Date	Pump 1	Pump 2	Pump 1 Hrs/Day	Pump 2 Hrs/Day	Daily Average Flow
8/22/2011	3103	3433	1.67	1.33	6,300
8/24/2011	3105	3435	1.00	1.00	4,200
9/1/2011					
9/2/2011					
9/6/2011					
9/7/2011					
9/9/2011					
9/12/2011					
9/14/2011					
9/19/2011					
9/26/2011					
9/30/2011					
10/3/2011					
10/7/2011					
10/11/2011					
10/14/2011					
10/21/2011					
10/24/2011	0				
10/26/2011	1.6		0.80		
10/31/2011	6.8		1.04		
11/7/2011	11.6		0.69		
11/11/2011	13.7		0.53		
11/14/2011	17		1.10		
11/21/2011	23.2		0.89		
11/28/2011	30.5		1.04		
12/2/2011	33.9		0.85		
12/5/2011	36.4		0.83		
12/9/2011	40.6		1.05		
12/12/2011	43		0.80		
12/16/2011	46.7	0.1	0.93	1.13	4,316
12/17/2011	49.1	2.3	2.40	2.20	9,660
12/19/2011	50	3	0.45	0.35	1,680
12/23/2011	55	9	1.25	1.50	5,775
12/28/2011	62.4	16.5	1.48	1.50	6,258
		Average	1.03	0.97	4,356.67
		Max	2.40	2.20	9,660.00
		Min	0.20	-	1,680.00
		Peak Factor			2.22

Hour meters on pumps were out of service

Note: No data was provided for 2012-2015

Ridings Service Area

Smithbridge Pump Station

2011 Operating Data

Single Pump Flow Rate 38 gpm

Date	Pump 1	Pump 2	Pump 1 Hrs/Day	Pump 2 Hrs/Day	Daily Average Flow
1/3/2011	1414	1467	0.33	0.07	912
1/10/2011	1416	1471	0.29	0.57	1,954
1/14/2011	1418	1472	0.50	0.25	1,710
1/20/2011	1420	1475	0.33	0.50	1,900
2/3/2011	1424	1480	0.29	0.36	1,466
2/11/2011	1428	1484	0.50	0.50	2,280
2/18/2011	1430	1486	0.29	0.29	1,303
3/1/2011	1434	1490	0.36	0.36	1,658
3/8/2011	1437	1493	0.43	0.43	1,954
3/17/2011	1440	1497	0.33	0.44	1,773
4/8/2011	1447	1504	0.32	0.32	1,451
4/13/2011	1449	1506	0.40	0.40	1,824
4/19/2011	1451	1508	0.33	0.33	1,520
4/22/2011	1452	1509	0.33	0.33	1,520
4/26/2011	1453	1511	0.25	0.50	1,710
4/29/2011	1454	1512	0.33	0.33	1,520
5/3/2011	1456	1514	0.50	0.50	2,280
5/6/2011	1457	1515	0.33	0.33	1,520
5/9/2011	1459	1517	0.67	0.67	3,040
5/18/2011	1461	1519	0.22	0.22	1,013
5/20/2011	1462	1520	0.50	0.50	2,280
5/23/2011	1464	1521	0.67	0.33	2,280
5/31/2011	1465	1524	0.13	0.38	1,140
6/3/2011	1466	1525	0.33	0.33	1,520
6/14/2011	1469	1527	0.27	0.18	1,036
6/17/2011	1470	1528	0.33	0.33	1,520
6/20/2011	1471	1529	0.33	0.33	1,520
6/27/2011	1473	1531	0.29	0.29	1,303
7/1/2011	1474	1532	0.25	0.25	1,140
7/5/2011	1475	1533	0.25	0.25	1,140
7/11/2011	1476	1534	0.17	0.17	760
7/13/2011	1477	1535	0.50	0.50	2,280
7/19/2011	1478	1536	0.17	0.17	760
7/25/2011	1480	1538	0.33	0.33	1,520
7/28/2011	1481	1538	0.33	0.13	1,064
8/1/2011	1482	1539	0.25	0.25	1,140
8/11/2011	1484	1542	0.20	0.30	1,140

8/19/2011	1486	1544	0.25	0.25	1,140
8/22/2011	1487	1545	0.33	0.33	1,520
8/24/2011	1488	1545	0.50	0.20	1,596
9/1/2011	1492	1550	0.50	0.63	2,565
9/2/2011	1492.5	1550	0.50	0.40	2,052
9/6/2011	1493	1551	0.13	0.25	855
9/7/2011	1493	1552	0.40	1.00	3,192
9/12/2011	1495	1553	0.40	0.20	1,368
9/14/2011	1495	1554	0.20	0.50	1,596
9/16/2011	1496	1555	0.50	0.50	2,280
9/19/2011	1497	1556	0.33	0.33	1,520
9/26/2011	1499	1558	0.29	0.29	1,303
9/27/2011	1499	1559	0.40	1.00	3,192
9/30/2011	1500	1559	0.33	0.13	1,064
10/3/2011	1501	1560	0.33	0.33	1,520
10/7/2011	1503	1561	0.50	0.25	1,710
10/11/2011	1504	1562	0.25	0.25	1,140
10/17/2011	1505	1564	0.17	0.33	1,140
10/21/2011	1506	1565	0.25	0.25	1,140
10/24/2011	1507	1566	0.33	0.33	1,520
10/26/2011	1508	1567	0.50	0.50	2,280
10/31/2011	1509	1569	0.20	0.40	1,368
11/7/2011	1511	1571	0.29	0.29	1,303
11/10/2011	1512	1571	0.33	0.13	1,064
11/14/2011	1513	1572	0.25	0.25	1,140
11/21/2011	1515	1575	0.29	0.43	1,629
11/28/2011	1517	1577	0.29	0.29	1,303
12/2/2011	1518	1578	0.25	0.25	1,140
12/5/2011	1519	1579	0.33	0.33	1,520
12/9/2011	1520	1580	0.25	0.25	1,140
12/12/2011	1593	1651	24.33	23.67	
12/16/2011	1594	1652	0.25	0.25	1,140
12/19/2011	1595	1654	0.33	0.67	2,280
12/23/2011	1598	1657	0.75	0.75	3,420
12/28/2011	1600	1659	0.40	0.40	1,824

Average	0.52	0.53	1,603
Max	24.33	23.67	3,420
Min	0.13	0.07	760.00
Peak Factor			2.13

Note: The float was found "stuck" on 12/12/2011 causing the pump to stay on, even though there was no flow. The flow was not calculated for this day.

