

**WORCESTER TOWNSHIP
MONTGOMERY COUNTY, PENNSYLVANIA**

**PRELIMINARY SEWER FEASIBILITY STUDY
CENTER POINT VILLAGE SERVICE AREA**

REFERENCE NO. 7339

MAY 2006



PRELIMINARY SEWER FEASIBILITY STUDY
CENTER POINT VILLAGE SERVICE AREA

INTRODUCTION

At the request of the Worcester Township Board of Supervisors, CKS Engineers, Inc. has prepared a Preliminary Sewer Feasibility Study for the Center Point Village Area of the Township. The study provides several alternatives for the extension of public sewer service to this area as a means of resolving historical problems with the malfunctioning of existing on-lot sewage disposal systems which currently service these properties.

As illustrated on the attached Sewer Feasibility Study Plans, the Center Point Village Service Area has been divided into a Base Study area, plus two potential alternates for an extension to the Base Study Area. The Base Study Area, illustrated on Exhibit A, consists of 73 properties located along Valley Forge Road, Hickory Hill Drive, Landis Road, Crest Terrace and Green Briar Drive. The Extension Alternate Study Area, as illustrated on Exhibits A-1 and A-2, consists of 22 properties located along Skippack Pike and Valley Forge Road. For the purposes of this study, the Extension Alternate Study Area is considered to be an extension to the Base Study Area, although it can technically stand on its own. The two combined study areas total 95 properties.

For the Base Study Area, it was determined that three points of connection to existing public sewer systems would be the most feasible and cost effective means of extending sewers into the Study Area. Two of the connections would be to existing manholes; one within the Valley Greene Wastewater Treatment Plant (WWTP) site and one at the intersection of Green Briar Drive and Conestoga Lane. The third point of connection would be by a proposed "doghouse" manhole at the intersection of Landis Road and Defford Road. For the Extension Alternate Study Area, two potential points of connection to existing public sewer systems were considered. The first and closest potential point of connection would be the existing "private" sewage facilities within the Center Point Village/Wawa Complex. The second potential point of connection would be to the existing manhole located in Defford Road at the Valley Greene WWTP. After reviewing the complexities involved in connecting to the existing "private" facilities, including upgrades to the existing system, Township acquisition of the "private" facilities, access, etc., we have concluded that the Defford Road connection point is the most feasible means of extending public sewers to the Extension Alternate Study Area.

We note that the existing public sewer systems, to which the proposed sewerage facilities would connect, are all tributary to the Valley Greene WWTP. Based upon a cursory review of the Township's current Municipal Wasteload Management (Chapter 94) Report, it appears that there is adequate capacity within the existing facilities to accommodate the projected wastewater flows from the Study Areas. In addition, the areas included in this study are identified in the Township's current Act 537 Sewage Facilities Plan as areas to be served with public sewers. Therefore, this study conforms to the Township's Act 537 Plan.

SEWAGE FACILITIES ALTERNATIVES

Based upon an analysis of the topography of the area, we have determined that the 73 properties in the Base Study Area can be provided with public sewer service by the installation of a "Conventional Sewer System" (CSS) which includes all gravity sewer main networks. However,

to provide public sewer service to the 22 properties in the Extension Alternate Study Area, sewage pumping facilities will be necessary to convey sewage flows across Zacharias Creek to the Valley Greene WWTP. We have developed two potential alternatives for providing public sewer service to the Extension Alternate Study Area. The first alternative involves the installation of a CSS with a public sewage pumping station and force main. The second alternative involves the installation of a "Low Pressure Sewer System" (LPSS). Under the LPSS alternative, individual grinder pumping stations would be installed on each property in the Extension Alternate Study Area, which would discharge to a common force main. Normally, for LPSS's, the individual grinder pumping stations and individual force mains are installed, owned and maintained by the respective property owners. The common force mains would be public facilities and would extend along the roadways and/or through easement areas, and would connect to the existing receiving sewer system.

A summarization of the two Study Areas is as follows:

A. BASE STUDY AREA

To provide sewer service to the Base Study Area, approximately 9,415 linear feet of gravity sewer main would be extended along Green Briar Drive, Crest Terrace, Hickory Hill Drive, Landis Road and Valley Forge Road and through easement areas. The proposed routing would require easements from approximately three properties. All other sewerage improvements would be located within Township and State road rights-of-way. The preliminary estimated project costs for the Base Study Area would be \$2,225,475. Exhibit A and an associated cost breakdown table is attached to this report.

