FEASIBILITY STUDY REPORT

For

THE MUNICIPAL AUTHORITY OF THE TOWNSHIP OF SOUTH FAYETTE

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1.0 INTRODUCTION

The Pennsylvania Clean Streams Law of 1937 and the Federal Clean Water Act (CWA) establishes criterion governing communities' sewage conveyance and treatment systems. Specifically, the Pennsylvania Clean Streams Law prohibits overflows from separate sanitary sewers and the Federal CWA through the Combined Sewer Policy, and requires certain controls be applied to reduce pollutants from combined sewer systems. For the 83 communities tributary to the Allegheny County Sanitary Authority (ALCOSAN) Conveyance and Collection System, ongoing non-compliance with these two laws resulted in the issuance of Administrative Consent Orders (ACOs) and Consent Order and Agreements (COAs) in early 2004 by the Allegheny County Health Department (ACHD) and Pennsylvania Department of Environmental Protection (PADEP), respectively. Subsequent to that, in January 2008, ALCOSAN, ACHD, and the Pennsylvania Department of Environmental Protection (PADEP) entered into a Consent Decree (CD) with the Federal Department of Justice (DOJ) and the United States Environmental Protection Agency (USEPA) to prepare and submit an approvable Wet Weather Plan (WWP) by January 2013.

These ACOs, COAs (collectively known as the Orders) and the ALCOSAN CD require the respective entities to gather data and information, characterize their respective systems, analyze and perform alternative analyses, and submit feasibility studies addressing work required to bring the systems into compliance with the Pennsylvania Clean Streams Law and the CWA, eliminate sanitary sewer overflows (SSOs), and fulfill the Pennsylvania and USEPA combined sewer overflow (CSO) Policy obligations. ALCOSAN's CD not only requires them to submit a plan to the regulators by January 2013 that outlines a program to comply with these laws but also requires the facilities, including the municipal facilities, to be constructed by 2026. The tributary municipalities are required to submit their feasibility studies to the regulators on or before July 2013 (within six months of ALCOSAN submitting its plan). These plans, which should be developed in coordination with ALCOSAN and all the municipalities that contribute flow to the ALCOSAN point of connection (POC), and should retain, store, convey and/or treat sewage

overflows that either ALCOSAN cannot accommodate or that ALCOSAN can address but that the municipalities decide to address. It is understood that the Feasibility Studies will serve as the basis for the next round of Orders that will mandate implementation of selected/approved alternatives. This report addresses the internal municipal alternatives that were evaluated as part of the feasibility study. Any alternatives developed as part of an ALCOSAN POC (also known as "complex") sewershed feasibility studies are included in the appendices of this report.

2.0 EXISTING SYSTEM DESCIPTION

The Municipal Authority of the Township of South Fayette (MATSF) was formed in 1963 to serve the residents of South Fayette Township, Allegheny County, with public sanitary sewer service. MATSF's sole responsibility is to manage the operation of the public sanitary sewer system within its service area. The Township consists of 20.95 square miles with public sanitary sewers serving approximately 50% of the land area, but over 95% of the occupied buildings. The remaining 50% of the land area is currently undeveloped, but steep slopes and certain zoning restrictions reduce future developable area to approximately 1/3 of the total square miles. A segment of the planned Southern Beltway in the western portion of the Township also will reduce the future developable land area.

The Authority owns and operates facilities located throughout the Township of South Fayette. The current system consists of over 130 miles of publicly-owned sewer ranging in size from 6" through 27" in diameter and over 4,000 manholes. The Authority co-owns various multi-municipal sewage conveyance facilities in the Robinson Run and the Thoms Run areas. The jointly-owned Robinson Run facilities are also managed on a day-to-day basis by the Municipal Authority of the Township of South Fayette personnel. Those facilities include an interceptor sewer from McDonald Borough to the ALCOSAN interceptor in the vicinity of Carnegie (connecting at manhole C45B-04) along with the 2.2 mgd (5.5 mgd peak) Oakdale Pump Station. The Thoms Run interceptor is co-owned with Collier Township Municipal Authority who is responsible for day-to-day operations and maintenance. That sewer connects to the ALCOSAN interceptor at C54-12. The Municipal Authority of the Township of South Fayette also owns and

operates the 2.4 mgd (6.0 mgd peak) Chartiers Creek pump station along with two smaller pump stations (Oakridge and South Fayette Park). The Oakridge pump station and South Fayette Park pump station convey wastewater ultimately to the Chartiers Creek pump station, which discharges to the ALCOSAN Chartiers Creek Interceptor system at manhole C54-16.

3.0 SEWER SYSTEM CHARACTERIZATION

On June 1, 2006, a Regional Flow Monitoring Plan (RFMP) was submitted to the PADEP and the ACHD for review and approval. The purpose of the plan was to comply with the Orders, and to document the efforts expended in developing the plan. The RFMP was assembled by 3RWW and the 3RWW/PM Team with direct input from ALCOSAN and the FMWG. The FMWG was composed of municipal engineers, some municipal managers and other interested parties. Concurrently, ALCOSAN was developing a flow monitoring plan to meet the requirements of the draft CD issued to ALCOSAN. In response to Agencies' comments and provisions of the CD, ALCOSAN developed and delivered a Regional Collection System Flow Monitoring Plan (RCSFMP) that incorporated most of the provisions of the RFMP and provided comprehensive flow monitoring of both the ALCOSAN system and the municipal collection systems. Implementation of the RCSFMP by ALCOSAN fulfilled the flow monitoring required by the municipal Orders.

There were fourteen (14) regional flow monitors installed in the sewershed tributary to POC C-54-16. In addition, MATSF installed six (6) flow monitors for a period of six (6) months after the completion of the RCSFMP. The flow monitoring data collected during this period was used to verify the model calibration and further investigate potential areas of concern. This supplemental metering was performed after disconnection of the Mayview combined sewer system from the MATSF system (in 2011).

4.0 I&I REMOVAL HISTORY

Since the late 1970's, the Authority was aware of the need to periodically inspect the public sewer system to isolate infiltration & inflow (I/I) and to attempt to remove it from the system. Those programs included various inspections and observations by the Authority personnel.

In 1977, MATSF personnel performed smoke testing of numerous homes and began a program to place plastic inserts into the frames of low lying manholes to prevent storm water from entering the sanitary sewer through manhole lids. The next year, a sewer system evaluation study was finalized by Gibson Thomas Engineering for the MATSF system. The system at that time consisted of only 43 miles of sewer. As a result of the study, certain recommendations were made for system repairs geared primarily to I/I reduction. In the Years 1979 to 1982, the Authority expended greater than $167,000 on sewer repair projects including televising, air testing and grouting of over 28,000 linear feet (5.3 miles) of public sewer, and performed investigation and repairs of the Sygan Hollow Interceptor and the Boyce Road Trunk Line. Even then, video tapes revealed that a significant portion of I/I was emanating from private service laterals.

In 1983, PaDER required that MATSF prepare a Corrective Action Plan and Schedule to address I/I concerns in MATSF's Chartiers Creek system. That extensive study was completed in February 1985. As part of this study, flow meters were installed in various locations throughout the system. Also, an intensive late night flow isolation program was conducted at numerous manholes in an attempt to locate areas with high infiltration rates. This study provided recommendations for televising specific sewer segments and also identified certain locations in the system where spot repairs would reduce I/I.

MATSF entered into an agreement with ALCOSAN that would allow for the elimination of the MATSF treatment facility upon construction of a pumping station that would convey wastewater to the ALCOSAN Chartiers Creek Interceptor. The effective date of that agreement was

September 12th 1983. The agreement called for a purchase of 2.4 Million Gallons/Day of capacity in the ALCOSAN system for a capital fee of $1,171,700. It is important to note that the agreement has specific limitations on I/I and a formula for monetary penalties along with a further requirement to locate and eliminate I/I that exceeds that allowance. The formula to determine the monetary penalty is determined by the length and size of MATSF's public sewer system along with analysis of water consumption data and system flow monitor data on a quarterly basis. The excess I/I determined as a result of the quarterly review is subject to penalties based on the prevailing ALCOSAN rate structure. Those values have been calculated since actual connection to the ALCOSAN system on February 17, 1987.

When the Chartiers Creek pump station to ALCOSAN was completed and placed into operation, the PaDEP Corrective Action Plan was eliminated as there was no longer an overload to a treatment facility. At that time, the system consisted of only 2,951 customers. Therefore, for several years, there was no urgent capacity issues with the exception of limiting the monetary penalties paid quarterly to ALCOSAN when the flow values stipulated in the agreement were exceeded. As ALCOSAN began raising rates on a regular basis in the early 1990's, those penalties became much more significant, even though the quantity of excess I/I did not change dramatically. By the mid 1990's, the monies due to ALCOSAN for excess I/I became very significant. Further, at that time, only 4 of the 83 communities that contributed flow to ALCOSAN were subject to such penalties; those being communities that connected to the ALCOSAN system after 1983. As such, those communities approached ALCOSAN requesting relief from the I/I provisions of their respective agreements. Accordingly, ALCOSAN, while not agreeing to eliminate the I/I clause in those agreements, did agree to allow any calculated penalties to be held in escrow by each community to be utilized for projects associated with the reduction of I/I. For MATSF, that understanding was memorialized in a Correction Action Agreement with ALCOSAN dated September 25, 1997. That agreement required MATSF to develop a plan to reduce I/I and established procedures to periodically provide certifications to ALCOSAN as to the work being performed and the status of the escrow account. Therefore, all monies for excess I/I that were previously being forwarded to ALCOSAN were now available

(beginning in June 1996) to be utilized for I/I related work in the MATSF system. Since that date through November 2012, over 2.155Million Dollars have been used in this fashion as opposed to paying ALCOSAN.

As a result of the ALCOSAN CAP, a renewed effort was made by MATSF beginning in 1997 to aggressively attempt to identify and reduce excess I/I. In February 1997, Ordinance No. 401 was adopted by the Township that mandated an inspection of each property at time of sale for any inflow sources such as driveway drains, downspouts, area drains, etc. MATSF also awarded a contract in 1997 for raising 19 manholes on the Chartiers Creek Interceptor in an effort to keep the manhole covers above the typical flood elevation. The cost of that project was approximately $22,000.

In 1997, over 50,000 linear feet of public sewer was televised, including extensive televising in the Hunting Ridge area and the entire Boyce Road Trunk Sewer and MATSF's Chartiers Creek Interceptor.

In early 2001, PaDEP and ACHD, in conjunction with EPA, began notifying all 83 communities connected to ALCOSAN that they would be requiring each community to enter into a Consent Order with respect to investigation of each sewer system due to excessive I/I and due to the magnitude overflow of wastewater into streams and rivers in this area. As a result, the 83 communities worked together, as coordinated by 3 Rivers Wet Weather, Inc, to negotiate the terms and conditions of a common Administrative Consent Order that would be signed by all communities. Over a period of 3 years, an exhaustive process took place to generate a consensus as to the language to be contained in that order. Ultimately, 2 draft orders were negotiated; one for communities with combined sewer systems and the other for communities with separate sewer systems. In January 2004, MATSF entered into that Administrative Consent Order with the Allegheny County Health Department requiring an extensive investigation of the system, including certain private sector components. Required work under the first phase of the ACO includes such items as manhole inspections, sewer televising, dye testing, and a regional flow

monitoring program. The ACO also requires that certain identified critical system defects must be repaired within 6 months of discovery, while the repair of less serious defects can be delayed until an overall O&M program/schedule is established.

Since executing the ACO, MATSF has been aggressively working towards completing the tasks as mandated therein within the short time frame allowed. As a result of the inspection work completed, certain rehabilitation projects have been undertaken.

MATSF has over the past several years been aggressive not only in reducing public sector I/I, but also in addressing the private portion of the system. Table E-1 is a summary of the private sector time of sale inspection and rehabilitation program statistics, dating back to the Year 2007. Table E-2 is a graphical representation of the inspection results. Table E-3 is a graphical depiction of the lateral repair projects completed since the Year 2007.

Table E-1
Private Sector Inspection Statistics

Yr	# of Tests	# Pssd	% Tst Pssd	DS	AD	FD or Sumps	V/C	MV	LD	Full Replace/Rehab		Spot Replace/Rehab		Total Replace/Rehab	
										#	Feet	#	Feet	#	Feet
2007	130	102	78.46	0	0	1	5	5	27		464		20		484
2008	165	137	83.03	2	0	0	6	9	25		559		62		621
2009	181	150	82.87	0	0	0	23	5	18		32		70		102
2010	187	156	83.42	0	0	1	19	1	11		335		15		350
2011	164	137	83.54	0	1	1	17	2	9	5	371	4	65	9	436
2012	192	157	81.77	0	2	1	20	2	21	18	1147	3	11	21	1158
2013	85	69	81.18	0	1	1	11	0	4	4	362	0	0	4	362
Tot	1104	908	0.82	2	4	5	101	24	115		3270		243		3513

Table Abbreviations

Yr	= Year	AD	= Area Drain	LD	= Lateral Defects
Pssd	= Passed	FD	= Floor Drain		
Tst	= Test	V/C	= Vents/Cleanouts		
DS	= Down Spout	MV	= Multiple Violations		

Table E-2
Private Sector Inspection Results
Year 2007 Through May 2013

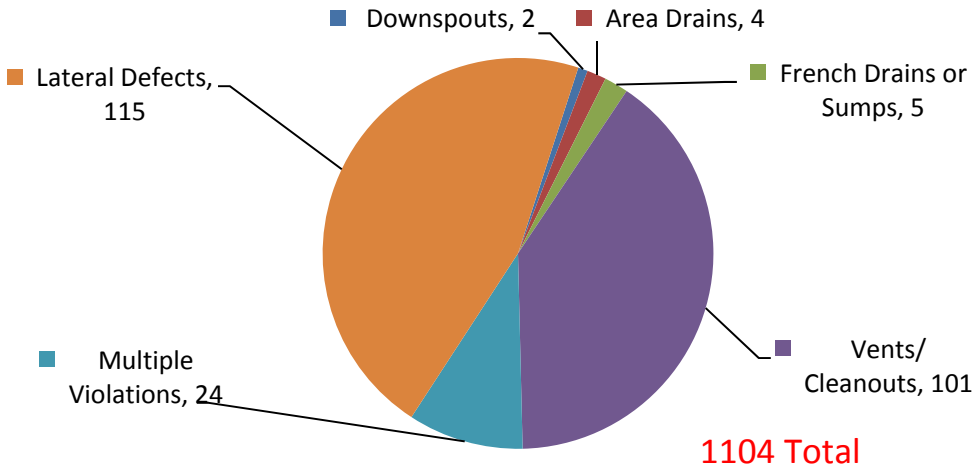
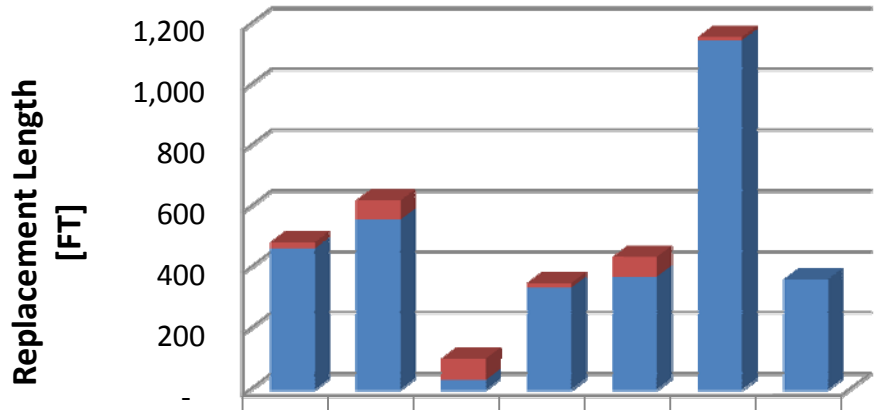


Table E-3
Lateral Repair Projects
Year 2007 Through May 2013



	2007	2008	2009	2010	2011	2012	2013
Spot Replace/Rehab	20	62	70	15	65	11	-
Full Replace/Rehab	464	559	32	335	371	1,147	362

The above statistics represent the lateral inspection program essentially for time of sale inspections. It is important to note that MATSF in May 2013 passed a resolution to expand the program from a time of sale program to an area wide inspection program. As such, portions of the MATSF system will be prioritized for both sewer main and lateral inspections independent of property transfer. Significant lateral defects will be required to be repaired within a specified time frame depending on the severity of the defects. Where the property owner is directed to replace their lateral from the structure to the sewer right-of-way, the Authority will provide a limited amount of financial assistance upon successful completion of the lateral replacement work.

5.0 PEAK FLOW ESTIMATES (PFE) / SYSTEM CAPACITY EVALUATION

In order to begin the future planning process, each municipality developed PFEs to provide "worst case scenario" flow rates and volumes at each POC for ALCOSAN's use. The Task 4 in Feasibility Study Working Group (FSWG) – Doc 002 requires municipality to submit Preliminary Flow Estimation (PFE) and system capacity analysis. Since the Mayview State Hospital CSO issue was corrected, the entire MATSF system was considered as an entirely separate sanitary system in PFE evaluation. The PFE for separate system is defined by the FSWG as the peak dry weather flow and wet weather flow for the summer and winter 1, 2, 5 and 10-year 24-hour design storms. It was found that the PFE in the winter condition is larger than the PFE in summer condition.

The PFE could be developed by using the Chartiers Creek Planning Basin Model, or by utilizing the RTK tools developed by Three Rivers Wet Weather (3RWW). MATSF conducted on analysis using both CCBM and RTK tools. The PFE was submitted to ALCOSAN in June 2010 making use of both methods.

The PFE showed the total peak flow to the Chartiers P.S. in future winter 10-YR 24-HR design storm to be approximately 15.18 MGD. The winter flow is higher than the summer flow at the same design level. Therefore, the winter design storm was utilized. In Alternative Two of this report, the peak flow to the Chartiers P.S. is adjusted to 12.50 MGD due to siphon flow diversion and sewer system routing effects (previously under estimated in the PFE submission).

The PFE only reflects the total flow at the Point of Connection (POC). To investigate and solve the sewer surcharge and manhole flooding (overflowing) problems in the entire system, MATSF conducted comprehensive system capacity analysis, which involves identifying all surcharged sewers and flooded manholes under the future flow condition for the 1, 2, 5, and 10-year Design Storms. Under Typical Year rainfall events, there are no areas in the POC C-54-16 sewer systems that are known to be surcharged. Based on the results of the evaluation, the alternative analysis of the system was performed with the use of the 10-yr, 24-hr Winter design storm for the system tributary to POC C-54-16. In accordance with the capacity evaluation, this storm is considered the maximum concern for system flooding and surcharging. All upgrades to eliminate flooding during these events will also prevent future surcharging in the areas of upgrades. All upgrades will be warranted by the prediction of flooding but designed to eliminate both flooding and surcharging.

6.0 ALTERNATIVE ANALYSIS / COST ESTIMATES

In accordance with the capacity evaluation, the upgrade alternatives considered for the Chartiers Creek sewershed are listed in Table E-4.

Table E-4
Evaluated Alternatives Upgrade Matrix

UPGRADE ITEM DESCRIPTION	ALTERNATIVE NAME				
	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 4A
Battle Ridge Road Storage Basin	•				
Presto-Sygan Road Storage Basin	•				
Verner Avenue Parallel Sewer	•	•	•	•	•
Bursca Drive Parallel Sewer	•	•	•	•	•
Millers Run Interceptor Parallel - Battle Ridge to 1st Avnue		•	•	•	•
Millers Run Interceptor Parallel - 1st Avenue to Presto-Sygan Road		•	•	•	•
Millers Run Interceptor Parallel - Presto-Sygan to 84 Lumber		•	•	•	•
Millers Run Interceptor Parallel - 1st Avenue to Presto-Sygan Road		•	•	•	•
Upgrade Chartiers Creek Pump Station to Increase Capacity		•			
Dry Weather Flow Siphon to POC C-55-02			•		
Wet Weather Overflow Siphon to POC C-55-02	•			•	
Brush Run POC C-55-02 Joint Interceptor					•
Brush Run POC C-55-02 Joint Siphon (Wet Weather Overflow)					•
Bursca Drive Area Bolted Manholes	•	•	•	•	•

Alternative One builds storage basins near flooding manholes where space is available, builds parallel sewers where space is unavailable, and keeps the Chartiers Creek Pump Station unchanged. The estimated total project cost for Alternative One is $8,177,000. Alternative Two builds parallel sewers near overflowing manholes and upgrades the Chartiers Creek Pump Station to convey all flow to the ALCOSAN Point of Connection (POC) C-56-14. The estimated total project cost for Alternative Two is $6,314,000. Alternative Three builds a siphon to convey all flows to ALCOSAN POC C-55-02. The estimated total project cost for Alternative Three is $4,490,000. Alternative Four retains the existing P.S. to convey dry weather flow and builds two siphons to convey wet weather flow to ALCOSAN POC C-55-02 and C-54-20. The estimated total project cost for Alternative Four is $4,147,000. Therefore, Alternative Four is selected for the South Fayette Sewershed upgrades. Table E-5 summarizes the capital costs associated the selected alternatives in each MATSF sewershed, and also the Multi-Municipal alternative which will be discussed in Section 7.0.

TABLE E-5: SUMMARY OF CAPITAL IMPROVEMENTS FOR RECOMMENDED ALTERNATIVE FOR MATSF

Capital Improvements	Size/Capacity	Estimated Capital Cost ($ Million)
POC C-54-16 Upgrades	Various size parallel sewers (See Section 7.5)	$4,147,000
POC C-55-02 Upgrades	Joint Siphon with Upper Saint Clair	$1,100,000
POC C-45B-04 Upgrades	Multiple Alternatives [1] (See Appendix A)	$2,000,000 (1)
POC C54-12 Upgrades	Upsized Interceptor – 18-inch to 21-inch (See Appendix B)	$286,000 (2)
	TOTAL	**$7,533,000**

[1] The communities involved in POC C-45B-04 have presented three (3) viable alternatives at the time of this report. The figure presented represents the maximum South Fayette exposure based on the highest cost alternative and cost allocation method, as they pertain to MATSF. Minimum exposure is estimated to be $1,000,000. Please reference Appendix A for more detail.

[2] The cost allocation in the Thoms Run watershed is on a per / EDU basis in accordance with the existing inter-municipal agreement between MATSF and Collier Township Municipal Authority. This figure represents South Fayette's share with planned system modifications to the South Fayette Park "Boys' Home" Pump Station. KLH Engineers is currently designing a sewer extension that will divert flow from this pump station out of the C-54-16 sewer shed to the C-54-12 sewershed. This pump station has capacity for 250 EDUs, which is incorporated into the estimated capital cost shown. If the project were not constructed, MATSF would expect a total capital cost exposure in the Thoms Run sewershed of approximately $143,000.

7.0 MULTI-MUNICIPAL ALTERNATIVES

In addition to the MATSF independent alternatives, the potential exists for multi-municipal capital improvements with the cooperation of the Township of Upper Saint Clair. Through the H&H modeling process, it was determined that the most viable alternative for the MATSF's C-54-16 sewershed is to convey all Chartiers Creek Interceptor flow to ALCOSAN's C-55-02 point-of-connection via a siphon under Chartiers Creek (flow from the Millers Run Interceptor would still flow to the Chartiers Creek Pump Station and continue to be conveyed to C-54-16). Being that an existing siphon at this location serves the communities of Upper Saint Clair and a small portion of Bethel Park Borough and Peters Township, and since there is an existing parallel interceptor upstream of that location for a significant distance within South Fayette, MATSF was invited to attend Brush Run POC C-55-02 coordination meetings for the past 2 years. Thus, a viable multi-municipal alternative was developed that could be implemented. This multi-municipal alternative is referred to hereinafter as Alternative 4A.

This multi-municipal alternative does not change the overall MATSF Chartiers Creek upgrade evaluation and alternative selection. The only revision to the POC C-54-16 alternative analysis, should an agreement be made utilizing this joint alternative, would be the elimination of a proposed MATSF only siphon to POC C-55-02. Table E-6 depicts the anticipated MATSF share of capital costs associated with this multi-municipal alternative.

TABLE E-6: SUMMARY OF MATSF's SHARE POC RECOMMENDED ALTERNATIVES

POC	Description of Alternative	Total Capital Cost ($ million)	Total Annual O&M Cost ($ million)	Present Worth Cost ($ million)
C-55-02	Joint Interceptor from MH JJ-0714B {310378S009} to POC C-55-02 Siphon; MATSF Wet Weather overflow from MH II-1503 {308382S007} to POC C-55-02 Siphon	$1.1 M [1]	N/A [2]	$1.1 M [3]

[1] This figure represents the MATSF share of the overall Brush Run POC C-55-02 upgrades, based on the most recent cost estimate prepared by the Gateway Engineers on behalf of the Township of Upper Saint Clair.

[2] The additional O&M Cost for this segment of joint interceptor is negligible.

[3] Based on ALCOSAN ACT present worth Method 1: Current capital cost equals present worth cost

The Brush Run POC C-55-02 upgrade alternatives are presented based upon the 2-year design storm. Under this scenario, a 48-inch diameter joint interceptor would begin just downstream of Bursca Drive, at manhole JJ-0714B {310378S009}, and continue 4,375-feet to the location of the existing C-55-02 siphon. By combining multi-municipal flow at the location selected, MATSF gains future capacity for their Chartiers Creek area flow, while Upper Saint Clair and all other POC C-55-02 communities see a capital cost savings.

8.0 FUNDING ALTERNATIVES / USER COST ANALYSIS

In accordance with the Alternatives outlined in the Study, barring any changes to the selection process due to further evaluation and changes conditions, the MATSF will look to obtain either PENNVEST funding or a bond issue to cover any capital project costs. As it stands, the MATSF has a potential aggregate funding requirement of approximately $7.5 million. With that said, the

Authority still entertains the potential that ALCOSAN may assume responsibility of funding and constructing portions of the capital improvements outline here within, inherited by the possible expansion of their role for acquiring certain multi-municipal interceptors, a concept that was presented within the Allegheny Conference led Regionalization Study. Upon negotiation of the terms and responsibilities of the MATSF in these multi-municipal capital projects, the Authority would then reevaluate their individual debt exposure for all remaining necessary capital improvements.

Table E-7 presents the projected user rates based on the recommended alternatives in this Study, in conjunction with the anticipated ALCOSAN rate increases. It is assumed that the current capital cost is equal to the present worth, and that the Authority will receive a 20-year loan at 3% interest to fund all projects.

TABLE E-7: USER COST ANALYSIS FOR MATSF BASED ON 5,000 GAL/MONTH

Cost Components	Monthly User Rate		Notes
	2012	2027	
ALOCSAN Annual Residential Wastewater Costs without Wet Weather Plan	$24.60	----	Estimated based upon ALCOSAN current charges assuming 15,000 gallons of water used per quarter Estimated from the 2012 cost inflated to 2027 dollars. See ALCOSAN Draft Wet Weather Plan
	----	$38.50	
Municipal Surcharge	$18.38	----	Based on actual Year 2012 data Estimated from the Year 2012 surcharge inflated to Year 2027 dollars
	----	$28.77	
ALCOSAN Wet Weather Plan Costs	----	$32.50	Uniform number spread across ALCOSAN service area for ALCOSAN-only DWWP cost ($1.5 Billion). See ALCOSAN Draft WWP
Chartiers Creek Municipal Surcharge with Recommended Alternative Cost (Debt Service)	----	$5.32	Includes $1,100,000 capital cost for POC C-55-02 Alternative 4A
Chartiers Creek Municipal Surcharge with Recommended Alternative Cost (O&M)	----	$0.25	
Robinson Run Municipal Surcharge with Recommended Alternative Cost (Debt Service)	----	$1.12	Reference Robinson Run Feasibility Study
Robinson Run Municipal Surcharge with Recommended Alternative Cost (O&M)	----	$0.07	Reference Robinson Run Feasibility Study
Thoms Run Municipal Surcharge with Recommended Alternative Cost (Debt Service)	----	$0.20	Reference Thoms Run Feasibility Study
Thoms Run Municipal Surcharge with Recommended Alternative Cost (O&M)	----	$0.00	Reference Thoms Run Feasibility Study
TOTAL COST / HOUSEHOLD	**$42.98**	**$106.73**	**Per Household per Month**

* Year 2012 user rates were utilized in this analysis to maintain consistency across all sewersheds

AFFORDIBILITY

GIVEN

Current Consumer Cost = $516 per year
Additional Cost per WWP / FS = $765 per year
Projected Consumer Cost = $1,281 per year
Future Number of Customers = 7,964
Projected Median Income = $117,883

CALCULATE

Financial Burden Ratio = 1.09%

As illustrated by the calculation above, the maximum debt exposure of South Fayette distributed among the projected population results in a low financial burden (Per EPA's CSO Policy Guidelines).

TABLE E-8: ESTIMATED ANNUAL COST PER HOUSEHOLD AFTER IMPLEMENTATION OF RECOMMENDED ALTERNATIVE

POC	Current Annual Cost Per Household	Cost Per Household After Recommended Alternative Implementation	Notes/Comments
C-54-16	**$516**	**$1,281**	Refer to User Cost Analysis
C-45B-04	**$516**	**$1,281**	Refer to User Cost Analysis
C-54-12	**$516**	**$1,281**	Refer to User Cost Analysis

* The MATSF Fayette charges all customers uniformly, regardless of sewer shed. The user cost analysis was completed based upon the overall Township debt exposure with incorporation of all projects in all three (3) POC sewersheds. Please refer to the User Cost Analysis in Section 9.3.

9.0 IMPLEMENATION SCHEDULE

All alternatives in the Study are contingent upon the approved ALCOSAN Wet Weather Plan, the WWP implementation schedule, and consideration to further evaluation of the MATSF sewer system. Inflow and infiltration removal projects, including lateral inspection programs and sewer lining projects, are ongoing within the Township and resulting system impacts will be monitored and evaluated. When final approval and design of the ALCOSAN's Chartiers Creek relief interceptor is complete, the Township will be able to better plan for integration of internal municipal sewer projects.

With that said, the Township plans to be proactive and complete sewer replacement and rehabilitation projects in known problem areas. An emergency siphon upstream of the Chartiers Creek Pump Station was recommended in the ALCOSAN Feasibility Study submission and the Township has already designed and constructed the project. In addition, MATSF recently awarded Contracts totaling just under $1.0 Million for upgrades to the Chartiers Creek Pump Station that will allow for increased reliability over the next 2 decades.

There are a few cases in which the H&H Model predicts overflowing and or surcharging conditions in the 10-year, 24-hour storm in problem areas that the Township does not feel exist. In these cases, further investigation and evaluation is necessary before designing and installing sanitary sewer infrastructure.

Finally, MATSF plans to continue to aggressively address issues associated with excessive infiltration/inflow. As pointed out earlier, the Authority recently expanded their private sector lateral inspection program from time of sale to an area wide program. While the capital alternatives described in this report do not rely on future I/I reduction, it will be a priority of the Authority to reduce extraneous flow to the degree possible. As such, impact of any future I/I reduction may result in certain modification of the alternatives during the design phase.

The following is a draft implementation schedule based for the recommended MATSF POC C-54-16 alternative. This schedule is subject to change in accordance with further evaluation of system conditions and overall alternatives, as well as the ALCOSAN Wet Weather Plan implementation schedule. It is the intent of the MATSF to continue I&I removal programs and update the evaluation of system conditions. No alternative is deemed critical or absolutely necessary, and will be re-evaluated prior to design.

Table E-9
Implementation Schedule

Schedule Item	Description	Date of Completion
1	Submit Feasibility Study to Regulatory Agencies	July 2013
2	Regulatory Agency Plan approval	July 2014
3	Confirm basis of design and evaluation of system conditions	July 2016
4	Negotiation/Agreement with communities for POC C-55-02 joint interceptor and siphon	July 2017
5	Design and build lower Millers Run / Verner Ave parallel sewers	July 2024
6	Design and build upper Millers Run parallel sewer	July 2025
7	Design and build facilities to convey Millers Run we weather flow to individually owned / joint siphon to POC C-55-02	July 2026
8	Completion of all projects in accordance with ALCOSAN's completion schedule for the Chartiers Creek Planning Basin	July 2026

The MATSF intends to continue discussion with Upper Saint Clair and the other communities tributary to POC C-55-02 in regard to a joint interceptor and siphon alternative. This Brush Run area could be the last on the list of projects to complete in MATSF, leaving time for further evaluation and negotiation. On the other hand, depending on ALCOSAN's Chartiers Creek Interceptor capacity improvements and other factors, MATSF would consider accelerating this schedule in conjunction with the other tributary communities.

