. Prior to the construction of the Timber Villa-ALP project and the completion of the first phase of Bishop Woods (approximately 31 EDUs), the Authority will make improvements to the Bossler Road No. 2 Pumping Station anticipated to begin 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.

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 2014

There was one extension to the Authority's system during 2014: Featherton Crossing Phase 3. The Authority anticipates the construction of sewer extensions for the Sylvester Walters, Timber Villa, and Featherton Crossing Phase 2B developments in 2015.

NEW CONNECTIONS

During calendar year 2014, 23 EDUs were connected to the ERSA service area. The number of EDUs now being serviced is approximately 4,928 EDUs as of the end of 2014.

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 2014, 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, Bossler 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 plans on making improvements to the Bossler Road No. 2 pumping station to a design capacity of 0.576 MGD prior to the construction of the 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 2015 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)		2014 AVERAGE DAILY FLOW (MGD)	2014 MAX. MONTHLY AVERAGE (MGD)	PROJECTED 2-YEAR MAX. HOURLY FLOW (MGD)
Mill Road	0.288	200	-	-	(4)	0.059	0.075	0.147
Aberdeen	0.130	90	0.288	200	(1)	0.034	0.044	0.086
Conewago	0.029	20	0.071	49	(1)	0.005	0.007	0.013
Hershey Road	0.348	242	-	-	(4)	0.097	0.126	0.241
Schwanger Road	1.411	980	-	-	(3)	0.106	0.158	0.319
Bossler Road No. 1	0.295	205	0.304	211	(1)	0.030	0.089	0.127
Turnpike Road No. 1	0.158	110	0.248	172	(1)	0.016	0.030	0.012
Wilkens Street	0.144	100	0.232	161	(1)	0.020	0.036	0.132
Turnpike Road No. 2	0.243	169	0.301	209	(1)	0.067	0.122	0.246
Bossler Road No. 2	0.432	300	0.370	257	(2)	0.117	0.171	0.548
Pioneer Hills	0.288	200	0.212	147	(1)	0.012	0.016	0.032
Nolt Road	0.144	100	0.288	200	(1)	0.079	0.115	0.222
Colebrook Road	0.576	400	0.829	576	(1)	0.127	0.204	0.344
Cameron Street	0.742	515	0.946	657	(1)	0.134	0.198	0.363
Miller Road	1.022	710	1.117	776	(1)	0.331	0.479	0.946

Notes:
(1) Tested pump capacity performed on January 20-21 and February 27, 2015.
(2) Tested pump capacity performed on February 3, 2012.
(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 2014, ERSA began construction on a new office and maintenance facility that will centralize day-to-day operation of the system near the geographic center of its service area. Construction is anticipated to be completed in Spring 2015.

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 projecting an overload condition 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 2015

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 2015.

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.

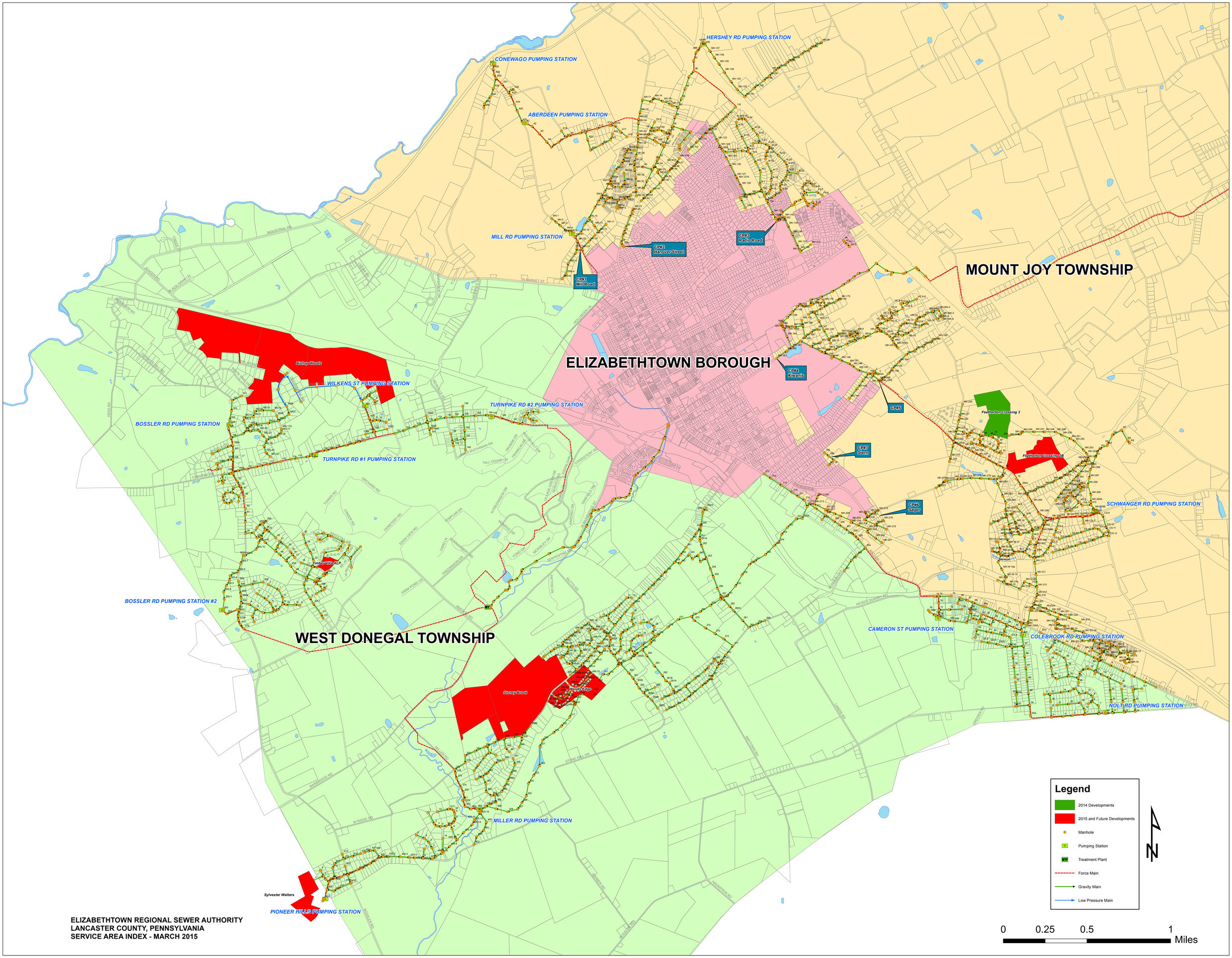
In 2010 the Authority televised approximately 4,700 linear feet of truss pipe in the Bossler No. 1 drainage basin. Based upon the results of the televising, the Authority rehabilitated approximately 4,350 linear feet of pipe with cured-in-place pipe (CIPP) which has shown to have significantly reduced 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 2015, 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 2015