It should be noted that there are two additional properties (Sykes and Moogan) located along Landis Road which could be included in the Base Study Area. However, due to the topography in that area, each of these two properties would require a grinder pump with force main in order to be served. These two properties are delineated on the attached Exhibit A.

B. BASE STUDY AREA WITH EXTENSION ALTERNATE AREA

1. CSS with Public Pumping Station Alternate

This alternative for the Extension Alternate Area involves the installation of a public sewage pumping station adjacent to Valley Forge Road at Zacharias Creek with approximately 700 linear feet of force main extending through Township property to the existing manhole in Defford Road. Approximately 2,425 linear feet of gravity sewer main would then be extended along Valley Forge Road and Skippack Pike and through easement areas. The proposed routing for this alternative may require an easement from one property. All other public sewage improvements would be located within State and Township road rights-of-way or on Township property. Including the estimated cost for the Base Study Area, the preliminary estimated project costs for this alternative would be \$2,975,050. Exhibit A-1 and an associated cost breakdown table is attached to this report.

2. LPSS Alternate

This alternative for the Extension Alternate Study Area involves the extension of approximately 3,130 linear feet of common force main along Valley Forge Road and Skippack Pike and through easement areas. The proposed routing for this alternative may require an easement from one property. All other public sewage improvements would be located within State and Township road rights-of-way or on Township property. Including the estimated cost for the Base Study Area, the preliminary estimated project costs for this alternative would be \$2,749,075. Exhibit A-2 and an associated cost breakdown table is attached to this report.

It should be noted that there is one additional property (Bustard) located along Valley Forge Road which could be included in the Extension Alternate Study Area. However, due to the topography in that area, this property would require a grinder pump with force main in order to be served under either the CSS with Public Pumping Station Alternate or LPSS Alternate. This property is delineated on the attached Exhibit A-1 and Exhibit A-2.

REQUIRED PERMITS/APPROVALS

In order to implement any of the study areas/alternatives for providing public sanitary sewage service to the Center Point Village Service Area, it will be necessary to first obtain various permits and/or approvals from regulatory agencies. These permits/approvals include the following:

- PA Department of Environmental Protection - Water Quality Management Permit for Sewer Extensions and Pumping Stations (Extension Alternate Study Area only).
- PA Department of Environmental Protection - Possible Chapter 105 General Permit for Potential Wetlands Crossings within Easement Areas.
- PA Department of Transportation - Highway Occupancy Permit for sewerage facilities within Valley Forge Road and Skippack Pike rights-of-way.
- Montgomery County Conservation District - Erosion and Sedimentation Control Plan Approval and possible NPDES permit.
- Texas Eastern Gas Pipeline approval for proposed construction across existing gas transmission lines at Valley Forge Road (Extension Alternate Study Area only).
- It will be necessary to revise the Township's Act 537 Sewage Facilities Plan to include the public pumping station or the low pressure sewer system alternatives proposed for the Extension Alternate Area in the plan. Even though this area is designated for public sewers, the plan does not show the "pumping" facilities that would be necessary to serve the Extension Alternate Area.

It is anticipated that the regulatory agency review/approval time associated with processing of these permits/approvals would be a minimum of six months.

CKS Engineers, Inc.