Recently, ALCOSAN, in conjunction with the Allegheny Conference, completed a regionalization study that had as a key recommendation that ALCOSAN consider expanding their ownership of multi-municipal trunk/interceptor sewers. To the extent that ALCOSAN is willing to do so, MATSF would actively participate in any discussion in that regard. In particular, the multi-municipal sewer alternative for connection to C-55-02 being considered by MATSF, USC and other tributary communities might be a good example of where an ALCOSAN ownership expansion might make sense, at least to the upper end of MATSF's proposed involvement in that sewer in the vicinity of Coal Run. Another area that seems appropriate for ALCOSAN's direct ownership would be the Robinson Run Interceptor tributary to C45B-04.

1.0 INTRODUCTION

The Pennsylvania Clean Streams Law of 1937 and the Federal Clean Water Act (CWA) establishes criterion governing communities' sewage conveyance and treatment systems. Specifically, the Pennsylvania Clean Streams Law prohibits overflows from separate sanitary sewers and the Federal CWA through the Combined Sewer Policy, and requires certain controls be applied to reduce pollutants from combined sewer systems. For the 83 communities tributary to the Allegheny County Sanitary Authority (ALCOSAN) Conveyance and Collection System, ongoing non-compliance with these two laws resulted in the issuance of Administrative Consent Orders (ACOs) and Consent Order and Agreements (COAs) in early 2004 by the Allegheny County Health Department (ACHD) and Pennsylvania Department of Environmental Protection (PADEP), respectively. Subsequent to that, in January 2008, ALCOSAN, ACHD, and the Pennsylvania Department of Environmental Protection (PADEP) entered into a Consent Decree (CD) with the Federal Department of Justice (DOJ) and the United States Environmental Protection Agency (USEPA) to prepare and submit an approvable Wet Weather Plan (WWP) by January 2013.

These ACOs, COAs (collectively known as the Orders) and the ALCOSAN CD require the respective entities to gather data and information, characterize their respective systems, analyze and perform alternative analyses, and submit feasibility studies addressing work required to bring the systems into compliance with the Pennsylvania Clean Streams Law and the CWA, eliminate sanitary sewer overflows (SSOs), and fulfill the Pennsylvania and USEPA combined sewer overflow (CSO) Policy obligations. ALCOSAN's CD not only requires them to submit a plan to the regulators by January 2013 that outlines a program to comply with these laws but also requires the facilities, including the municipal facilities, to be constructed by 2026. The tributary municipalities are required to submit their feasibility studies to the regulators on or before July 2013 (within six months of ALCOSAN submitting its plan). These plans, which should be developed in coordination with ALCOSAN and all the municipalities that contribute flow to the ALCOSAN point of connection (POC), and should retain, store, convey and/or treat sewage

overflows that either ALCOSAN cannot accommodate or that ALCOSAN can address but that the municipalities decide to address. It is understood that the Feasibility Studies will serve as the basis for the next round of Orders that will mandate implementation of selected/approved alternatives. This report addresses the internal municipal alternatives that were evaluated as part of the feasibility study. Any alternatives developed as part of an ALCOSAN POC (also known as "complex") sewershed feasibility studies are included in the appendices of this report.

1.1 Feasibility Study Objectives

The Feasibility Study objectives for the Municipal Authority of the Township of South Fayette (MATSF) system were generated from a combination of objectives outlined in the Feasibility Study Working Group (FSWG) Document 027 and the PADEP's Draft Feasibility Study Outline. The objectives of this feasibility study include:

- Participate and cooperate with ALCOSAN in the development of a WWP.
- July 2013 submit a municipal flow management compliance plan (Feasibility Study), which evaluates a range of practicable alternatives to:
  - Meet CWA and Clean Stream Law requirements
  - Eliminate SSOs
  - Fulfill Pennsylvania and USEPA CSO Policy obligations
  - Develop a Feasibility Study with other municipalities within the same ALCOSAN POC sewershed
  - Develop short-term and long-term flow management proposals that will meet the Municipality's flow management objectives through September 30, 2046

In response to SSOs within a given system, ACOs were negotiated between the municipalities tributary to the ALCOSAN service area and the ACHD. The ACO required certain tasks including Assessment (Phase I) and Flow Monitoring Plan (Phase II) on each of the municipal systems. Semi-Annual Progress Reporting was a mandated requirement of the ACO.

As part of a collaborative, multi-municipal effort, 3 Rivers Wet Weather (3RWW) developed a Flow Monitoring Working Group (FMWG) consisting of approximately 30 to 40 representatives made up of municipal managers, representatives from municipal engineering firms, regulatory agencies, 3RWW, and ALCOSAN. The FMWG ultimately developed the municipal Flow Monitoring Plan that was submitted to the regulatory agencies and implemented in 2008 and 2009.

After submittal of the Flow Monitoring Plan, the 3RWW FMWG evolved into the FSWG. The FSWG developed an engineering approach to the Feasibility Study that included a ten-task synopsis of the ACO requirements as follows:

- System Inventory/System Investigation;
- Flow Monitoring Program;
- System Characterization;
- System Capacity Analysis;
- System Infiltration/Inflow Investigation (separate sanitary sewer systems);
  - Initial Infiltration/Inflow Screening;
  - Detailed Infiltration/Inflow Investigation;
- Alternative Evaluation (1) – Internal Municipal Alternatives;
- Alternative Evaluation (2) – Multi-Municipal Alternatives (integrate regional alternatives);
- Compare/Review Internal/Multi-Municipal Alternatives with Regional/ALCOSAN System Alternatives;
- Financial and Institutional Analysis;
  - Financial Analysis;
  - Institutional Analysis; and
- Feasibility Study Report(s).

These tasks are defined in greater detail in the FSWG Document 002 dated June 9, 2009. As noted above, the final task is a Feasibility Study Report.

1.2 Report Contents

This report is intended to present a description of the work tasks performed, as well as the results of the tasks that culminate in recommended wet weather control alternatives. This report presents the Township of South Fayette information regarding the development, evaluation, and selection of recommended alternative for wet weather control. This Feasibility Study Report was prepared according to guidelines provided in the 3RWW FSWG Documents, which were developed for such purpose, in cooperation with the participating municipalities.

This report is divided into eleven sections. Details on the information contained in each section are described below:

- Section 1.0 presents the objectives of this Feasibility Study.
- Section 2.0 provides a discussion of the regulatory background and requirements under which this Feasibility Study was prepared, the role that the 3RWW FSWG played in the development of this study, and an overview of municipal coordination.
- Section 3.0 provides a description of the ALCOSAN planning basins, the existing municipal systems that are the subject of this study, and the existing overflows that occur in those systems.
- Section 4.0 describes the 2008 Flow Monitoring Data that was collected for the system, provides a summary of sewer system investigations that were conducted, and discusses any defects that were identified and how they were addressed.
- Section 5.0 explains the development of the hydraulic analysis tools that were used and the model conditions that were developed and evaluated as a basis for alternative development.

- Section 6.0 presents the water quality issues that are the reason behind the need for controlling sewer overflows. Design storm development and the levels of control that will be evaluated are discussed.
- Section 7.0 goes through the alternative development process for alternatives that would be implemented entirely within the municipality including the technology screening and site screening processes, alternative formation, alternative evaluation criteria, cost estimating, green infrastructure, and alternative selection.
- Section 8.0 is similar to Section 8.0 except that it describes alternatives that were developed that would have to be implemented in and by more than one municipality in order to be effective for the control of overflows at the downstream ALCOSAN connection point.
- Section 9.0 provides a discussion of how costs will be allocated for the implementation of the recommended alternative including details on financial responsibility agreements, affordability analyses, and funding alternatives.
- Section 10.0 explains how the recommended alternative meshes with the internal municipal projects that are implemented separately from the recommended alternative, and how it will mesh with the overall regional ALCOSAN Recommended Alternative.
- Section 11.0 includes details about how the recommended alternative will be implemented including schedule, cost sharing agreements, and O&M agreements.

2.0 BACKGROUND

As discussed in Section 1, this Feasibility Study is the culmination of numerous studies and activities and will fulfill the requirements of the MATSF Administrative Consent Order (ACO). Details of the regulatory requirements and activities performed leading to this Feasibility Study are presented in the following sections.

2.1 Regulatory Requirements

The regulatory requirements to be met are outlined in the municipal ACO/COA as well as in ALCOSAN's CD. The applicable sections of these documents are presented below.

2.1.1 ACO/COA Requirements for Municipalities

The ACO and COA include a section entitled "Feasibility Study in Conjunction with an ALCOSAN Enforcement Order", which has the following requirement:

COA /ACO Definition (Section 15 of ACO)

i. *Establishing with ALCOSAN the quantity and rate of sewage flow from the municipality that ALCOSAN will be able to retain, store, convey and treat upon implementation of a Wet Weather Plan and/or LTCP* [Long-Term Control Plan]*; and*
ii. *Developing a feasibility study with an alternatives analysis evaluating the Municipality's options to construct sewage facilities necessary to retain, store, convey and treat sewage flows from the Municipality including, but not limited to, any sewage flows that: (A) ALCOSAN cannot accommodate or (B) ALCOSAN could accommodate, but which the Municipality decides to address in a separate manner ("Feasibility Study").*
iii. *The Municipality shall submit to ACHD the Feasibility Study within six (6) months after ALCOSAN submits a Wet Weather Plan and/or LTCP to EPA and/or DEP as*

required by the Enforcement Order. The Feasibility Study shall evaluate a range of alternatives, including but not limited to, alternatives to eliminate SSOs, and shall estimate the cost and time necessary to implement or construct each alternative.

The section in the ACO on operations and maintenance also includes language that requires separate sewer systems to plan for adequate system capacities in order to eliminate SSOs. This requirement is reiterated below.

Operation and Maintenance Program (Section 17 of ACO)

(iii) Take all feasible steps to provide required capacity(ies) to eliminate SSOs in its Sanitary Sewer System and to plan for additional capacity, or other means to eliminate such SSOs.

2.1.2 Consent Decree Requirements as it Relates to Design Flows for Municipalities

ALCOSAN's Consent Decree requires the following:

A. ***Compliance Requirements:***

1. *Within the time frames established as part of the Wet Weather Plan process described in this Consent Decree, ALCOSAN shall:…*
   a. *construct and operate conveyance, storage, and treatment facilities for flows from the Regional Collection System in accordance with Section VI, Subsections B (Planning, Design, and Construction Requirements) and C (Operational Requirements).*

B. ***Planning, Design, and Construction Requirements***

1. *Sanitary Sewer System Flow Within the time frames established as part of the Wet Weather Plan process described below, but in no event later than September 30,*

2026, ALCOSAN shall design and construct facilities for the Conveyance and Treatment System sufficient to:……

a. *eliminate all Sanitary Sewer Overflows from the Conveyance and Treatment System; and*

b. *capture and provide Treatment, for at least twenty years after completion of construction of the remedial controls, and implementation of the remedial activities, required under the Wet Weather Plan approved by the Plaintiffs, for a flow volume equivalent to all of the Sanitary Sewer System flow that is generated in the Regional Collection System. Notwithstanding the foregoing, ALCOSAN need not design and construct facilities to capture and provide Treatment for a given amount of Sanitary Sewer System flow from a Customer Municipality within the Regional Collection System if:*

   i. *the Customer Municipality has constructed or is legally committed under an Enforceable Document to construct facilities to capture and provide Treatment for that amount of Sanitary Sewer System flow; or*

   ii. *insufficient capacity exists to convey a given amount of flow from the Customer Municipality to the Conveyance and Treatment System, the Customer Municipality certifies that it does not intend to create and/or cannot create capacity sufficient to convey that given amount of flow to the Conveyance and Treatment System, and PADEP and EPA have determined that the Customer Municipality can comply with the Clean Water Act through means other than conveying this amount of flow to the Conveyance and Treatment System; and*

   iii. *ALCOSAN submits a proposal to the Plaintiffs to exclude such municipal flow on the grounds set forth above in Subparagraphs 17(b)(i) or 17(b)(ii), with sufficient detail for review and approval by EPA and PADEP, and for review and comment by ACHD, in accordance with Section VIII (Review and Approval of Submittals); and*

iv. EPA and PADEP approve of ALCOSAN's proposal to exclude the municipal flow from its planning, design, and construction of such facilities.

2. *Combined Sewer System Flow Within the time frames established as part of the Wet Weather Plan process described below, but in no event later than September 30, 2026, ALCOSAN shall design and construct facilities for the Conveyance and Treatment System sufficient to capture and treat flows from the Combined Sewer System for at least twenty years after completion of construction of the remedial controls, and implementation of the remedial activities, required under the Wet Weather Plan approved by the Plaintiffs, as follows:*

   a. Demonstration Approach – If ALCOSAN submits the Wet Weather Plan utilizing the Demonstration Approach pursuant to Section VI, Subsections H (Wet Weather Plan – General Requirements) and J (Wet Weather Plan – Demonstration Approach), and EPA's Combined Sewer Overflow Policy, then: ALCOSAN shall design and construct facilities for the Conveyance and Treatment System sufficient to capture and provide Treatment to the volumetric equivalent of all Peak Dry Weather Flow generated in the Regional Collection System; and, for the volumetric equivalent of all Wet Weather Flow generated in the Combined Sewer System portion of the Regional Collection System, ALCOSAN shall design and construct facilities that will meet the requirements of the Clean Water Act, consistent with EPA's Combined Sewer Overflow Policy. Notwithstanding the foregoing, ALCOSAN need not design and construct facilities to capture and provide such treatment to a given amount of Combined Sewer System flow from a Customer Municipality within the Regional Collection System if:

i. the Customer Municipality has constructed or is legally committed under an Enforceable Document to construct facilities to achieve such capture and treatment; or

ii. insufficient capacity exists to convey a given amount of flow from the Customer Municipality to the Conveyance and Treatment System, the Customer Municipality certifies that it does not intend to create and/or cannot create capacity sufficient to convey that given amount of flow to the Conveyance and Treatment System, and PADEP and EPA have determined that the Customer Municipality can comply with the Clean Water Act through means other than conveying this amount of flow to the Conveyance and Treatment System; and

iii. ALCOSAN submits a proposal to the Plaintiffs to exclude such municipal flow on the grounds set forth above in Subparagraphs 18(a)(i) or 18(a)(ii), with sufficient detail for review and approval by EPA and PADEP, and for review and comment by ACHD, in accordance with Section VIII (Review and Approval of Submittals); and

iv. EPA and PADEP approve of ALCOSAN's proposal to exclude the municipal flow from its planning, design, and construction of such facilities.

N. Planning, Design, and Construction Requirements

75. Customer Municipality Input on Managing Sewer System Flow. As part of the evaluation of remedial controls and remedial activities that ALCOSAN shall undertake in developing the Wet Weather Plan in accordance with Appendix S (Wet Weather Plan Requirements for Demonstration Approach) or Appendix V (Wet Weather Plan Requirements for Demonstration Approach), ALCOSAN shall solicit input from each Customer Municipality on the following:

a. the forecasts of total flow (in gallons per day and, if available, in gallons-per-day-per-inch-mile of sewer line), that each Point of Connection will contribute to the Conveyance and Treatment System upon implementation of the Wet Weather Plan, and the total service population or each Point of Connection;

b. a characterization of the flows from both the contributing Combined Sewer System and/or the Sanitary Sewer System at each Point of Connection, a description of how each such characterization was prepared, and a description of how such flows will be managed and/or maintained at each Point of Connection; and

c. a program for managing contributions from the customer Municipality so that such contributions to the Conveyance and Treatment System do not result in exceedances of system capacity or do not preclude compliance with the requirements of the clean Water Act, consistent with EPA's Combined Sewer Overflow Policy.

2.2 Role of the FSWG

The role of the FSWG was to facilitate coordination between the municipalities and the regulatory agencies and to provide guidance to the municipalities through the course of achieving compliance with regulatory requirements. The FSWG coordinated at FSWG meetings with PADEP specifically regarding the Feasibility Studies. The PADEP provided input on what they want to be addressed by each municipality in the feasibility studies. These points are as follows:

- Describe the combined sewer system (CSS) hydraulic characterization efforts, hydraulic characterization parameters, tools and other evaluation and estimation tools used by the Municipality to develop its Feasibility Study.

- Identify and summarize all additional flow monitoring efforts conducted (and other related flow information utilized by a Municipality) which is in addition to the ALCOSAN sponsored flow monitoring program.
- For each ALCOSAN POC-shed describe and comment on the inter-municipal and ALCOSAN cooperation and coordination efforts for which the Municipality has actively participated to develop its Feasibility Study.
- For each POC-shed briefly outline the flow management proposals developed with all municipalities and ALCOSAN. Should another municipality fail to propose Feasibility Study improvements the Municipality deems necessary to fulfill the Feasibility Study objectives, then the Municipality should outline those for ACHD and/or Department consideration.

The following sections describe the FSWG activities in more detail.

2.2.1 Objectives of the FSWG

The 3RWW FSWG evolved from the 3RWW FMWG to continue facilitation and coordination efforts with the 83 municipalities to develop this feasibility study. The group's objectives were as follows:

- To facilitate the municipal obligations to achieve compliance with the ACO/COA request for municipal Feasibility Studies.
- To establish a coordinated schedule.
- To facilitate identification of cost-effective and sustainable solutions.
- To facilitate technical, financial and institutional solutions.
- To develop standardized processes and reporting.
- To develop objectives and identify deliverables and due dates for Feasibility Study elements.

- To establish a reasonable schedule for the municipal Feasibility Studies in conjunction with ALCOSAN and the Basin Planners.
- To serve as a venue/forum for municipal engineers, ALCOSAN, Basin Planners, Agencies, 3RWW, 3RWW/Program Management (3RWW/PM) Team, for discussion of items related to Feasibility Studies.
- To foster intra- and inter-basin collaboration.
- To address issues from the Basin Planners.
- To facilitate utilization of the ALCOSAN-provided tools such as the hydraulic models and costing tool by the municipal engineer.
- To develop information to engage municipal/authority boards recording the Feasibility Study process.
- To develop ways to look at Feasibility Studies on a sewershed basis.
- To involve municipal managers in the Feasibility Study process.
- To provide a forum for sharing tools and techniques necessary to complete the Feasibility Studies.
- To achieve compliance with the ACO/COA.

2.2.2 Task List Developed by the FSWG

The 3RWW FSWG developed a detailed outline of tasks that will need to be completed by the municipalities in order to meet regulatory requirements. They are listed below:

Task 1 – System Inventory/System Investigation

Most of this work should already be completed by the municipality. Any data gaps identified in the later phases due to incomplete inventory and/or investigation will necessitate additional work by the municipality. (The ACO/COA require completion: physical survey by 5/31/07, closed-circuit television (CCTV) by 5/31/10, defect repairs by 11/30/10)

Outcomes/Deliverables:

- Geographic information systems (GIS) Map of Sewer System.

- Identify defects related to pipe structure, capacity restriction, and inflow.

Task 2 – Flow Monitoring Program

Subtasks:

- Regional Collection System Flow Monitoring Program administered by ALCOSAN and coordinated with Municipalities and Authorities (municipalities) by the Flow Monitoring Implementation Team and Flow Monitoring Working Group.
- QA/QC review by ALCOSAN and 3RWW program teams.
- Initial data review for data quality and consistency by the municipal engineers, begin investigation/resolution of any observed discrepancies or unexpected results.
- Acceptance of flow monitoring data by municipalities.

Outcomes/Deliverables:

- QA/QC'd flow monitoring data (glass box data set).
- Flow monitoring data summary and report submittal to ACHD and PADEP.

Task 3 – System Characterization

Required Inputs:

- Deconstructed hydrographs from 3RWW and ALCOSAN
- ALCOSAN Basin Planner model of portion of sewershed (if desired)

Subtasks:

- Confirm delineation of POC and flow-monitor sewersheds.
- Deconstruct or obtain deconstructed storm hydrographs.
- Evaluate flow data consistency to identify abnormalities. Identify any additional field work needed to ensure understanding of system connectivity.
- Identify any stream inflows.

- Develop hydrologic and hydraulic (H&H) Tools or H&H Model – municipality to choose best methodology from the following four basic approaches –
  - develop a regression analysis tool,
  - develop a unit hydrograph from flow data,
  - develop a synthetic unit hydrograph (RTK or other) using available SHAPE Program from ALCOSAN/CDM, and/or
  - develop full hydraulic model or extend the ALCOSAN model to include upstream areas not covered by the Basin Planner's model.
- Calibrate/Verify H&H tools or models using info from the flow monitoring program for dry and wet weather flows.
- Dry weather evaluation.
- Wet weather evaluation.
- For areas with insufficient flow monitoring data, either collect additional data or use data from similar monitored areas to estimate flows.
- Identify and develop methodology for estimating dry and wet weather flows for unmonitored areas.
- Coordinate the chosen approach with ALCOSAN's Basin Planner.

Outcomes/Deliverables:

- Calibrated Analysis Tool or H&H Model.
- Capture values for each flow monitor.
- Wet weather/runoff derived inflow and infiltration (RDII) volumes and peak rates for monitored storms.
- Volume, frequency and duration for each overflow during monitored events.
- Dry weather flows (24-hour volume and peak flow).
- Estimate dry and wet weather flows for unmonitored areas using similitude.

Task 4 – System Capacity Analysis

Required Inputs:

- Regulatory design criteria and compliance requirements for both separate sanitary systems (SSS) and CSS from PADEP and ACHD
- Identify existing inter-municipal and ALCOSAN sewer agreements for upstream and downstream sewage conveyance and sewer ownership.
- Preliminary flows (FSWG definition) from upstream and downstream municipalities (iterative process as Task 4 is refined by all municipalities)

Subtasks:

- Establish baseline conditions that include near-term improvements and application of nine-minimum controls (CSS) and Operation and Maintenance (O&M) plan (for SSS).
- Identify population growth and commercial development and corresponding future flows for the chosen design year (2046) and coordinate with Basin Planner.
- Wet weather evaluation for selected rainfall events using regulatory criteria. Perform evaluation of the sewer system to determine existing capacity and compare with future conditions. For combined sewer systems show levels of surcharge for each design storm. Also, for combined sewer systems develop a typical year's overflow statistics for each outfall.
- Share preliminary flows (FSWG definition) with upstream and downstream municipalities.
- Identify capacity deficiencies.
- Consider capacity (deficiencies) in regard to existing inter-municipal sewer agreements.
- Identify the need for inter-municipal sewer agreements with upstream and downstream municipalities and refer to the municipal manager and board for the commencement of discussions.

- Identify required capacities. For combined sewer systems, municipalities can determine "level of service" to provide to its customers.
- Estimate overflow volumes and peak rates for various flow conditions (typical year/design storms as discussed in FSWG Document 003).
- Plot wet weather control alternatives for each design storm or level of service versus present worth costs to develop a cost benefit analysis in order to identify the cost effective "knee of the curve" for the minimum design storm."
- Coordinate design storm selection (SSS) (knee-of-the-curve results) with other municipalities and ALCOSAN.
- Coordinate with ALCOSAN and submit consolidated design storm for review, comment and approval.

Outcomes/Deliverables:

- Map of sewer surcharge levels (for CSS).
- Map of areas of deficient sewer capacity (for SSS).
- Annual overflow statistics for combined sewer overflow (CSO) outfalls.
- Quantification of peak rates and volumes lost from the system (for SSS).
- Identification and understanding of current inter-municipal ownership of sewers and service agreements.
- Information for completing alternative development and evaluation.
- Preliminary flows (current and future) if all flow is conveyed to ALCOSAN without regard to actual intra or inter-municipal pipe conveyance capacity or deficiencies for the 1, 2, 5 & 10 year design storm (SSS) and the typical year (for CSS) – FSWG Definition (provide to ALCOSAN and upstream/downstream municipalities).
- Submission of Design Storm recommendations to Agencies (PADEP and ACHD) for review and acceptance of design storm control level.

Task 5 – System Infiltration/Inflow Investigation (separate sanitary sewer systems)

This Task to proceed in parallel with Tasks 3 and 4.

Task 5A – Initial Infiltration/Inflow Screening

Required Inputs:

- Flow monitoring data.
- System characteristics (area, footage by diameter, population).

Subtasks:

- Define criteria for screening process.
  - Peaking factor, gpdim, gpad, gpcd, "C".
  - SSOs and/or basement flooding issues.
  - Capacity deficiencies.
  - Capacity allocation issues.
- Apply screening criteria to metershed flow data.
- Determine need for flow isolation studies.
- Prepare approach and methodology.
- Outline schedule to perform the study.

Outcomes/Deliverables:

- Quantification and distribution of Infiltration/Inflow on a metershed basis.
- Decision whether to perform a flow isolation study.
- Plan for I/I flow isolation study (if needed).

Task 5B – Detailed Infiltration/Inflow Investigation

Required Inputs:

- Results from Task 5A screening.

Subtasks:

- Perform nighttime flow isolation field study.
- Analysis of flow isolation field study results.

Outcomes/Deliverables:

- Quantification and distribution of Infiltration/Inflow on a sub-unit basis.

Task 6 – Alternative Evaluation (1) – Internal Municipal Alternatives

The identification and development of control alternatives for Municipal separate and combined systems, including internal municipal CSOs and SSOs, was coordinated with ALCOSAN, other municipalities in the sewershed, and the FSWG. At this point each municipality could look at what is required to resolve the deficiencies internal to the municipality first (Task 6) and then look regionally (Task 7).

Required Inputs:

- Alternative technology list with preliminary design and performance criteria.
- ALCOSAN's cost tool (Part of ALCOSAN Technical Memo 6 [TM-6]).
- Task 4 Outcomes and Deliverables.
- Quantification and distribution of Infiltration/Inflow on a sub-unit basis.
- Preliminary flows (current and future) if all flow is conveyed to ALCOSAN without regard to actual intra or inter-municipal pipe conveyance capacity or deficiencies (FSWG Definition).
- ALCOSAN Transport and Treat cost.
- ALCOSAN's proposed billing basis (surcharge vs. water consumption).
- Water quality objectives (internal municipal CSOs).
- Agency (PADEP and ACHD) comments/approval of design storm control levels

Subtasks:

- FSWG review of all technologies

- Listing of pros and cons.
- Develop short list of technologies for the municipalities to consider.

- Municipal screening of technology(ies)
  - Use surviving technologies for further alternative formation.
- Develop evaluation criteria – Cost & Non-cost Factors.
  - Define all the non-cost factors (including siting/zoning, expandability of sites, operability, work force training, community acceptability, etc.).
  - Include municipality assigned weight for each factor.
  - Obtain buy-in from stakeholders and municipality.
- Use surviving technologies (including green solutions) to formulate feasible alternatives for municipal systems for each of the design storms and CSS surcharge levels or SSS deficient sewers.
  - Transport (parallel relief or other).
  - Storage (basin or tunnel).
  - Flow reduction (I/I) removal.
  - Satellite treatment (combined systems).
- Develop Present Worth Costs
  - Capital costs and O&M costs.
  - Compute present worth value (use common interest rates and term). (FSWG discussion issue: Consider design life/ salvage value?).
  - The FSWG will review ALCOSAN's cost tool (Part of TM-6) to ensure the tool is applicable to municipalities. Supplement with additional cost tools required to develop internal municipal alternatives.
- Apply evaluation criteria to alternatives and rank all alternatives.
- Select "highest ranked" wet weather control alternative(s) for the internal municipal alternative.
- Present selected alternatives to local governing body at a public meeting for review, comment and consensus.

Outcomes/Deliverables:

- Internal municipal sewershed based evaluation (size, layout and cost) and ranking of alternative solutions including:
  - Convey all flow to ALCOSAN.
  - Store and convey all flow to ALCOSAN.
  - Flow Reduction.
  - Satellite Treatment (Combined systems only).
- Identification of highest ranked alternative(s) for municipality's internal option.
- If the municipality is the only contributor to a point-of-connection, this analysis results in interim design flows from the municipality to ALCOSAN with control alternatives for the ALCOSAN Basin Planner's use.

Task 7 – Alternative Evaluation (2) – Multi-Municipal Alternatives (integrate regional alternatives)

After completing, or concurrent with Task 6, the municipality was in a position to work with other neighboring municipalities to identify and analyze cooperative ways to combine their respective wet weather solutions. This resulted in a series of multi-municipal alternatives. The identification and development of these alternatives was facilitated by the FSWG and the Basin Planner in order to ensure that the procedure for alternative development was consistent with both local and regional approaches. Required Inputs:

- Tasks 4 and 5 Outcomes and Deliverables.
- Alternative technology list with preliminary design and performance criteria.
- ALCOSAN's cost tool (Part of Technical Memorandum TM-6).
- Quantification and distribution of Infiltration/Inflow on a sub-unit basis.
- Preliminary flows (current and future) if all flow is conveyed to ALCOSAN without regard to actual intra or inter-municipal pipe conveyance capacity or deficiencies (FSWG Definition).

- ALCOSAN Transport and Treat cost.
- ALCOSAN's proposed billing basis (surcharge vs. water consumption).
- Water quality objectives (internal municipal CSOs).
- Highest ranked alternative(s) for municipality's internal option, when available.

Subtasks:

- Develop process and schedule for multi-municipal evaluations.
- FSWG review of all technologies.
  - Listing of pros and cons.
  - Develop short list of technologies for each group of municipalities to consider.
- Screen technology(ies).
  - Use surviving technologies for further alternative formation.
- Continue discussions on and development of multi-municipal sewer agreements with municipal manager and board.
- Develop evaluation criteria – Cost & Non-cost factors.
  - Define all the non-cost factors (including siting/zoning, operability, work force training, community acceptability, etc.).
  - Include municipality assigned weight for each factor.
  - Obtain buy-in from stakeholders and municipalities.
- Use surviving technologies (including green solutions) to formulate feasible alternatives for multi-municipal systems.
  - Transport (parallel relief or other).
  - Storage (basin or tunnel).
  - Flow reduction (I/I) removal.
  - Satellite treatment (combined systems).
- Develop Present Worth Costs –
- Capital costs and O&M costs.

  - Compute present worth value (use common interest rates and term). (FSWG discussion issue: Consider design life/ salvage value?).
  - The FSWG will review ALCOSAN's cost tool (Part of ALCOSAN TM-6) to ensure the tool is applicable to multi-municipal alternatives. Supplement with additional cost tools required to develop multi-municipal alternatives.
- Apply evaluation criteria to alternatives and rank all alternatives.
- Select "highest ranked" wet weather control alternative(s) for the multi-municipal alternative.
- Work with municipal managers to refine selected alternative scope and required multi-municipal sewer agreement outlining cost sharing, ownership, O&M, future capacity requirements for proposed solutions.
- Present alternatives to local governing body at a public meeting for review, comment and consensus.

Outcomes/Deliverables:

- Identification and understanding of required multi-municipal sewer agreements and ownership of sewers.
- Multi-municipal sewershed based evaluation (size, layout and cost)and ranking of alternative solutions including:
  - Convey all flow to ALCOSAN.
  - Store and convey all flow to ALCOSAN.
  - Flow Reduction.
  - Satellite Treatment (Combined systems only).
- Identify highest ranked alternative for the multi-municipal approach. Will likely include the internal municipal alternatives as a subset.
- Size, layout and cost of highest ranked alternative for municipality's multi-municipal (regional) option. It is possible to have 2 best alternatives.

- Interim design flows (for municipalities choosing a multi-municipal approach) to ALCOSAN Basin Planners.
- Draft multi-municipal sewer agreement outlining cost sharing, ownership, O&M, future capacity requirements for proposed solutions.

Task 8 – Compare/Review Internal/Multi-municipal Alternatives with Regional /ALCOSAN System Alternatives

Following the identification of the highest ranked internal municipal alternatives as well as the highest ranked multi-municipal alternatives (Tasks 6 and 7), ALCOSAN's Basin Planner identified a highest ranked "Planning Basin-wide or ALCOSAN System-wide" alternative to implement at/near the Point-of-Connection. Under Task 8, the respective engineering teams further refined and developed alternative approaches including achieving consensus of effectiveness of each alternative in wet weather flow reduction, identifying and quantifying cost elements that affect selection, and preparing a life cycle based present worth cost analysis of surviving alternatives. Alternatives were then be ranked.