Note: No data was provided for 2012-2015

Ridings Service Area

Woodlands Pump Station

2011 Operating Data

Single Pump Flow Rate 120 gpm

Date	Pump 1	Pump 2	Pump 1 Hrs/Day	Pump 2 Hrs/Day	Daily Average Flow
1/3/2011	2280	2065	0.25	0.25	3,600
1/7/2011	2282	2067	0.50	0.50	7,200
1/10/2011	2284	2068	0.67	0.33	7,200
1/13/2011	2286	2070	0.67	0.67	9,600
1/17/2011	2289	2073	0.75	0.75	10,800
1/20/2011	2290	2075	0.33	0.67	7,200
1/27/2011	2293	2078	0.43	0.43	6,171
2/1/2011	2298	2082	1.00	0.80	12,960
2/11/2011	2304	2088	0.60	0.60	8,640
2/17/2011	2307	2092	0.50	0.67	8,400
2/22/2011	2310	2094	0.60	0.40	7,200
3/1/2011	2313	2097	0.43	0.43	6,171
3/7/2011	2317	2100	0.67	0.50	8,400
3/11/2011	2323	2103	1.50	0.75	16,200
3/14/2011	2324	2104	0.33	0.33	4,800
3/21/2011	2328	2107	0.57	0.43	7,200
3/28/2011	2331	2110	0.43	0.43	6,171
4/4/2011	2333	2113	0.29	0.43	5,143
4/13/2011	2338	2117	0.56	0.44	7,200
4/19/2011	2340	2119	0.33	0.33	4,800
4/22/2011	2342	2120	0.67	0.33	7,200
4/26/2011	2343	2122	0.25	0.50	5,400
4/29/2011	2344	2123	0.33	0.33	4,800
5/3/2011	2346	2124	0.50	0.25	5,400
5/6/2011	2347	2125	0.33	0.33	4,800
5/9/2011	2348	2126	0.33	0.33	4,800
5/23/2011	2353	2131	0.36	0.36	5,143
5/27/2011	2355	2133	0.50	0.50	7,200
5/31/2011	2356	2134	0.25	0.25	3,600
6/3/2011	2357	2135	0.33	0.33	4,800
6/6/2011	2358	2136	0.33	0.33	4,800
6/14/2011	2361	2139	0.38	0.38	5,400
6/17/2011	2362	2140	0.33	0.33	4,800
6/20/2011	2363	2141	0.33	0.33	4,800
6/27/2011	2365	2143	0.29	0.29	4,114
7/1/2011	2367	2144	0.50	0.25	5,400
7/5/2011	2368	2145	0.25	0.25	3,600

Date	Pump 1	Pump 2	Pump 1 Hrs/Day	Pump 2 Hrs/Day	Daily Average Flow
7/11/2011	2370	2147	0.33	0.33	4,800
7/13/2011	2371	2148	0.50	0.50	7,200
7/19/2011	2372	2149	0.17	0.17	2,400
7/25/2011	2374	2151	0.33	0.33	4,800
8/1/2011	2377	2153	0.43	0.29	5,143
8/8/2011	2380	2156	0.43	0.43	6,171
8/11/2011	2381	2157	0.33	0.33	4,800
8/15/2011	2382	2159	0.25	0.50	5,400
8/19/2011	2384	2160	0.50	0.25	5,400
8/22/2011	2385	2161	0.33	0.33	4,800
8/24/2011	2386	2162	0.50	0.50	7,200
9/1/2011	2391	2167	0.63	0.63	9,000
9/6/2011	2393	2169	0.40	0.40	5,760
9/12/2011	2398	2172	0.83	0.50	9,600
9/14/2011	2399	2173	0.50	0.50	7,200
9/19/2011	2401	2176	0.40	0.60	7,200
9/26/2011	2405	2179	0.57	0.43	7,200
9/30/2011	2407	2181	0.50	0.50	7,200
10/5/2011	2409	2184	0.40	0.60	7,200
10/7/2011	2410	2186	0.50	1.00	10,800
10/11/2011	2413	2188	0.75	0.50	9,000
10/17/2011	2417	2192	0.67	0.67	9,600
10/21/2011	2419	2194	0.50	0.50	7,200
10/24/2011	2421	2196	0.67	0.67	9,600
10/26/2011	2422	2197	0.50	0.50	7,200
10/31/2011	2425.5	2201	0.70	0.80	10,800
11/7/2011	2425.9	2204.7	0.06	0.53	4,217
11/10/2011	2431.1	2206	1.73	0.43	15,600
11/14/2011	2433	2208	0.48	0.50	7,020
11/21/2011	2437	2212	0.57	0.57	8,229
11/28/2011	2439	2215	0.29	0.43	5,143
12/2/2011	2441	2216	0.50	0.25	5,400
12/5/2011	2443	2218	0.67	0.67	9,600
12/9/2011	2445	2220	0.50	0.50	7,200
12/12/2011	2446	2221	0.33	0.33	4,800
12/16/2011	2448	2223	0.50	0.50	7,200
12/19/2011	2449	2224	0.33	0.33	4,800
12/23/2011	2451	2226	0.50	0.50	7,200
12/28/2011	2453	2228	0.40	0.40	5,760
		Average	0.48	0.45	6,788.91
		Max	1.73	1.00	16,200.00
		Min	0.06	0.17	2,400.00
		Peak Factor			2.39

Date	Pump 1	Pump 2	Pump 1 Hrs/Day	Pump 2 Hrs/Day	Daily Average Flow

Note: No data was provided for 2012-2015

Appendix E

Calibration Report

Ridings WWTP Effluent Flow Meter

W.G. MALDEN
P.O. BOX 196, EAST EARL, PA 17519
PHONE: (717) 768-0800 FAX: (717) 768-0802

SERVICE REPORT

CHADDS FORD TWP. SEWER AUTHORITY
10 RING ROAD
CHADDS FORD, PA 19348

SERVICE DATE: 5/12/2015
METER#: C2040 AA
LOCATION: RIDINGS OF CHADDS FORD - EFFLUENT
SERIAL #: 9018730E/123220-0005
MANUFACTURER: BADGER/PARTLOW
RECORDER: MRC 5000
TRANSMITTER: 2100
PRIMARY: 45°
MAXIMUM CAPACITY: 401,219 GPD
SERVICE CONTRACT: ANNUAL