ESTIMATED COST BREAKDOWN TABLES

WORCESTER TOWNSHIP PRELIMINARY SEWER FEASIBILITY STUDY CENTER POINT VILLAGE SERVICE AREA BASE STUDY AREA CONVENTIONAL SEWER SYSTEM PRELIMINARY ESTIMATED PROJECT COST					
ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST (1)	TOTAL COST (2)
1	8" PVC Main in State Highways, including Excavation and Backfill	1,680	L.F.	\$110.00	\$184,800.00
2	8" PVC Main in Township Streets, including Excavation and Backfill	5,990	L.F.	\$100.00	\$599,000.00
3	8" DIP Main in Township Streets, including Excavation and Backfill	1,155	L.F.	\$165.00	\$190,575.00
4	8" PVC Main in Easements, including Excavation and Backfill	590	L.F.	\$60.00	\$35,400.00
5	6" PVC Service Laterals	1,795	L.F.	\$65.00	\$116,675.00
6	6" DIP Service Laterals	185	L.F.	\$110.00	\$20,350.00
7	PVC Tees	66	Ea.	\$95.00	\$6,270.00
8	DIP Tees	7	Ea.	\$525.00	\$3,675.00
9	Manholes - Standard	36	Ea.	\$2,450.00	\$88,200.00
10	Manholes - Watertight	3	Ea.	\$2,800.00	\$8,400.00
11	Connect to Existing System	3	Ea.	\$1,750.00	\$5,250.00
12	Stream Crossing	1	Ea.	\$6,000.00	\$6,000.00
13	State Highway Restoration (3)	1,445	S.Y.	\$54.00	\$78,030.00
14	Township Road Restoration (3)	6,125	S.Y.	\$44.00	\$269,500.00
15	Unimproved Easement Restoration	1,600	S.Y.	\$4.00	\$6,400.00
ESTIMATED CONSTRUCTION COST					\$1,618,525.00
10% CONTINGENCIES					\$161,855.00
SUBTOTAL					\$1,780,380.00
25% ENGINEERING/LEGAL/INSPECTION					\$445,095.00
TOTAL (4)					\$2,225,475.00

**WORCESTER TOWNSHIP
PRELIMINARY SEWER FEASIBILITY STUDY
CENTER POINT VILLAGE SERVICE AREA
BASE STUDY AREA
CONVENTIONAL SEWER SYSTEM
PRELIMINARY ESTIMATED PROJECT COST**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST (1)	TOTAL COST (2)
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NOTES

- (1) Unit cost based upon current construction cost data.
- (2) Preliminary construction cost estimates based upon conceptual design layout and are subject to change with preparation of detailed engineering plans.
- (3) Restoration costs based upon standard Township and PennDOT trench restoration criteria, including milling and overlay of roadway half-width of PennDOT Highways.
- (4) Preliminary estimated project cost does not include easement acquisition costs.

**WORCESTER TOWNSHIP
PRELIMINARY SEWER FEASIBILITY STUDY
CENTER POINT VILLAGE SERVICE AREA
BASE STUDY AREA W/EXTENSION ALTERNATE A-1
CONVENTIONAL SEWER SYSTEM W/PUBLIC PUMPING STATION
PRELIMINARY ESTIMATED PROJECT COST**

ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST (1)	TOTAL COST (2)
1	8" PVC Main in State Highways, including Excavation and Backfill	3,730	L.F.	\$110.00	\$410,300.00
2	8" PVC Main in Township Streets, including Excavation and Backfill	5,990	L.F.	\$100.00	\$599,000.00
3	8" DIP Main in Township Streets, including Excavation and Backfill	1,155	L.F.	\$165.00	\$190,575.00
4	8" PVC Main in Easements, including Excavation and Backfill	965	L.F.	\$60.00	\$57,900.00
5	6" PVC Service Laterals	2,415	L.F.	\$65.00	\$156,975.00
6	6" DIP Service Laterals	185	L.F.	\$110.00	\$20,350.00
7	PVC Tees	88	Ea.	\$95.00	\$8,360.00
8	DIP Tees	7	Ea.	\$525.00	\$3,675.00
9	Manholes - Standard	43	Ea.	\$2,450.00	\$105,350.00
10	Manholes - Watertight	5	Ea.	\$2,800.00	\$14,000.00
11	Sanitary Sewage Pump Station	1	Ea.	\$95,000.00	\$95,000.00
12	2" PVC Force Main in Township Streets	50	L.F.	\$38.00	\$1,900.00
13	2" PVC Force Main in Easements	655	L.F.	\$34.00	\$22,270.00
14	Connect to Existing System	4	Ea.	\$1,750.00	\$7,000.00
15	Stream Crossings	2	Ea.	\$6,000.00	\$12,000.00
16	State Highway Restoration (3)	2,890	S.Y.	\$60.00	\$173,400.00
17	Township Road Restoration (3)	6,155	S.Y.	\$44.00	\$270,820.00
18	Unimproved Easement Restoration	3,700	S.Y.	\$4.00	\$14,800.00