Required Inputs:

- ALCOSAN's viable regional alternatives identified by the Basin Planners including preliminary site plans, and design basis/limitations.
- Outcomes/deliverables from Tasks 6 & 7.
- ALCOSAN's updated Transport and Treatment costs and billing basis for each remaining viable alternative under consideration.
- Local governing body acceptance of internal and multi-municipal approaches**.**

Subtasks:

- Review updates to ALCOSAN's transport and treatment costs and billing basis for impact on highest ranked alternatives. Update internal and multi municipal alternatives as needed.

- Meet with Basin Planner and understand Planning Basin and System alternatives for the municipal sewershed.
- Discuss with the Basin Planner how the internal and multi-municipal alternatives affect the Planning Basin and System alternatives.
- Identify economies that can be achieved through modification of the internal and multi-municipal alternatives or the Planning Basin and System alternatives.
- Identify economies that can be achieved through combining of the internal and multi-municipal alternatives and the Planning Basin and System alternatives into joint facilities.
- Present alternatives to local governing body at a public meeting for review, comment and consensus.

Outcomes/Deliverables:

- Coordinated evaluation of alternatives with ALCOSAN.
- Improved cost effectiveness of internal and multi-municipal alternatives and Planning Basin and System alternatives.
- Identify final highest ranked alternative for the municipality (internal/multi-municipal/regional).
- Size, layout and cost of the highest ranked alternative for the municipality(ies).
- Final design flows to ALCOSAN based on the final highest ranked alternative from the municipal feasibility study.

Task 9 – Financial and Institutional Analysis

Task 9A – Financial Analysis

The engineer kept the MATSF manager informed as the ongoing analyses and present worth costs were developed for the highest ranked alternatives in Tasks 6, 7 and 8. On an ongoing basis, each municipality evaluated their ability to pay for or finance their portion of the required

system improvements, if any. If the costs were beyond the municipality's financial abilities, then alternative approaches, such as an institutional change, could be considered.

Required Inputs:

- Project/financing life-cycle term
- Capital Cost
- O & M Cost
- Wet Weather flow surcharge rate structure
- Consecutive Service costs (conveyance, transport and treatment)

Subtasks:

- Determine ability of Municipality to incur additional debt (LGUDA)
- Complete Financial Capacity and affordability analysis
- Identify Revenue Sources and borrowing base
- Identify funding Alternatives
- Calculate User Fees under identified funding alternatives.

Outcomes/Deliverables:

- Clear understanding of implementation costs and how costs will be addressed.
- Understanding of financial requirements.
- User Fee Schedule

Task 9B – Institutional Analysis

Each municipality considered the benefits and reasonableness of their current institutional framework to implement the required obligations of the ACO/COA and the municipal feasibility study. Municipalities could then decide if they can operate, maintain, and provide service for the best interests of their residents and the region.

Required Inputs:

- Existing Administration and management structure
- Existing Ordinances and regulations
- O&M Plan
- Existing Inter-Municipal/Agency Agreements
- Institutional Alternatives

Subtasks:

- Perform asset inventory and valuation
- Identify new or alternative institutional framework necessary to implement the Plan. Alternatives may include:
    - No Change
    - Contracted O & M
    - Form an Authority – There are financial and political advantages to formation of an authority where the sewer system is presently owned and operated by the municipality.
    - Form a Joint Authority – There may be additional efficiencies to be gained by formation of a joint authority where the sewer system is presently owned and operated by a municipality or a small authority.
    - Convey ownership of the system to an Authority – Not every municipality needs to be in the sewer business. The professional operation of the sewer system can provide efficiency and improved operations.
- Identify and prepare, as necessary, new or updated Administrative and O&M Plans.
- Prepare new or updated inter-municipal sewer agreements, as necessary.
- Prepare new or updated municipal ordinances, as necessary.
- Select preferred institutional framework.

Outcomes/Deliverables:

- Municipal selection of the final alternatives, schedules, and costs.

- Municipal consideration of sewer consolidation.
- Understanding of institutional options, advantages and disadvantages.
- Defined best institutional framework for the future.
- Draft Ordinances and Agreements

Task 10 – Feasibility Study Report(s)

Required Inputs:

- Outcomes and deliverables from all prior tasks.

Subtasks:

This Feasibility Study Report is the final product of Task 10. Each municipality with an ACO or COA must submit this study to the governing agency. In addition, if the municipality is part of an ALCOSAN-defined "complex" sewershed, ALCOSAN has requested that the municipality also contribute information to the POC Feasibility Study Report(s) to which it is tributary. The FSWG has developed a uniform format for both types of feasibility studies that the municipality may use as a template.

Outcomes/Deliverables:

- Draft Feasibility Study Report
- Final Feasibility Study Report

2.3 Municipal Coordination Overview

An overall plan for municipal coordination is presented in 3RWW FSWG Document 002A.

South Fayette Authority has actively participated in the Feasibility Study development process for all three (3) of their watersheds tributary to ALCOSAN. The Authority has had a representative at a majority of the Feasibility Study Working Group meetings and Robinson Run

Advisory Group (RRAG) meetings, as well as frequently attending meetings with the communities of the Thoms Run POC C-54-12 and the Brush Run POC C-55-02 meetings.

After the submission of this Study, MATSF intends to continue communication with the parties involved in all four (4) existing and potential POC watersheds.

3.0 EXISTING SYSTEM DESCRIPTION

3.1 Municipal Systems

A description of the existing municipal system is provided below.

3.1.1 Existing Sewershed Description for The Township of South Fayette

3.1.1.1 SERVICE AREA

General Overview

The Municipal Authority of the Township of South Fayette (MATSF) was formed in 1963 to serve the residents of South Fayette Township, Allegheny County, with public sanitary sewer service. MATSF's sole responsibility is to manage the operation of the public sanitary sewer system within its service area. The Township consists of 20.95 square miles with public sanitary sewers serving approximately 50% of the land area, but over 95% of the occupied buildings. The remaining 50% of the land area is currently undeveloped, but steep slopes and certain zoning restrictions reduce future developable area to approximately 1/3 of the total square miles. A segment of the planned Southern Beltway in the western portion of the Township also will reduce the future developable land area.

The Authority owns and operates facilities located throughout the Township of South Fayette. The current system consists of over 130 miles of publicly-owned sewer ranging in size from 6" through 27" in diameter and over 4,000 manholes. The Authority co-owns various multi-municipal sewage conveyance facilities in the Robinson Run and the Thoms Run areas. The jointly-owned Robinson Run facilities are also managed on a day-to-day basis by the Municipal Authority of the Township of South Fayette personnel. Those facilities include an interceptor sewer from McDonald Borough to the ALCOSAN interceptor in the vicinity of Carnegie

(connecting at manhole C45B-04) along with the 2.2 mgd (5.5 mgd peak) Oakdale Pump Station. The Thoms Run interceptor is co-owned with Collier Township Municipal Authority who is responsible for day-to-day operations and maintenance. That sewer connects to the ALCOSAN interceptor at C54-12. The Municipal Authority of the Township of South Fayette also owns and operates the 2.4 mgd (6.0 mgd peak) Chartiers Creek pump station along with two smaller pump stations (Oakridge and South Fayette Park). The Oakridge pump station and South Fayette Park pump station convey wastewater ultimately to the Chartiers Creek pump station, which discharges to the ALCOSAN Chartiers Creek Interceptor system at manhole C54-16.

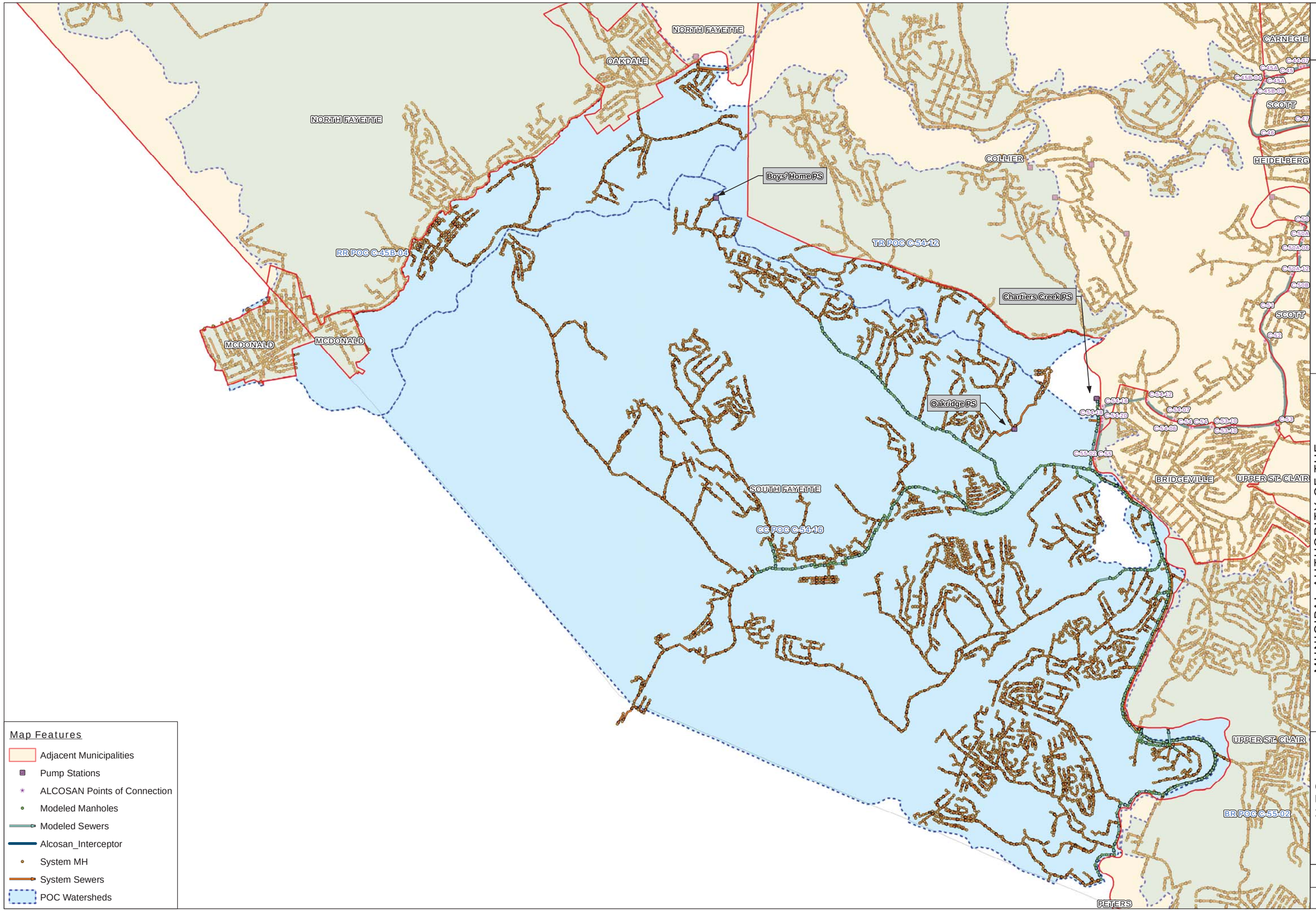
The oldest sewer segments owned and operated by MATSF were built in the late 1950's. However, this is a small portion of the system located within the Fairview Manor plan. The core Chartiers Creek system was constructed commencing in 1973 simultaneous with the construction of a wastewater treatment facility located in the vicinity of Presto-Sygan Road. That core system was completed in 1974 and served approximately 1,800 existing homes and businesses that previously had on-lot systems. The vast majority of that core system was constructed with vitrified clay pipe (VCP) with the exception of certain interceptor sewers that were constructed with reinforced concrete pipe (RCP). As a result of the construction of this core system, significant growth was made possible in that portion of the Township with the Hunting Ridge plan being the first significant development. That plan ultimately added approximately 600 dwelling units to the system between 1974 and 1978. VCP was also utilized for the construction of sewer in that plan. Numerous other residential developments were constructed on a steady basis between 1978 and 1985 at a rate of approximately 100 EDU's per year, ultimately straining the capacity of the treatment facility. Due to this rapid growth, and the projected costs with expanding the treatment facility, MATSF negotiated with ALCOSAN and entered into an agreement in 1983 to allow for the expansion of the ALCOSAN regional system to include South Fayette Township. The aforementioned Chartiers Creek pump station was placed into operation in 1986 which allowed for the decommissioning of the MATSF treatment plant and ultimate sale of that property. While developers subsequently continued to expand the system in this portion of the Township, existing homes within the Robinson Run and Thom Run

watersheds continued to rely on septic systems. As a result of the multi-municipal projects, public sewers were extended to nearly 270 existing South Fayette homes in the Robinson Run area in 1991 and to approximately 90 existing homes and businesses in the Thoms Run area in 1995.

The most recent Township-wide ACT 537 update undertaken by MATSF was adopted by South Fayette Township as their official sewage plan in June of 1992. Since the adoption of that plan, sewers were constructed by MATSF at various locations in the Township to initially address areas with malfunctioning on-lot systems and also to expand the availability of public sewers to other areas with within the township. The vast majority of the recommendations of that ACT 537 plan were implemented by MATSF by 1998. More recently, MATSF has worked with private developers to extend sewers into some of the more remote portions of the Township while avoiding the construction of additional pump stations. Currently, there are 228 dwellings scattered throughout the township that continue to rely on septic systems for wastewater disposal. The most recent public project to reduce the number of on-lot systems was undertaken by MATSF in 2008, serving 17 homes in the Battle Ridge road vicinity.

In 2010, the former Mayview State Hospital was sold to a private entity. The purchaser of the property took appropriate steps in 2011 to convert the existing combined sewer system into a storm system. Only one building remains in use on that property and the new owner constructed a sanitary lateral to the MATSF system for that building, and then subsequently disconnected all other piping to the MATSF system at the site of the Mayview metering station. The elimination of this combined sewer also converted two (2) combined sewer overflows to storm water outfalls. The former combined sewer system and the CSO's were owned by the Commonwealth of Pennsylvania. This also has had a significant reduction on the peak flow rate to MATSF system. Any redevelopment of this property will require construction of new sanitary only sewers.

Figure 3-1 is a map of the entire MATSF collection system, depicting the three (3) watersheds in which MATSF is tributary.


NORTH FAYETTE
OAKDALE
NORTH FAYETTE
CARNEGIE
C-44-07
C-45A
C-45
C-45B-04
C-45A
C-45B-08
SCOTT
C-47
C-46
COLLIER
HEIDELBERG
Boys' Home PS
RR POC C-45B-04
TR POC C-54-12
C-50
C-50A
C-50A-08
C-50A-12
C-50B
Chartiers Creek PS
C-51
SCOTT
C-52
MCDONALD
MCDONALD
C-54-12
C-54-13
C-54-14
C-54-20
C-54-07
C-54-06
C-54-51
C-53-10
C-53
Oakridge PS
C-53-12 C-53
BRIDGEVILLE
UPPER ST. CLAIR
SOUTH FAYETTE
CC POC C-54-16
UPPER ST. CLAIR
BR POC C-53-02
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ALLEGHENY COUNTY, PA
MATSF Sewersheds Map
N.T.S.
SEE FULL SIZE
Author: Bryan Churilla
Date: 7/25/2013
NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
Projection: Lambert Conformal Conic
217-35
FIG 3-1
Map Features
Adjacent Municipalities
Pump Stations
ALCOSAN Points of Connection
Modeled Manholes
Modeled Sewers
Alcosan_Interceptor
System MH
System Sewers
POC Watersheds

Chartiers Creek POC C-54-16 Sewershed

The South Fayette Sewershed is a separate sanitary sewershed tributary to Chartiers Creek Basin in the ALCOSAN service area in Pennsylvania. The total population in the sewershed is approximately 13,425 and the sewershed tributary area is 3,516 acres. Approximately 93% of all MATSF sanitary sewage customers are tributary to ALCOSAN POC C-54-16.

The sewershed tributary to POC C-54-16 is 99.8% owned and operated by the MATSF, as calculated as a ratio of inch-miles of sewer. At the top extent of the southwest portion of the shed, Cecil Township Municipal Authority (CTMA) owns the remaining 0.2% of the tributary sewers. The CTMA customers (approximately 17 EDU's) tributary to the MATSF system are in the vicinity of the municipal boundary along Route 50. MATSF has a long standing agreement with CTMA for up to 300 EDU's in that can be connected to MATSF in the Millers Run vicinity. ALCOSAN accepted the conditions of that agreement when MATSF connected to their system in 1986.

$$\begin{aligned}\text{Percent Owned MATSF} &= (\text{MATSF In-Mi})/(\text{Total In-Mi}) \times 100 \\ &= (1049.4)/(1051.5) \times 100 \\ &= 99.8\%\end{aligned}$$

Robinson Run POC C-45B-04

The second largest of the three (3) watersheds in the Township of South Fayette is the Robinson Run POC C-45B-04 watershed. The service area for the watershed represents eight (8) percent of the total Township land area, and approximately five (5) percent of all MATSF customers are tributary to POC C-45B-04. MATSF currently serves 303 customers through ten (10) separate points of connection into the jointly owned and operated Robinson Run Interceptor sewer.

Please refer to the Robinson Run Feasibility Study for POC C-45B-04 sewershed mapping.

Thoms Run POC C-54-12

The 109 customers in the Thoms Run watershed are served by branch collector sewers which extend from the Thoms Run interceptor, which is aligned along Thoms Run road near the northern border of the Township line. The Thoms Run watershed represents only three (3) percent of the total Township land area, and only two (2) percent of the total 6,120 customers.

For Thoms Run POC C-54-12 sewershed mapping, please refer to the Thoms Run Feasibility Study.

3.1.1.12 SEWER AND INTERCEPTOR

Chartiers Creek POC C-54-16

As seen in Figures 3-1 and 3-2, MATSF's south main interceptor flows along the Chartiers Creek. Its west main interceptor flows along Millers Run. The south branch and west branch join each other approximately 3,000 ft before the Chartiers Pump Station.

In 1993, four (4) Contracts were awarded to construct sewer extensions around the Township that would facilitate development in new watersheds. Contract 93-1 constructed an 8 inch trunk sewer which extends up an unnamed tributary to Chartiers Creek from a point near the end of the Chartiers Creek Interceptor. The sewer extends from Mayview Road to Washington Pike in a valley parallel to Fawcett Church Road serving the Saddlewood, Sundance developments and will soon serve the new Fieldcrest residential development on Washington Pike.

Contract 93-2 was awarded for the construction of the 10 inch Fishing Run Trunk sewer. The sewer begins at a manhole along Millers Run Road and the private Maud Mine Road. The sewer continues up Fishing Run with branches serving the southern side of Mohawk, Battle Ridge Roads and the Sterling Ridge development.

The next Contract, 93-3, was awarded to construct the 10 inch Dolphin Run Trunk Sewer. The sewer extends up Dolphin Run serving homes along the north side of Battle Ridge Road with additional branches serving developments along Old Oakdale Road including Forest Ridge and the Berkshires. It will soon serve a new residential development Deerfield Ridge also on Old Oakdale Road.

The final contract in this group 93-4 was awarded to construct the collector sewers in the Thoms Run watershed. These collector sewers serve areas adjacent to Battle Ridge, Oak Ridge and Dutch Hill Roads.

In 1998 Contract 98-1 was awarded to construct two separate extensions, the first to serve existing properties on the southern end of Boyce Road. The second extended a branch sewer along Alpine Road starting near Hickory Heights Drive and extending to Hickory Grade Road.

Additionally in 1998 Contract 98-2 was awarded to construct sewers that serve properties along the north side of Oak Ridge Road from Petricca Drive to Dutch Hill Road. The 8 inch sewer starts at the Oak Ridge Pump Station which was constructed to convey the flows generated in this watershed. The 6 inch force main discharges to gravity sewers in the Sygan Hollow sewer shed. Branches were also constructed from the Sygan Hollow truck sewer to serve properties along the southern side of Oak Ridge Road.

Contract 2002-1 was awarded to extend the Fishing Run trunk sewer to serve additional home along Battle Ridge Road and the Granite Ridge Development along Robinson Run Road. The Municipal Authority awarded the last contract for Authority funded sewer extension in 2006 to construct additional branches from the Fishing Run Trunk sewer to serve properties between 4257 and 4278 Battle Ridge Road. Since 2006 all sewer extensions have been constructed by developers.

Appendix B includes tables listing manhole and sewer characteristics in South Fayette Sewershed.

Robinson Run POC C-45B-04

The Robinson Run sewershed in total contains 16,200 linear feet of interceptor sewer, ranging from 12 to 18 inches in diameter, a 2.2 MGD pump station, 9,350 linear feet of 18-inch diameter force main, and 19,350 linear feet of 24-inch gravity sewer between the force main discharge and ALCOSAN POC C-45B-04.

The interceptor extends from the upper end near the McDonald Borough boundary and continues downstream along Robinson Run to the Oakdale Pump Station. Flow is then pumped through a 9,600 foot 18-inch force main, which is aligned parallel with the Panhandle Trail. Near where Robinson Run passes under Nike Site Road in Collier Township, the flow discharges into a 24-inch gravity interceptor that continues 19,000 feet following the alignment of the Panhandle Trail and the Pittsburgh and Ohio Central Railroad to Carnegie where it connects to the ALCOSAN Chartiers Creek Interceptor at POC C-45B-04.

Please refer to the Robinson Run Feasibility Study for more detail on the Robinson Run sewers and interceptor.

Thoms Run POC C-54-12

The jointly owned Thoms Run interceptor extends approximately 22,830 linear feet and is comprised of various lengths of 10, 12, 15, and 18-inch separate sanitary sewer lines. Collier Township owns and operates approximately 113,466 linear feet of collection sewer tributary to the interceptor, while South Fayette's flow contribution is conveyed through approximately 14,705 linear feet of collection sewer.

The upper portion of the Thoms Run Interceptor was constructed in 1992 under Collier Township Municipal Authority Contract 6-57-76 is operated and maintained by CTMA. The 15-inch interceptor starts near the intersection of Prestley and Thoms Run Oakdale Road in Collier Township and generally follows the alignment of the road to a manhole near Pinch Road where the sewer reduces to 12 inches. At the intersection of KP Hollow Road the sewer follows the alignment of the stream to a manhole adjacent to Steen Hollow Road where it reduces to 10 inches. The sewer continues to a manhole near the intersection of Nike Site Road where it ends and splits into two 8 inch collector sewers.

More detailed information on the Thoms Run sewers and interceptors is available in the Thoms Run Feasibility Study.

3.1.1.13 PUMP STATIONS

MATSF owns and operates three (3) pump stations in the Chartiers Creek sewershed, the Chartiers Creek, South Fayette Park and Oak Ridge pump stations. All stations are in good condition and are fully operational.

Chartiers Creek POC C-54-16

Chartiers Creek Pump Station

The Chartiers Creek Pump Station was constructed under PaDEP Permit #0285449 and is rated for an average flow of 2.4 MGD (6.0 MGD peak). The pump station includes three (3) submersible pumps each rated at 2100 gpm at 38 feet TDH. The pumps are controlled by a pressure operated level control system and variable frequency drives. The facility has three (3) main pumps, two operating in lead/lag mode and one (1) stand-by which is alternately operated so that all pumps are operating units. This facility is checked on a daily basis exclusive of weekends and holidays. The alarm and monitoring system was updated in 2007 with expanded capabilities, including the ability to check pump station via internet access in real time.

The original pump station had no provisions for emergency overflow in the event of equipment failure or for extraordinary weather conditions. In 2005, PADEP amended the construction permit for the pump station to allow for the construction of emergency overflow facilities. The facility was constructed in late 2005 and is fully functional, including calibration of the associated flow meter. Since this structure was placed into operation there have been six (6) overflow events. There was one overflow event at this location in 2010.

In the Year 2013, MATSF awarded a $1.0 million Contract to upgrade the Chartiers Creek PS. The pump station renovations included sluice gate and grinder replacement, wet well cleaning, repairs and coating, odor control system, wet well mixer, HVAC upgrades, a new roof, door replacement, a new above ground fuel tank and pumping system for existing generator, a new loading dock with crane, and electrical equipment replacement.

Other Pump Stations

There are two satellite pump stations in the Chartiers Creek system. The South Fayette Park Pump Station placed in operation August 1990 and located at Lat/Lon 40.239195/ 80.1024465. The pump station consists of four 20 HP pumps housed in an underground steel housing rated at 300 gpm @ 111 TDH. Due to the high head conditions, 2 pumps sets are connected in series. There were no capacity or significant operational problems at this location in 2010.

The 2nd facility in the Chartiers Creek system is the Oakridge Pump Station placed in operation in October 1999 and located at Lat/Lon 40.2144695/ 80.753805. The facility consists of two 26 horsepower submersible pumps and is designed for a discharge rate of 185 gpm @ 168.5 TDH. There were no capacity or significant operational problems at this location in 2010.

Both pump stations were updated with new monitoring and alarm systems in 2010 with expanded capabilities, including the ability to check pump station via internet access in real time.

Robinson Run POC C-45B-04

The jointly owned Oakdale Pump Station was constructed under PaDEP permit # 0288457 and is rated at 2.2 MGD (5.5 MGD Design Peak) flow. The pump station is located off Noblestown Road near the Oakdale Borough boundary in North Fayette Township. The pump station was placed into operation in August 1990. The pump station includes three (3) 75 Hp shaft driven centrifugal pumps. The pumps are controlled by a pressure operated level control system and variable frequency drives.

The pump control system at the Oakdale Pump Station allows the pumps to pump at rates greater than the 5.5 MGD design rate for limited periods of time. The ability for the 3rd pump to come on-line provides a peak discharge rate of up to 7.5 MGD. It should be noted that this rate is attainable only if the wet well is operating at higher than design conditions and only for relatively short duration.

Thoms Run POC C-54-12

There are no sanitary sewer pump stations within the Thoms Run POC C-54-12 sewershed.

TABLE 3-1: SEWERSHED CHARACTERISTICS FOR THE MATSF, BY POC

POC	Tributary Area (Acres)	Population	Equivalent Dwelling Units	Combined			Separate			Storm		
				Inch-Miles	Linear Feet	Inch-Miles per Acre	Inch-Miles	Linear Feet	Inch-Miles per Acre	Inch-Miles	Linear Feet	Inch-Miles per Acre
C-54-16 [1]	3,516	13,425	5,690	N/A	N/A	N/A	1,051	605,917	0.228	N/A	N/A	N/A
C-45B-04	874 [5]	717 [6]	304	N/A	N/A	N/A	85.3	59,350	0.098	N/A	N/A	N/A
C-54-12	225 [4]	274 [6]	116	N/A	N/A	N/A	24.4 [8]	14,705	0.108	N/A	N/A	N/A
Total	**4,615 [2]**	**14,416 [3]**	**6,110**	**N/A**	**N/A**	**N/A**	**1,160.7**	**679,972**	**0.434**	**N/A**	**N/A**	**N/A**

[1] POC C-54-16 includes a small portion of sewer that is within Cecil Township

[2] Figure extracted from the ALCOSAN Wet Weather Plan: South Fayette = 4,595; Cecil Township = 20

[3] Figure extracted from the Year 2010 Census Data

[4] Figure extracted from Thoms Run Feasibility Study

[5] Figure extracted from GIS takeoff

[6] Figures based on POC EDU count as percentage of total; POC-45B-04 = 5%; POC-54-12 = 2%

[7] Figures obtained from the Year 2013 MATSF Annual Report and Budget, Appendix C

[8] Figure obtained from 3RWW Web Map QuickReport for POC C-54-12 by Estimated Owner

3.1.2 Multi-Municipal System(s) and Complex Sewersheds

There are some ALCOSAN POCs that receive flow from more than one municipality. These are considered to be "multi-municipal" systems because more than one municipality contributes flow, and a solution for managing flow would have to consider each of the contributing municipalities. There are over 100 such multi-municipal sewersheds contributing to ALCOSAN POCs. Some of these multi-municipal systems are more complex than others and, as such, were defined by ALCOSAN as "complex sewersheds". There are 48 complex sewersheds in the ALCOSAN system. ALCOSAN sent letters to each municipality in the complex sewersheds, dated November 7, 2011, requesting that one comprehensive feasibility study, designated by POC, be submitted for each complex sewershed. ALCOSAN also requested that each complex sewershed feasibility study be submitted with a "Resolution" from the governing bodies of the participating municipalities. The Resolution should acknowledge the joint effort of the participating municipalities and authorize the release of the feasibility study to ALCOSAN for planning and review purposes. MATSF currently has multi-municipal flow in two (2) of their three (3) sewersheds, with potential alternatives also including joint options with the Brush Run POC C-55-02.

Currently, the MATSF is a part of two (2) other complex sewersheds, Robinson Run POC C-54B-08 and Thoms Run POC C-54-12. Maps of the complex sewersheds can be found in their corresponding Feasibility Studies. Information regarding the development and evaluation of the recommended alternative for the municipal area that is tributary to the complex/multi-municipal sewersheds can also be found in the appended Studies.

3.1.3 Current Flow Management Agreements

Chartiers Creek POC C-54-16

The MATSF accepts flow from small portion of the POC C-54-16 sewers which are located in Cecil Township. The MATSF bills the Municipal Authority of the Township of Cecil (CTMA)

directly for the customer usage in accordance with the current flow management agreement between the two (2) Townships.

Robinson Run POC C-45B-04

Please refer to the Robinson Run Feasibility Study.

Thoms Run POC C-54-12

Please refer to the Thoms Run Feasibility Study.

3.2 Existing Overflows

Chartiers Creek POC C-54-16

There is one (1) permitted overflow within the system, located at the Chartiers Creek Pump Station. This emergency overflow is only activated in the event that pump station capacity and emergency siphon capacity are exceeded. The overflow was approved and constructed in the Year 2005 under the PADEP Part II Permit No. 0285449.

Robinson Run POC C-45B-04

There is one (1) permitted overflow within the system, located at the Oakdale Pump Station. This emergency overflow is only activated in the event that pump station is exceeded. This overflow was constructed as a part of the original Borough of Oakdale WWTP and has remained in service since that time. The overflow was identified and noted in the Year 1990 on the PA DEP Part II Permit No. 0288457 for the pump station construction.

Please refer to the Robinson Run Feasibility Study for more detail.

Thoms Run POC C-54-12

There are no known overflows in the Thoms Run POC C-54-12 sewershed.

3.3 Direct Stream Inflows

Chartiers Creek POC C-54-16

There are no direct stream inflows into the MATSF sanitary system tributary to POC C-54-16.

Robinson Run POC C-45B-04

There are no direct stream inflows into the MATSF sanitary system tributary to POC C-45B-04.

Thoms Run POC C-54-12

There are no direct stream inflows into the MATSF sanitary system tributary to POC C-54-12.

TABLE 3-2: KNOWN CONSTRUCTED DISCHARGE LOCATIONS IN THE MUNICIPALITY [(1)]

Municipal Regulatory ID	Location	Receiving Waters	Owners
0285449 [(2)]	Chartiers Creek Pump Station	Chartiers Creek	MATSF
0288457 [(2)]	Oakdale Pump Station	Chartiers Creek	RRIS communities

(1) Please reference the Robinson Run Feasibility Study and the Thoms Run Feasibility Study for more information on other communities tributary to those POCs.

(2) "Municipal Regulatory ID" listed depicts the PADEP Part II Construction Permit Number

4.0 SEWER SYSTEM CHARACTERIZATION

This portion of the report presents the approach utilized to determine existing flows in the sewer system through regional flow monitoring, and outlines the location of the flow monitors. Also discussed is identification of system defects and repairs.

4.1 2008 Flow Monitoring Data Evaluation

The 3RWW/PM Team, along with the municipalities, developed guidelines for implementing a system-wide flow monitoring program. The program that was implemented is described below.

4.1.1 Flow Monitoring Program Background

On June 1, 2006, a Regional Flow Monitoring Plan (RFMP) was submitted to the PADEP and the ACHD for review and approval. The purpose of the plan was to comply with the Orders, and to document the efforts expended in developing the plan. The RFMP was assembled by 3RWW and the 3RWW/PM Team with direct input from ALCOSAN and the FMWG. The FMWG was composed of municipal engineers, some municipal managers and other interested parties. Concurrently, ALCOSAN was developing a flow monitoring plan to meet the requirements of the draft CD issued to ALCOSAN. In response to Agencies' comments and provisions of the CD, ALCOSAN developed and delivered a Regional Collection System Flow Monitoring Plan (RCSFMP) that incorporated most of the provisions of the RFMP and provided comprehensive flow monitoring of both the ALCOSAN system and the municipal collection systems. Implementation of the RCSFMP by ALCOSAN fulfilled the flow monitoring required by the municipal Orders.