WORK PERFORMED

CLEANED EQUIPMENT: X **PRIMARY:** X

RECORDER CALIBRATION **CHECKED AT:** 0 & 100%
ERROR: -1% **CORRECTED ACCURACY:** ±1%

TOTALIZER CALIBRATION **CHECKED AT:** 0 & 100%
ERROR: 0% **CORRECTED ACCURACY:** ±1/2%

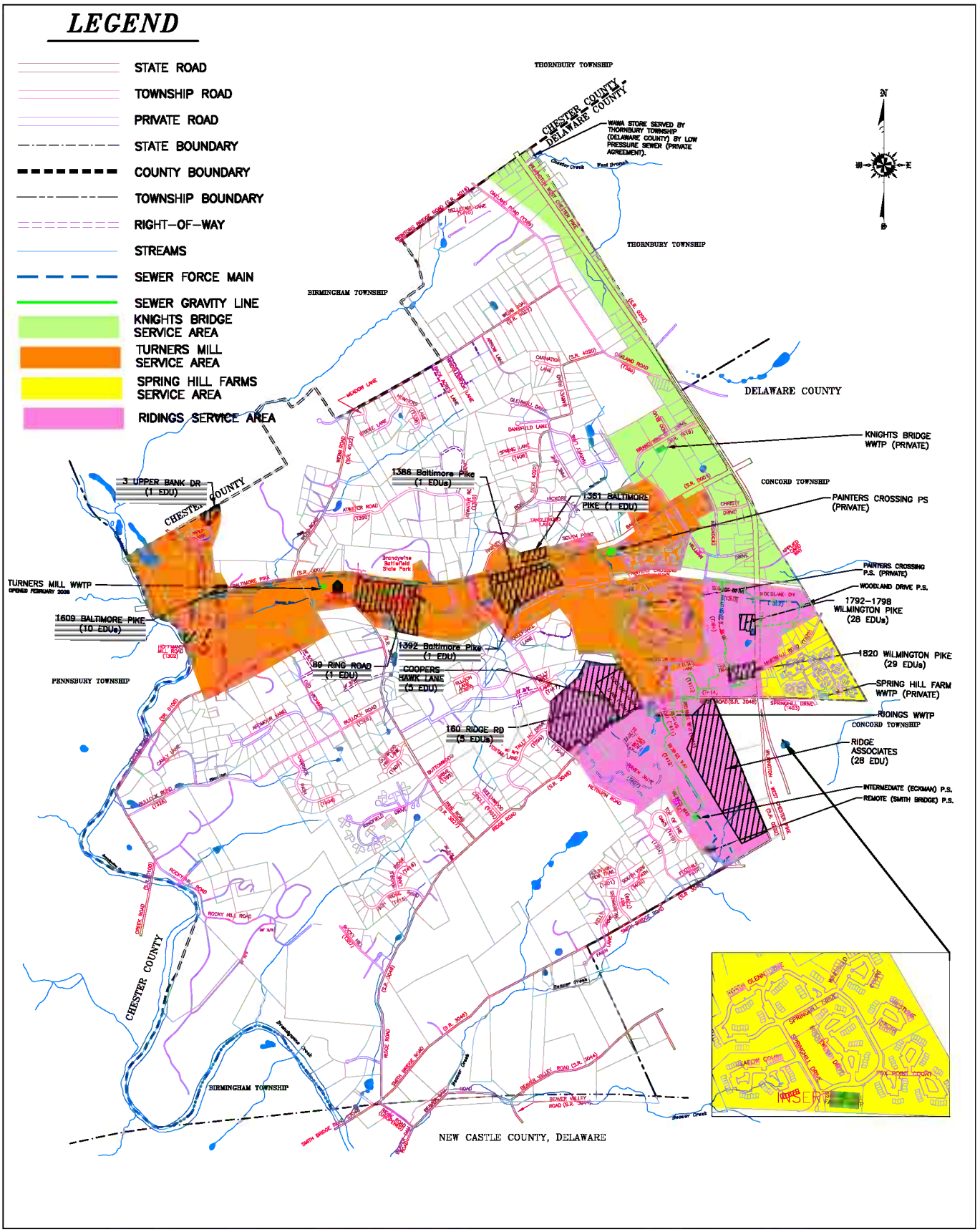
TRANSMITTER CALIBRATION
SIMULATED HEAD RISES AND FLOW MEASUREMENTS
ERROR: 0% **CORRECTED ACCURACY:** ±1%

COMMENT: PERFORMED ANNUAL CALIBRAITON. CLEANED PRIMARY. LEFT EQUIPMENT OPERATING PROPERLY.

SERVICE REPRESENTATIVE: BOB **PERSON SEEN:** JOE
copies: JOE DIMATTEO

Appendix F

Service Area Map



Pennoni Associates Inc. One Drexel Plaza, 3001 Market Street, Philadelphia, Pennsylvania 19104 Consulting Engineers

SK-1

CHAPTER 94 REPORT

CHADDS FORD TOWNSHIP SEWER MAP

CHADDS FORD TOWNSHIP SEWER AUTHORITY
10 RING ROAD
CHADDS FORD, PENNSYLVANIA

ALL DIMENSIONS MUST BE VERIFIED BY CONTRACTOR IN THE FIELD BEFORE PROCEEDING WITH THE WORK

DATE	NO.	REVISIONS	BY
3/16/12	0	2011 SUBMISSION	JAS
3/25/11	0	2010 SUBMISSION	JAS
3/26/09	0	2008 SUBMISSION	LRA
3/27/08	0	2007 SUBMISSION	LRA

CHAPTER 94
MUNICIPAL WASTELOAD MANAGEMENT
ANNUAL REPORT

2015
CHADDS FORD TOWNSHIP
SEWER AUTHORITY

TURNERS MILL WASTEWATER
TREATMENT FACILITY

DELAWARE COUNTY
PENNSYLVANIA

Prepared by:
PENNONI ASSOCIATES, INC.
3001 Market Street, 2nd Floor
Philadelphia, PA 19104

Prepared for:
CHADDS FORD TOWNSHIP SEWER AUTHORITY
Turners Mill Wastewater Treatment Facility
P.O. Box 816
Chadds Ford, PA 19317-0628

Preparer:	Permittee:
Pennoni Associates, Inc.	Chadds Ford Township Sewer Authority
Thomas Leisse, P.E.	Amanda Serock, Authority Manager

TABLE OF CONTENTS

2015 Chapter 94 Report for the Turners Mill WWTP
Chadds Ford Township Sewer Authority, Delaware County, Pennsylvania

1.0 INTRODUCTION

This report is provided to comply with the Title 25, Chapter 94 Municipal Wasteload Management regulations of the Pennsylvania Department of Environmental Protection (PADEP) concerning wastewater facilities. This subject of this report is the municipally owned sewage collection and treatment system flowing to the Turners Mill Wastewater Treatment Facility in Chadds Ford Township, Delaware County.

1.1 Treatment Plant Description

There are two municipally owned sewage treatment plants (WWTP's) in Chadds Ford Township, Delaware County. The Ridings WWTP is located at the intersection of Ridge Road and Ridings Boulevard. The Turners Mill WWTP is located adjacent to the Township Building at the intersection of Baltimore Pike (Route 1) and Ring Road.

There are also two private WWTP's in the Township. The Springhill Farm WWTP (NPDES Permit No. PA0052230) serves the Springhill Farms Development and the shopping center at Wilmington-West Chester Pike (Route 202) and Ridge Road in the south east corner of the Township. The Knights Bridge WWTP (NPDES Permit No. PA0052663) serves properties owned by the Henderson Group at the intersection of Routes 202 and Route 1.

Operation and maintenance responsibilities for the Ridings and Turners Mill WWTPs as well as the municipally owned sewage pump stations are provided on a contract basis by the Delaware County Regional Water Quality Control Authority (DELCORA). Management and administrative duties are carried out by the Board of Directors of the Chadds Ford Township Sewer Authority, an Authority Manager, and an administrative manager.

Turners Mill WWTP

The Turners Mill WWTP started treatment operations in 2008 in accordance with NPDES Permit PA0244031. The current permit has an expiration date of December 31, 2017. The facility discharges treated wastewater to an unnamed tributary of Harvey Run in the Brandywine Creek watershed.

The Turners Mill STP is permitted for an average daily flow of 0.140 MGD with a design hydraulic capacity of 0.150 MGD with a peak design flow of 0.403 MGD. The permitted Organic Loading Capacity is 280.22 lb/day measured as BOD_5.

The treatment process utilized at the Turners Mill WWTP is extended aeration. The plant incorporates a mechanical screen with manual bar screen by-pass, concrete tanks with package treatment units, and ultraviolet disinfection.

2.0 HYDRAULIC AND ORGANIC LOADING

2.1 Condition of the Turners Mill Treatment Plant

The Turners Mill WWTP is in relatively new condition. Regular maintenance is provided by DELCORA to ensure that the pumps, tanks, and other mechanical equipment are functioning properly.