WORCESTER TOWNSHIP PRELIMINARY SEWER FEASIBILITY STUDY CENTER POINT VILLAGE SERVICE AREA BASE STUDY AREA W/EXTENSION ALTERNATE A-1 CONVENTIONAL SEWER SYSTEM W/PUBLIC PUMPING STATION PRELIMINARY ESTIMATED PROJECT COST					
ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST (1)	TOTAL COST (2)
	ESTIMATED CONSTRUCTION COST				\$2,163,675.00
	10% CONTINGENCIES				\$216,365.00
	SUBTOTAL				\$2,380,040.00
	25% ENGINEERING/LEGAL/INSPECTION				\$595,010.00
	TOTAL (4)				\$2,975,050.00
NOTES (1) Unit cost based upon current construction cost data. (2) Preliminary construction cost estimates based upon conceptual design layout and are subject to change with preparation of detailed engineering plans. (3) Restoration costs based upon standard Township and PennDOT trench restoration criteria, including milling and overlay of roadway full and/or half-width of PennDOT Highways. (4) Preliminary estimated project cost does not include easement acquisition costs.					

**WORCESTER TOWNSHIP
PRELIMINARY SEWER FEASIBILITY STUDY
CENTER POINT VILLAGE SERVICE AREA
BASE STUDY AREA W/EXTENSION ALTERNATE A-2
COMBINATION CONVENTIONAL SEWER SYSTEM AND
LOW PRESSURE SEWER SYSTEM
PRELIMINARY ESTIMATED PROJECT COST**