More details on the Flow Monitoring Program are included in *Summary Report of the Flow Monitoring Conducted Pursuant to the Municipal Administrative Consent Orders and Consent Order Agreements* (3RWW/PM Team, June 30, 2009).

4.1.2 Additional Flow Monitoring

Chartiers Creek POC C-54-16

There were fourteen (14) regional flow monitors installed in the sewershed tributary to POC C-54-16. In addition, MATSF installed six (6) flow monitors for a period of six (6) months after the completion of the RCSFMP. The flow monitoring data collected during this period was used to verify the model calibration and further investigate potential areas of concern. This supplemental metering was performed after disconnection of the Mayview combined sewer system from the MATSF system. The information for these additional flow monitors is also summarized in Table 4-1.

Robinson Run POC C-45B-04

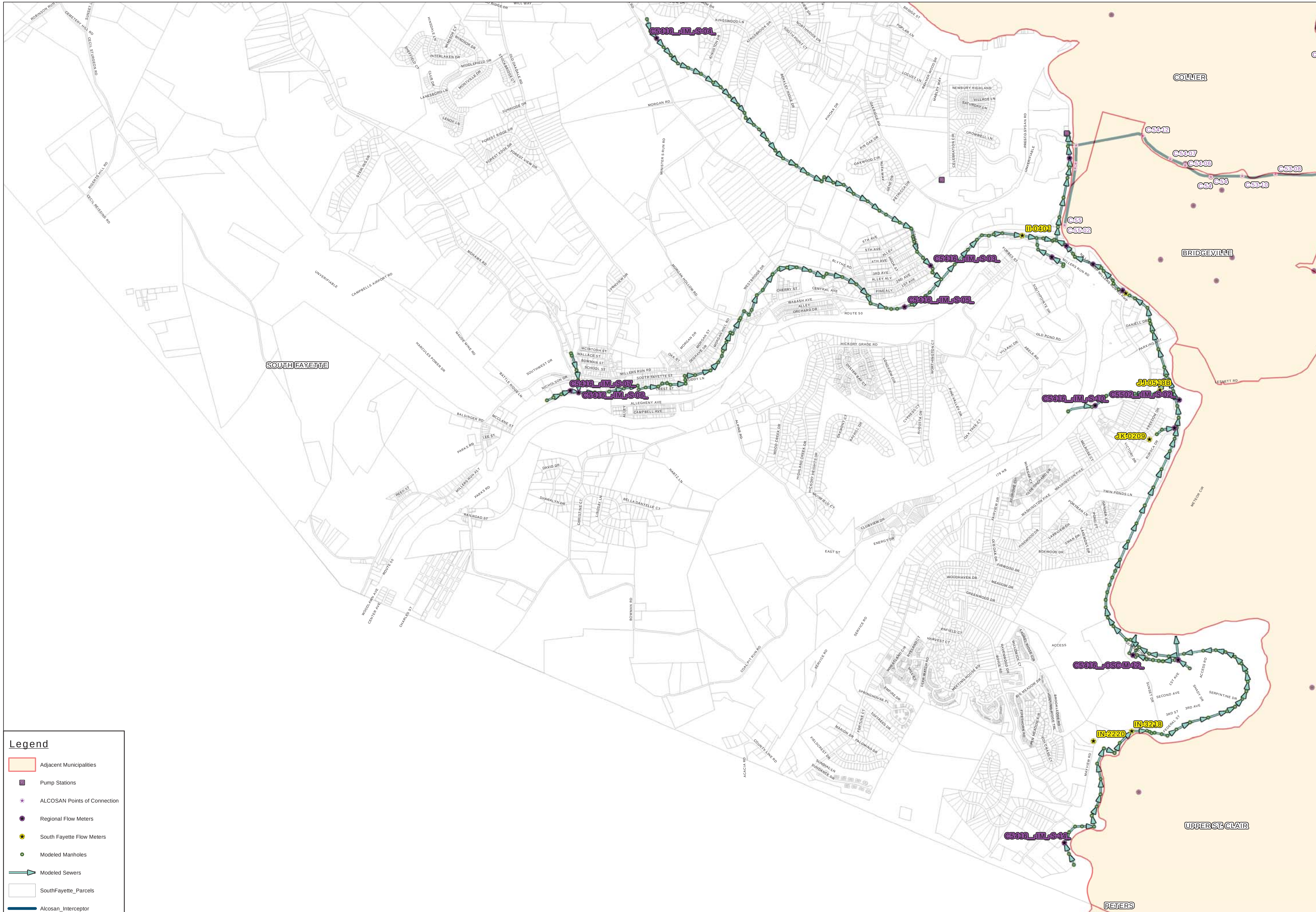
Please refer to the Robinson Run Feasibility Study.

Thoms Run POC C-54-12

Please refer to the Thoms Run Feasibility Study.

4.1.3 Flow Monitoring Results

The information for monitors that were located in the municipality and collecting data is summarized in Table 4-1 below. The extent of the model and the flow monitors that were monitored in the MATSF system are shown on Figure 4-1. The results of the system-wide flow monitoring program are presented in detail in the *Summary Report of the Flow Monitoring Conducted Pursuant to the Municipal Administrative Consent Orders and Consent Order Agreements* (3RWW/PM Team, June 30, 2009).



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MUNICIPAL AUTHORITY OF THE TOWNSHIP OF SOUTH FAYETTE ALLEGHENY COUNTY, PA

Model Extents and Flow Monitor Locations

N.T.S.
SEE FULL SIZE

Author: Bryan Churilla
Date: 7/25/2013
NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
Projection: Lambert Conformal Conic

217-35

FIG 4-1

TABLE 4-1: SUMMARY OF FLOW METER IN THE MATSF SYSTEM, BY POC (CC POC C-54-16 ONLY)

POC	Meter Name	Monitor Type	Monitor Duration	Comments
C-54-16	C5416_-POC-L-01_	Municipal Boundary	One (1) Year	POC C-54-16
C-54-16	C5416_-IM_-S-02_	Internal Municipal	One (1) Year	Hickory Grade Road
C-54-16	C5416_-IM_-S-03_	Internal Municipal	One (1) Year	Sygan Road Lower
C-54-16	C5416_-IM_-S-04_	Internal Municipal	One (1) Year	Sygan Road Upper
C-54-16	C5416_-IM_-S-05_	Internal Municipal	One (1) Year	Millers Run Lower
C-54-16	C5416_-IM_-S-06_	Internal Municipal	One (1) Year	Millers Run Upper
C-54-16	C5416_-IM_-S-07_	Internal Municipal	One (1) Year	Battle Ridge Road
C-54-16	C5416_-IM_-S-08_	Internal Municipal	One (1) Year	Chartiers Creek (CC) Total
C-54-16	C5416_-IM_-S-09_	Internal Municipal	One (1) Year	Coal Run Lower
C-54-16	C5416_-IM_-S-10_	Internal Municipal	One (1) Year	Coal Run Upper
C-54-16	C5416_-IM_-S-11_	Internal Municipal	One (1) Year	Freedom Road
C-54-16	C5416_-IM_-S-14_	Internal Municipal	One (1) Year	Chartiers Creek Upper
C-54-16	C5416_-OSC-M-12_	Overflow Structure	One (1) Year	Mayview CSO
C-54-16	C5416_-OSC-M-13_	Overflow Structure	One (1) Year	Mayview CSO
C-54-16	II-0401	Internal Municipal	One (1) Year	Tot. Millers Run (MR)
C-54-16	II-3015	Internal Municipal	Six (6) Months	Tot. CC
C-54-16	IN-2220	Internal Municipal	Six (6) Months	CC Tributary
C-54-16	IN-3218	Internal Municipal	Six (6) Months	CC Tributary
C-54-16	JK-0209	Internal Municipal	Six (6) Months	CC Tributary
C-54-16	JJ-0518B	Internal Municipal	Six (6) Months	CC Tributary

Note: Please refer the corresponding Feasibility Studies for flow monitors pertaining to Robinson Run and Thoms Run

4.2 Description of Flow Isolation Studies and Sewer System Evaluation Surveys

The 3RWW FSWG Document 009 (entitled *Infiltration/Inflow Screening Guideline/Flow Isolation Study Decision Criteria Guidelines*) provided the decision making guidance as to whether a municipality/authority should consider a sanitary sewer system flow isolation study to locate areas of excessive infiltration. If the municipality conducted a flow isolation study, general concepts and techniques typically employed in performing such studies along with guidance in securing professional services towards implementation of a flow isolation study were considered by the Municipality. In addition, the USEPA Construction Grants Program originated and developed the concept of "excessive inflow and infiltration (I/I)". This program mandated I/I studies and Sewer System Evaluation Surveys (SSES) to evaluate removal of extraneous flow quite literally at the source (i.e. the joint, roof leader, etc.). Over the years, based partially on lack of effectiveness of this approach, (i.e. search/fix to remove I/I), the objective has evolved to "flow reduction" in the form of store/contain. However, the long term cost of simple contain/store/treat can be prohibitive. Additionally, diversion of stream recharge flow to downstream remote sewage treatment facilities is not consistent with the intent of maintaining local stream quantity.

4.2.1 Flow Isolation Study/SSES Procedures

The Municipal Authority of the Township of South Fayette has conducted one (1) flow isolation study in the history of the system. This study was conducted in the Year 1985 and was used to characterize the system. No recent flow isolation study was conducted as a part of this Study.

4.3 Recommendations Resulting from the MATSF Flow Isolation Studies/SSES

No recommendations relevant to this Study were made based upon the findings of the Year 1985 Flow Isolation Study. The original flow isolation study will be used to help prioritize work areas as part of the newly instated (May 2013) area-wide private lateral inspection program.

4.4 Summary of Defect Repairs

4.4.1 ALCOSAN Flow Agreement I&I Work

Since the late 1970's, the Authority was aware of the need to periodically inspect the public sewer system to isolate infiltration & inflow (I/I) and to attempt to remove it from the system. Those programs included various inspections and observations by the Authority personnel.

In 1977, MATSF personnel performed smoke testing of numerous homes in an attempt to locate any improper connections that would allow I/I to enter the system. Also, MATSF personnel began a program to place plastic inserts into the frames of low lying manholes to prevent storm water from entering the sanitary sewer through manhole lids. Approximately 300 inserts were installed at that time.

In late 1978, a sewer system evaluation study was finalized by Gibson Thomas Engineering for the MATSF system. The system at that time consisted of only 43 miles of sewer. As a result of the study, certain recommendations were made for system repairs geared primarily to I/I reduction. In 1979, the Authority expended approximately $67,000 in the Fairview Manor Area for various sewer main repairs performed under Contracts 79-1 & 79-2. Contract 80-6 involved various manhole repairs and main sewer grouting at a cost in excess of $100,000. The above contracts included televising, air testing and grouting of over 28,000 linear feet (5.3 miles) of public sewer. Even then, video tapes revealed that a significant portion of I/I was emanating from private service laterals.

In 1980/1981, recommendations from an infiltration analysis of the Sygan Hollow Interceptor by Schneider Consulting Engineers (SCE) resulted in grouting main line joints on approximately 1,376' of the total 12,800 foot trunk line.

In 1982, SCE performed an investigation on the Boyce Road Trunk Line by plugging each manhole segment and observing at the next downstream manhole for any leaks. The findings of that investigation were that the pipe was in very good condition and no rehabilitation was necessary. It is important to note that there are very few direct house lateral connections to this trunk sewer.

In 1983, PaDER required that MATSF prepare a Corrective Action Plan and Schedule to address I/I concerns in MATSF's Chartiers Creek system. That extensive study was completed in February 1985. As part of this study, flow meters were installed in various locations throughout the system. Also, an intensive late night flow isolation program was conducted at numerous manholes in an attempt to locate areas with high infiltration rates. This study provided recommendations for televising specific sewer segments and also identified certain locations in the system where spot repairs would reduce I/I.

MATSF entered into an agreement with ALCOSAN that would allow for the elimination of the MATSF treatment facility upon construction of a pumping station that would convey wastewater to the ALCOSAN Chartiers Creek Interceptor. The effective date of that agreement was September 12th 1983. The agreement called for a purchase of 2.4 Million Gallons/Day of capacity in the ALCOSAN system for a capital fee of $1,171,700. It is important to note that the agreement has specific limitations on I/I and a formula for monetary penalties along with a further requirement to locate and eliminate I/I that exceeds that allowance. The formula to determine the monetary penalty is determined by the length and size of MATSF's public sewer system along with analysis of water consumption data and system flow monitor data on a quarterly basis. The excess I/I determined as a result of the quarterly review is subject to penalties based on the prevailing ALCOSAN rate structure. Those values have been calculated since actual connection to the ALCOSAN system on February 17, 1987.

A copy of the ALCOSAN / MATSF Agreement can be found in Appendix E.

When the Chartiers Creek pump station to ALCOSAN was completed and placed into operation, the PADEP Corrective Action Plan was eliminated as there was no longer an overload to a treatment facility. At that time, the system consisted of only 2,951 customers. Therefore, for several years, there was no urgent capacity issues with the exception of limiting the monetary penalties paid quarterly to ALCOSAN when the flow values stipulated in the agreement were exceeded. As ALCOSAN began raising rates on a regular basis in the early 1990's, those penalties became much more significant, even though the quantity of excess I/I did not change dramatically. By the mid 1990's, the monies due to ALCOSAN for excess I/I became very significant. Further, at that time, only 4 of the 83 communities that contributed flow to ALCOSAN were subject to such penalties; those being communities that connected to the ALCOSAN system after 1983. As such, those communities approached ALCOSAN requesting relief from the I/I provisions of their respective agreements. Accordingly, ALCOSAN, while not agreeing to eliminate the I/I clause in those agreements, did agree to allow any calculated penalties to be held in escrow by each community to be utilized for projects associated with the reduction of I/I. For MATSF, that understanding was memorialized in a Correction Action Agreement with ALCOSAN dated September 25, 1997. That agreement required MATSF to develop a plan to reduce I/I and established procedures to periodically provide certifications to ALCOSAN as to the work being performed and the status of the escrow account. Therefore, all monies for excess I/I that were previously being forwarded to ALCOSAN were now available (beginning in June 1996) to be utilized for I/I related work in the MATSF system. Since that date through November 2012, over $2.155 Million have been used in this fashion as opposed to paying ALCOSAN.

Please refer to Appendix F and Appendix G, respectively, for copies of the MATSF Excess Infiltration / Inflow Calculations and MATSF Corrective Action Plan for ALCOSAN.

As a result of the ALCOSAN CAP, a renewed effort was made by MATSF beginning in 1997 to aggressively attempt to identify and reduce excess I/I. In February 1997, Ordinance No. 401 was adopted by the Township that mandated an inspection of each property at time of sale for any

inflow sources such as driveway drains, downspouts, area drains, etc. MATSF also awarded a contract in 1997 for raising 19 manholes on the Chartiers Creek Interceptor in an effort to keep the manhole covers above the typical flood elevation. The cost of that project was approximately $22,000.

In 1997, over 50,000 linear feet of public sewer was televised, including extensive televising in the Hunting Ridge area and the entire Boyce Road Trunk Sewer and MATSF's Chartiers Creek Interceptor.

In early 2001, PaDEP and ACHD, in conjunction with EPA, began notifying all 83 communities connected to ALCOSAN that they would be requiring each community to enter into a Consent Order with respect to investigation of each sewer system due to excessive I/I and due to the magnitude overflow of wastewater into streams and rivers in this area. As a result, the 83 communities worked together, as coordinated by 3 Rivers Wet Weather, Inc, to negotiate the terms and conditions of a common Administrative Consent Order that would be signed by all communities. Over a period of 3 years, an exhaustive process took place to generate a consensus as to the language to be contained in that order. Ultimately, 2 draft orders were negotiated; one for communities with combined sewer systems and the other for communities with separate sewer systems. In January 2004, MATSF entered into that Administrative Consent Order with the Allegheny County Health Department requiring an extensive investigation of the system, including certain private sector components. Required work under the first phase of the ACO includes such items as manhole inspections, sewer televising, dye testing, and a regional flow monitoring program. The ACO also requires that certain identified critical system defects must be repaired within 6 months of discovery, while the repair of less serious defects can be delayed until an overall O&M program/schedule is established.

A copy of the ACHD / MATSF Consent Order and Agreement can be found in Appendix H.

Since executing the ACO, MATSF has been aggressively working towards completing the tasks as mandated therein within the short time frame allowed. As a result of the inspection work completed, certain rehabilitation projects have been undertaken. One such project, done as part of a multi-municipal bid by the South Hill Area Council of Governments (SHACOG), allowed for installation of spot liners to fix defects at various locations in the MATSF system. That work was completed by mid-2005 and included 10 spot liners at a total cost of just over $38,000. More recently, MATSF participated in another joint SHACOG bid for lining pipe between manholes. That work included relining 4,300 feet of 8" sewer in the Endler portion of the Fairview Manor Plan. That work was completed in the spring of 2006 at a cost of approximately $211,000.

Contract 2005-01 was a Township wide project that consists of grouting mainline sewers and televising laterals at various locations throughout the Township. These locations were selected as a result of reviewing televising data from the recent ACO inspections. This project was released for bid in July 2005 and envisioned testing joints and subsequent grouting of approximately 20,000 linear feet of mainline sewer. The project also involved inspection and lateral grouting in certain areas as discussed in the next section of this report. The project was awarded to Sewer Specialty Services in August 2005 for an amount of $143,165 based upon estimated quantities.

The most current ACO summary of completed work to date is attached in Appendix I. A summary of the MATSF ACO Compliance Work Expenditures can be found in Appendix J.

Table 4-2 is a summary of the private sector inspection and rehabilitation program statistics, dating back to the Year 2007. Table 4-3 is a graphical representation of the inspection results. Table 4-4 is a graphical depiction of the lateral repair projects completed since the Year 2007.

Table 4-2
Private Sector Inspection Statistics

Yr	# of Tests	# Pssd	% Tst Pssd	DS	AD	FD or Sumps	V/C	MV	LD	Full Replace/Rehab #	Full Replace/Rehab Feet	Spot Replace/Rehab #	Spot Replace/Rehab Feet	Total Replace/Rehab #	Total Replace/Rehab Feet
2007	130	102	78.46	0	0	1	5	5	27		464		20		484
2008	165	137	83.03	2	0	0	6	9	25		559		62		621
2009	181	150	82.87	0	0	0	23	5	18		32		70		102
2010	187	156	83.42	0	0	1	19	1	11		335		15		350
2011	164	137	83.54	0	1	1	17	2	9	5	371	4	65	9	436
2012	192	157	81.77	0	2	1	20	2	21	18	1147	3	11	21	1158
2013	85	69	81.18	0	1	1	11	0	4	4	362	0	0	4	362
Tot	1104	908	0.82	2	4	5	101	24	115		3270		243		3513

Table Abbreviations

Yr	= Year	AD	= Area Drain	LD	= Lateral Defects
Pssd	= Passed	FD	= Floor Drain		
Tst	= Test	V/C	= Vents/Cleanouts		
DS	= Down Spout	MV	= Multiple Violations		

Table 4-3
Private Sector Inspection Results
Year 2007 through May 2013

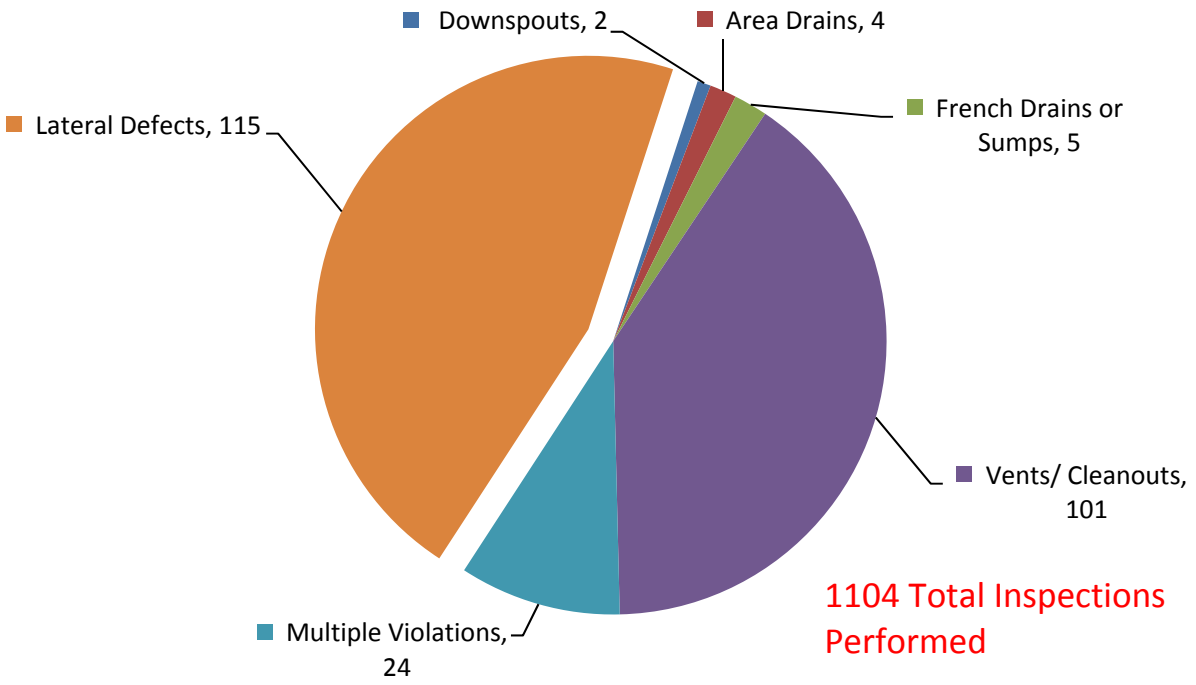
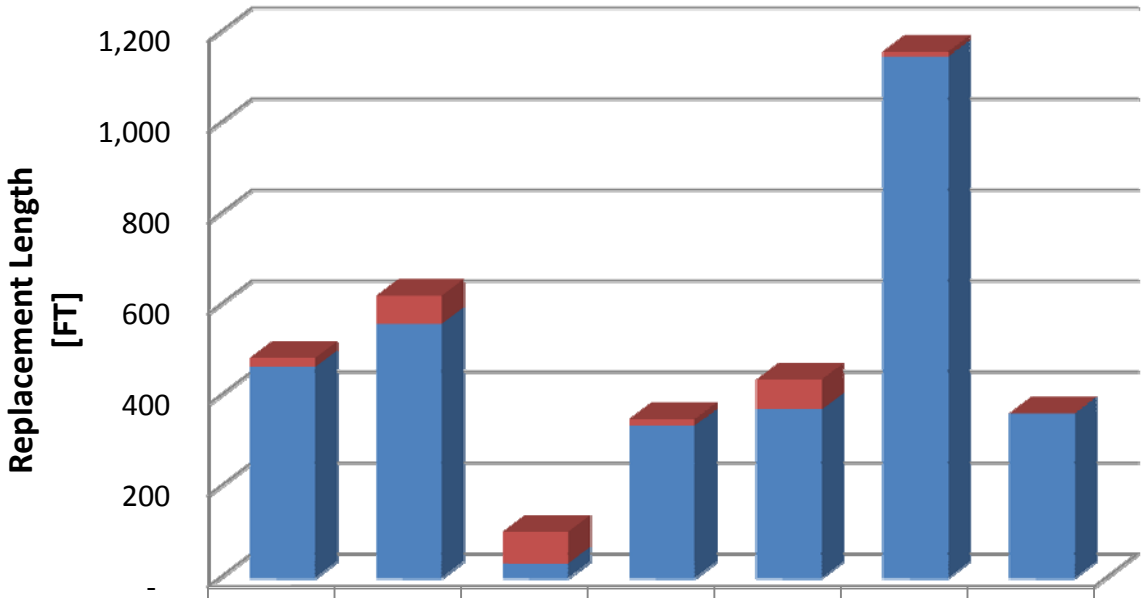


Table 4-3
Lateral Repair Projects
Year 2007 through May 2013



	2007	2008	2009	2010	2011	2012	2013
Spot Replace/Rehab	20	62	70	15	65	11	-
Full Replace/Rehab	464	559	32	335	371	1,147	362

The above statistics represent the lateral inspection program essentially for time of sale inspections. It is important to note that MATSF in May 2013 passed a resolution to expand the program from a time of sale program to an area wide inspection program. As such, portions of the MATSF system will be prioritized for both sewer main and lateral inspections independent of property transfer. Significant lateral defects will be required to be repaired within a specified time frame depending on the severity of the defects. Where the property owner is directed to replace their lateral from the structure to the sewer right-of-way, the Authority will provide a limited amount of financial assistance upon successful completion of the lateral replacement work.

In accordance with measures outlined in the Private Sector Committee Report, the MASTF has recently begun moving forward with an area-wide lateral inspection program. The Authority plans to develop a systematic approach to implement an all-encompassing Township lateral inspection program. On May 2, 2013 the Authority passed Resolution No. 173, which stated the following.

> *1. The Authority intends to implement and area-wide sewer lateral inspection program.*
>
> *2. Video camera inspections will be undertaken independent of property sale and in addition to the video and dye testing procedures that are currently performed at the time of sale on properties within the Township.*
>
> *3. The Authority shall amend its rules and regulations as necessary to set forth requirements to identify and remedy defective sewer laterals upon video camera inspections and also to provide for penalties and other enforcement mechanisms as deemed advisable by the Authority.*

A copy of the full Resolution can be found in Appendix K.

5.0 SEWER SYSTEM CAPACITY ANALYSIS

This section of the report discusses the use of the data to determine preliminary flow estimates, and review and accept the calibration of the ALCOSAN H&H model developed by the Basin Planners.

5.1 Development and Calibration/Verification of H&H Tools

The approach used by the municipality was developed by the 3RWW PPM Team and vetted by the FSWG. This approach was to use the RTK values developed from the municipal flow data to develop design flows for appropriate design storms such as 1-yr, 2-yr, 5-yr and 10-yr storms. These values were compared to the values derived from the H&H Model. As long the comparisons were within 25%, the municipality would accept the models without further investigations. However, in instances were these values varied by more than 25%, the municipalities would review the Model results with the Basin Planner to try and resolve the discrepancy. The main intent of this approach was to offer a way for the municipalities to actively review and accept the ALCOSAN Model for their sewer system evaluations.

5.2 Baseline Conditions

The municipalities are required by The Orders and the ALCOSAN CD to coordinate with ALCOSAN in providing municipal planning information for the development of control alternatives. Information on which the baseline conditions H&H model could be based was developed by municipalities for incorporation into the municipal and ALCOSAN models. The planning horizon date for the models is September 2046.

This section describes the development of a Baseline Condition H&H model for predicting 2046 wastewater flow without implementing the recommended alternative. There are a number of factors that need to be accounted for in the development of a future conditions model. The impacts on expected dry weather and wet weather flow from population shifts, future development, and planned collection system modifications need to be estimated.

The CCBM was developed and validated using flow monitoring data in 2008 to reflect the existing flow conditions. However, the alternative evaluation requires the maximum flow condition including population increase through 2046. Thus, it is necessary to derive the future flow based on current flow. The major change of future flow from current flow is the base flow that is caused by population growth. For this reason, the baseflow in Chartiers Creek Sewershed was modified to reflect future flow conditions. The revised model does not reflect RDII on future growth. MATSF assumed any future RDII would be offset by ongoing I/I reduction program being implemented by MATSF.

It was found that the maximum capacity of the Chartiers P.S. in the model is more than its actual maximum capacity. The Chartiers P.S. maximum capacity in the model is 14.688 MGD, while its actual maximum capacity is only 7.00 MGD. For the alternative evaluation, the Chartiers Creek P.S. maximum capacity was limited to its actual peak capacity of 7.00 MGD.

Manhole FJ-2215 {298378S012} in the model has the depth of 9.20 ft. MATSF surveyed this manhole and found its depth is actually 12.91 ft. In the alternative evaluation, 12.91 ft was used.

Manhole IJ-3319 {309378S005} in the model has the depth of 4.70 ft. MATSF surveyed this manhole and found it was removed and the pipe was sealed. In the alternative evaluation, 20 ft surcharge depth was used to simulate removal of the manhole.

TABLE 5-1: SUMMARY OF PLANNED PROJECTS INCORPORATED INTO FUTURE MODEL FOR THE MATSF

POC	Planned Project	Project Status	Funding Source	Project Completion Date
C-54-16	Mayview Hospital property sewer separation. Property purchased from state in 2010 by a private company.	Complete	N/A	Complete
C-54-20	Chartiers Creek Pump Station (CCPS) Emergency Siphon	Complete	Authority Reserves	Complete
C-54-16	CCPS O&M Upgrades	In Progress	10-yr Bank Loan	Fall 2013
C-54-16 / C-54-12	Boys' Home Pump Station Elimination / Flow Reroute	In Design	10-yr Bank Loan	Summer 2014

TABLE 5-2: EXISTING AND FUTURE POPULATION AND SEWERED AREAS FOR THE MATSF, BY POC [1]

POC	Sewershed Area (acres)			Population		
	Existing	Future	Percent Increase	Existing [(1)]	Future	Percent Increase
C-54-16	3,516	5,594 [(2)]	59.11%	13,425	21,360	59.11%
C-45B-04	874	1,391 [(2)]	59.11%	733	1,141	59.11%
C-54-12	225	358 [(2)]	59.11%	287	436	59.11%
Total	**5,714**	**7,343**	**59.11%**	**14,416**	**22,937 [(3)]**	**59.11%**

[(1)] Reference Table 3-1 for population and sewershed area source information

[(2)] Future Area = [(Existing Area)(Future Population)] / (Existing Population) = [(7,343)(22,937)] / (14,416) = 7,343 acres

[(3)] Figure based on SPC 2046 future population as reported in the Chartiers Creek PFE Report

5.2.1 Dry Weather Flows (Existing and Future)

Chartiers Creek POC C-54-16

POC C-54-16 is incorporated into the ALCOSAN Chartiers Creek (CC) Planning Basin Model. The Municipal Authority of the Township of South Fayette reviewed the existing baseline conditions set forth by the basin planner, corresponding to the regional flow monitoring data. MATSF felt the conditions were reasonable and therefore accepted them as correct.

KLH Engineers, Inc, with assistance from MATSF, developed a future conditions model by using the ALCOSAN March 2010 Planning Basin Model as a foundation for analysis. At the time of the future conditions model development, the population within the Township, tributary to POC C-54-16 was approximately 13,106 persons. The corresponding monitored dry weather flow was 2.092 MGD. Future conditions were projected by incorporating the Southwest Pennsylvania Commission (SPC) population increase estimations for the Township of South Fayette.

The SPC data projected a future population of 22,937 in all sewer sheds within the Township of South Fayette. It is assumed that the future population in the POC C-54-16 sewershed will be 21,360 persons, as determined in Table 5-2. This population change equates to a 59.11% increase. The projected dry weather flow was then calculated and distributed among potential development areas.

The calculation for future dry weather flow was calculated by deconstructing the existing dry weather flow into base wastewater flow (BWWF) and ground water infiltration (GWI). As a result of MATSF's aggressive efforts to minimize I/I entering the system, it is assumed that GWI will not increase before the Year 2046. This assumption is further explained in Section 2.1.2.2. The future BWWF was calculated as a ratio of the existing BWWF to the project population change. This value was then added to the future GWI, resulting in the overall future DWF parameter. This calculation is illustrated below.

GIVEN

DWF_1 = 2.0922 MGD

$BWWF_1$ = 0.5793 MGD

GWI_1 = 1.5129 MGD

POP_1 = 13,106 persons

ASSUME

GWI_2 = 1.5129 MGD

POP_2 = 21,281 persons

SOLVE

$BWWF_2 = [(POP_1)(BWWF_1)] / (POP_1)$

$BWWF_2 = [(21,281)(0.5793)] / (13,106) = 0.941$ MGD

$DWF_2 = GWI_2 + BWWF_2$

$DWF_2 = (1.5129 + 0.941) = 2.4535$ MGD

Information on future and existing dry weather flows for ALCOSAN POCs C-45B-04 and C-54-12 can be found in their respective Feasibility Studies.