2.2 Current Hydraulic Loading

As per the Water Quality Management Permit No. 2305404 T1, the Turners Mill Treatment Plant has a permitted Annual Average Flow Capacity of 0.140 MGD and a Design Hydraulic Capacity of 0.403 MGD (Peak Flow). The Annual Average Flow in 2015 at the Turners Mill Plant was 0.0713 MGD. The maximum average month was 0.086 MGD in January 2015. The 3-Month Average Max flow was 0.082 MGD as averaged from January through March 2015. These flows are within the permitted Annual Average Capacity of the treatment facility. The treatment plant did not experience a hydraulic overload condition in 2015.

Because the Turners Mill Collection System is relatively new and primarily consists of low pressure sewers, the plant experiences little increases in flow during wet weather. The plant did not receive any higher flows than expected or that could not be handled by the treatment facility.

Table 1 outlines Turners Mill WWTP's historic 5-year hydraulic loading data and the current year's rainfall.

Table 1

Hydraulic Loading (MGD)						Rainfall (inches)
Month	2011	2012	2013	2014	2015	2015
January	**0.060**	0.059	0.063	0.075	**0.086**	3.2
February	**0.065**	0.055	0.064	0.081	**0.084**	1.2
March	**0.065**	0.052	0.060	**0.080**	**0.076**	3.6
April	0.058	0.051	0.058	**0.079**	0.062	2.8
May	0.059	0.055	0.061	**0.087**	0.067	1.3
June	0.058	0.053	0.061	0.080	0.074	8.0
July	0.057	0.056	**0.063**	0.075	0.069	3.0
August	0.061	0.054	**0.064**	0.074	0.065	2.3
September	0.057	0.053	**0.062**	0.074	0.066	4.1
October	0.054	**0.063**	0.061	0.079	0.069	5.9
November	0.056	**0.060**	0.062	0.079	0.067	3.9
December	0.060	**0.063**	0.064	0.082	0.070	7.8
Annual Average (AA)	0.0593	0.0562	0.0618	0.0788	0.0713	3.9
3 Month Max. Average	0.064	0.062	0.063	0.082	0.082	
Ratio (3 Month Max to AA Ratio)	1.07	1.10	1.02	1.04	1.15	
5-Year Average Hydraulic Ratio =					**1.08**	

2.3 Current Organic Loading

As stipulated in the Water Quality Management Permit No. 2305404 the Permitted Organic Capacity is 280.22 lb/day as BOD_5. Influent 24-hour composite samples are collected twice per month from the head of the Turners Mill Treatment Plant and are tested for BOD_5, TSS, and pH.

The Annual Average loading at the Turners Mill WWTP was 180.9 lbs/day in 2015. The maximum month was reported in March 2015 with a loading of 228.5 lbs per day. The treatment facility experienced a higher than average organic loading in March 2015, however, the effluent quality remained within the permitted limits during this time.

The Turners Mill WWTP does not accept hauled-in septage.

Table 2 outlines the influent loading calculations. Calculations were based on the influent BOD_5 concentration and the flow on the day that the sample was taken. The daily loadings were then averaged to determine the monthly average organic loading at the WWTP. Because the treatment facility does not receive flows in excess of 0.100 MGD, there is no influent flow monitoring. Effluent flow measurements as reported in the monthly DMRs were used in all loading calculations.

Table 2

2015 Organic Loading Sampling Data

Date of Sample	A BOD5 (mg/l)	B Flow (MGD)	C = A x B x 8.34 Daily BOD5 (lbs/day)	Monthly Average[1] (lbs/day)
1/8/2015	268	0.0899	200.8	
1/22/2015	264	0.0846	186.3	193.6
2/5/2015	274	0.0796	181.9	
2/19/2015	299	0.1019	254.1	218.0
3/5/2015	285	0.0893	212.3	
3/19/2015	390	0.0752	244.7	228.5
4/2/2015	302	0.0642	161.7	
4/16/2015	232	0.0633	122.6	142.1
5/7/2015	371	0.0796	246.1	
5/21/2015	319	0.0718	191.0	218.6
6/4/2015	284	0.0680	161.1	
6/18/2015	266	0.0740	164.2	162.7
7/2/2015	210	0.0728	127.5	
7/16/2015	310	0.0834	215.6	171.6
8/6/2015	354	0.0589	173.9	
8/20/2015	271	0.0571	129.1	151.5
9/3/2015	305	0.0572	145.5	
9/17/2015	268	0.0654	146.2	145.8
10/1/2015	390	0.0731	237.8	
10/15/2015	286	0.0530	126.4	182.1
11/5/2015	249	0.0635	131.9	
11/19/2015	268	0.0881	196.9	164.4
12/3/2015	249	0.0876	181.9	
12/17/2015	323	0.0751	202.3	192.1
			Annual Average =	180.9

Table 3 outlines the historic 5-year organic loading data including calculations of the Annual Average, Maximum Month, Maximum Month to Annual Average Ratio, and the 5-year Average Organic Ratio.

Table 3
2015 Organic Loaing (lbs/day)

Month	2011	2012	2013	2014	2015
January	187.51	132.00	158.44	186.12	193.56
February	227.18	177.80	88.40	167.33	218.02
March	181.37	132.30	132.29	167.15	228.49
April	176.22	110.60	124.58	126.34	142.10
May	174.38	128.50	140.15	318.10	218.60
June	143.88	136.30	141.29	200.45	162.66
July	116.24	120.60	127.65	135.53	171.56
August	138.38	98.50	137.85	129.98	151.47
September	128.03	119.00	125.01	139.22	145.84
October	111.19	202.60	105.47	180.21	182.09
November	155.84	129.00	168.84	155.19	164.39
December	125.30	140.30	207.89	194.72	192.11
Annual Average (AA)	155.46	135.63	138.16	175.03	180.91
Max Month	227.18	202.60	207.89	318.10	228.49
Ratio (Month Max to AA Ratio)	1.46	1.49	1.50	1.82	1.26
5-Year Average Ratio =					**1.51**

3.0 5-YEAR HYDRAULIC AND ORGANIC LOADING PROJECTIONS

Hydraulic Loading

The Turners Mill Wastewater Treatment Plant currently has a permitted hydraulic capacity of 0.140 MGD. There were approximately 460 connections to the Turners Mill Collection System in 2015 yielding an annual average flow of 0.0713 MGD. There are 47 projected connections (totaling 47 EDUs) in the next 5 years. At approximately 155 gpd/EDU, there is an expected increase in flow of 0.0073 MGD. The expected hydraulic loading in 2020 is estimated to be 0.0734 MGD with a projected maximum monthly flow of 0.0793 MGD. These flow projections were calculated based on the guidance provided in the Department's Annual Report Template. The supporting tables and calculations can be found in Appendix A. A graph showing the past and projected hydraulic loading can be found on Figure 1.