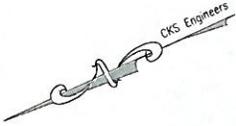
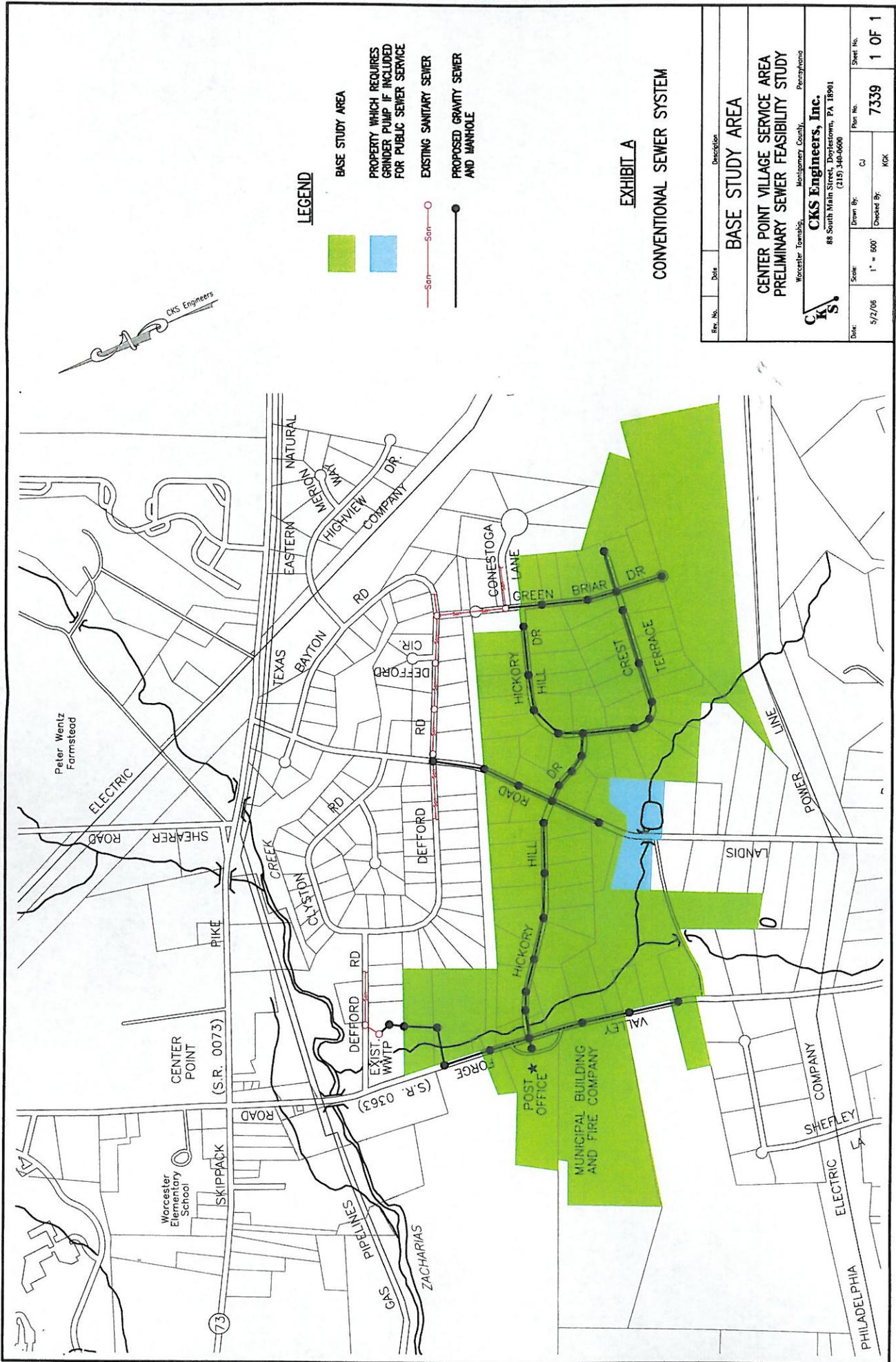
ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST (1)	TOTAL COST (2)
1	8" PVC Main in State Highways, including Excavation and Backfill	1,680	L.F.	\$110.00	\$184,800.00
2	8" PVC Main in Township Streets, including Excavation and Backfill	5,990	L.F.	\$100.00	\$599,000.00
3	8" DIP Main in Township Streets, including Excavation and Backfill	1,155	L.F.	\$165.00	\$190,575.00
4	8" PVC Main in Easements, including Excavation and Backfill	590	L.F.	\$60.00	\$35,400.00
5	6" PVC Service Laterals	1,795	L.F.	\$65.00	\$116,675.00
6	6" DIP Service Laterals	185	L.F.	\$110.00	\$20,350.00
7	PVC Tees	66	Ea.	\$95.00	\$6,270.00
8	DIP Tees	7	Ea.	\$525.00	\$3,675.00
9	Manholes - Standard	36	Ea.	\$2,450.00	\$88,200.00
10	Manholes - Watertight	3	Ea.	\$2,800.00	\$8,400.00
11	3" PVC Force Main in State Highways	715	L.F.	\$50.00	\$35,750.00
12	3" PVC Force Main in Township Streets	50	L.F.	\$44.00	\$2,200.00
13	3" PVC Force Main in Unimproved Easements	1,030	L.F.	\$38.00	\$39,140.00
14	2-1/2" PVC Force Main in State Highways	460	L.F.	\$45.00	\$20,700.00
15	2" PVC Force Main in State Highways	390	L.F.	\$43.00	\$16,770.00
16	1-1/2" PVC Force Main in State Highways	485	L.F.	\$38.00	\$18,430.00
17	1-1/4" PVC Individual Force Main Laterals	590	L.F.	\$32.00	\$18,880.00

<p align="center">WORCESTER TOWNSHIP PRELIMINARY SEWER FEASIBILITY STUDY CENTER POINT VILLAGE SERVICE AREA BASE STUDY AREA W/EXTENSION ALTERNATE A-2 COMBINATION CONVENTIONAL SEWER SYSTEM AND LOW PRESSURE SEWER SYSTEM PRELIMINARY ESTIMATED PROJECT COST</p>					
ITEM NO.	DESCRIPTION	QUANTITY	UNIT	UNIT COST (1)	TOTAL COST (2)
18	Flushing Connections	3	Ea.	\$1,050.00	\$3,150.00
19	Air Release Chambers	2	Ea.	\$1,750.00	\$3,500.00
20	Lateral Assemblies	22	Ea.	\$400.00	\$8,800.00
21	Grinder Pumps (5)	22	Ea.	\$5,000.00	\$110,000.00
22	Connect to Existing System	4	Ea.	\$1,750.00	\$7,000.00
23	Stream Crossings	2	Ea.	\$6,000.00	\$12,000.00
24	State Highway Restoration (3)	2,585	S.Y.	\$64.00	\$165,440.00
25	Township Road Restoration (3)	6,155	S.Y.	\$44.00	\$270,820.00
26	Unimproved Easement Restoration	3,350	S.Y.	\$4.00	\$13,400.00
ESTIMATED CONSTRUCTION COST					\$1,999,325.00
10% CONTINGENCIES					\$199,935.00
SUBTOTAL					\$2,199,260.00
25% ENGINEERING/LEGAL/INSPECTION					\$549,815.00
TOTAL (4)					\$2,749,075.00
NOTES					
(1) Unit cost based upon current construction cost data.					
(2) Preliminary construction cost estimates based upon conceptual design layout and are subject to change with preparation of detailed engineering plans.					
(3) Restoration costs based upon standard Township and PennDOT trench restoration criteria, including milling and overlay of roadway full and/or half-width of PennDOT Highways.					
(4) Preliminary estimated project cost does not include easement acquisition costs.					
(5) Grinder Pumps to be provided by Township for each property.					