TABLE 5-3: SUMMARY OF DRY WEATHER FLOWS FOR THE MATSF BY POC

POC	Tributary Area (acres)	Total Average Dry Weather Flow		
		Existing Conditions (mgd)	Future 2046 Conditions (mgd)	Percent Difference
C-54-16	3,516	2.09	2.45	17.25%
C-45B-04	874	0.073 [2]	0.101 [3]	38.8%
C-54-12	225	0.012 [1]	0.094 [1]	710%
Total	**5,714**	**2.175**	**2.645**	

[1] South Fayette total average dry weather flow for C-54-12 portion was calculated as ratio of tributary area. Future build-out and flows can be found in the *Alternatives Analysis* section of the Thoms Run Feasibility Study

Existing Total DWF = 0.012MGD
Future Total DWF = 0.094MGD

[2] South Fayette portion of total average dry weather flow for C-45B-04 was calculated as ratio of tributary area. Total DWF was extracted from the June 2010 PFE submission.

[3] South Fayette portion of future total average dry weather flow for C-45B-04 was extracted from the Robinson Run Feasibility Study

5.2.2 Groundwater Infiltration (Existing and Future)

Chartiers Creek POC C-54-16

As previously stated, the existing GWI values for the POC C-54-16 were accepted as accurate by the MATSF and remain unchanged for future conditions models. The inherited theory behind this assumption is that increased inflow and infiltration due to changing sewer condition and age will be counter-balanced by infiltration removal projects such as lateral rehabilitation, sewer lining projects, and sanitary sewer upgrades and replacements. In addition, it is assumed that future development GWI values will be minimal and/or offset by MATSF aggressive I/I reduction program. Therefore, existing conditions peak RDII flow is equivalent to the projected Year 2046 peak RDII flow.

Robinson Run POC C-45B-04

Please refer to the Robinson Run Feasibility Study.

Thoms Run POC C-54-12

Please refer to the Thoms Run Feasibility Study.

5.2.3 Estimation Process for Unmonitored Areas

Chartiers Creek POC C-54-16

All unmonitored area assumptions for POC C-54-16 were accepted and deemed reasonable as presented in the ALCOSAN Chartiers Creek Planning Basin H&H Model, distributed in March 2010.

Robinson Run POC C-45B-04

Please refer to the Robinson Run Feasibility Study.

Thoms Run POC C-54-12

Please refer to the Thoms Run Feasibility Study.

5.3 Preliminary Flow Estimates

Each municipality developed PFEs to provide "worst case scenario" flow rates and volumes at each POC for ALCOSAN's use. The methods that municipalities used to develop these flow rates and volumes are described below.

The Task 4 in Feasibility Study Working Group (FSWG) – Doc 002 requires municipality to submit Preliminary Flow Estimation (PFE) and system capacity analysis. Since the Mayview State Hospital CSO issue was corrected, the entire MATSF system was considered as an entirely separate sanitary system in PFE evaluation. The PFE for separate system is defined by the FSWG as the peak dry weather flow and wet weather flow for the summer and winter 1, 2, 5 and 10-year 24-hour design storms. It was found that the PFE in the winter condition is larger than the PFE in summer condition.

The PFE could be developed by using the Chartiers Creek Planning Basin Model, or by utilizing the RTK tools developed by Three Rivers Wet Weather (3RWW). MATSF conducted on analysis using both CCBM and RTK tools. The PFE was submitted to ALCOSAN in June 2010 making use of both methods.

The PFE showed the total peak flow to the Chartiers P.S. in future winter 10-YR 24-HR design storm to be approximately 15.18 MGD. The winter flow is higher than the summer flow at the same design level. Therefore, the winter design storm was utilized. In Alternative Two of this report, the peak flow to the Chartiers P.S. is adjusted to 12.50 MGD due to siphon flow diversion and sewer system routing effects (previously under estimated in the PFE submission).

A copy of the Chartiers Creek PFE Results can be found in Appendix L.

5.4 Capacity Deficient Sewers

Accepted engineering practice for the design of sanitary sewers provides for foreseeable future flows and results in sewer capacity where the current and future flows are transported within the pipe system without surcharging, basement backups, manhole pops, or overflows; and includes a factor of safety. In the current analyses required for the Feasibility Study under the municipal orders, the possibility exists for a portion of the sanitary sewer system to be slightly under capacity. Under these conditions, where the remedy could be extremely costly on a per foot basis, the engineer may want to consider the extent of surcharging and evaluate whether limited surcharge is appropriate for submission to the regulatory agencies for their review. Operating sewers in consistent surcharge (especially where the original design did not intend such operation) can result in continued deterioration of the sewer system as well as potential exfiltration and eventual undermining of the sewer line potentially resulting in surface or sewer collapse/breaks, etc. Older systems, particularly those with less resilient joints or structurally weakened by cracks can sustain physical damage when operated under surcharge. Accelerated pipe failure associated with cyclical surcharge/non-surcharge operation is a risk to be considered. However, the municipal engineer who is knowledgeable about the local municipal system may determine it is appropriate to consider surcharge in their deficiency analyses.

Chartiers Creek POC C-54-16

The PFE only reflects the total flow at the Point of Connection (POC). To investigate and solve the sewer surcharge and manhole flooding problems in the entire system, MATSF conducted comprehensive system capacity analysis, which involves identifying all surcharged sewers and flooded manholes under the future flow condition for the winter 10-yr 24-hour design storm.

Figure 5-1 shows the location of the Mayview State Hospital (MSH) CSOs at the time of the analysis. Figure 5-2 shows the MATSF sewer system capacity under winter 10-yr 24-hour design storm. At the time of the analysis, the MSH had not yet disconnected from the MATSF system, and therefore, the capacity analysis does not include this portion of the sewershed.

Mayview CSOs Removed from System

Mayview CSOs Removed from System

UPPER ST. CLAIR

SOUTH FAYETTE

ACCESS

SERPENTINE

SHORT

1ST

SECOND

3RD

STATE

FEDERAL

MAIN

SUNSET

SHADY

LAKEMONT

FIRWOOD

MEADOW

GREENWOOD

LAUREL RIDGE

WILLOWICK

CHRISMAN

BIG MEADOW

GARDEN APARTMENT

CLEARFORK

MORNING WIND

HUNTING RIDGE

BROOKLEDGE

FIRETHORNE

FOX CHASE

Legend

- Mayview CSO Outfall
- Street_Centerline
- Adjacent Municipalities
- Modeled Manholes
- Modeled Sewers
- SouthFayette_Parcels
- SouthFayette_Building_Footprints

N

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MUNICIPAL AUTHORITY OF THE TOWNSHIP OF SOUTH FAYETTE ALLEGHENY COUNTY, PA

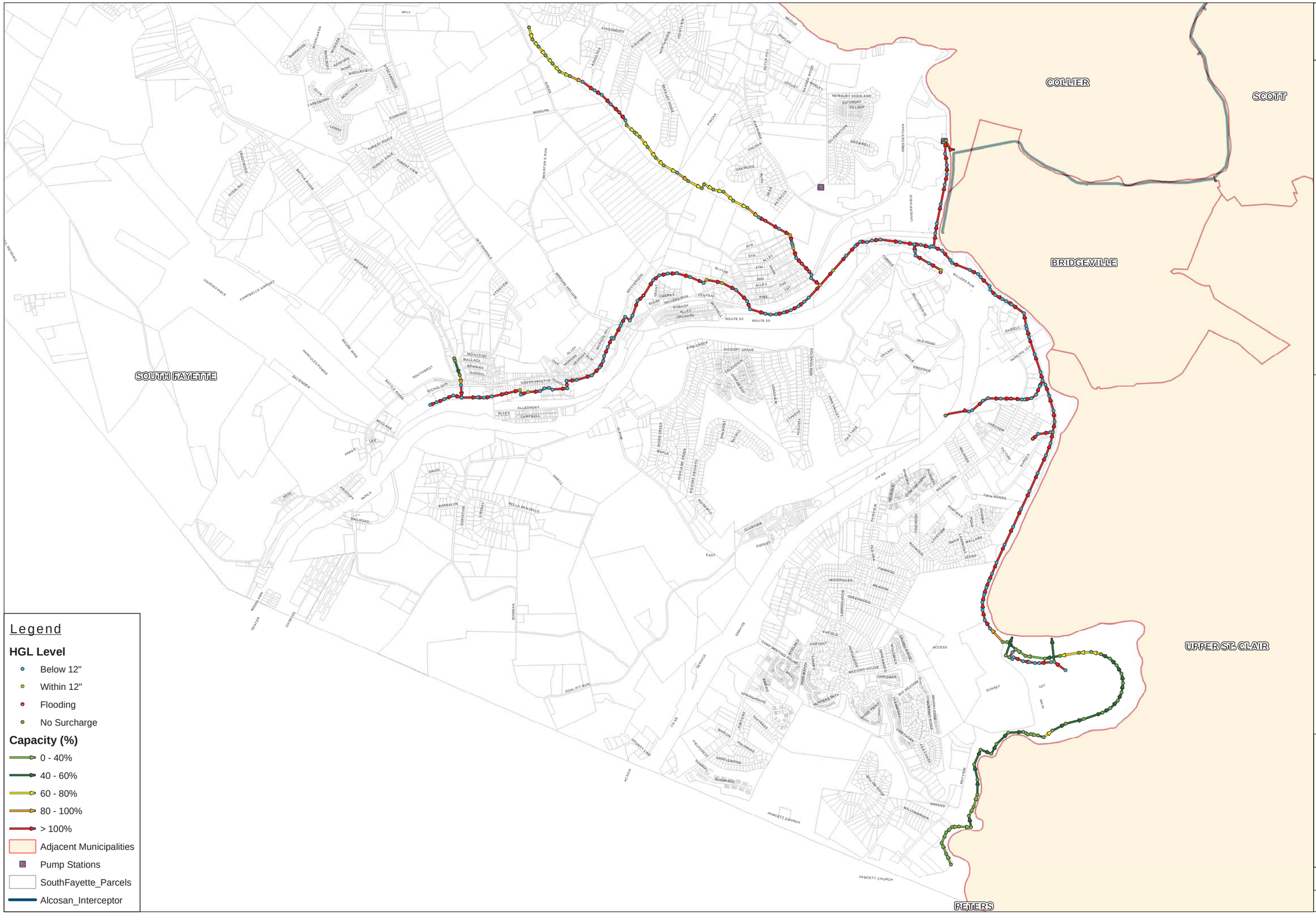
Mayview CSO Locations

N.T.S.
SEE FULL SIZE

Author: Bryan Churilla
Date: 7/25/2013
NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
Projection: Lambert Conformal Conic

217-35

FIG 5-1



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MUNICIPAL AUTHORITY OF THE TOWNSHIP OF SOUTH FAYETTE ALLEGHENY COUNTY, PA
10-YR Design Storm Capacity Map

N.T.S.
SEE FULL SIZE

Author: Bryan Churilla
Date: 7/25/2013
NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
Projection: Lambert Conformal Conic

217-35

FIG 5-2

Tables 5-5 shows the maximum overflow rate and overflow volume for all flooding manholes and overflow outfalls.

Table 5-5
10-Year, 24-Hour Design Storm
Overflow Rate and Volume
Existing Conditions

Manhole/Outfall	Flow Rate (MGD)	Volume (MG)
FJ-0618 {296378S014}	1.3225	0.2611
FJ-2216 {298378S013}	0.0369	0.0038
GG-0110B {299385S002}	0.1387	0.0069
GI-0714 {300381S004}	0.7008	0.2227
HH-0417 {303382S012}	0.4436	0.0282
HI-1306 {304381S012}	0.3213	0.0413
HI-1508 {304381S016}	0.1742	0.0305
HI-2108B {305381S001}	0.2712	0.0511
II-1508B {307381S010}	0.1728	0.0018
IK-1602 {308378S002}	0.1844	0.0036
JK-0408 {310377S005}	2.1605	0.4418
JJ-0714B {310378S009}	0.7105	0.0996
CHARTIERS_PS	2.8733	1.2597

Robinson Run POC C-45B-04

Please refer to the Robinson Run Feasibility Study.

Thoms Run POC C-54-12

Please refer to the Thoms Run Feasibility Study.

5.4.1 Existing Basement Flooding Areas–History and Locations

The following section depicts existing basement flooding areas within the MATSF sanitary system, but it important to note that the Authority is currently taking action to implement upgrades that will alleviate a section of the flooding. The Authority has a preliminary sewer plan that will eliminate the South Fayette Park (Boys' Home) Pump Station and re-route the flow by gravity sewer to the Thoms Run POC C-54-12 sewershed. The removal of this flow from the Chartiers Creek POC C-55-16 sewershed will remedy some of the basement backup and overflow issues, especially in the Verner Avenue area. The pump station elimination and sewer extension project is currently under design and is expected to be complete by the summer of the Year 2014.

Chartiers Creek POC C-54-16

The occurrence of sanitary sewer back-up into basements in the South Fayette Township Municipal Authority system as a result of problems experienced in the public sector is extremely infrequent. However, there have been three (3) occasions dating back to the Year 1994 in which basement back-up did occur due to extraordinary weather conditions. On 2 of these events, precipitation exceeded 4" in less than 24 hours. The remaining event was a combination of a significant storm event along with extensive snow melting that resulted in regional flooding. The Authority has identified those areas that have been affected by such events and have taken steps to reduce reoccurrence. Nonetheless, future unusual climatic events could again cause sewage back-up into a limited number of basements.

There are three (3) known areas of basement flooding within the POC C-54-16 tributary sewershed. These locations are all along the Millers Run Interceptor, one (1) at Blythe Road, one (1) at Verner Avenue, and one (1) at South Fayette Street. During these infrequent events, South Fayette Township Volunteer Fire Departments (VFD's) provided assistance to MATSF in pumping from select manholes to avoid sewage entering basements in the referenced areas. This portion of MATSF's emergency response program, while rarely necessary, has replaced the need for the VFD's to pump wastewater from basements of homes in these locations, thus preventing

property damage and reducing health risks to those property owners. As necessary during extreme precipitation events when the sanitary sewer system capacity is exceeded, portable suction lift rental pumps are placed at the following locations.

- Manhole FJ-1017C: South Fayette Street, adjacent to Millers Run
- Manhole HI-1812B: Intersection of Millers Run Road and Presto-Sygan Road
- Manhole IG-1618B: Outside of the Chartiers Creek Pump Station

In preparing MATSF's emergency response plan for extreme wet weather events,a meeting was held between VFD representatives and Authority representatives to discuss a plan of action. The outcome of this meeting and other internal discussions led to the following plan of action:

- Obtain copies of all call reports from the VFD pertaining to basement back-ups
- Notify ACHD/PaDEP or event and subsequently submit written documentation
- Notify Authority insurance carrier as to the event.
- Send correspondence to affected property owners including references to proper clean-up procedures.
- Provide clean-up assistance when requested.
- Conduct on-site interviews with the affected property owners.
- Prepare memorandum to Authority Board as to the circumstances including recommendations towards preventing reoccurrence.
- Implement approved recommendations.

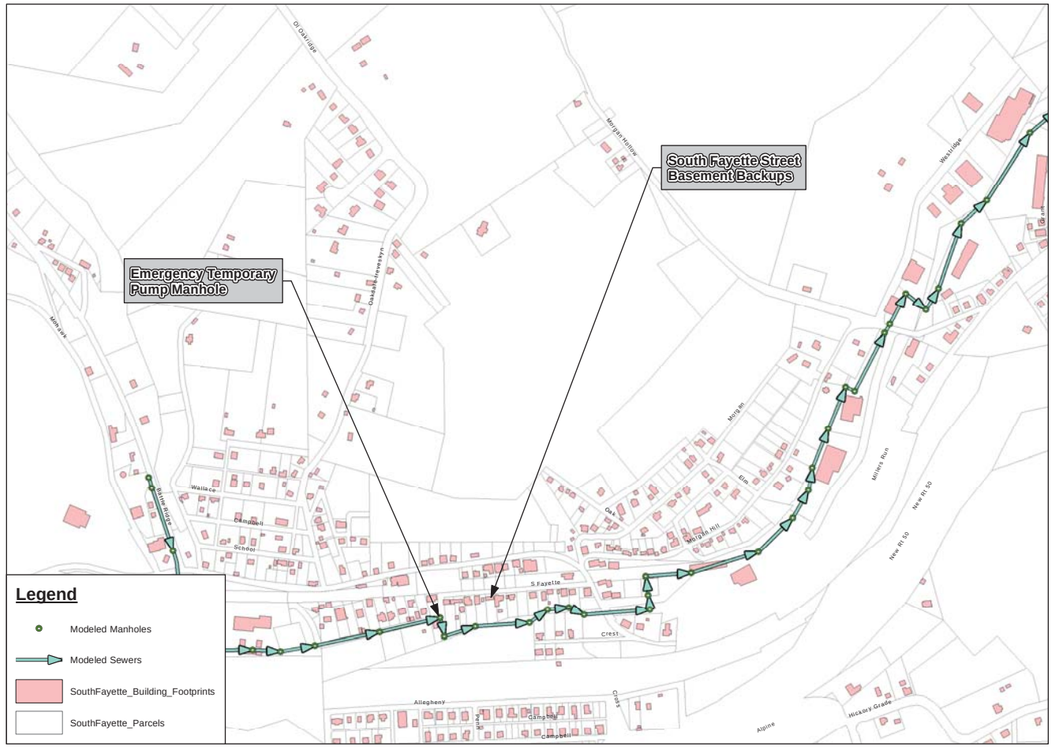
The emergency pump discharge is conveyed directly to Millers Run. A location map of the known basement backups and emergency pumping manholes can be seen in Figure 5-3.

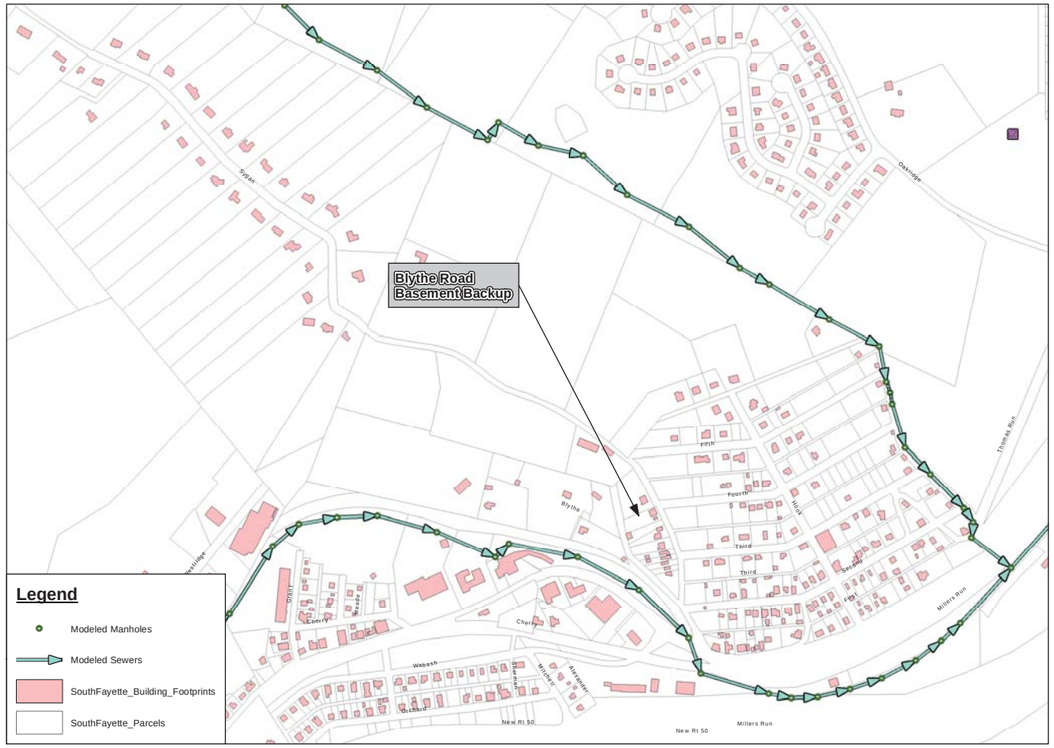
Robinson Run POC C-45B-04

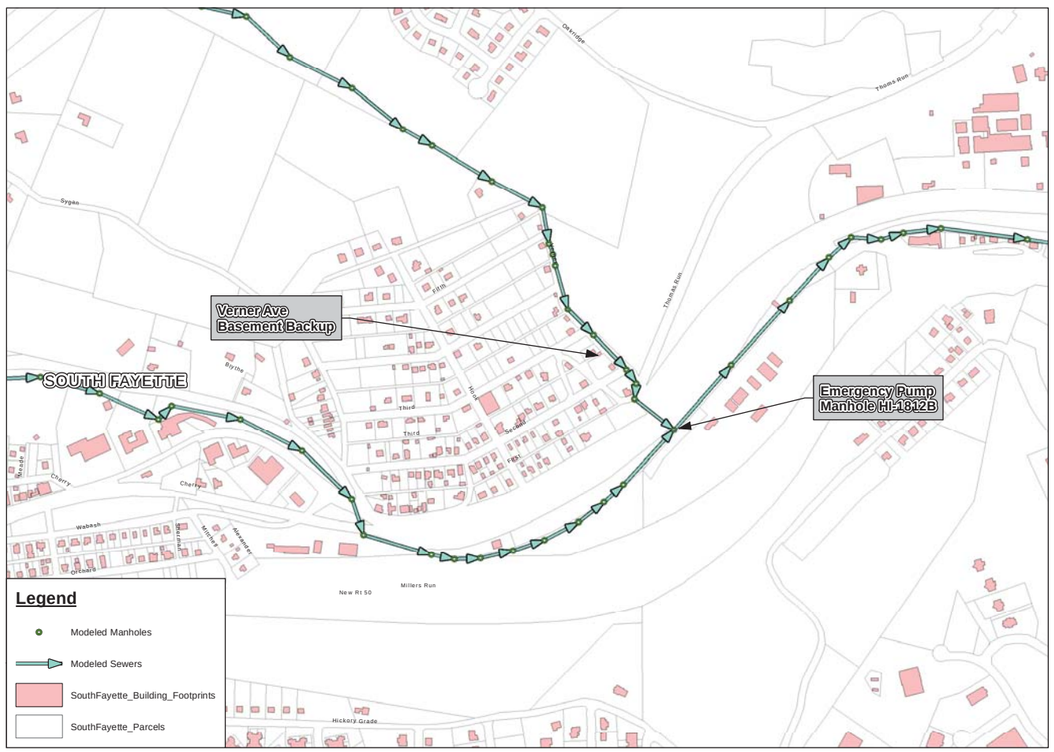
Please refer to the Robinson Run Feasibility Study.

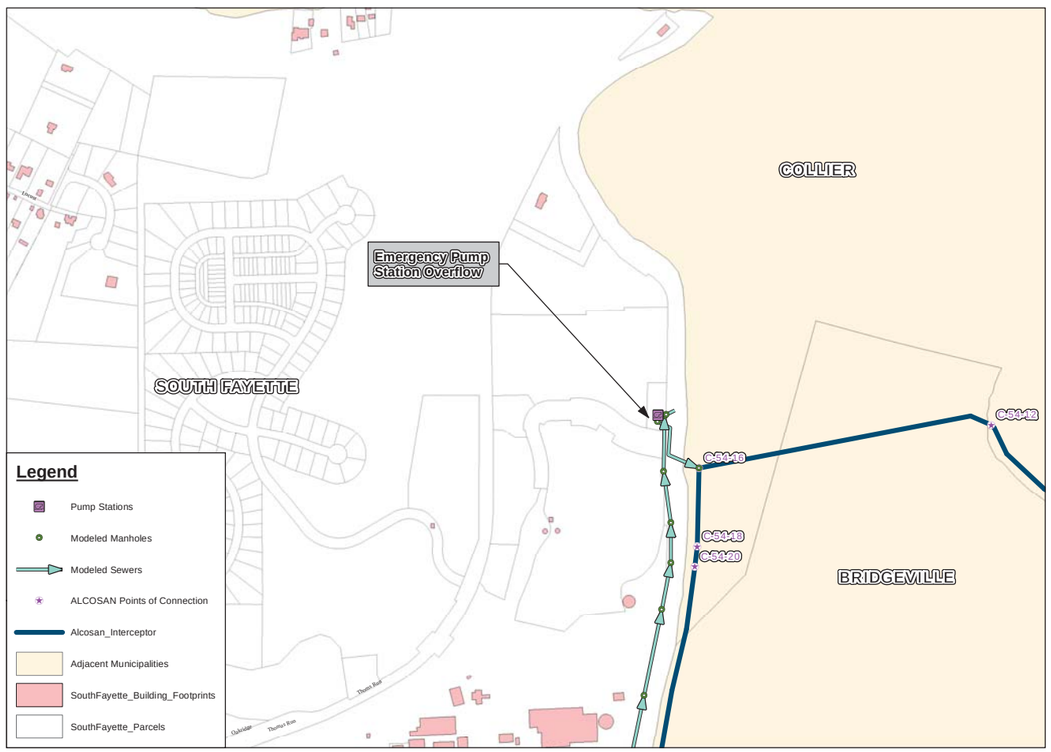
Thoms Run POC C-54-12

Please refer to the Thoms Run Feasibility Study.









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Basement Backup and Emergency Pump Locations

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SEE FULL SIZE

Author: Bryan Churilla
Date: 7/26/2013
NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
Projection: Lambert Conformal Conic

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FIG 5-3

5.4.2 Capacity Requirements for Various Design Storms and Levels of Protection

Chartiers Creek POC C-54-16

Under Typical Year rainfall events, there are no areas in the POC C-54-16 sewer systems that are known to be surcharged.

In the Year 2010, a system wide capacity evaluation of the Chartiers Creek system was conducted for the 1, 2, 5, and 10-year Design Storms. A copy of the evaluation can be seen in Appendix M of this Study.

The alternative analysis of the system was performed for the 10-yr, 24-hr design storm for the system tributary to POC C-54-16. In accordance with the Year 2010 capacity evaluation, this storm is considered the maximum concern for system flooding and surcharging. All upgrades to eliminate flooding during these events will also prevent future surcharging in the areas of upgrades. All upgrades will be warranted by the prediction of flooding but designed to eliminate both flooding and surcharging.

Robinson Run POC C-45B-04

Please refer to the Robinson Run Feasibility Study.

Thoms Run POC C-54-12

Please refer to the Thoms Run Feasibility Study.

The H&H Model for the sewer system consists of two (2) main interceptors. The first is the Chartiers Creek Interceptor which flows south to north, starting at the southeast corner of the Township. This interceptor runs parallel to the POC C-55-02 interceptor, owned and operated by Upper Saint Clair.

The second interceptor is the Millers Run Interceptor which flows southeast to northeast along Millers Run Road from its point of origin in Cecil Township. The H&H model extends to a point just beyond Battle Ridge Road, and includes small sewer extensions up the 10-inch Battle Ridge Road sewer, as well as a considerably long extension up the 10-inch to 8-inch Sygan Road sewer.

Some key sewers and their capacity characteristics during the 10-year design event can be seen in Table 5-6.

Table 5-6
Key System Location Characteristics, 10-year Storm

ID	Full Depth [ft]	Full Flow [mgd]	% Slope	Max Flow [mgd]	Max Flow Class	Max Vel [ft/s]	Max Flow/ Full Flow	Reserve Cap [mgd]	Total Flow Volume [mg]
Location: Millers Run Interceptor, Upstream of Battle Ridge Road									
EJ-2718 {295378S004}	1.25	2.496	0.357	2.343	Backwater	3.178	0.939	0.153	2.158
Location: Battle Ridge Road, Prior to Millers Run									
EJ-2915 {295378S005}	0.833	1.566	1.223	0.499	Backwater	3.368	0.319	1.067	0.429
Location: Millers Run Interceptor, Downstream of Battle Ridge Road									
EJ-2919B {295378S006}	1.25	2.444	0.343	2.755	Exceeds Capacity	3.473	1.127	-0.311	2.828
Location: Millers Run Interceptor, Upstream of Sygan Road									
HI-1515 {304381S015}	1.5	4.627	0.464	3.735	Backwater	3.662	0.807	0.891	5.327
Location: Sygan Road, Prior to Millers Run									
HI-1610 {304381S017}	0.833	1.572	1.233	2.157	Exceeds Capacity	6.164	1.372	-0.585	2.728
Location: Millers Run Interceptor, Downstream of Sygan Road									
HI-1812B {304381S019}	1.5	4.033	0.353	5.429	Exceeds Capacity	4.753	1.346	-1.396	8.302
Location: Chartiers Creek Interceptor, Prior to Chartiers Creek PS Sewer									
II-1503 {308382S007}	2	10.474	0.513	5.738	Backwater	3.143	0.548	4.737	7.614

The resulting sewer system capacity can be seen in Figure 5-2.

Robinson Run POC C-45B-04

Please refer to the Robinson Run Feasibility Study.

Thoms Run POC C-54-12

Please refer to the Thoms Run Feasibility Study.

5.5 Overflow Frequency and Volume

As stated in the previous section, the elimination of the South Fayette Park (Boys' Home) Pump Station and re-routing of flow to the Thoms Run POC C-54-12 sewershed will alleviate some of the basement backup and overflow issues, especially in the Verner Avenue area. The pump station elimination and sewer extension project is currently under design and is expected to be complete by the summer of the Year 2014.

Chartiers Creek POC C-54-16

There have been six (6) recorded overflow occurrences dating back to January 2005. Each event was documented and submitted to both the PADEP and the Allegheny County Health Department on the appropriate sanitary sewer overflow reporting form.

On January 17, 2005, 3.82 inches of rain were recorded in a storm event that required temporary bypass pumping within the system to prevent basement flooding. Temporary pumps were installed at three (3) manhole locations during the event, and the Chartiers Creek Pump Station remained fully operational despite a power failure which was supplemented by the emergency generator. The Emergency Response Plan was enacted with assistance of the South Fayette Volunteer Fire Departments (VFD's) and only minor residential property impacts were experienced. During the 17.25 hours of the overflow event, it is estimated that 686,000 gallons of sewage were pumped approximately 100-feet from MATSF Manhole FJ-1017C to the adjacent Millers Run creek. An additional 473,000 gallons were pumped over 17.5 hours from Manhole HI-1812B, at the intersection of Millers Run Road and Presto-Sygan Road. Another 1,088,000 gallons were pumped from Manhole IG-1618B, located just outside of the Chartiers Creek Pump Station, during 28.5 hours of recorded overflow.

Six (6) overflow events were recorded in which the Chartiers Creek Pump Station Emergency Overflow Structure was activated. The first, on January 15, 2007, lasted 0.5 hours and produced a metered discharge volume of 53,784 gallons to Chartiers Creek. The second, on March 15, 2007, lasted 4.5 hours and produced a metered discharge volume of 104,492 gallons. The 3rd

event, on November 26, 2007, lasted 1.0 hours and produced a metered discharge volume of 115,158 gallons.

The next recorded overflow occurrence, dated March 4, 2008, was similar to the January 2005 event. It was estimated that 52,000 gallons of sewage were pumped Manhole FJ-1017C to the adjacent Millers Run creek over a period of 2.5 hours. An additional 93,000 gallons were pumped over 8.25 hours from Manhole HI-1812B, at the intersection of Millers Run Road and Presto-Sygan Road. Another 275,579 gallons were pumped from Manhole IG-1618B, located just outside of the Chartiers Creek Pump Station, during 12.0 hours of recorded overflow. An additional 13,500 gallons were pumped during 1.5 hours of overflow at Manhole GI-3316, and a metered overflow volume of 275,579 gallons was experienced at the Chartiers Creek Pump Station Emergency Overflow Structure.

Then on October 30, 2010, during a 3.05" precipitation event, the meter at the Chartiers Creek Pump Station overflow recorded a discharge of 792,000 gallons.

The final SSO event occurred during a storm even that started on July 9, 2013 and ended on July 10, 2013. A total of 3.10" of rain were recorded at the pump station, with nearly 2" of the rain falling within a two (2) hour period. In addition, other recent rain events had resulted in saturated ground conditions prior to the event. As a result of the event, pump station capacity was exceeded, despite a fully functional emergency siphon bypass with a design capacity of 2 MGD. In addition, approximately four (4) basements were flooded on Verner Street, and another six (6) flooded on Blythe Road. A total metered overflow volume of 288,825 gallons was experienced at the Chartiers Creek Pump Station Emergency Overflow Structure over a period of 8.5 hours. All three (3) emergency pumping locations combined for a total volume of 150,000 gallons.