Organic Loading

The Turners Mill Wastewater Treatment Plant has a permitted organic loading capacity of 280.22 lbs BOD5/day. There were approximately 460 connections to the Turners Mill Collection System in 2015 yielding an annual average loading of 180.9 lbs BOD5/day. There are 47 projected connections in the next 5 years which equates to an expected increase in loading of 18.49 lbs BOD5/day. The projected Annual Average organic loading in 2020 is approximately 199.4 lbs BOD5/day with a projected maximum monthly loading of 300.7 lbs BOD5/day. These projections were calculated based on the guidance provided in the Department's Annual Report Template. The supporting tables and calculations can be found in Appendix B. A graph showing the past and projected Organic loading can be found on Figure 2.

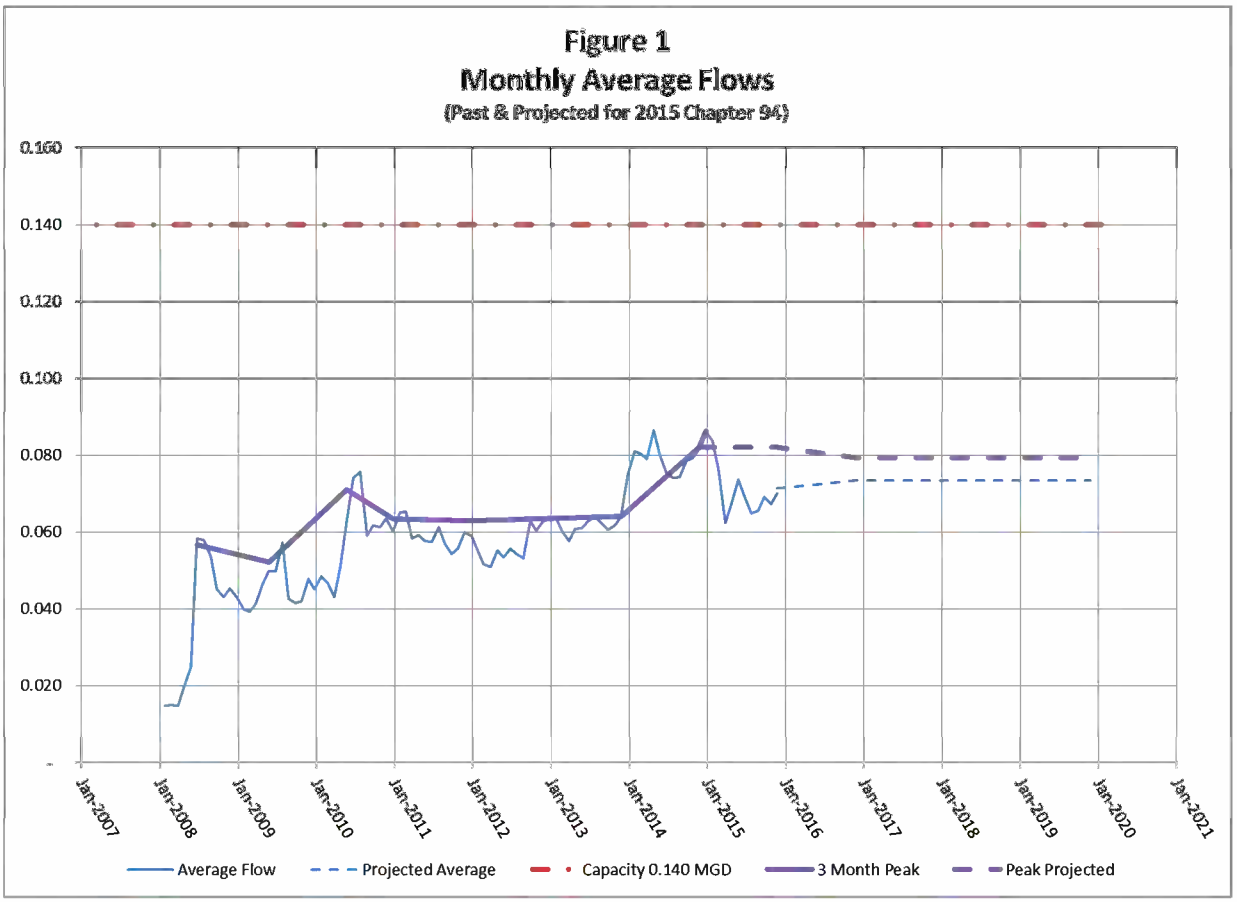
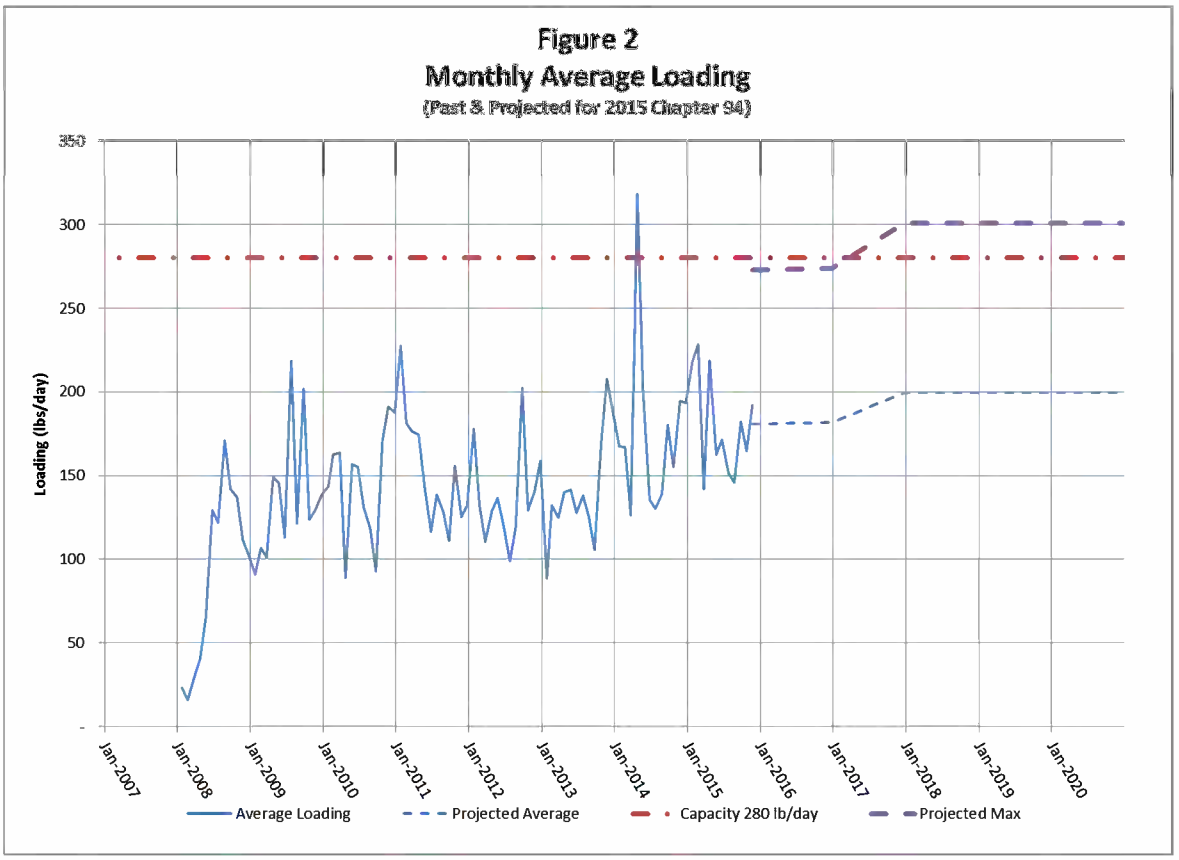


Figure 1
Monthly Average Flows
(Past & Projected for 2015 Chapter 94)
0.160
0.140
0.120
0.100
0.080
0.060
0.040
0.020
-
Jan-2007
Jan-2008
Jan-2009
Jan-2010
Jan-2011
Jan-2012
Jan-2013
Jan-2014
Jan-2015
Jan-2016
Jan-2017
Jan-2018
Jan-2019
Jan-2020
Jan-2021
Average Flow
Projected Average
Capacity 0.140 MGD
3 Month Peak
Peak Projected



4.0 SEWER EXTENSIONS

There were no new residential connections made to the Turners Mill System in 2015. There have been no sewer extensions approved in the Turners Mill WWTP service area in 2015. A map showing the known proposed projects which will require public sewers but are in the conceptual or preliminary planning stages can be found in Appendix F.