WORCESTER TOWNSHIP PRELIMINARY SEWER FEASIBILITY STUDY CENTER POINT VILLAGE SERVICE AREA PRELIMINARY ESTIMATED PROJECT COST SUMMARY TABLE			
STUDY AREA/ SEWER SYSTEM ALTERNATIVE	PROPERTIES SERVED	PRELIMINARY ESTIMATED PROJECT COST	AVERAGE PROPERTY ⁽¹⁾ ASSESSMENT
BASE STUDY AREA			
Conventional Sewer System	73	\$2,225,475.00	\$30,486.00
BASE STUDY AREA W/EXTENSION ALTERNATE A-1			
Conventional Sewer System w/Public Pumping Stations	95	\$2,975,050.00	\$31,316.00
BASE STUDY AREA W/EXTENSION ALTERNATE A-2			
Combination Conventional Sewer System and Low Pressure Sewer System	95	\$2,749,075.00	\$28,938.00
NOTE: ⁽¹⁾ DOES NOT INCLUDE ON-LOT COSTS (PLUMBING, HOUSE CONNECTIONS, GRINDER PUMP INSTALLATION, ETC.). ESTIMATED AVERAGE ON-LOT COSTS FOR PROPERTIES WITH CONVENTIONAL GRAVITY CONNECTION IS APPROXIMATELY \$8,000 PER PROPERTY, AND FOR PROPERTIES WITH LOW PRESSURE SEWER SYSTEM CONNECTION IS APPROXIMATELY \$6,000 PER PROPERTY.			

CKS Engineers, Inc.