It is important to note that there were no SSO events within MATSF's Chartiers Creek system between October 2010 and the most recent July 2013 event. The conversion of the former siphon connected to old Reichhold site to ALCOSAN to an emergency overflow connection to

ALCOSAN for the MATSF system (completed in 2011), has prevented SSO events at the Chartiers Creek Pump Station for all but the most extreme of wet weather events, such as that of July 2013. Further, elimination of the tributary Mayview combined system in 2011 and continued I/I reduction efforts by MATSF undoubtedly will have a major impact on minimizing future SSO events within the entirety of the sewer system tributary to C-54-16.

Please refer to Appendix N for supporting documentation and reporting forms for each of the above listed overflow events.

~~TABLE 5-X: BASELINE CONDITION, TYPICAL YEAR ANNUAL CSO DISCHARGE SUMMARY FOR THE TOWNSHIP OF SOUTH FAYETTE~~

~~CSO Outfall~~	~~Owner~~	~~Number of Overflows in the Typical Year~~	~~Annual Overflow Volume (MG)~~	~~Peak Rate (mg~~		
				~~0 Overflows per Year~~	~~4 Overflows per Year~~	~~10 Overflows per Year~~

TABLE 5-7: BASELINE CONDITION, TYPICAL YEAR ANNUAL SSO DISCHARGE SUMMARY FOR THE MATSF

SSO Outfall	Owner	Peak Rate 2-yr Design Storm	Peak Rate 10-yr Design Storm
Chartiers Creek PS Emergency Overflow	MATSF	N/A	2.87 [(1)]
Oakdale Pump PS Emergency Overflow	RRIS communities	1.85	2.22

[(1)] The H&H Model used to simulate these 10-yr, 24-hr baseline conditions was developed prior to the MATSF construction of an emergency bypass siphon upstream of the Chartiers Creek Pump Station. This emergency bypass siphon may reduce the peak SSO discharge rate at the pump station during 10-yr, 24-hr flow conditions.

6.0 CSO/SSO CONTROL GOALS

Water quality issues are the driving force behind the ALCOSAN CD and municipal COA and ACO requirements. These requirements stem from the existing water quality criteria in the local streams that are not being met, some as a result of combined and separate overflows. CSO and SSO control goals were developed by ALCOSAN and each municipality so that water quality criteria will be met after implementation of the regional wet weather plan that includes municipal alternatives.

The detailed methodology that was used to develop the CSO and SSO control goals is described in the FSWG Document 031 "Water Quality based Approach to Feasibility Study Development". The CSO and SSO control goals that were selected are provided in the following section.

6.1 Background for Selection of Control Level

6.1.1 CSO Control Level

The sewershed tributary to POC C-54-16 is entirely separate sewer, and therefore this section is not applicable.

TABLE 6-1: APPLICABLE WATER QUALITY STANDARDS FOR THE CHARTIERS CREEK PLANNING BASIN

Receiving Stream	Stream Designation	TMDL (Y/N) (If No, is a TMDL proposed)	TMDL Parameter	Is TMDL CSO Related (Y/N)	In Attainment with TMDL (Y/N)
Chartiers Creek	WWF	Yes	PCBs, Chlordane, Acid Mine Drainage	No	Yes

6.1.2 SSO Control Level

Separate sanitary sewers are typically designed to accept only sanitary sewage from residential, commercial and industrial areas of any given municipality. As a result of aging or improperly constructed and maintained infrastructure, these sewers are subjected to high flows during wet weather events. These flows result in SSOs, and/or basement flooding. By definition, SSOs are illegal and need to be controlled.

During the preliminary discussions in the FSWG meeting on March 26, 2009, the PADEP introduced a concept to be used for establishing separate sanitary transport and SSO control criteria.

SSO Control and Separate Sanitary Sewer Transport Capacity Criteria

- Develop a "knee-of-the-curve" analysis utilizing the 1-yr, 2-yr, 5-yr and 10-yr, 24-hour storms at a minimum to determine the break-even- point for SSO control. The design rainfall depths for the design storms should match rainfall depths used or proposed by ALCOSAN. This evaluation will be performed under the auspices of the FSWG and the approach and results will be summarized in a different (later) document.
- The design storm approach acknowledges that a 2-year summer rainfall that occurs when there is snow on the ground would result in runoff that exceeds the intended 2-year summer storm design. Given this possibility, the FSWG developed a methodology that includes the selection of a design month. This design month, in addition to the selected design storm return frequency would represent the overall intended design conditions.
- Additional discussion was developed around the idea of matching/using the selected design storm used by ALCOSAN for its separate sanitary sewer interceptors.

For SSO storage design a good starting point included the 2-yr storm as one of the points evaluated.

6.2 Recommendations for Control Levels

When evaluating upgrade requirements and alternatives in the POC C-54-16 sewershed, MATSF utilized the Winter 10-year, 24-hour design storm. All flooding predicted by the model within the system was deemed as capacity deficient and planned for upgrades. All upgrades were then designed to prevent surcharging during the same winter design storm. In no instances was alleviation of flooding but the existence of surcharging considered a sufficient upgrade.

Please refer to Appendix M for more detail on the system hydraulic capacity evaluation during the 10-year, 24-hour storm, as well as the other various design storm levels.

7.0 ALTERNATIVE EVALUATION (INTERNAL MUNICIPAL)

The MATSF utilized the H&H model extents, in conjunction with historical knowledge, to pinpoint the best locations for upgrades to alleviate flooding. Once the locations of necessary upgrades were determined, the ultimate analysis came down to the economic feasibility, operation and maintenance requirements, physical geography impacts, and upgrade reliability. In all cases for the MATSF, alternatives came down to a choice between wet weather storage and upgraded conveyance for additional capacity. The cost comparison between the alternatives, capacity gained, operation and maintenance impacts, and the potential complications of under or over sizing were used in determination of the final recommendation.

Once suitable technologies and best possible sites to house them are identified, a list of alternatives to be evaluated was developed. This list provides a unique identification to all alternatives and will include their respective technologies involved, sites identified and any other variations compared to similar alternatives (for example a parallel pipe could be routed in several ways). A list of the alternatives that were developed for evaluation for this municipality is provided below.

Table 7-1 is a matrix of all evaluated Alternatives, combined with the corresponding upgrades that included as part of the respective Alternative. Each of the Alternative Item Descriptions will be described in detail in the respective Alternative Section.

All manhole references in this Study are in accordance with the Municipal Authority of South Fayette's identification system. Following the manhole name, the Chartiers Creek Planning Basin Model manhole ID is also referenced, denoted in brackets ({XXX}).

Table 7-1
Evaluated Alternatives Upgrade Matrix

UPGRADE ITEM DESCRIPTION	ALTERNATIVE NAME				
	Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 4A
Battle Ridge Road Storage Basin	•				
Presto-Sygan Road Storage Basin	•				
Verner Avenue Parallel Sewer	•	•	•	•	•
Bursca Drive Parallel Sewer	•	•	•	•	•
Millers Run Interceptor Parallel - Battle Ridge to 1st Avnue		•	•	•	•
Millers Run Interceptor Parallel - 1st Avenue to Presto-Sygan Road		•	•	•	•
Millers Run Interceptor Parallel - Presto-Sygan to 84 Lumber		•	•	•	•
Millers Run Interceptor Parallel - 1st Avenue to Presto-Sygan Road		•	•	•	•
Upgrade Chartiers Creek Pump Station to Increase Capacity		•			
Dry Weather Flow Siphon to POC C-55-02			•		
Wet Weather Overflow Siphon to POC C-55-02	•			•	
Brush Run POC C-55-02 Joint Interceptor					•
Brush Run POC C-55-02 Joint Siphon (Wet Weather Overflow)					•
Bursca Drive Area Bolted Manholes	•	•	•	•	•

In addition to the upgrades summarize in Table 7-1, the following system alterations were made in the H&H model under all alternatives.

- Near W. Bridge Road, bolt manhole GI-0714 {300381S004} to eliminate flooding at manhole GI-0714 {300381S004}.
- Near Hickory Grade Road, bolt manhole II-1508B {307381S010} and II-1508A {307381S012} to eliminate flooding at manhole II-1508B {307381S010}.
- Along the Verner Road sewer, bolt existing manhole GG-0110B {299385S002} and new manhole MH3.6 to eliminate flooding.
- Change the manhole FJ-2215 {298378S012} depth in the model from 9.20 ft to 12.91 ft based on Nov 24, 2010 survey. This change has already been completed.

While the H&H Model did predict flooding in the areas listed above, these locations are highly visible and there has been no historical documentation of overflowing. These areas will continue to be monitored closely to determine whether the model predictions are accurate.

TABLE 7-2: LISTING OF ALTERNATIVES EVALUATED FOR MATSF

Alternative Name	System Type	Control Level	Description
Alternative One	Separate Sanitary	Eliminate flooding for 10-year Winter Storm	Storage basins and install varying sized parallel sewers
Alternative Two	Separate Sanitary	Eliminate flooding for 10-year Winter Storm	Upgrade Chartiers Creek PS and install varying sized parallel sewers
Alternative Three	Separate Sanitary	Eliminate flooding for 10-year Winter Storm	Varying sized parallel sewers and siphon to POC C-55-02
Alternative Four	Separate Sanitary	Eliminate flooding for 10-year Winter Storm	Varying sized parallel sewers and wet weather siphon to POC C-55-02

7.1 Evaluation Criteria Development

7.1.1 Alternative One

The following represents the first combination of modeled system improvements that would alleviate wet weather issues.

1. Section One – Battle Ridge Rd Storage Basin

Build a storage basin near the intersection of Battle Ridge Road and Millers Run Road, to capture wet weather overflow from manhole EJ-2919B {295378S006}. Table 7-3 outlines the required capacity of proposed storage basin in this area. Table 7-4 outlines the proposed sewer construction required convey flow to the storage basin.

Table 7-3
Proposed Storage in Section One, Alternative One

Proposed Storage	Top Elevation	Volume (MG)	Peak Inflow (MGD)
OF2.0	867.24	0.3029	1.4951

Table 7-4
Proposed Sewer Construction in Section One, Alternative One

Proposed Sewer	Upstream MH	Downstream MH	Length	Diameter	Upstream Invert	Downstream Invert	Avg Depth
CDT2.0	EJ-2919B {295378S006}	OF2.0	199.94	12.00	869.74	867.24	10.80

2. Section Two - Presto-Sygan Rd Storage Basin

Build a storage basin near the intersection of Presto-Sygan Road and Millers Run Road, to capture wet weather overflow from manhole HI-1812B {304381S019}. Table 7-5 outlines the required capacity of the proposed storage in this area. Table 7-6 outlines the proposed manhole construction in this area, while Table 7-7 outlines the proposed sewer construction in this area.

Table 7-5
Proposed Storage in Section Two Alternative One

Proposed Storage	Top Elevation	Volume (MG)	Peak Inflow (MGD)
OF3.0	825.20	0.6514	2.4295

Table 7-6
Proposed Manholes in Section Two Alternative One

Proposed MH	Invert	Depth	Paved
MH3.10	821.55	14.20	No

Table 7-7
Proposed Sewers in Section Two Alternative One

Proposed Sewer	Upstream MH	Downstream MH	Length	Diameter	Upstream Invert	Downstream Invert	Avg Depth
CDT3.10	MH3.10	OF3.0	215.53	12.00	827.75	825.20	7.90

2. Section Three – Verner Street to Millers Run Road

Construct an 8-inch parallel sewer starting just upstream of the end of Verner Street at manhole HH-0417 {303382S012}, and extending to the intersection of Presto-Sygan Rd and Millers Run Rd, manhole HI-1812B {304381S019}. Table 7-8 outlines the proposed manholes in this area. Table 7-9 outlines the proposed sewers in this area.

Table 7-8
Proposed Manholes in Section Three Alternative One

Proposed MH	Invert	Depth	Paved
MH3.1	872.96	7.93	No
MH3.2	866.21	10.45	No
MH3.3	860.37	4.99	No
MH3.4	852.64	4.70	Yes
MH3.5	847.61	4.70	Yes
MH3.6	839.30	4.70	Yes
MH3.7	837.27	4.70	Yes
MH3.7.1	835.20	10.80	Yes
MH3.7.2	833.64	12.36	Yes
MH3.8	832.55	9.64	Yes
MH3.9	828.59	7.31	No

Table 7-9
Proposed Sewers in Section Three Alternative One

Proposed Sewer	Upstream MH	Downstream MH	Length	Diameter	Upstream Invert	Downstream Invert	Avg Depth
CDT3.0.1	HH-0417 {303382S012}	MH3.1	20	8.00	873.32	872.96	8.16
CDT3.1	MH3.1	MH3.2	380	8.00	872.96	866.21	9.19
CDT3.2	MH3.2	MH3.3	328	8.00	866.21	860.37	7.72
CDT3.3	MH3.3	MH3.4	334	8.00	860.37	852.64	4.84
CDT3.4	MH3.4	MH3.5	264	8.00	852.64	847.61	4.70
CDT3.5	MH3.5	MH3.6	318	8.00	847.61	839.30	4.70
CDT3.6	MH3.6	MH3.7	263	8.00	839.30	837.27	4.70
CDT3.7	MH3.7	MH3.7.1	144	8.00	837.27	835.20	7.75
CDT3.7.1	MH3.7.1	MH3.7.2	108	8.00	835.20	833.64	11.58
CDT3.7.2	MH3.7.2	MH3.8	76	8.00	833.64	832.55	11.00
CDT3.8	MH3.8	MH3.9	276	8.00	832.55	828.59	8.48
CDT3.9	MH3.9	HI-1812B {304381S019}	22	8.00	828.59	828.28	7.46
		TOTAL	**2,533**				

3. Section Four – Bursca Drive

This section of the model depicts a lack of capacity, but flooding has never been observed in the field. Although upgrade alternatives were analyzed and will be recommended, this area of the system will be further investigated and evaluated before any upgrades are designed or constructed. With that being said, the upgrades in this area include 551-feet of 12-inch parallel sewer from manhole JK-0408 {310377S005} to manhole JK-0906B {310377S017}. Table 7-10 outlines the proposed manhole construction in this area, while Table 7-11 outlines the proposed sewer construction in this area.

Table 7-10
Proposed Manholes in Section Four Alternative One

Proposed MH	Invert	Depth	Paved
MH5.1	834.29	7.36	No
MH5.2	832.37	6.63	Yes
MH5.3	828.15	6.58	Yes

Table 7-11
Proposed Sewers in Section Four Alternative One

Proposed Sewer	Upstream MH	Downstream MH	Length	Diameter	Upstream Invert	Downstream Invert	Avg Depth
CDT5.0	JK-0408 {310377S005}	MH5.1	19	12.00	834.52	834.29	7.25
CDT5.1	MH5.1	MH5.2	159	12.00	834.29	832.37	6.99
CDT5.2	MH5.2	MH5.3	349	12.00	832.37	828.15	6.60
CDT5.3	MH5.3	JK-0906B {310377S017}	24	12.00	828.15	827.86	6.73
		TOTAL	**551**				

5. Presuming actual flooding can be confirmed in this area, under this alternative, the following manholes will need to be bolted to eliminate potential areas of flooding near the intersection of Washington Pike and Bursca Drive.

- IJ-3319 {309378S005}
- IK-2201 {308378S003}
- IJ-2322 {308378S004}
- IK-1602 {308378S002}
- IJ-2519 {309378S001}
- IJ-3019 {309378S004}
- JJ-0616 {310378S901}
- JJ-07148 {310378S009}
- JJ-0219 {310378S002}
- JI-0222 {310380S009}
- JJ-0301C {310380S011}
- JJ-0119 {310378S001}
- JJ-0419 {310378S005}
- JJ-0518B {310378S006}

Figure 7-6, at the end of this section, shows all the Alternative One upgrades with an aerial map as background. Figure 7-1 shows the overflow to the proposed storage near manhole EJ-2919B {295378S006}. Figure 7-2 shows the overflow to proposed storage near manhole HI-1812B {304381S019}.

Figure 7-1
The Overflow to Proposed Storage near Battle Ridge Road

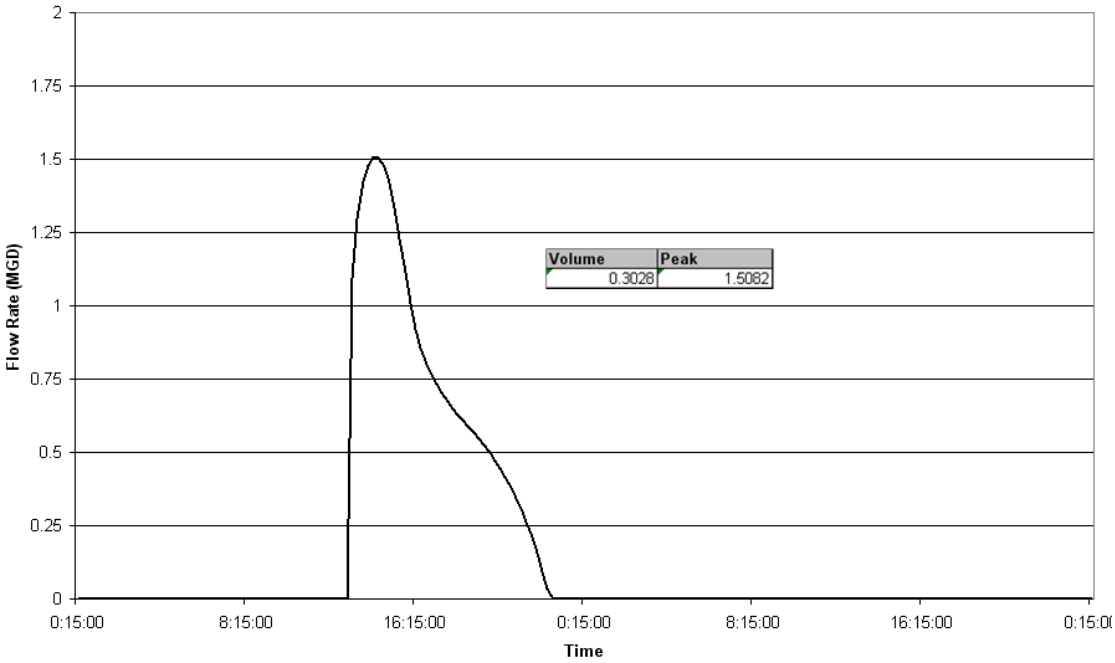
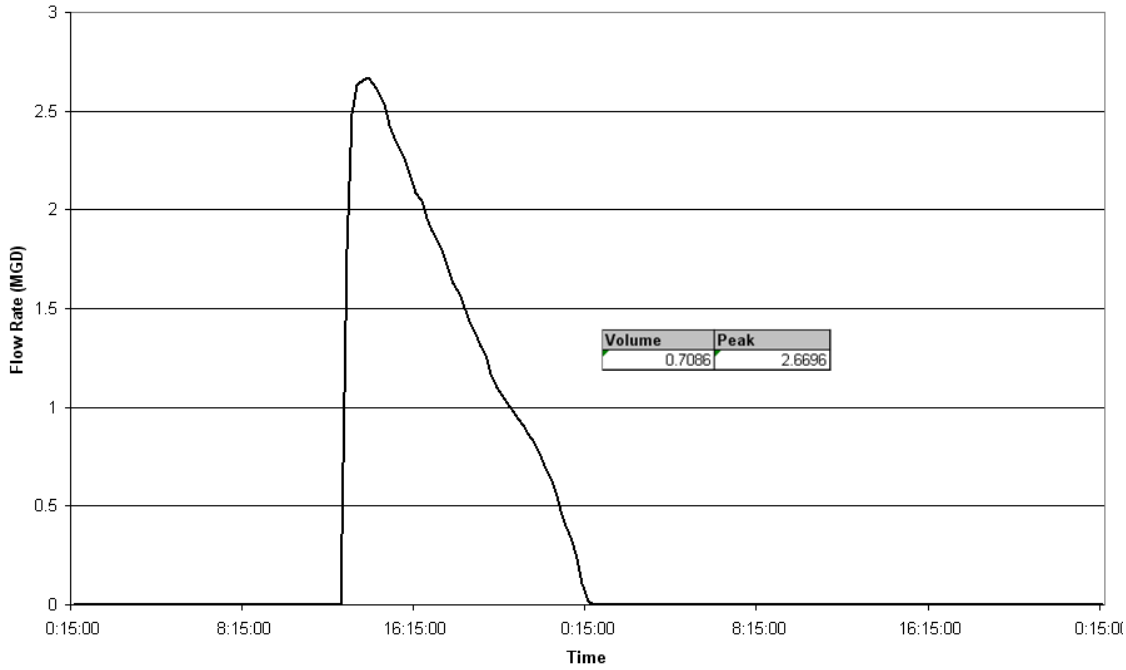


Figure 7-2
The Overflow to Proposed Storage near Presto-Sygan Road



4.2.2 Alternative Two

The following represents the second combination of modeled system improvements that would alleviate wet weather issues.

1. Section One – Battle Ridge Road to 1st Avenue

Build a 12-inch parallel sewer along the Millers Run Interceptor starting downstream of Battle Ridge Road at manhole FJ-0618 {296378S014}, extending to manhole MH2.24 at the intersection of 1st Ave and Millers Run Rd. Table 7-12 outlines the proposed manholes in this area, while Table 7-13 outlines the proposed sewers in this area.

Table 7-12
Proposed Manholes in Section One Alternative Two

Proposed MH	Invert	Depth	Paved
MH2.1	863.45	6.42	Yes
MH2.2	861.99	6.01	No
MH2.3	860.63	5.37	No
MH2.4	859.16	9.84	No
MH2.5	857.72	6.28	No
MH2.6	857.27	7.73	No
MH2.7	855.80	18.20	No
MH2.8	854.33	21.67	No
MH2.9	852.86	28.14	No
MH2.10	851.38	15.62	No
MH2.11	849.90	19.10	No
MH2.12	848.43	11.57	Yes
MH2.13	846.95	13.05	No
MH2.14	846.19	9.81	No
MH2.15	844.71	7.29	No
MH2.16	843.23	9.77	No
MH2.17	841.75	8.25	No
MH2.18	840.27	9.73	No
MH2.19	838.79	9.21	No
MH2.20	837.31	10.69	No
MH2.21	835.83	10.17	No
MH2.22	834.34	13.66	No
MH2.23	832.88	13.12	No
MH2.24	830.69	15.31	No

Table 7-13
Proposed Sewers in Section One Alternative Two

Proposed Sewer	Upstream MH	Downstream MH	Length	Diameter	Upstream Invert	Downstream Invert	Avg Depth
CDT2.0	FJ-0618 {296378S014}	MH2.1	18	12.00	863.52	863.45	6.38
CDT2.1	MH2.1	MH2.2	395	12.00	863.45	861.99	6.22
CDT2.2	MH2.2	MH2.3	365	12.00	861.99	860.63	5.69
CDT2.3	MH2.3	MH2.4	397	12.00	860.63	859.16	7.61
CDT2.4	MH2.4	MH2.5	386	12.00	859.16	857.72	8.06
CDT2.5	MH2.5	MH2.6	120	12.00	857.72	857.27	7.00
CDT2.6	MH2.6	MH2.7	398	12.00	857.27	855.80	12.96
CDT2.7	MH2.7	MH2.8	396	12.00	855.80	854.33	19.94
CDT2.8	MH2.8	MH2.9	396	12.00	854.33	852.86	24.91
CDT2.9	MH2.9	MH2.10	397	12.00	852.86	851.38	21.88
CDT2.10	MH2.10	MH2.11	399	12.00	851.38	849.90	17.36
CDT2.11	MH2.11	MH2.12	396	12.00	849.90	848.43	15.34
CDT2.12	MH2.12	MH2.13	396	12.00	848.43	846.95	12.31
CDT2.13	MH2.13	MH2.14	206	12.00	846.95	846.19	11.43
CDT2.14	MH2.14	MH2.15	397	12.00	846.19	844.71	8.55
CDT2.15	MH2.15	MH2.16	398	12.00	844.71	843.23	8.53
CDT2.16	MH2.16	MH2.17	399	12.00	843.23	841.75	9.01
CDT2.17	MH2.17	MH2.18	399	12.00	841.75	840.27	8.99
CDT2.18	MH2.18	MH2.19	399	12.00	840.27	838.79	9.47
CDT2.19	MH2.19	MH2.20	398	12.00	838.79	837.31	9.95
CDT2.20	MH2.20	MH2.21	399	12.00	837.31	835.83	10.43
CDT2.21	MH2.21	MH2.22	399	12.00	835.83	834.34	11.92
CDT2.22	MH2.22	MH2.23	393	12.00	834.34	832.88	13.39
CDT2.23	MH2.23	MH2.24	189	12.00	832.88	15.31	13.46
		TOTAL	**8,435**				

2. Section Two – 1st Avenue to Presto-Sygan Road

Build a 24-inch sewer from the conclusion of Section One at manhole MH2.24, and extend the sewer to the intersection of Presto-Sygan Rd and Millers Run Rd at manhole HI-1812B {304381S019}. This location is the existing manhole which conveys Sygan Rd flow into the Millers Run Interceptor. Table 7-14 outlines the proposed manhole construction in this area, while Table 7-15 outlines the proposed sewer construction.

Table 7-14
Proposed Manholes in Section Two Alternative Two

Proposed MH	Invert	Depth	Paved
MH2.25	830.35	13.65	No
MH2.25.1	829.84	14.16	Yes
MH2.26	829.32	12.68	No
MH2.27	828.81	10.19	No
MH3.9	828.31	7.59	No

Table 7-15
Proposed Sewers in Section Two Alternative Two

Proposed Sewer	Upstream MH	Downstream MH	Length	Diameter	Upstream Invert	Downstream Invert	Avg Depth
GI-3418 {303380S003}	GI-3418 {303380S003}	MH2.24	174	18.00	830.92	830.69	14.16
CDT2.24	MH2.24	MH2.25	256	24.00	830.69	830.35	14.48
CDT2.25	MH2.25	MH2.25.1	388	24.00	830.35	829.84	13.91
CDT2.25.1	MH2.25.1	MH2.26	388	24.00	829.84	829.32	13.42
CDT2.26	MH2.26	MH2.27	384	24.00	829.32	828.81	11.43
CDT2.27	MH2.27	MH3.9	379	24.00	828.81	828.31	8.89
CDT3.9	MH3.9	HI-1812B {304381S019}	21	24.00	828.31	821.70	10.14
		TOTAL	**1,990**				

3. Section Three – Verner Ave to Millers Run Road

Build an 8-inch parallel sewer starting just upstream of the end of Verner Ave at manhole HH-0417 {303382S012}, and extending to the final manhole constructed in Section One at the intersection of Presto-Sygan Rd and Millers Run Rd, manhole MH3.9. Table 7-16 outlines the proposed manholes in this area. Table 7-17 outlines the proposed sewers in this area.

Table 7-16
Proposed Manholes in Section Three Alternative Two

Proposed MH	Invert	Depth	Paved
MH3.1	872.96	7.93	No
MH3.2	866.21	10.45	No
MH3.3	860.37	4.99	No
MH3.4	852.64	4.70	Yes
MH3.5	847.61	4.70	Yes
MH3.6	839.30	4.70	Yes
MH3.7	837.27	4.70	Yes
MH3.7.1	835.20	10.80	Yes
MH3.7.2	833.64	12.36	Yes
MH3.8	832.55	9.64	Yes

Table 7-17
Proposed Sewers in Alternative Two, Section Three

Proposed Sewer	Upstream MH	Downstream MH	Length	Diameter	Upstream Invert	Downstream Invert	Avg Depth
CDT3.0.1	HH-0417 {303382S012}	MH3.1	20	8.00	873.32	872.96	8.16
CDT3.1	MH3.1	MH3.2	380	8.00	872.96	866.21	9.19
CDT3.2	MH3.2	MH3.3	328	8.00	866.21	860.37	7.72
CDT3.3	MH3.3	MH3.4	334	8.00	860.37	852.64	4.84
CDT3.4	MH3.4	MH3.5	264	8.00	852.64	847.61	4.70
CDT3.5	MH3.5	MH3.6	318	8.00	847.61	839.30	4.70
CDT3.6	MH3.6	MH3.7	263	8.00	839.30	837.27	4.70
CDT3.7	MH3.7	MH3.7.1	144	8.00	837.27	835.20	7.75
CDT3.7.1	MH3.7.1	MH3.7.2	109	8.00	835.20	833.64	11.58
CDT3.7.2	MH3.7.2	MH3.8	76	8.00	833.64	832.55	11.00
CDT3.8	MH3.8	MH3.9	276	8.00	832.55	828.59	8.48
		TOTAL	**2,512**				

4. Section Four – Presto-Sygan Road to Former 84 Lumber Property

Build an 18-inch parallel sewer from the intersection of Presto-Sygan Rd and Millers Run Rd, manhole HI-1812B {304381S019}, extending to manhole II-1302 {307382S001} at the

former location of 84 Lumber, where flow is combined with the Chartiers Creek Interceptor flow and conveyed to the Chartiers Creek Pump Station. Table 7-18 outlines the proposed manholes in this area. Table 7-19 outlines the proposed sewers in this area.

Table 7-18
Proposed Manholes in Section Four Alternative Two

Proposed MH	Invert	Depth	Paved
MH4.1	823.12	9.88	No
MH4.2	821.67	12.33	No
MH4.3	820.21	11.79	No
MH4.4	818.75	14.25	No
MH4.5	817.62	14.38	No
MH4.6	816.15	11.85	Yes
MH4.7	814.70	11.30	No
MH4.8	813.24	12.76	No
MH4.9	811.77	14.23	No
MH4.10	807.30	17.77	No

Table 7-19
Proposed Sewers in Section Four Alternative Two

Proposed Sewer	Upstream MH	Downstream MH	Length	Diameter	Upstream Invert	Downstream Invert	Avg Depth
CDT4.0	HI-1812B {304381S019}	MH4.1	21	18.00	823.20	823.12	11.41
CDT4.1	MH4.1	MH4.2	398	18.00	823.12	821.67	11.11
CDT4.2	MH4.2	MH4.3	399	18.00	821.67	820.21	12.06
CDT4.3	MH4.3	MH4.4	400	18.00	820.21	818.75	13.02
CDT4.4	MH4.4	MH4.5	310	18.00	818.75	817.62	14.32
CDT4.5	MH4.5	MH4.6	400	18.00	817.62	816.15	13.12
CDT4.6	MH4.6	MH4.7	399	18.00	816.15	814.70	11.58
CDT4.7	MH4.7	MH4.8	399	18.00	814.70	813.24	12.03
CDT4.8	MH4.8	MH4.9	400	18.00	813.24	811.77	13.50
CDT4.9	MH4.9	MH4.10	296	18.00	811.77	807.30	16.00
		TOTAL	**3,422**				

5. **Section Five – Bursca Drive**

   This Section is the same as Alternative 1, Section 4.

6. Under this alternative, the same manholes that were outlined in Alternative One will need to be bolted eliminate potential areas of flooding near the intersection of Washington Pike and Bursca Drive. **Please refer to Alternative One, Upgrade Item No. 6.**

7. Upgrade the Chartiers Creek Pump Station (CCPS) to increase peak capacity from 6.00 MGD to 12.50 MGD.

8. Build a 20 inch parallel force main from the CCPS to POC C-54-16, and retain the existing force main.

Figure 7-7, found at the conclusion of this section, shows all the Alternative Two upgrades with an aerial map as background.

4.2.3 Alternative Three

The following section represents the third combination of modeled MATSF system improvements that would alleviate wet weather issues.

1. Section One – Battle Ridge Road to 1st Avenue

This Section is the same as Alternative 2, Section 1.

2. Section Two - 1st Avenue to Presto-Sygan Road

This Section is the same as Alternative 2, Section 2.

3. Section Three - Verner Avenue to Millers Run Road

This Section is the same as Alternative 2, Section 3.

4. Section Four – Presto-Sygan Road to former 84 Lumber Property

This Section is similar to Alternative 2, Section 4, as upgrades include an 18-inch parallel sewer from manhole HI-1812B {304381S019} to manhole II-1302 {307382S001}, except manhole and sewer characteristics are slightly altered due to a revised hydraulic profile. Table 7-20 outlines the proposed manhole construction in this area, while Table 7-21 outlines the proposed sewers in this area.