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 2015

GENERAL

On January 20th – 21st, 2015, Adam Smith and Stephanie Countess 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 2014 average daily flow at this station was 0.059 MGD and the maximum monthly average flow was 0.075 MGD. The design capacity of this station is 0.288 MGD.

- The Authority completed the following items during 2014:

    1. Both check valves cleaned once.
    2. Battery charger replaced.
    3. Serviced communitor.
    4. Float junction box in wetwell removed.
    5. Fuel primer and copper tubing on genset replaced.

- There is some minor corrosion on drywell floor.
- The sump pump housing is cracked.
- There is significant flooding (2-3 in) in the valve pit.

Aberdeen

This station is in good condition and operating satisfactorily. The 2014 average daily flow at this station was 0.034 MGD and the maximum monthly average flow was 0.044 MGD. The tested capacity of this station is 0.288 MGD.

- The valve pit has minor I/I and should be marked for repair.
- The valve pit is dirty and should be cleaned.

Conewago

This station is in good condition and operating satisfactorily. The 2014 average daily flow at this station was 0.005 MGD and the maximum monthly average flow was 0.007 MGD. The tested capacity of this station is 0.071 MGD.

- Some wood supports on the roof of the outdoor enclosure are warped.

Hershey Road

This station is in good condition and operating satisfactorily. The 2014 average daily flow at this station was 0.097 MGD and the maximum monthly average flow was 0.126 MGD. The design capacity of this station is 0.348 MGD.

- The Authority completed the following items during 2014:

    1. Battery charger replaced.
    2. Pump #2 rebuilt.
    3. Pump #2 pulled twice.
    4. SCADA Program reloaded.

- There is some minor corrosion on drywell floor, pump stands and housing.
- There is significant flooding (1-2 in) in the valve pit.

Schwanger Road

This station is in good condition and operating satisfactorily. The 2014 average daily flow at this station was 0.106 MGD and the maximum monthly average flow was 0.158 MGD. The design capacity of this station is 1.411 MGD.

- The Authority completed the following items during 2014:

    1. New PLC installed.
    2. VFD drives repaired.
    3. Grease zerks installed on pumps.

Bossler Road No. 1

This station is in good condition and operating satisfactorily. The 2014 average daily flow at this station was 0.030 MGD and the maximum monthly average flow was 0.089 MGD. The tested capacity of this station is 0.304 MGD.

- The Authority completed the following items during 2014:

    1. Both check valves cleaned six times.
    2. Battery charger replaced.
    3. Starter contact kits installed on pumps.
    4. Latching relays installed.

5. Compressor air filters replaced.
6. Battery charger replaced.

- Some mortar is missing along top of concrete wetwell.
- 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.

Turnpike Road No. 1

This station is in good condition and operating satisfactorily. The 2014 average daily flow at this station was 0.016 MGD and the maximum monthly average flow was 0.030 MGD. The tested capacity of this station is 0.248 MGD.