STUDY PLAN EXHIBITS

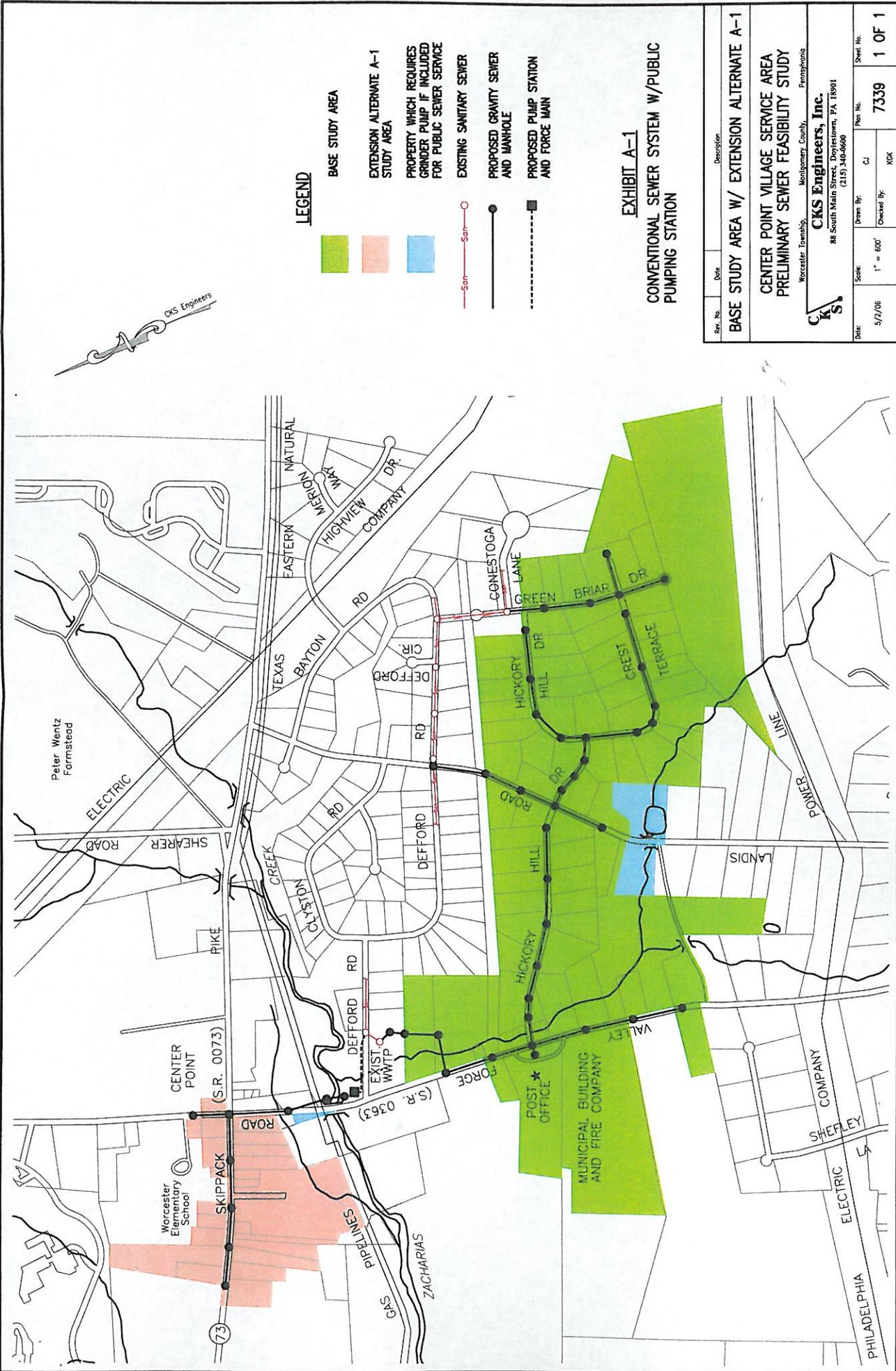


LEGEND

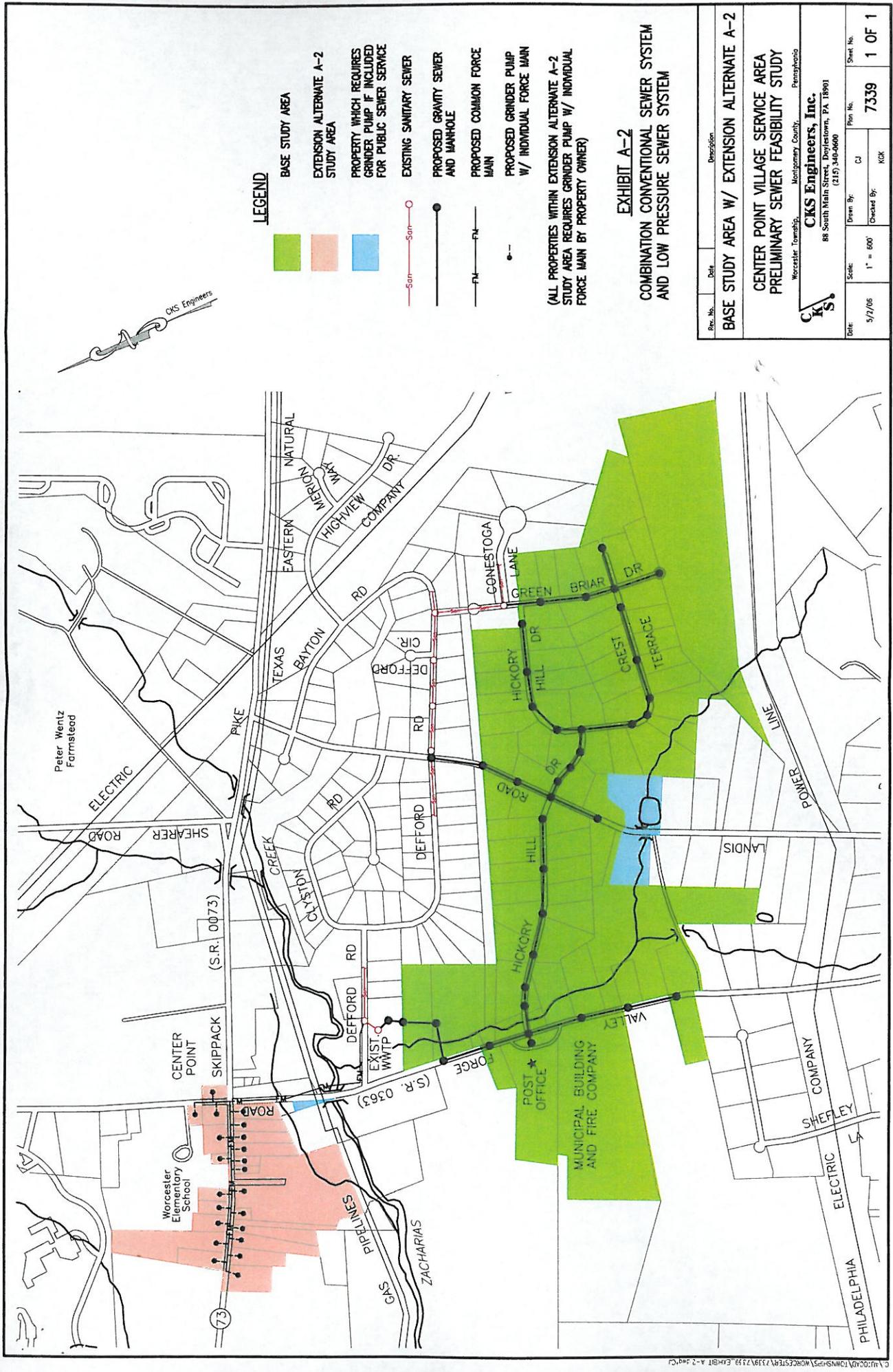
- BASE STUDY AREA
- PROPERTY WHICH REQUIRES GRINDER, PUMP, IF INCLUDED FOR PUBLIC SEWER SERVICE
- EXISTING SANITARY SEWER
- PROPOSED GRAVITY SEWER AND MANHOLE

**EXHIBIT A
CONVENTIONAL SEWER SYSTEM**

Rev. No.	Date	Description	Sheet No.
		BASE STUDY AREA	
CENTER POINT VILLAGE SERVICE AREA PRELIMINARY SEWER FEASIBILITY STUDY			
Worcester Township, Montgomery County, Pennsylvania CKS Engineers, Inc. 88 South Main Street, Doylestown, PA 19911 (215) 340-0000			
Date:	Scale:	Drawn By:	Plot No.
5/2/06	1" = 600'	CJ	7339
		Checked By:	1 OF 1
		KCK	



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LEGEND

- BASE STUDY AREA
- EXTENSION ALTERNATE A-2 STUDY AREA