Table 7-20
Proposed Manholes in Section Four Alternative Three

Proposed MH	Invert	Depth	Paved
MH4.1	823.12	9.88	No
MH4.2	821.58	12.42	No
MH4.3	820.03	11.97	No
MH4.4	818.48	14.52	No
MH4.5	817.28	14.72	No
MH4.6	815.73	12.27	Yes
MH4.7	814.19	11.81	No
MH4.8	812.64	13.36	No
MH4.9	811.09	14.91	No
MH4.10	810.37	14.63	No

Table 7-21
Proposed Sewers in Section Four Alternative Three

Proposed Sewer	Upstream MH	Downstream MH	Length	Diameter	Upstream Invert	Downstream Invert	Avg Depth
CDT4.0	HI-1812B {304381S019}	MH4.1	21	18.00	823.20	823.12	11.42
CDT4.1	MH4.1	MH4.2	398	18.00	823.12	821.58	11.15
CDT4.2	MH4.2	MH4.3	399	18.00	821.58	820.03	12.20
CDT4.3	MH4.3	MH4.4	400	18.00	820.03	818.48	13.24
CDT4.4	MH4.4	MH4.5	310	18.00	818.48	817.28	14.62
CDT4.5	MH4.5	MH4.6	400	18.00	817.28	815.73	13.49
CDT4.6	MH4.6	MH4.7	399	18.00	815.73	814.19	12.04
CDT4.7	MH4.7	MH4.8	399	18.00	814.19	812.64	12.59
CDT4.8	MH4.8	MH4.9	400	18.00	812.64	811.09	14.14
CDT4.9	MH4.9	MH4.10	184	18.00	811.09	810.37	14.77
CDT4.10	MH4.10	II-1202B {307382S006}	40	18.00	810.37	808.72	15.06
		TOTAL	**3,350**				

5. Section Five – Bursca Drive

This Section is the same as Alternative One, Section Four and Alternative Two, Section Five.

6. Section Six –POC C-55-02 Total Flow Siphon

Build varied diameter gravity sewer and siphon, upstream of the Chartiers Creek Pump Station, from manholes II-1202B {307382S006} and II-1503 {308382S007} to ALCOSAN manhole POC C-55-02. Table 7-22 outlines the proposed manhole construction in this area, while Table 7-23 outlines the proposed sewers in this area.

Table 7-22
Proposed Manholes in Section Four Alternative Three

Proposed MH	Invert	Depth	Paved
MH6.1	808.52	15.48	No
MH6.2	808.36	16.64	No
MH6.3	807.87	7.13	No
MH6.4.1[1]	794.00	1.50	No
MH6.5.1[1]	794.00	1.50	No
MH6.4.2[1]	794.00	1.75	No
MH6.5.2[1]	794.00	1.75	No
MH6.6	807.73	3.27	No

[1] Manholes MH6.4.1, MH6.5.1, MH6.4.2, and MH6.5.2 are not real manholes. They are dummy manholes to model siphons.

Table 7-23
Proposed Sewers in Section Four Alternative Three

Proposed Sewer	Upstream MH	Downstream MH	Length	Diameter	Upstream Invert	Downstream Invert	Avg Depth
II-1202B {307382S006}	II-1202B {307382S006}	MH6.1	128	24.00	808.72	808.52	15.49
CDT6.1	MH6.1	MH6.2	100	24.00	808.52	808.36	16.06
CDT6.2	MH6.2	MH6.3	314	27.00	808.36	807.87	11.88
CDT6.3.1[1]	MH6.3	MH6.4.1	16	18.00	807.87	807.85	11.56
CDT6.4.1[1]	MH6.4.1	MH6.5.1	54	18.00	807.85	807.76	15.00
CDT6.5.1[1]	MH6.5.1	MH6.6	19	18.00	807.76	807.73	8.63
CDT6.3.2[1]	MH6.3	MH6.4.2	16	21.00	807.87	807.85	11.56
CDT6.4.2[1]	MH6.4.2	MH6.5.2	54	21.00	807.85	807.76	15.00
CDT6.5.2[1]	MH6.5.2	MH6.6	19	21.00	807.76	807.73	8.63
CDT6.6	MH6.6	C-55-02	47	27.00	807.73	807.66	7.23
		TOTAL	**767**				

[1] Sewers CDT6.3.1, CDT6.4.1, and CDT6.5.1 are regular siphons. Sewers CDT6.3.2, CDT6.4.2, and CDT6.5.2 are relief siphons.

7. Under this alternative, the same manholes that were outlined in Alternative One will need to be bolted eliminate potential areas of flooding near the intersection of Washington Pike and Bursca Drive. **Please refer to Alternative One, Upgrade Item No. 6.**

8. Keep existing Chartiers P.S. to convey remnant and proposed development flow.

Figure 7-8, included at the end of this Section, shows all the Alternative Three upgrades with an aerial map as background.

In order to accommodate the hydraulics of both dry and wet weather flow, the proposed siphon requires two (2) separate sewer lines. The first would convey only dry weather flow. The flow through this first siphon line to C-55-02 is shown in Figure 7-3. Then, under design storm conditions, when capacity of the first siphon is exceed, an additional sewer is activated via an upstream overflow. Figure 7-4 shows the wet weather siphon flow to the ALCOSAN manhole C-55-02.

Figure 7-3
Dry Weather Flow Siphon
To POC C-55-02 (Alternative Three)

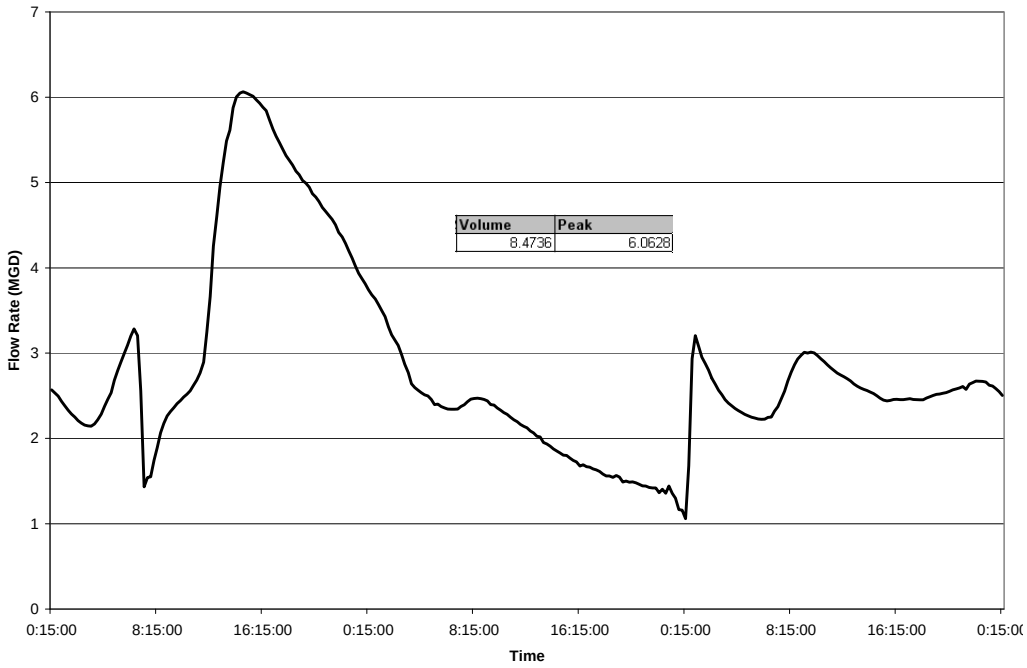
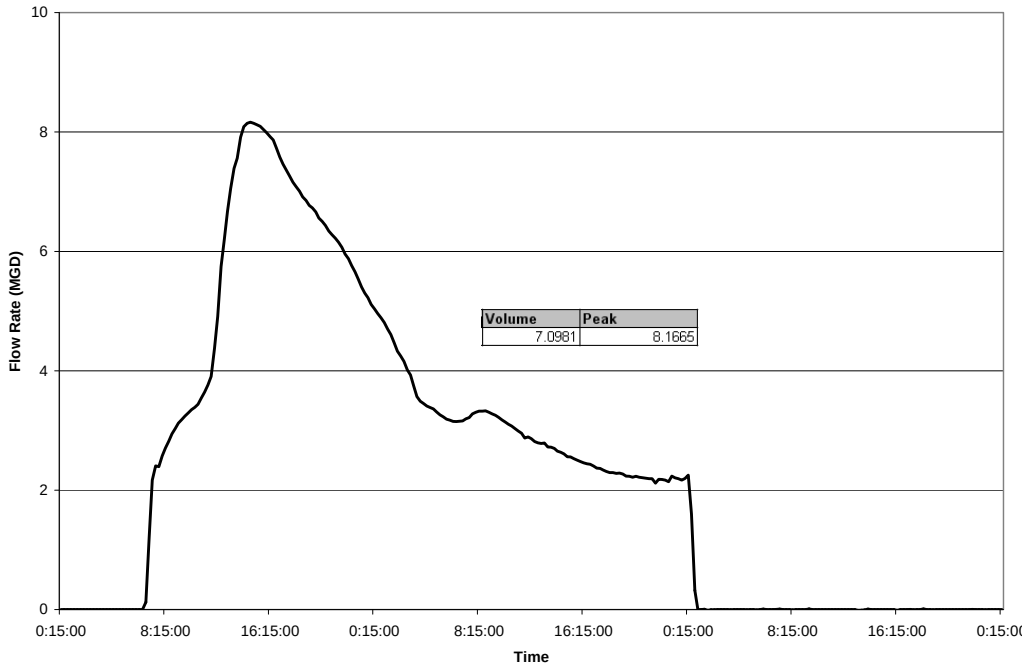


Figure 7-4
Wet Weather Siphon Flow
To POC C-55-02 (Alternative Three)



4.2.4 Alternative Four

The fourth evaluated alternative includes the following combination of modeled MATSF system improvements that would alleviate wet weather issues.

1. Section One – Battle Ridge Road to 1st Avenue

This Section is the same as Alternative 2, Section 1.

2. Section Two - 1st Avenue to Presto-Sygan Road

This Section is the same as Alternative 2, Section 2.

3. Section Three - Verner Avenue to Millers Run Road

This Section is the same as Alternative 2, Section 3.

4. Section Four – Presto-Sygan Road to 84 Lumber Property

This Section is the same as Alternative 2, Section 4.

5. Section Five - Bursca Drive

This Section is the same as Alternative One, Section Four and Alternative Two, Section Five.

6. Section Six –POC C-55-02 Wet Weather Siphon

In this Alternative, a siphon to POC C-55-02 is proposed to convey only wet weather overflow out of the Chartiers Creek system. The capacity of the downstream Chartiers Creek Pump Station, as well as the recently constructed emergency siphon to POC C-55-20, would be exceeded prior to activating the proposed wet weather siphon to ALCOSANPOC C-55-02. In this Section, an overflow relief siphon is proposed from manhole IH-1320 {307382S008} to ALCOSAN manhole C-55-02. Table 7-24 outlines the proposed manhole construction in this area, while Table 7-25 outlines the proposed sewers in this area.

Table 7-24
Proposed Manholes in Section Six Alternative Four

Proposed MH	Invert	Depth	Paved
MH6.1	806.48	18.34	No
MH6.2	808.60	6.40	No
MH6.3 (1)	794.00	16.00	No
MH6.4 (1)	794.00	14.00	No
MH6.5	807.89	3.11	No

[1] Manholes MH6.3 and MH6.4 are not real manholes. They are dummy manholes to model siphons.

Table 7-25
Proposed Sewers in Section Six Alternative Four

Proposed Sewer	Upstream MH	Downstream MH	Length	Diameter	Upstream Invert	Downstream Invert	Avg Depth
CDT6.1	MH6.1	MH6.2	22	18.00	808.75	806.48	11.24
CDT6.2 [1]	MH6.2	MH6.3	17	18.00	806.48	808.60	11.20
CDT6.3 [1]	MH6.3	MH6.4	54	18.00	808.60	808.48	15.00
CDT6.4 [1]	MH6.4	MH6.5	32	18.00	808.48	808.11	8.56
CDT6.5	MH6.5	C-55-02	33	18.00	808.11	807.89	7.15
		TOTAL	**158**				

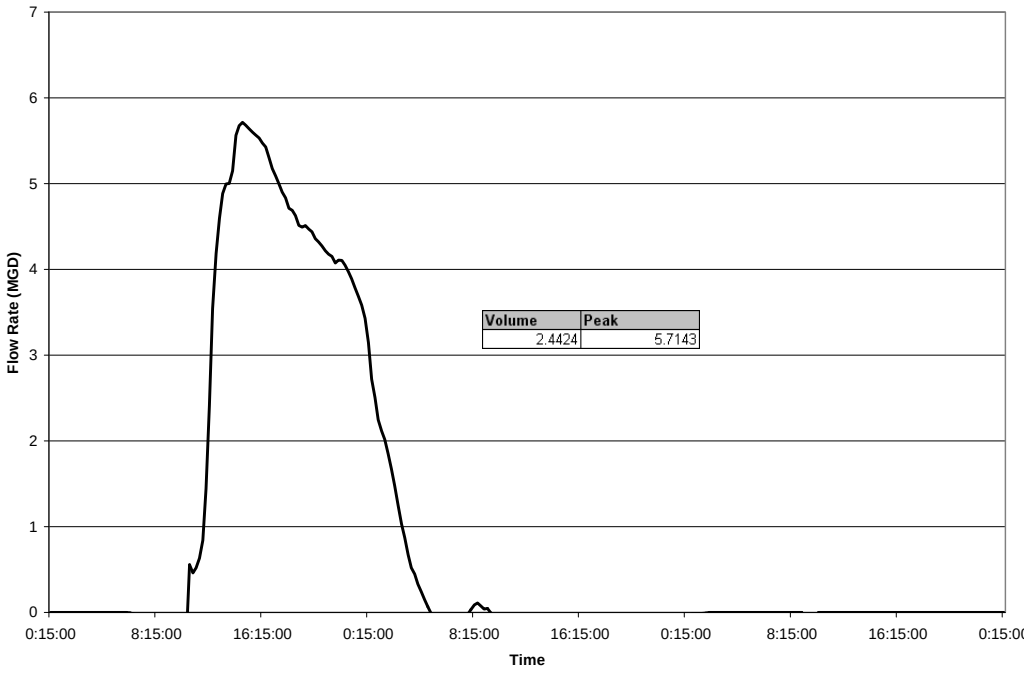
[1] Sewers CDT6.2, CDT6.3, and CDT6.4 are siphons.

7. Under this alternative, the same manholes that were outlined in Alternative One will need to be bolted to eliminate potential areas of flooding near the intersection of Washington Pike and Bursca Drive. **Please refer to Alternative One, Upgrade Item No. 6.**

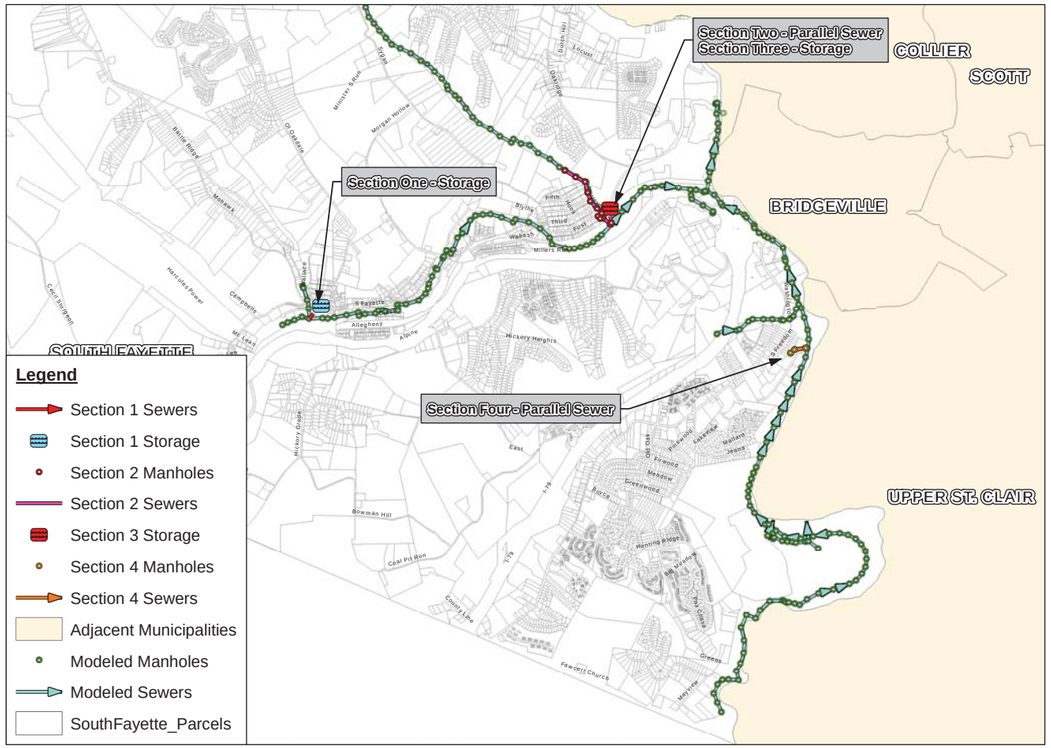
8. Keep existing Chartiers P.S. to convey Dry Weather Flow to ALCOSAN POC C-54-16.

Figure 7-9 shows all the Alternative Four upgrades with an aerial map as background. Figure 7-5 shows the proposed wet weather siphon overflow to the ALCOSAN manhole C-55-02.

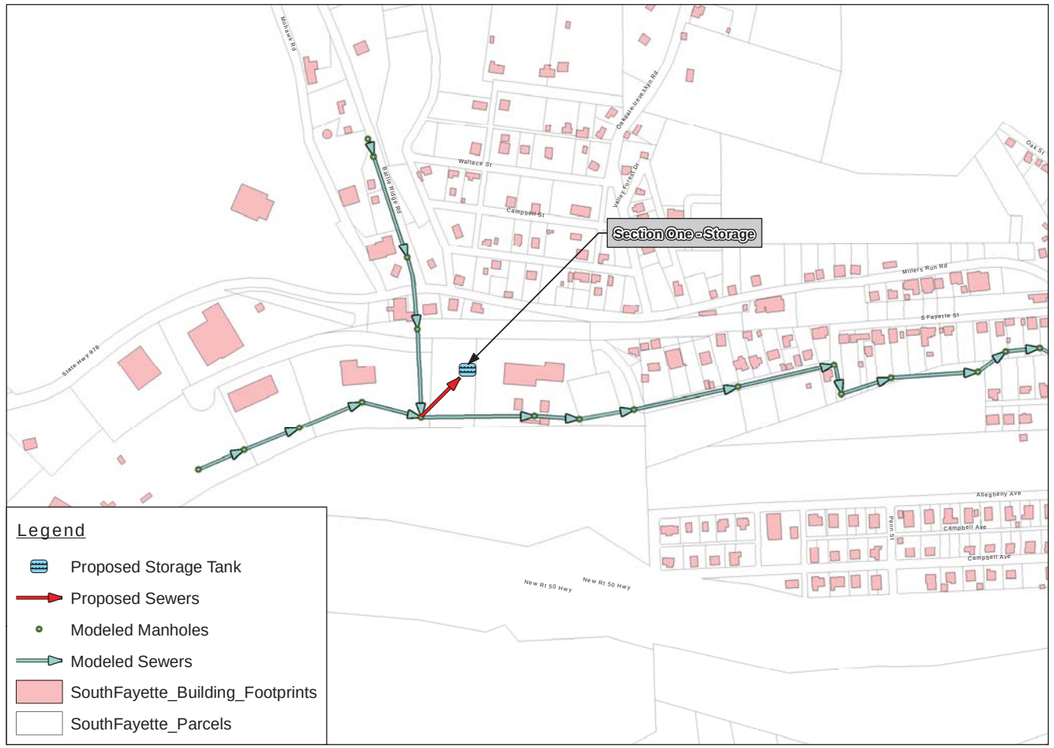
Figure 7-5
Wet Weather Siphon Overflow to Manhole C-55-02 (Alternative Four)



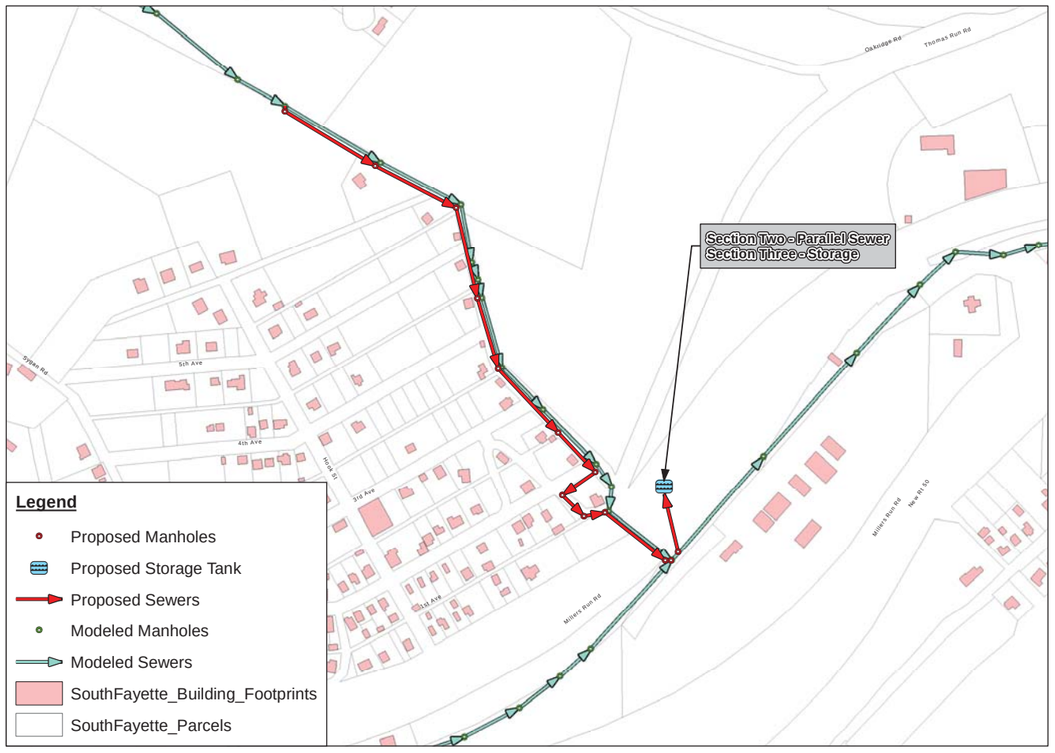
OVERALL ALTERNATIVE ONE MAP



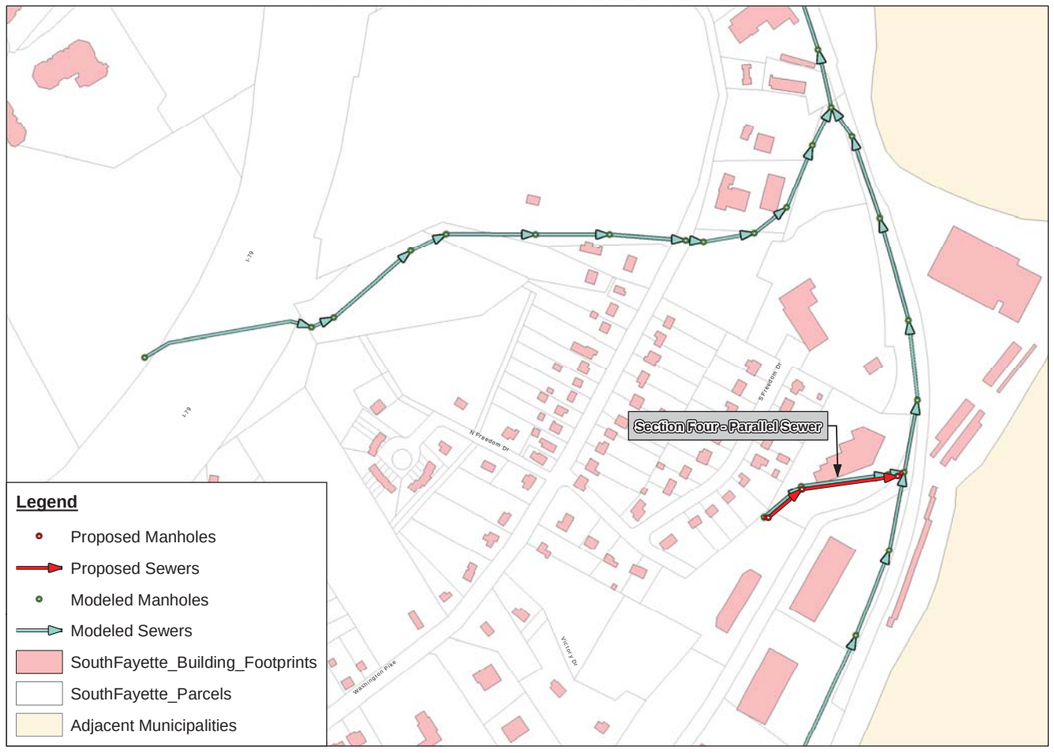
SECTION ONE - BATTLE RIDGE RD STORAGE TANK



SECTION TWO - SYGAN RD PARALLEL SEWER
SECTION THREE - SYGAN RD STORAGE TANK



SECTION FOUR - PARALLEL SEWER



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217-35

FIG 7-6

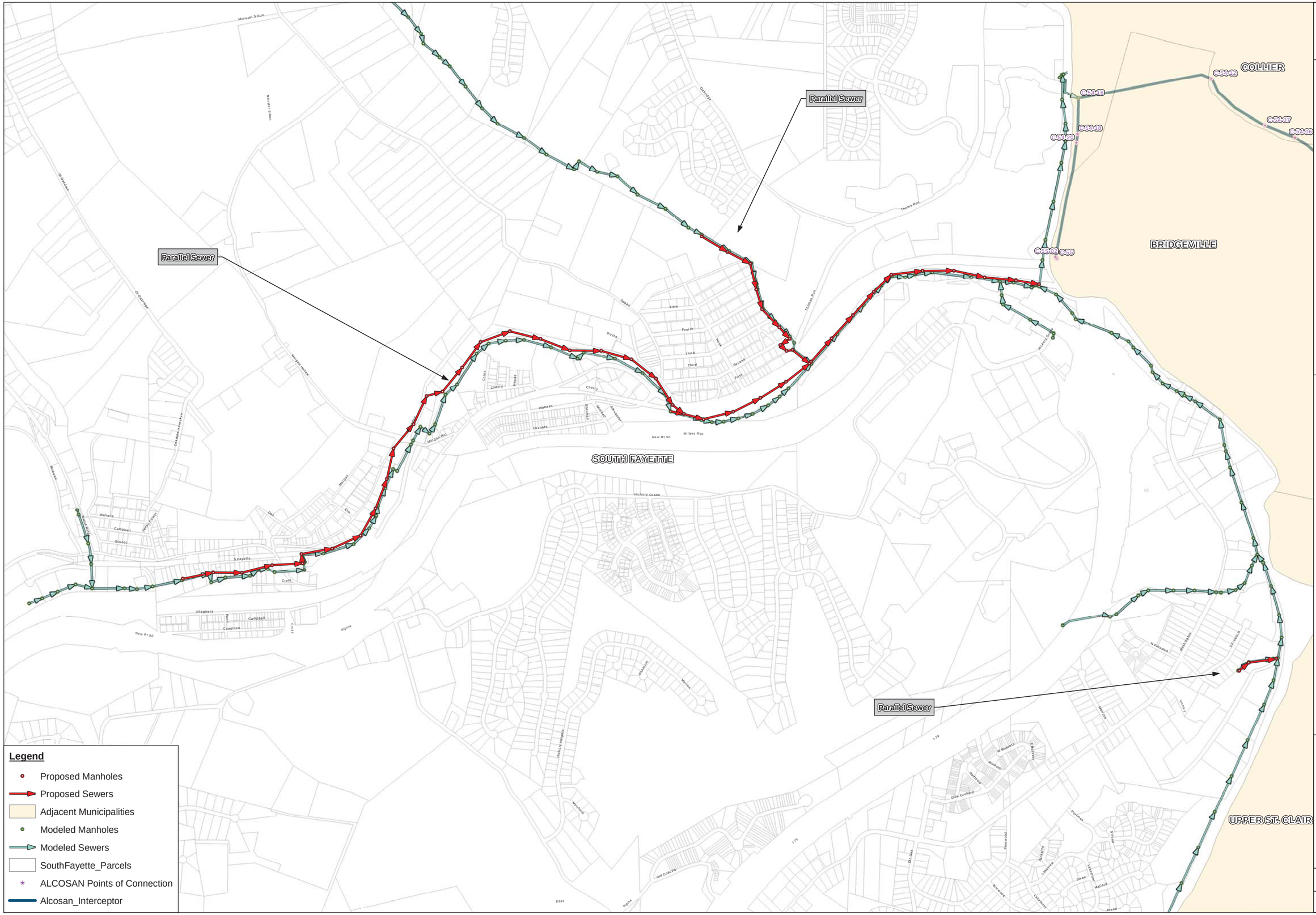

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FIG 7-7

N

COLLIER

BRIDGEVILLE

SOUTH FAYETTE

UPPER ST. CLAIR

C-55-02 Siphon

Parallel Sewer

Parallel Sewer

C-54-12
C-54-19
C-54-17
C-54-18
C-54-20
C-54 C-54
C-53
C-55-02

Legend

- Proposed Manholes
- Proposed Sewers
- Pump Stations
- Modeled Manholes
- Modeled Sewers
- Adjacent Municipalities
- SouthFayette_Parcels
- ALCOSAN Points of Connection
- Alcosan_Interceptor

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Alternative 3 Map

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217-35

FIG 7-8

Parallel Sewer

C-55-02 Siphon

Parallel Sewer

C-54-10
C-54-07
C-54-08
C-54
C-54
C-55
C-55-02

COLLIER

BRIDGEVILLE

SOUTH FAYETTE

UPPER ST. CLAIR

Legend

- Proposed Manholes
- Proposed Sewers
- Pump Stations
- Modeled Manholes
- Modeled Sewers
- Adjacent Municipalities
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Alternative 4 Map

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Date: 7/25/2013
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217-35

FIG 7-9

7.2 Cost Estimates

The Feasibility Study Working Group proposed two different approaches to consider the alternatives cost. One approach, which can be described as Universal Rate Payer Centric, considers the total cost of transport and treatment comprising the total rate levied on and paid by the rate payer (i.e. ALCOSAN costs plus local municipal alternative costs) in the alternative evaluations. The other approach, which can be described as Local Rate Payer Centric, considers only the local internal municipal transport and treatment costs in the alternative evaluation. The latter approach disregards all ALCOSAN regional facilities' and adjacent municipal internal cost components.

The MATSF determined to adapt the second approach because it is impossible to collect the overall ALCOSAN regional transport and treatment cost at this stage. All cost estimates presented here within were developed with Base Year 2011 costs.

4.3.1 Alternative One Cost Estimate

The estimated total project cost for Alternative One is $8,177,000. This cost includes a 25% contingency on estimated construction cost. The components of this cost are summarized in Table 7-26 below.

Table 7-26
Alternative One Project Costs

Item	Cost
Total Estimated Construction Cost	$7,222,000
Additional Project Costs	$955,000
Total Estimated Project Cost	$8,177,000

A detailed cost estimate is included in Appendix V.

4.3.2 ALTERNATIVE TWO COST ESTIMATE

The estimated total project cost for Alternative Two is $6,314,000. This cost includes a 25% contingency on estimated construction cost. The components of this cost are summarized in Table 7-27 below.

Table 7-27
Alternative Two Project Costs

Item	Cost
Total Estimated Construction Cost	$5,389,000
Additional Project Costs	$925,000
Total Estimated Project Cost	$6,314,000

A detailed cost estimate is included in Appendix W.

4.3.3 ALTERNATIVE THREE COST ESTIMATE

The estimated total project cost for Alternative Three is $4,387,000. This cost includes a 25% contingency on estimated construction cost. The components of this cost are summarized in Table 7-28 below.