Below is a list outlining each projected extension project within the next 5 years. A detailed list of all projected future connections can be found in Appendix C:

Table 4

Project	EDUs	Date
1361 Baltimore Pike	1	2016
1392 Baltimore Pike	1	2016
E3 Ventures	45	2017

5.0 PROGRAM FOR SANITARY SEWER MONITORING, MAINTENANCE, AND REPAIR

The Turners Mill Collection System is relatively small and is substantially comprised of low pressure sewers. There are two privately owned gravity collection systems that contribute flow to Turners Mill. The gravity collection system that serves the Estates at Chadds Ford is new and now dedicated to the Sewer Authority. The gravity collection

system that serves the Painters Crossing Condominiums is owned by the condominium association. These two systems are collected by privately owned pump stations and there have been no indications of I/I issues in either system.

a. Monitoring
   The Authority contracts with DELCORA to monitor the municipally owned collection systems in conjunction with their operations at the Authority's treatment facilities.
b. Maintenance
   Maintenance to the sewage collection system is made on an as-needed basis. When required, maintenance is performed by DELCORA or a local contractor that has a master-services agreement with the Authority.
   The following maintenance was provided in 2015.
   1. January- Replaced failed pH probe
   2. February- Pull and clean return activated sludge pumps.
   3. March- Replaced sonic relay at Estates Pump Station.
   4. May – Pull and clean return activated sludge pumps.
   5. June- Replaced Tertiary Filter.
   6. July- Installed new exhaust fan at the Estates Pump Station.
   7. August- Purchased and installed new intensity sensor for UV system.
   8. September- Removed failed EQ pump and repaired.
   9. November – Repaired effluent sampler.
c. Repairs
   Repairs to the sewage collection system and treatment facility are made on an as-needed basis. When required, repairs are performed by DELCORA or a local contractor that has a master-services agreement with the Authority. Some of the repairs are listed above in the maintenance section (b).
d. Rehabilitation
   No rehabilitations were performed in the Turners Mill collection system in 2015.
e. Routine and Special Activities
   DELCORA personnel routinely inspect the sewage treatment facility, perform maintenance, and make repairs as needed.
f. Personnel and Equipment Used
   DELCORA provides a number of staff and a variety of equipment on an as-needed basis to the Authority. The staff provided includes licensed operators, technicians, electricians, mechanics and office personnel to operate and maintain the collection and treatment facilities and to prepare and submit monthly reports to the Authority and DEP.
g. Sampling Frequency
   Regular sampling of the sewage within the collection system is not conducted on a regular basis. Sampling at the Turners Mill Treatment Plant is conducted in accordance with the NPDES Permit. Most constituents are sampled on a weekly basis and some on a bi-weekly basis.
h. Quality Assurance
   All testing is conducted by accredited laboratories – DELCORA (Lab ID 23-00671) and ALS Environmental (22-293).

i. Data Analysis
No detailed data analysis was performed (or required) for the Turners Mill collection system.

j. Infiltration/Inflow (I/I) Monitoring
The municipally owned portion of the Turners Mill collection system consists exclusively of a low pressure sewer system all of which was constructed since 2008. The flows recorded at the treatment plant do not indicate significant infiltration or inflow and therefore no I&I monitoring was conducted in 2015.

k. The Authority does not maintain any combined sewers in their system.

6.0 CONDITION OF THE SEWER SYSTEM

The Turners Mill Collection System is generally in excellent condition. It currently operates within its design and permitted capacity and is projected to do so over the next 5 years. There are no hydraulic overloads projected or known areas with surcharging within the Turners Mill Collection System.

The municipally owned portions of the Turners Mill Collection System are relatively new with the oldest portions being constructed in 2008. There are no known portions of the system that are in need of repair, replacement, or rehabilitation. The existing low pressure sewer lines are designed and sized properly for the current and projected connections within the system.

There were no Sanitary Sewer Overflows reported in the Turners Mill Collection System in 2015.

There are no permanent flow meters in the Turners Mill Collection System. Flows from the discharge of the Turners Mill WWTP are recorded and reported with each monthly DMR.

7.0 SEWAGE PUMPING STATIONS

There is one Authority owned pump station in the Turners Mill collection system. There is one privately owned pump station that is maintained and operated by the respective owner – the Painters Crossing Pump Station. There have been no issues or problems reported to the Authority regarding these pump stations.

Neither of the pump stations currently have influent flow meters. However, both stations are equipped with effluent flow meters that record the totalized flow. The Authority requested the flow data for 2010 and 2011 for both of the stations (as requested in the DEP Review of the 2011 Chapter 94 Report). That flow data that was made available is attached in Appendix D and a summary is provided in the Table below.

Table 5
Pump Stations

			Present Flows			Projected Flows
Pump Station Name	Numer of Pumps	Hydraulic Capacity (gpm)	Annual Average Flows (gpd)	Peak Day Flow (gpd)	Peak Hourly Flow* (gpm)	2-Year Projected Max Flow (gpd)
Painters Crossing	2	220	30,100	35,450	103	35,450
Estates at Chadds Ford	2	100	14,337	17,472	51	17,472

*Peak hourly flows are estimated based on a peaking factor applied to the Peak Day flow. For Painters Crossing and Estates at Chadds Ford, a peaking factor of 4.2 was used.

Painters Crossing Pump Station

The Painters Crossing pump station is located adjacent to the Painters Crossing Condominiums at 1300 Baltimore Pike. The Station serves 242 Condominiums (170 EDUs). There are no future connections proposed for this pump station. The pump station consists of two aboveground Smith & Loveless pumps rated at 220 gpm each, resulting in a peak design flow of 316,800 gpd. The station does not have an influent flow meter. However, the station does have a chart recorder and there were no recorded instances where both pumps came on at the same time due to high flows in 2012. The force main from the pump station discharges into a combined forcemain that conveys the sewage directly to the Turners Mill WWTP.

The Painters Crossing Pump Station is in relatively good condition with only routine maintenance required in 2015 including periodic cleaning and removing of grease and debris from the wetwell. No upgrades to the station are currently planned. The Painters Crossing Pump Station has an emergency generator for back-up power which is reportedly inspected and exercised on a regular basis.