- The Authority completed the following items during 2014:

1. Both check valves cleaned three times.
2. Compressor air filters replaced.
3. Building unit heater replaced.
4. Starter contacts replaced on pumps.
5. Latching relays installed.

- Some mortar is missing along top of concrete wetwell.
- 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.
- Intake louvers have one panel loose.
- Generator exhaust needs fine screen.

Wilkens Street

This station is in good condition and operating satisfactorily. The 2014 average daily flow at this station was 0.020 MGD and the maximum monthly average flow was 0.036 MGD. The tested capacity of this station is 0.232 MGD.

- The Authority completed the following items during 2014:

1. Both check valves cleaned four times.
2. Battery charger replaced.
3. Starter contacts replaced on pumps.
4. Latching relays installed.
5. Exhaust on genset repaired.
6. Pump #1 pulled to remove wood obstruction from impeller.
7. Compressor diaphragms and air filters replaced.
8. Seal line replaced.
9. Blower motor repaired.

Turnpike Road No. 2

This station is in good condition and operating satisfactorily. The 2014 average daily flow at this station was 0.067 MGD and the maximum monthly average flow was 0.122 MGD. The tested capacity of this station is 0.301 MGD.

- The Authority completed the following item during 2014:

    1. Both check valves cleaned four times.
    2. Battery charger replaced.
    3. Starter contacts replaced on pumps.
    4. Latching relays installed.
    5. Compressor air filters replaced.
    6. Replaced fan blade for exhaust in dry well.

- Some floor corrosion is present in dry well. Cathodic protection replacement should be considered.

Bossler Road No. 2

This station is in good condition and operating satisfactorily. The 2014 average daily flow at this station was 0.117 MGD and the maximum monthly average flow was 0.171 MGD. The tested capacity of this station is 0.370 MGD.

- This pumping station is scheduled to be upgraded in 2015.
- Past reports have noted an infiltration leak under the valve pit drainpipe penetration into the wet well. This should be monitored and grouted if it continues to be a problem.

Pioneer Hills

This station is in good condition and operating satisfactorily. The 2014 average daily flow at this station was 0.012 MGD and the maximum monthly average flow was 0.016 MGD. The tested capacity of this station is 0.212 MGD.

- The Authority completed the following items during 2014:

    1. Outside lightbulbs replaced with CFLs.
    2. Six capacitors replaced in out-of-phase box for pump #2.
    3. Compressor diaphragms replaced.
    4. Floats adjusted in wetwell.
    5. Chatterbox battery replaced.

Nolt Road

This station is in good condition and operating satisfactorily. The 2014 average daily flow at this station was 0.079 MGD and the maximum monthly average flow was 0.115 MGD. The tested capacity of this station is 0.288 MGD.

- The Authority completed the following items during 2014:

    1. Both check valves cleaned four times.
    2. Latching relays installed.
    3. Compressor air filters replaced.
    4. Battery charger replaced.
    5. Conduit repaired for receptacles.

Colebrook Road

This station is in good condition and operating satisfactorily. The 2014 average daily flow at this station was 0.127 MGD and the maximum monthly average flow was 0.204 MGD. The tested capacity of this station is 0.829 MGD.

- The Authority completed the following items during 2014:

    1. Air compressor #1 replaced.
    2. Compressor air filters replaced.
    3. Battery charger replaced.
    4. Latching relays installed.
    5. Pumping station power-washed.

- Some floor corrosion present in dry well. Cathodic protection replacement should be considered.

Cameron Street

This station is in good condition and operating satisfactorily. The 2014 average daily flow at this station was 0.134 MGD and the maximum monthly average flow was 0.198 MGD. The tested capacity of this station is 0.946 MGD.

- The Authority completed the following items during 2014:

    1. Compressor air filters replaced.
    2. Generator hand primer, batteries and battery tender replaced.
    3. Dynatech replaced generator end, serviced conduit/switches, installed working hour meter, and replaced top controls on generator.
    4. Generator switch for tester (auto) replaced.
    5. Front end of radiator removed and reinstalled.
    6. Latching relays installed.
    7. Starter contacts replaced on pump #2.
    8. Chatterbox battery replaced.

- Check valve #2 needs touch-up paint.
- Significant floor corrosion present in dry well. Cathodic protection replacement should be considered.

Miller Road

This station is in good condition and operating satisfactorily. The 2014 average daily flow at this station was 0.331 MGD and the maximum monthly average flow was 0.479 MGD. The tested capacity of this station is 1.117 MGD.

- The Authority completed the following items during 2014:

    1. Pump #1 pulled to remove sewer snake.
    2. Check valve #2 rebuilt.
    3. Latching relays installed.
    4. New dehumidifier installed.
    5. Battery charger replaced.
    6. Force main repaired near creek.
    7. Compressor air filters replaced.
    8. Seal line replaced.
    9. Louver motor and limit switch replaced.

- Touch up paint in dry wells needed on check valves, pumps and support frames.

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 once during 2014. 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 getting in.

- 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 2015, 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.

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