Table 7-28
Alternative Three Project Costs

Item	Cost
Total Estimated Construction Cost	$3,690,000
Additional Project Costs	$800,000
Total Estimated Project Cost	$4,490,000

A detailed cost estimate is included in Appendix X.

4.3.4 ALTERNATIVE FOUR COST ESTIMATE

The estimated total project cost for Alternative Four is $4,043,000. This cost includes a 25% contingency on estimated construction cost. The components of this cost are summarized in Table 7-29 below.

Table 7-29
Alternative Four Project Costs

Item	Cost
Total Estimated Construction Cost	$3,372,000
Additional Project Costs	$775,000
Total Estimated Project Cost	$4,147,000

A detailed cost estimate is included in Appendix Y.

TABLE 7-30: LISTING OF ALTERNATIVES EVALUATED FOR MATSF

Alternative Name	System Type	Control Level	Description	Total Present Worth Cost
Alternative One	Separate Sanitary	Eliminate flooding for 10-year Winter Storm	Storage basins and install varying sized parallel sewers	$8,177,000 (1)
Alternative Two	Separate Sanitary	Eliminate flooding for 10-year Winter Storm	Upgrade Chartiers Creek PS and install varying sized parallel sewers	$6,314,000 (1)
Alternative Three	Separate Sanitary	Eliminate flooding for 10-year Winter Storm	Varying sized pararllel sewers and siphon to POC C-55-02	$4,490,000 (1)
Alternative Four	Separate Sanitary	Eliminate flooding for 10-year Winter Storm	Varying sized parallel sewers and wet weather siphon to POC C-55-02	$4,147,000 (1)

[1] Costs reflect February 2011 Feasibility Study submission to ALCOSAN. No adjustment has been made

7.3 Alternative Selection Process

In order to determine the highest ranked alternative, MATSF conducted extensive modeling analysis, field investigation, and cost evaluation. The MATSF completed and submitted the Preliminary Flow Estimation (PFE) in June 2010 to ALCOSAN. The South Fayette Sewershed capacity analysis was done to support the alternative evaluation.

7.4 Alternative Evaluation Results

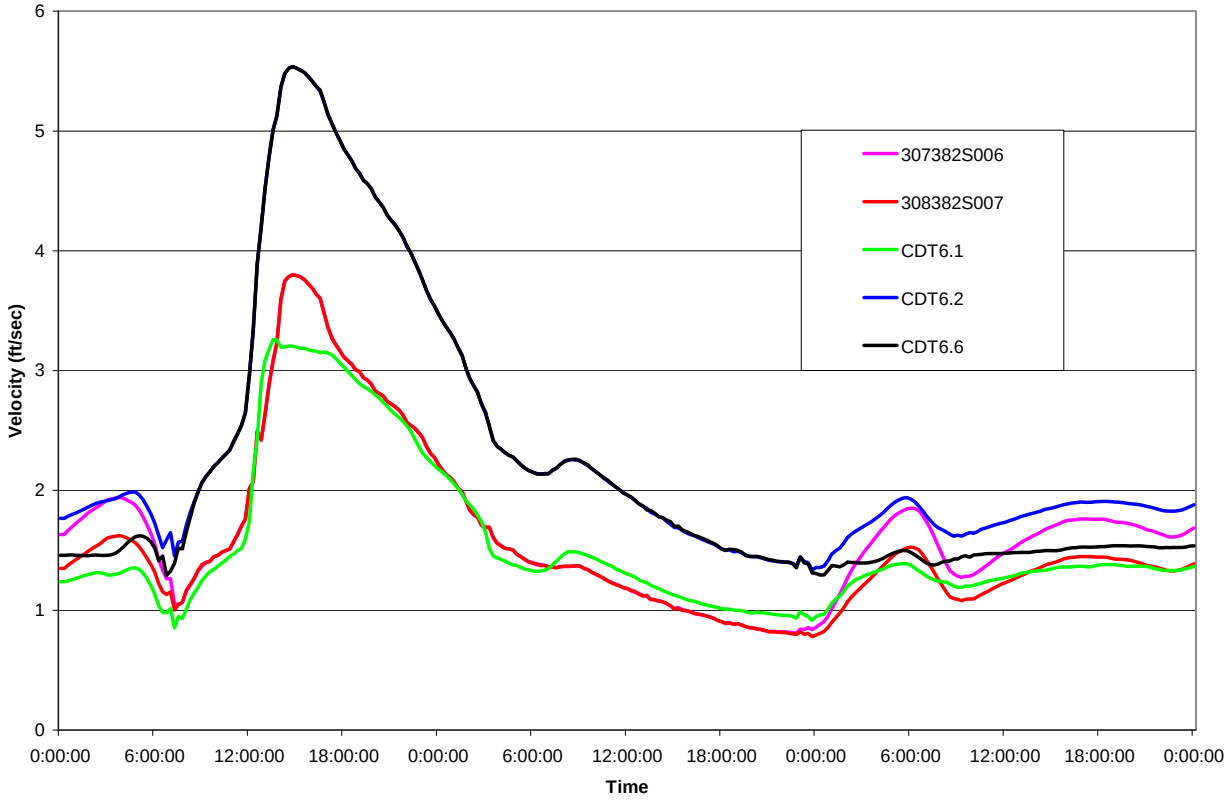
Alternative One requires substantial Operation and Maintenance (O&M) cost for the storage basins and moderate O&M cost for the pump station. Alternative Two requires substantial O&M cost for the pump station. Alternative Three and Alternative Four require lower O&M cost for the pump station. It is obvious that Alternative One and Alternative Two have larger capital cost and O&M cost than Alternative Three and Alternative Four.

The O&M costs for Alternative Three and Alternative Four are comparable. However, Alternative Three has a potential sedimentation problem at the proposed siphon sewer and a potential wet well odor issue at the pump station..

Alternative Three builds a gravity sewer and siphon from II-1202B {307382S006} and II-1503 {308382S007} to ALCOSAN manhole C-55-02. Due to the small invert difference between II-1202B {307382S006} / II-1503 {308382S007} and C-55-02, the net siphon elevation differential in nominal. Therefore, the flow velocity in the sewer is less than desirable. Figure 9 shows the flow velocity in the proposed sewers II-1202B {307382S006}, II-1503 {308382S007}, CDT6.1, CDT6.2, and CDT6.6 in a 10 year 24 hour design storm. As can be seen from Figure 7-11, all flow velocities in dry weather are smaller than 2 ft/sec, which is the minimum velocity needed to maintain an effective self cleaning scour.

Alternative Three keeps the existing Chartiers pump station to convey remnant and new development flow in the immediate vicinity of that facility. Because most dry weather flow will be conveyed through a new siphon under this alternative, the remnant and new development average flow was estimated to be very small (less than 0.25 MGD). The existing Chartiers pump station capacity is permitted at 6.00 MGD. A large pump station and wet well with relatively low flow could create a substantial odor issue at the pump station.

Figure 7-11
Flow Velocity in Alternative 3 Proposed Sewers



Alternative Four does not have these problems because of high flow velocity in dry weather and reasonable dry weather flow at the pump station. Therefore, Alternative Four is the recommended alternative for the MATSF sewershed currently tributary to ALCOSAN POC C-54-16.

7.5 Recommended Alternative Description

Alternative Four requires the following system modifications.

1. Section One: Build a 12-inch parallel sewer from manhole FJ-0618 {296378S014} to manhole MH2.24. Table 7-11 outlines the proposed manholes in this area. Table 7-12 outlines the proposed sewers in this area. (Same as Section One, Alternative Two)

2. Section Two: Build a 24-inch sewer from manhole MH2.24 to manhole HI-1812B {304381S019}. Table 7-13 outlines the proposed manholes in this area. Table 7-14 outlines the proposed sewers in this area. (Same as Section Two, Alternative Two)

3. Section Three: Build an 8-inch parallel sewer from manhole HH-0417 {303382S012}to manhole MH3.9. Table 7-15 outlines the proposed manholes in this area. Table 7-16 outlines the proposed sewers in this area. (Same as Section Three, Alternative Two)

4. Section Four: Build an 18-inch parallel sewer from manhole HI-1812B {304381S019} to manhole II-1302 {307382S001}. Table 7-17 outlines the proposed manholes in this area. Table 7-18 outlines the proposed sewers in this area. (Same as Section Four, Alternative Two)

5. Section Five: Build a 12-inch parallel sewer from manhole JK-0408 {310377S005} to manhole JK-0906B {310377S017}. Table 7-9 outlines the proposed manholes in this area. Table 7-10 outlines the proposed sewers in this area. (Same as Section Four, Alternative One)

6. Section Six: Build siphon from IH-1320 {307382S008} to ALCOSAN manhole C-55-02 to convey overflow. Table 7-23 outlines the proposed manholes in this area. Table 7-24 outlines the proposed sewers in this area.

TABLE 7-30: SUMMARY OF CAPITAL IMPROVEMENTS FOR RECOMMENDED ALTERNATIVE FOR MATSF

Capital Improvements	Size/Capacity	Estimated Capital Cost ($ million)
POC C-54-16 Upgrades	Various size parallel sewers (See Section 7.5)	$4,147,000
POC C-45B-04 Upgrades	Multiple Alternatives (1)	$2,000,000 (1)
POC C-54-12 Upgrades	Upsized Interceptor – 18-inch to 21-inch	$286,000 (1)
	TOTAL	**$6,433,000**

(1) The communities involved in POC C-45B-04 have presented three (3) viable alternatives at the time of this report. The figure presented represents the maximum South Fayette exposure based on the highest cost alternative and cost allocation method, as they pertain to MATSF. Minimum exposure is estimated to be $1,000,000.

(2) The cost allocation in the Thoms Run watershed is on a per / EDU basis in accordance with the existing inter-municipal agreement between MATSF and Collier Township Municipal Authority. This figure represents South Fayette's share with planned system modifications to the South Fayette Park "Boys' Home" Pump Station. KLH Engineers is currently designing a sewer extension that will divert flow from this pump station out of the C-54-16 sewer shed to the C-54-12 sewershed. This pump station has capacity for 250 EDUs, which is incorporated into the estimated capital cost shown. If the project were not constructed, MATSF would expect a total capital cost exposure in the Thoms Run sewershed of approximately $143,000.

TABLE 7-31: COST BREAKDOWN OF RECOMMENDED ALTERNATIVE FOR MATSF

Cost Component	CSO Control			SSO Control			Combined TPW Cost ($ million)
	Capital Cost [1] ($ million)	Annual O&M Cost ($ million)	TPW Cost CSO Control ($ million)	Capital Cost [1] ($ million)	Annual O&M Cost ($)	TPW Cost SSO Control ($ million)	
POC C-54-16	N/A	N/A	N/A	$4.147	$13,000	$9.093	$9.093
POC C-45B-04	N/A	N/A	N/A	$2.000	$8,000	$4.985	$4.985
POC C-54-12	N/A	N/A	N/A	$0.286	$0.000	$1.636	$1.636
TOTAL	N/A	N/A	N/A	**$6.433**	**$21,000**	**$15.714**	**$15.714**

(1) Total Project Costs (Construction + Contingency + Soft Costs)

(2) TPW Cost represents inflated Base Year 2027 cost plus the Present Worth of 20 years O&M Costs stating at inflated Base Year 2027

7.6 Recommended Alternative Operation and Maintenance

The recommended upgrades selected for the MATSF do not include any technologies that would require alternative O&M above and beyond the current Authority Plan. The Authority has submitted, and maintains, an extensive Sewage Collection System Operation and Maintenance Plan to the ACHD as part of their ACO. The Plan covers all required information to properly manage the system, including the following.

1. General Information - System Description
2. Collection System Management
    a. Organizational Structure
    b. Budgeting
    c. Training
    d. Compliance
    e. Communication and Customer Service
    f. SSO Notification Program
    g. Record Keeping
    h. Legal Authority
3. Collection System Operations, Maintenance and Equipment
    a. Safety
    b. Odors
    c. Planned Maintenance and Scheduling
    d. Internal Inspection Program (Televising, etc.)
    e. Sewer Cleaning
    f. Chemical Cleaning and Root Removal
    g. Maintenance of Right-of-Way
    h. Emergency Response
    i. Equipment and Tools Management
    j. Pump Station Operation
        i. Pump Station Operation - Inspection
        ii. Pump Station Operation - Emergencies
        iii. Pump Station Operation - Monitoring
        iv. Pump Station Operation - Recordkeeping
        v. Pump Station Operation - Force Mains and Air/Vacuum Valves
4. Collection System Capacity Assurance Program
    a. Engineering-Modeling
    b. Engineering-Design/Construction
    c. Engineering-Capacity
    d. Engineering-System Mapping, As-built Plans, and Updating
    e. Sewer System Capacity Evaluation - Flow Monitoring
    f. Sewer System Capacity Evaluation - Smoke and Dye Testing Program
    g. Sewer System Capacity Evaluation - Manhole Inspection
    h. Rehabilitation - Manholes
    i. Rehabilitation – Sewer Pipes
    j. Inflow and Infiltration - Continuing Sewer Assessment

The Authority's O&M plan is too large to be included as part of this Study, but a copy of the Plan is always available at the Authority office or by request.

7.7 Stream Removals

There are no direct stream inflows anywhere within the three (3) South Fayette sewersheds, therefore this section is not applicable.

8.0 MULTI-MUNICIPAL SEWERSHED RECOMMENDED ALTERNATIVES

Through the H&H modeling process, it was determined that the most viable alternative for the MATSF's C-54-16 sewershed is to convey excessive wet weather flows to ALCOSAN's C-55-02 point-of-connection via a siphon under Chartiers Creek (flow from the Millers Run Interceptor would still flow to the Chartiers Creek Pump Station and continue to be conveyed to C-54-16). Being that an existing siphon at this location serves the communities of Upper Saint Clair and a small portion of Bethel Park Borough and Peters Township, and since there is an existing parallel interceptor upstream of that location for a significant distance within South Fayette,MATSF was invited to attend Brush Run POC C-55-02 coordination meetings for the past 2 years. Thus, a viable multi-municipal alternative was developed that could be implemented. This multi- municipal alternative is referred to hereinafter as Alternative 4A.

This multi-municipal alternative does not change the overall MATSF Chartiers Creek upgrade evaluation and alternative selection. The only revision to the POC C-54-16 alternative analysis, should an agreement be made utilizing this joint alternative, would be the elimination of a proposed MATSF only siphon to POC C-55-02.

TABLE 8-1: MATSF REQUIRED COST FOR JOINT POC ALTERNATIVES

POC	Description of Alternative	Total Capital Cost ($ million)	Total Annual O&M Cost ($ million)	Present Worth Cost ($ million)
C-55-02	Joint Interceptor from MH JJ-0714B {310378S009} to POC C-55-02 Siphon; MATSF Wet Weather overflow from MH II-1503 { 308382S007} to POC C-55-02 Siphon	$1.1 M [1]	N/A [2]	$1.1 M [3]

[1] This figure represents the MATSF share of the overall Brush Run POC C-55-02 upgrades, based on the most recent cost estimate prepared by the Gateway Engineers on behalf of the Township of Upper Saint Clair.

[2] The additional O&M Cost for this segment of joint interceptor is negligible.

[3] Based on ALCOSAN ACT present worth Method 1: Current capital cost equals present worth cost

The Brush Run POC C-55-02 upgrade alternatives are presented based upon the 2-year design storm. Under this scenario, a 48-inch diameter joint interceptor would begin just downstream of Bursca Drive, at manhole JJ-0714B {310378S009}, and continue 4,375-feet to the location of the existing C-55-02 siphon. By combining multi-municipal flow at the location selected, MATSF gains future capacity for their Chartiers Creek area flow, while Upper Saint Clair and all other POC C-55-02 communities see a capital cost savings.

Please refer to Figure 8-1 for a map of this recommended multi-municipal Alternative 4A, along with the 2-yr design storm hydrographs from MATSF and Upper Saint Clair.

C-55-02 Joint Siphon

MATSF Point of Connection into Upper Saint Clair POC C-55-02 Brush Run Interceptor

BRIDGEVILLE

SOUTH FAYETTE

UNVERIFIABLE

TO SYGAN

ROUTE 50

HICKORY GRADE

FORBES

MILLERS RUN

MILLERS RUN

SOUTHPOINTE

OLD POND

VILLANI

ABELE

DANIELL

PARKING LOT

LAURETTA

FREEDOM

VICTORY

MELROSE

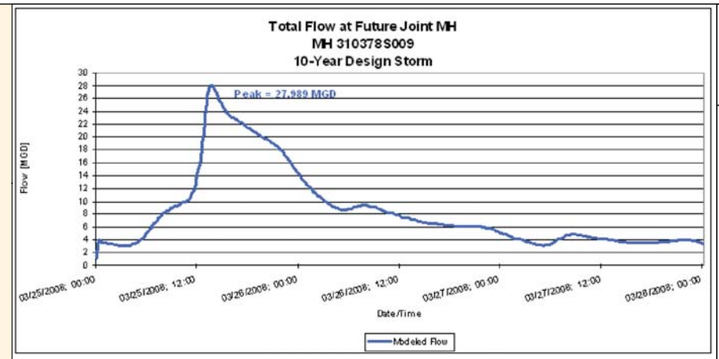
WASHINGTON

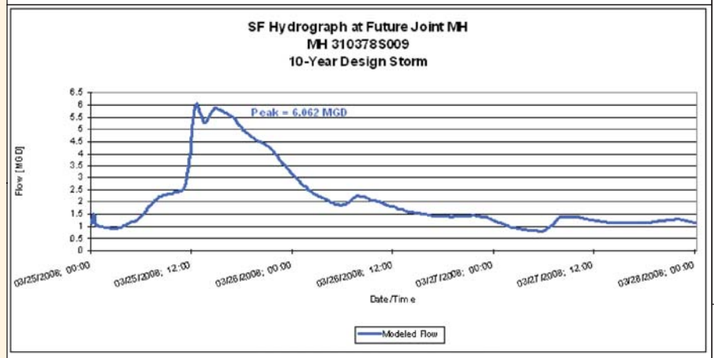
WASHINGTON

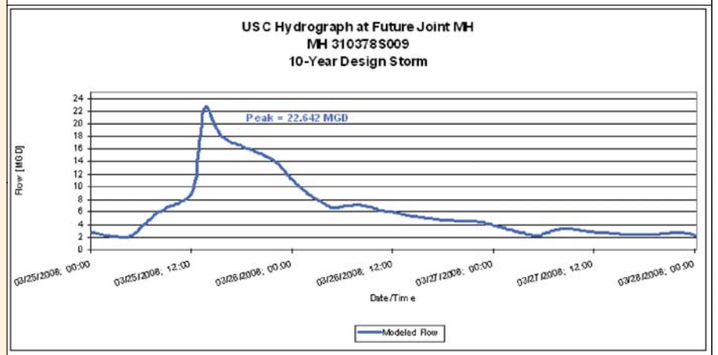
BURSCA

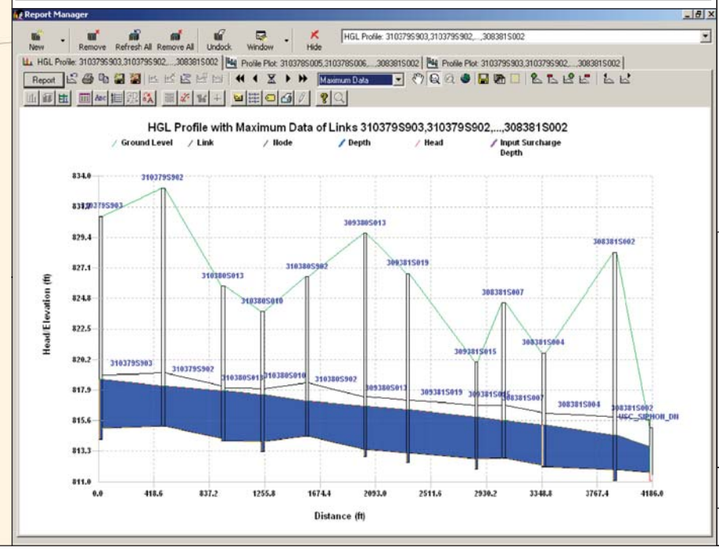
Legend

- C-54-16 Manhole
- C-54-16 Sewer
- C-55-02 Manhole
- C-55-02 Sewer
- Adjacent Municipalities
- Street_Centerline









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KLH ENGINEERS, INC

MUNICIPAL AUTHORITY OF THE TOWNSHIP OF SOUTH FAYETTE ALLEGHENY COUNTY, PA

Alternative 4A Map

N.T.S.

SEE FULL SIZE

Author: Bryan Churilla
Date: 7/25/2013

NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet
Projection: Lambert Conformal Conic

217-35

FIG 8-1

9.0 Financial and Institutional Considerations

9.1 Memorandum of Understanding (MOU) and Inter-Municipal Agreements

Please refer to the Robinson Run and Thoms Run Feasibility Studies for the corresponding Inter-Municipal Agreement information for POC C-45B-04 and POC C-54-12, respectively. A MOU Resolution is also included as Appendix AA for the potential multi-municipal project discussed under alternative 4A to POC C-55-02.

9.2 Funding Alternatives

In accordance with the Alternatives outlined in this Study, barring any changes to the selection process due to further evaluation and changes conditions, the MATSF will look to obtain either PENNVEST funding or a bond issue to cover any capital project costs. As it stands, the MATSF has a potential aggregate funding requirement of approximately $7.5 million. With that said, the Authority still entertains the potential that ALCOSAN may assume responsibility of funding and constructing portions of the capital improvements outline here within, inherited by the possible expansion of their role for acquiring certain multi-municipal interceptor concept presented within the Allegheny Conference led Regionalization Study. Upon negotiation of the terms and responsibilities of the MATSF in these multi-municipal capital projects, the Authority would then reevaluate their individual debt exposure for all remaining necessary capital improvements.

9.3 User Cost Analysis

The Municipal Authority of the Township of South Fayette compiles an Annual Report and Budget with consideration to Sanitary Sewer Operations and Sewage Service Rate modifications. The MATSF Rates for Sewage Service adopted for the Year 2013, including all ALCOSAN charges, are as follows.

$12.00 per month service charge + $6.75 per 1,000 gallons of water used

The Year 2013 average customer sewage bill based on 15,000 gallons per quarter usage is $137.25 per quarter, $63.38 of which funds the Authority's Annual Budget requirements and $73.87 of which covers ALCOSAN conveyance and treatment costs.

To remain consistent with the Robinson Run and Thoms Run Feasibility Studies, the Year 2012 sewage rates will be used for the User Cost Analysis. These rates, based on 15,000 gallons per quarter usage, yield an average customer sewage bill of $128.94 per quarter, $55.07 for Municipal charges and $73.87 for ALCOSAN charges.

Table 9-1 presents the projected user rates based on the recommended alternatives in this Study, in conjunction with the anticipated ALCOSAN rate increases. It is assumed that the current capital cost is equal to the present worth, and that the Authority will receive a 20-year loan at 3% interest to fund all projects. Year 2012 user rates were utilized in this analysis to maintain consistency across all sewersheds

TABLE 9-1: USER COST ANALYSIS FOR MATSF

Cost Components	Monthly User Rate		Notes
	2012	2027	
ALOCSAN Annual Residential Wastewater Costs without Wet Weather Plan	$24.60	----	Estimated based upon ALCOSAN current charges assuming 15,000 gallons of water used per quarter Estimated from the 2012 cost inflated to 2027 dollars. See ALCOSAN Draft Wet Weather Plan
	----	$38.50	
Municipal Surcharge	$18.38	----	Based on actual Year 2012 data Estimated from the Year 2012 surcharge inflated to Year 2027 dollars
	----	$28.77	
ALCOSAN Wet Weather Plan Costs	----	$32.50	Uniform number spread across ALCOSAN service area for ALCOSAN-only DWWP cost ($1.5 Billion). See ALCOSAN Draft WWP
Chartiers Creek Municipal Surcharge with Recommended Alternative Cost (Debt Service)	----	$5.32	Calculated from Table 7-31 plus C-55-02 Alternative 4A
Chartiers Creek Municipal Surcharge with Recommended Alternative Cost (O&M)	----	$0.25	Calculated from Table 7-31 plus C-55-02 Alternative 4A
Robinson Run Municipal Surcharge with Recommended Alternative Cost (Debt Service)	----	$1.12	Reference Robinson Run Feasibility Study
Robinson Run Municipal Surcharge with Recommended Alternative Cost (O&M)	----	$0.07	Reference Robinson Run Feasibility Study
Thoms Run Municipal Surcharge with Recommended Alternative Cost (Debt Service)	----	$0.20	Reference Thoms Run Feasibility Study
Thoms Run Municipal Surcharge with Recommended Alternative Cost (O&M)	----	$0.00	Reference Thoms Run Feasibility Study
TOTAL COST / HOUSEHOLD	**$42.98**	**$106.73**	**Per Household per Month**

9.4 Affordability

The following was extracted from the EPA's ***Policy & Guidance: Interim Economic Guidance for Water Quality Standards - Chapter 5:*** *Section 5.2.a Public-Sector Developments: Calculate and Evaluate the Municipal Preliminary Screener Value.*

> *Whether or not maintaining high-quality water is likely to interfere with a development due to additional public-sector costs is determined by jointly considering the results of two tests. The first test is a "screener" to establish whether the community can clearly pay for the project. The Municipal Preliminary Screener estimates the total per household annual pollution control costs to be borne by households (existing costs plus those attributable to the proposed project) as a percentage of median household income. The screener is written as follows:*
>
> $$\text{Municipal Preliminary Screener} = \frac{\text{Average Total Pollution Control Cost Per Household}}{\text{Median Household Income}}$$
>
> *Median household income information for many municipalities is available from the Census of Population. To estimate median household income for the current year, use the CPI inflation rate for the period between the year that median household income is available and the current year.*
>
> *Depending on the results of the screener, the community is expected to incur small, mid-range, or large economic impacts (see **Worksheet S**). If the total annual cost per household (existing annual cost per household plus the incremental cost related to the proposed project) is less than 1.0 percent of median household income, then the requirements are not expected to impose a substantial economic hardship on households and would not interfere with the development.*
>
> *Communities are expected to incur mid-range impacts when the ratio of total annual compliance costs to median household income is between 1.0 and 2.0 percent. If the average annual cost per household exceeds 2.0 percent of median household income, then the project may place a large financial burden on many of the households within the community and the requirements may interfere with the development. In either case, communities move on to the Secondary Test to demonstrate substantial impacts.*

The affordability of the projects outlined in this study, as they pertain to the Township of South Fayette, can be calculated as follows.

AFFORDIBILITY

GIVEN

Current Consumer Cost =	$516 per year
Additional Cost per WWP / FS =	$765 per year
Projected Consumer Cost =	$1,281 per year
Future Number of Customers =	7,964
Projected Median Income =	$117,883

CALCULATE

Financial Burden Ratio = 1.09%

As illustrated by the calculation above, the maximum debt exposure of South Fayette distributed among the projected population results in a low financial burden (per EPA's CSO Policy Guidelines).

TABLE 9-2: ESTIMATED ANNUAL COST PER HOUSEHOLD AFTER IMPLEMENTATION OF RECOMMENDED ALTERNATIVE

POC	Current Annual Cost Per Household	Cost Per Household After Recommended Alternative Implementation	Notes/Comments
C-54-16	**$516**	**$1,281**	Refer to User Cost Analysis
C-45B-04	**$516**	**$1,281**	Refer to User Cost Analysis
C-54-12	**$516**	**$1,281**	Refer to User Cost Analysis

* The MATSF Fayette charges all customers uniformly, regardless of sewer shed. The user cost analysis was completed based upon the overall Township debt exposure with incorporation of all projects in all three (3) POC sewersheds. Please refer to the User Cost Analysis in Section 9.3.

10.0 Integration of Selected Alternatives

Chartiers Creek POC C-54-16

All alternatives in this report are contingent upon the approved ALCOSAN Wet Weather Plan, the WWP implementation schedule, and consideration to further evaluation of the MATSF sewer system. Inflow and infiltration removal projects, including lateral inspection programs and sewer lining projects, are ongoing within the Township and resulting system impacts will be monitored and evaluated. When final approval and design of the ALCOSAN's Chartiers Creek relief interceptor is complete, the Township will be able to better plan for integration of internal municipal sewer projects.

With that said, the Township plans to be proactive and complete sewer replacement and rehabilitation projects in known problem areas. An emergency siphon upstream of the Chartiers Creek Pump Station was recommended in the ALCOSAN Feasibility Study submission and the Township has already designed and constructed the project. In addition, MATSF recently awarded Contracts totaling just under $1.0 Million for upgrades to the Chartiers Creek Pump Station that will allow for increased reliability over the next 2 decades.

There are a few cases in which the H&H Model predicts overflowing and or surcharging conditions in the 10-year, 24-hour storm in problem areas that the Township does not feel exist. In these cases, further investigation and evaluation is necessary before designing and installing sanitary sewer infrastructure.

Finally, MATSF plans to continue to aggressively address issues associated with excessive infiltration/inflow. As pointed out earlier, the Authority recently expanded their private sector lateral inspection program from time of sale to an area wide program. While the capital alternatives described in this report do not rely on future I/I reduction, it will be a priority of the

Authority to reduce extraneous flow to the degree possible. As such, impact of any future I/I reduction may result in certain modification of the alternatives during the design phase.

Robinson Run POC C-45B-04 / Thoms Run POC C-54-12

Integration of alternatives affecting the MATSF in the Robinson Run and Thoms Run watersheds is explained in the Feasbility Studies.

11.0 Implementation

11.1 Implementation Schedule

The following is a draft implementation schedule based for the recommended MATSF POC C-54-16 alternative. This schedule is subject to change in accordance with further evaluation of system conditions and overall alternatives, as well as the ALCOSAN Wet Weather Plan implementation schedule. It is the intent of the MATSF to continue I&I removal programs and update the evaluation of system conditions. No alternative is deemed critical or absolutely necessary, and will be re-evaluated prior to design.

Despite the possibility of future evaluation and revision of alternatives, MATSF acknowledges that the upgrades recommended in this Study were the best options at the time of submission. The MATSF Board has adopted these alternatives, and those presented in the Robinson Run and Thoms Run sewersheds, as the leading alternatives based on the results of this Study. All three (3) Resolutions are attached to this Study in Appendix BB.

Table 11-1
Implementation Schedule

Schedule Item	Description	Date of Completion
1	Submit Feasibility Study to Regulatory Agencies	July 2013
2	Regulatory Agency Plan approval	July 2014
3	Confirm basis of design and evaluation of system conditions	July 2016
4	Negotiation/Agreement with communities for POC C-55-02 joint interceptor and siphon	July 2017
5	Design and build lower Millers Run / Verner Ave parallel sewers	July 2024
6	Design and build upper Millers Run parallel sewer	July 2025
7	Design and build facilities to convey Millers Run we weather flow to individually owned / joint siphon to POC C-55-02	July 2026
8	Completion of all projects in accordance with ALCOSAN's completion schedule for the Chartiers Creek Planning Basin	July 2026

11.2 Joint Municipal Planning and Implementation

The MATSF intends to continue discussion with Upper Saint Clair and the other communities tributary to POC C-55-02 in regard to a joint interceptor and siphon alternative. This Brush Run area could be the last on the list of projects to complete in MATSF, leaving time for further evaluation and negotiation. On the other hand, depending on ALCOSAN's Chartiers Creek Interceptor capacity improvements and other factors, MATSF would consider accelerating this schedule in conjunction with the other tributary communities.

Recently, ALCOSAN, in conjunction with the Allegheny Conference, completed a regionalization study that had as a key recommendation that ALCOSAN consider expanding their ownership of multi-municipal trunk/interceptor sewers. To the extent that ALCOSAN is willing to do so, MATSF would actively participate in any discussion in that regard. In particular, the multi-municipal sewer alternative for connection to C-55-02 being considered by MATSF, USC and other tributary communities might be a good example of where an ALCOSAN ownership expansion might make sense, at least to the upper end of MATSF's proposed involvement in that sewer in the vicinity of Coal Run. Another area that seems appropriate for ALCOSAN's direct ownership would be the Robinson Run Interceptor tributary to C45B-04.

11.3 Regulatory Compliance Reporting

MATSF plans to continue regular operational Regulatory Compliance Reporting as carried out in the past. The Township will also be compiling records and flow monitoring data corresponding to the tasks outlined in this Study to confirm the necessity of the recommended alternatives.