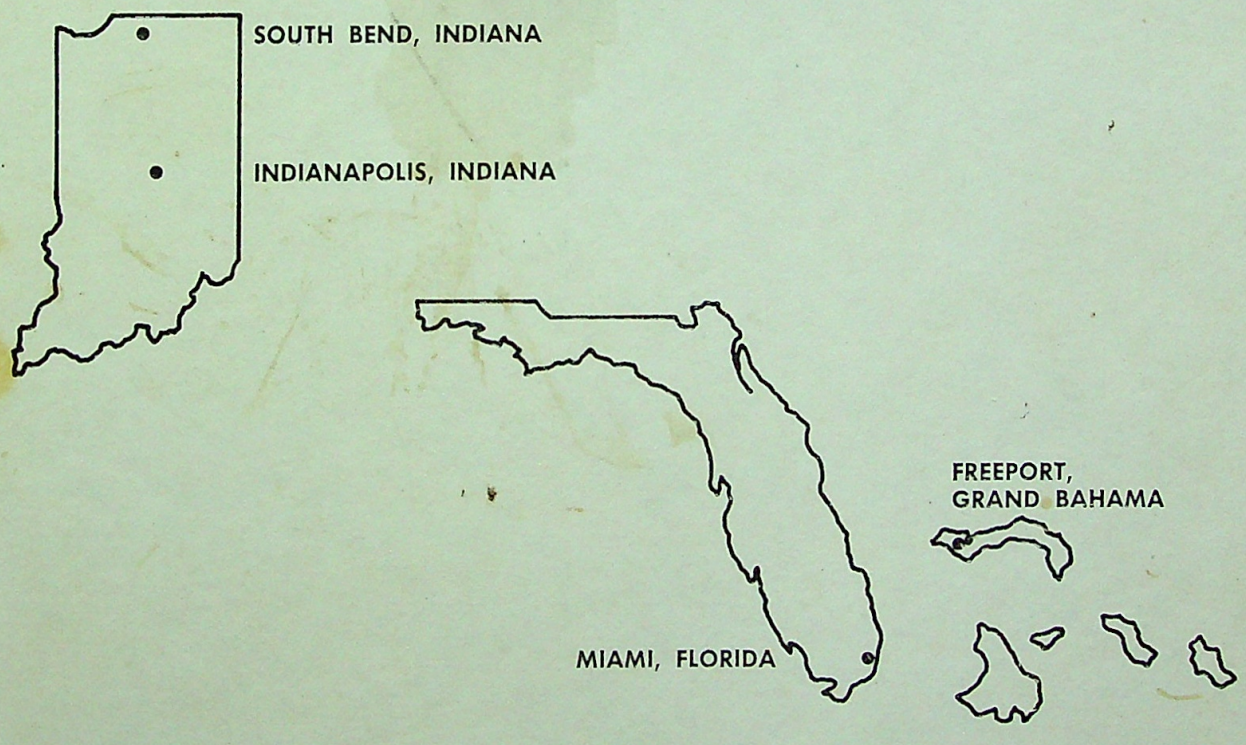
LARRY REYNOLDS

WHITESTOWN, INDIANA

ENGINEERING REPORT ON THE FEASIBILITY OF A MUNICIPAL SANITARY SEWER SYSTEM



CLYDE E. WILLIAMS AND ASSOCIATES, INC.

AND

DEVELOPMENT ENGINEERING, LTD.

PROFESSIONAL ENGINEERS

WHITESTOWN, INDIANA

ENGINEERING REPORT
ON THE
FEASIBILITY OF A MUNICIPAL
SANITARY SEWER SYSTEM

CLYDE E. WILLIAMS & ASSOCIATES, INC.
AND
DEVELOPMENT ENGINEERING LIMITED
Professional Engineers
SOUTH BEND, INDIANA 46628 — INDIANAPOLIS, INDIANA 46205
MIAMI, FLORIDA 33143 — FREEPORT, GRAND BAHAMA

March 1967

Reply to: 1902 North Sheridan Avenue
South Bend, Indiana - 46628

The President and Town Board
Whitestown, Indiana

Re: Sanitary Sewerage Improvements

Gentlemen:

In accordance with our agreement, we are pleased to present our Engineering Report on the feasibility of the Town of Whitestown constructing and operating a municipal sanitary sewer system and sewage treatment facilities.

The assistance of the Town officials and employees in collecting the information necessary for this report is greatefully acknowledged.

The privilege of serving the Town is appreciated and we are looking forward to the opportunity of assisting in the development of this sanitary sewer program.

Very truly yours,

CLYDE E. WILLIAMS & ASSOCIATES
Professional Engineers

Clyde E. Williams
Clyde E. Williams

CEW/ml

WHITESTOWN, INDIANA

ENGINEERING REPORT ON THE FEASIBILITY OF A MUNICIPAL SANITARY SEWER SYSTEM

TOWN OFFICIALS

ROBERT HAMILTON	PRESIDENT
LARRY REYNOLDS	MEMBER
WILLIAM SPENCER	MEMBER
WAYNE JOHNSON	CLERK-TREASURER
DON M. SORTOR	SUPERINTENDENT
WENDELL IDDINGS	ATTORNEY

Prepared by

CLYDE E. WILLIAMS & ASSOCIATES, INC.
Professional Engineers

1902 North Sheridan Avenue
South Bend, Indiana - 46628

3839 Meadows Drive
Indianapolis, Indiana - 46205

MARCH, 1967

INTRODUCTION

1. Purpose and Scope

The engineering firm of Clyde E. Williams & Associates has been engaged by the Town of Whitestown, Indiana to make an investigation and prepare an engineering report on the feasibility of the construction and operation of a sanitary sewage collection and treatment system.