Estates at Chadds Ford Pump Station

The Estates at Chadds Ford pump station is located at 3 Evergreen Place and serves the 120 residences in the Estates at Chadds Ford subdivision. There are several future connections proposed for this pump station in the next 5 years. The pump station consists of two aboveground Smith & Loveless pumps rated at 100 gpm each, resulting in a peak design flow of 144,000 gpd. The station does not have an influent flow meter. The station was dedicated to the Authority in 2013. The station does have a chart recorder and there were no recorded instances where both pumps came on at the same time due to high flows in 2015. The force main from the pump station discharges into a combined forcemain that conveys the sewage directly to the Turners Mill WWTP.

The Estates at Chadds Ford Pump Station is in relatively good condition with routine maintenance provided in 2015 including periodic cleaning and removing of grease and debris from the wetwell. The Estates at Chadds Ford Pump Station has an emergency

generator for back-up power which is reportedly inspected and exercised on a regular basis.

8.0 INDUSTRIAL WASTES

There are no industrial dischargers into the Turners Mill sewage collection system. Connection specifications have been provided by the Authority, and connections are inspected by the Township Code Enforcement Officer. The Township has a grease trap ordinance which is monitored and enforced by the Township Code Enforcement Officer. All connections are limited to discharging domestic strength wastewater.

9.0 CORRECTIVE ACTION PLAN

There is no current or projected hydraulic or organic overload condition identified with the Turners Mill WWTP or for any portion of the collection and conveyance system within the WWTP's sewer service area.

10.0 CALIBRATION REPORTS

Calibration Report for the effluent flow meter at the Turners Mill WWTP can be found in Appendix E.

11.0 TRIBUTARY MUNICIPALITY REPORTS

Chadds Ford Township does not receive tributary flows from any other municipality or authority.

Appendix A

Projected Hydraulic Loading Calculations

Table A1-Historical Connections				
Year	# EDUs Connected	Flow Rate (gpd/EDU)	Additional Flow (MGD)	Total # EDUs Connected
2007	-	155	-	-
2008	363	155	0.0563	363
2009	12	155	0.0019	375
2010	46	155	0.0071	421
2011	28	155	0.0043	449
2012	1	155	0.0002	450
2013	10	155	0.0016	460
2014	-	155	-	460
2015	-	155	-	460
Calculated EDU Rate		155.1 gpd/edu		

Table A2 – Adjusted Annual Average Flow											
				Connections							Adjusted
Year	AA Flow (MGD)	MM Flow (MGD)	MM/AA Ratio	2008	2009	2010	2011	2012	2013	2014	AA Flow (MGD)
2007				0.05629	0.0019	0.0071	0.0043	0.0002	0.0016	-	0.0713
2008	0.051	0.057	1.12		0.0019	0.0071	0.0043	0.0002	0.0016	-	0.0656
2009	0.045	0.052	1.16			0.0071	0.0043	0.0002	0.0016	-	0.0583
2010	0.058	0.071	1.23				0.0043	0.0002	0.0016	-	0.0638
2011	0.0593	0.064	1.07					0.0002	0.0016	-	0.0610
2012	0.0562	0.063	1.12						0.0016	-	0.0578
2013	0.0618	0.063	1.02							-	0.0618
2014	0.0788	0.082	1.04								0.0788
2015	**0.0713**	0.082	1.15								0.0713
5 Yr Avg	0.0655		1.080								**0.0661**

TableA3 – Adjusted Projections					
Year	AA Flow (MGD)	New EDUs	Increased Flow (MGD)	Projected AA Flow (MGD)	Projected Max Month (MGD)
2016	0.0661	2	0.0003	0.0665	0.0718
2017	0.0665	45	0.0070	0.0734	0.0793
2018	0.0734	0	-	0.0734	0.0793
2019	0.0734	0	-	0.0734	0.0793
2020	0.0734	0	-	0.0734	0.0793
Calculated EDU Rate		155.1 gpd/edu			

Appendix B

Projected Organic Loading Calculations

Year	Previous Years AA Loading (lb/day)	Projected New EDUs	Increased Loading (lb/day)	Projected AA Loading (lb/day)	Projected Peak Loading (lb/day)
2015				180.9	272.8
2016	180.9	2	0.79	181.7	274.0
2017	181.7	45	17.70	199.4	300.7
2018	199.4	0	-	199.4	300.7
2019	199.4	0	-	199.4	300.7
2020	199.4	0	-	199.4	300.7

Average 2015 Loading	180.9	lb/day
Total EDU's in 2015	460	EDU's
Average Loading	0.39	lb/day/EDU
5 Year Avg Ratio	1.51	

Appendix C

Turners Mill Projected Future Connections

TURNERS MILL							
CONNECTIONS	**EDUs**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021+**
Currently Connected							
Other residential	324						
Non-Residential	136						
Total Currently Connected	***460***						
Properties Assessed but not Connected							
Residential							
3 Upper Bank Road	1						1
89 Ring Road	1						1
1386 Baltimore Pike (Chadds Ford One)	1						1
Non Residential							
1392 Baltimore Pike (New Horizens)	1	1					
Total Assessd but not Connected	***4***	***1***	***0***	***0***	***0***	***0***	***3***
Dedicated Connections							
1361 Baltimore Pike	1	1					
E3 Ventures	45		45				
Total Dedicated Connections	***46***	***1***	***0***	***0***	***0***	***0***	***0***
TOTAL COMMITTED CAPACITY	**510**						
NEW CONNECTIONS		**2**	**45**	**0**	**0**	**0**	**3**
TOTAL CONNECTIONS	**460**	**462**	**507**	**507**	**507**	**507**	**510**

Appendix D

Pump Station Flow Data

11/17	1631445	20,146
11/20	1693487	20,681
11/24	1778018	21,133
12/1	1946234	24,031
12/4	2004797	19,521
12/8	2086865	20,517
12/11	2147665	20,267
12/15	2231150	20,871
12/18	2295067	21,306
12/22	2382423	21,839
12/29	2540429	22,572
	Average	21,191
	Max	28,372

Turners Mill Service Area

Painters Crossing Pump Station

2011 Operating Data

Single Pump Design Flow Rate 220 gpm

Date	Meter Reading (gallons)	Daily Average Flow (gpd)
9/1/2011	4900895	
9/6/2011	5065549	32,931
9/8/2011	5134738	34,595
9/13/2011	5286112	30,275
9/15/2011	5342157	28,023
9/20/2011	5486792	28,927
9/22/2011	5538055	25,632
9/27/2011	5696533	31,696
9/29/2011	5752779	28,123
10/3/2011	5884348	32,892
10/6/2011	5971775	29,142
10/7/2011	6001784	30,009
10/10/2011	6085052	27,756
10/12/2011	6141863	28,406
10/14/2011	6196456	27,297
10/17/2011	6288382	30,642
10/19/2011	6344834	28,226
10/21/2011	6405321	30,244
10/24/2011	6498938	31,206
10/26/2011	6556335	28,699
10/28/2011	6609827	26,746
10/31/2011	6716153	35,442
11/2/2011	6768608	26,228
11/4/2011	6831334	31,363
11/7/2011	6923961	30,876
11/9/2011	6984545	30,292
11/11/2011	7043583	29,519
11/14/2011	7133846	30,088
11/16/2011	7190612	28,383
11/18/2011	7242521	25,955
11/21/2011	7343763	33,747
11/25/2011	7479285	33,881
11/28/2011	7576999	32,571
11/30/2011	7642840	32,921
12/2/2011	7700877	29,019
12/5/2011	7799423	32,849

Date	Meter Reading (gallons)	Daily Average Flow (gpd)
12/7/2011	7852223	26,400
12/9/2011	7910921	29,349
12/12/2011	8004926	31,335
12/14/2011	8064796	29,935
12/16/2011	8123134	29,169
12/19/2011	8233196	36,687
12/21/2011	8279695	23,250
12/23/2011	8345221	32,763
12/28/2011	8507522	32,460
12/30/2011	8566586	29,532
	Average	30,066
	Max	35,442

Note: Due to the change in Operators at this privately owned pump station, 2010 data and early 2011-2015 data was not provided to the Authority for incorporation into the Chapter 94 Report.