- PROPERTY WHICH REQUIRES GRINDER PUMP IF INCLUDED FOR PUBLIC SEWER SERVICE
- EXISTING SANITARY SEWER
- PROPOSED GRAVITY SEWER AND MANHOLE
- PROPOSED COMMON FORCE MAIN
- PROPOSED GRINDER PUMP W/ INDIVIDUAL FORCE MAIN

(ALL PROPERTIES WITHIN EXTENSION ALTERNATE A-2 STUDY AREA REQUIRES GRINDER PUMP W/ INDIVIDUAL FORCE MAIN BY PROPERTY OWNER)

EXHIBIT A-2
COMBINATION CONVENTIONAL SEWER SYSTEM AND LOW PRESSURE SEWER SYSTEM

Rev. No.	Date	Description
		BASE STUDY AREA W/ EXTENSION ALTERNATE A-2
		CENTER POINT VILLAGE SERVICE AREA PRELIMINARY SEWER FEASIBILITY STUDY
Worcester Township, Montgomery County, Pennsylvania CKS Engineers, Inc. 88 South Main Street, Doylestown, PA 18901 (215) 340-0600		
Date:	Scale:	Drawn By:
5/7/06	1" = 600'	CJ
		Checked By:
		KCK
		Sheet No.
		7339
		1 OF 1