Appendix E

Calibration Reports

1. Turners Mill WWTP Effluent Flow Meter

W.G. MALDEN
P.O. BOX 196, EAST EARL, PA 17519
PHONE: (717) 768-0800 FAX: (717) 768-0802

SERVICE REPORT

CHADDS FORD TOWNSHIP SEWER AUTHORITY
10 RING ROAD
CHADDS FORD, PA 19348

SERVICE DATE: 5/12/2015
METER#: C8328 AA
LOCATION: TURNER'S MILL WWTP EFFLUENT
SERIAL #: 11564/1255916-0003
MANUFACTURER: EASTECH/PARTLOW
RECORDER: MRC 5000
TRANSMITTER: 2210
PRIMARY: 60° WEIR
MAXIMUM CAPACITY: 200,000 GPD
SERVICE CONTRACT: ANNUAL

WORK PERFORMED

CLEANED EQUIPMENT: X **PRIMARY:** X

RECORDER CALIBRATION **CHECKED AT:** 0, 50, & 100%
ERROR: 0% **CORRECTED ACCURACY:** ±1%

TOTALIZER CALIBRATION **CHECKED AT:** 0, 50, & 100%
ERROR: 0% **CORRECTED ACCURACY:** ±1%

TRANSMITTER CALIBRATION

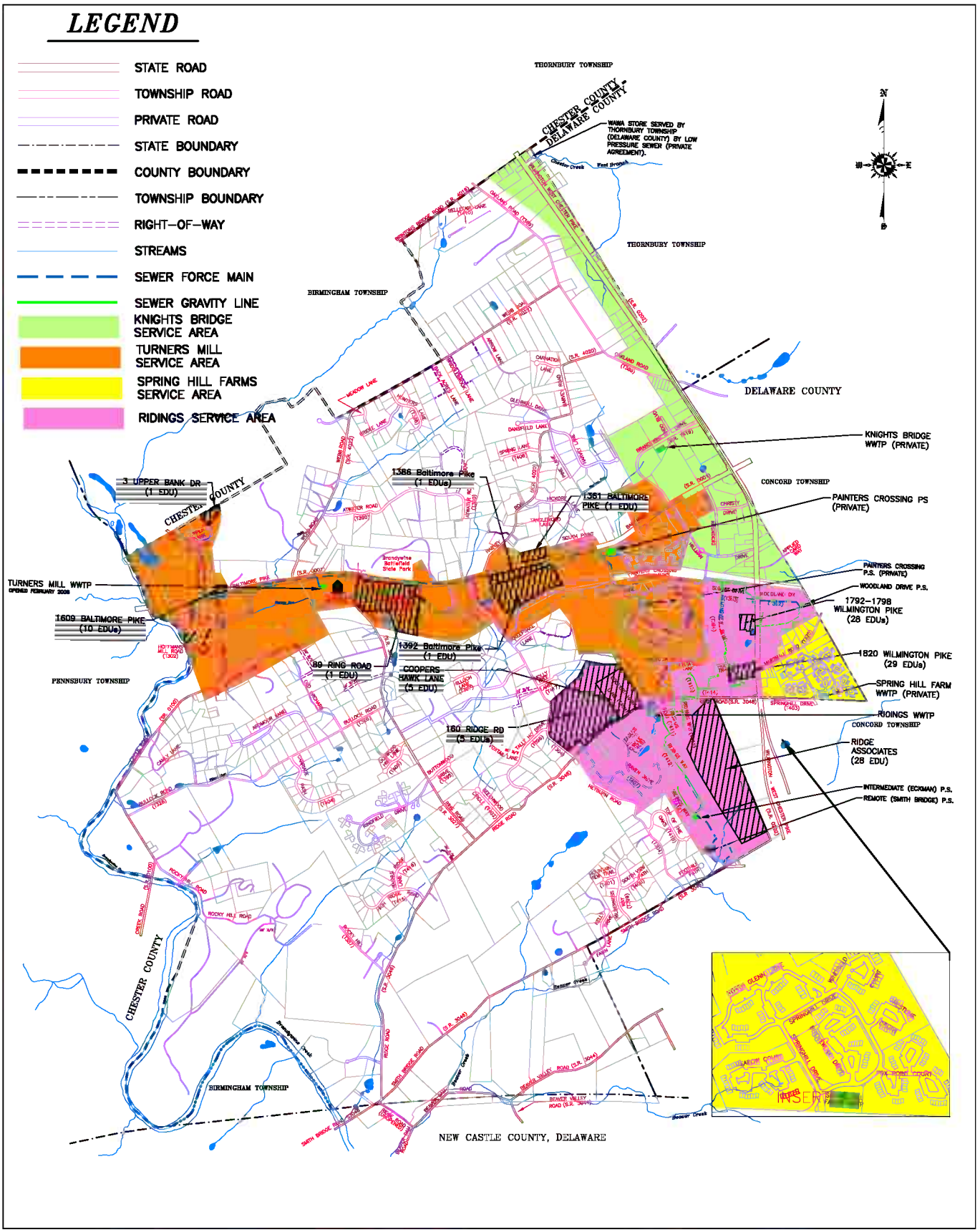
SIMULATED HEAD RISES & ZERO FLOW MEASUREMENTS
ERROR: 0% **CORRECTED ACCURACY:** ±1%

COMMENT: PERFORMED ANNUAL CALIBRATION. LEFT EQUIPMENT OPERATING PROPERLY.

SERVICE REPRESENTATIVE: BOB **PERSON SEEN:** JOE
copies: JOE DIMATTEO - DELCORA

Appendix F

Service Area Map



Pennoni Associates Inc. One Drexel Plaza, 3001 Market Street, Philadelphia, Pennsylvania 19104 Consulting Engineers

SK-1

CHAPTER 94 REPORT

CHADDS FORD TOWNSHIP SEWER MAP

CHADDS FORD TOWNSHIP SEWER AUTHORITY
10 RING ROAD
CHADDS FORD, PENNSYLVANIA

ALL DIMENSIONS MUST BE VERIFIED BY CONTRACTOR IN THE FIELD BEFORE PROCEEDING WITH THE WORK

DATE	NO.	REVISIONS	BY
3/16/12	0	2011 SUBMISSION	JAS
3/25/11	0	2010 SUBMISSION	JAS
3/26/09	0	2008 SUBMISSION	LRA
3/27/08	0	2007 SUBMISSION	LRA