2. Development

Whitestown is located in Boone County approximately 4 miles west of U.S. 421 and 9 miles southeast of Lebanon, the County Seat. The economy of the town is based primarily on agricultural operations, light industries, business services and a portion of the population employed in surrounding cities such as Indianapolis. Whitestown has electric power from the PSCI, telephone service supplied by the Hendricks Telephone Corporation and operates its own water utility.

Drainage for the town is provided by the Jackson Run which flows to the east into Eagle Creek. Slopes in the area are moderate and drainage is generally to the north and east.

3. Existing Sewerage Facilities

Whitestown at the present time is without a sanitary sewer system. The town does have sewers, but these are small segments of storm sewers, used to drain the streets of storm runoff. They were built specifically for storm drainage over the years and undoubtedly some septic sewage has found its way into these sewers.

Sewage treatment for the town consists of individual treatment in the form of septic tanks. We have no means of determining the degree of treatment provided by these individual septic tanks, but the degree of treatment could vary from as little as no treatment to more effective treatment by removal of most of the solids from the sewage. In any case, the tank effluent is both offensive and potentially dangerous.

A septic tank not employing an efficient irrigation field provides little treatment to sewage beyond the removal of some solids by sedimentation which is probably the highest degree of treatment provided any of the sewage that may be entering the storm sewers. Septic tanks that are not properly serviced and operated will provide little treatment to the sewage.

The normal flow of water in Jackson Run does not provide sufficient dilution for these sewage wastes which results in pollution of these waterways. The degree of pollution varies, with little water being available for dilution of these wastes during the dry seasons. This creates a polluted condition, and may be accompanied by obnoxious odors.

RECOMMENDED IMPROVEMENTS

1. Proposed Sewerage Facilities

We recommend for the town of Whitestown, a complete sewage collection system and treatment facilities. The existing storm sewers will be maintained as they are, with possibly some additions and extensions that may be necessary to accommodate the final design of the sanitary sewers. All septic tanks now in use will be abandoned as the proposed sewer will serve all homes inside the corporate limits. The service to the homes from the sewer will be accomplished by connecting the house plumbing directly to the sewer, bypassing the septic tank completely. Septic tanks will not be allowed to drain into the sewers as the municipal sewage treatment works are designed to treat raw sewage only.

There are three probable means of treatment for Whitestown and these will be discussed under "Sewage Treatment Methods".

2. Period of Design

It is essential that the sanitary sewerage facilities be designed to satisfy the needs of the town for a reasonable number of years in the future. The length of time for which these facilities are intended to adequately serve their purpose, without modification or addition, is known as the period of design. This period varies according to the type of facility involved but should represent a reasonable balance between the investment need and the expense of frequent additions or modifications.

Collecting sanitary sewers should be designed to serve the ultimate development of the area served. Trunk and interceptor sewers and other structures that cannot be readily enlarged or duplicated should be designed to serve for relatively long periods of time. Sewage treatment facilities, which are designed in units which can be readily enlarged or duplicated, may be designed for shorter periods of time to hold capital investment to a minimum.

For Whitestown, we recommend that interceptor sewers

be designed to accommodate the ultimate development of the property they serve. The sewage treatment plant would be designed for a period of 30 years and sewage oxidation ponds would be designed for a period of 10 years with land provided for future expansion.

3. Population Forecast

To obtain an estimate of the quantity of sewage that will originate at the end of each of the periods of design, it is necessary to estimate the population that will be served during each of the periods.

Estimation of a town's growth is usually based upon the population increases of the previous decades. This data is usually obtained from the U.S. Census for the past 40 years. Because Whitestown was just recently incorporated, and has a population of less than a 1000 people, the census figures for the years previous to 1950 were not listed separately but were included in the total population of the county. In order to arrive at a reasonable estimate of the future growth we have compiled the population data for Boone County from 1920 and Whitestown from 1950.

From 1920 to 1940 the population at the county decreased by approximately 1500 people. In the years from 1940 to the present time, the population of Boone County has steadily increased with the greatest increase occuring during the 1950's. During this period, the population increased approximately 11.8 percent over the previous decades. The population of Whitestown during this period also increased 11.5% percent. We believe the average population increase of the county can be applied to the Town of Whitestown for purposes of projecting the future population.

The proximity of Indianapolis and highway 65 to Whitestown is a potential factor in the future growth of the town. The ease of commutting to Indianapolis via the interstate highway increases the value of Whitestown as a residential community. The trend today is to live in a suburban atmosphere and commute to the larger cities for employment. We therefore have applied the average increase of 11 percent and projected the population for the next 50 years on the bases of Whitestown expanding as a residential community.

A tabulation of the population of Boone County and Whitestown is presented as follows:

BOONE COUNTY

YEAR	POPULATION	PERCENT
1920	23,575	
1930	22,290	- 5.45%
1940	22,081	- 0.94%
1950	23,993	+ 8.66%
1960	27,543	+14.80%

WHITESTOWN

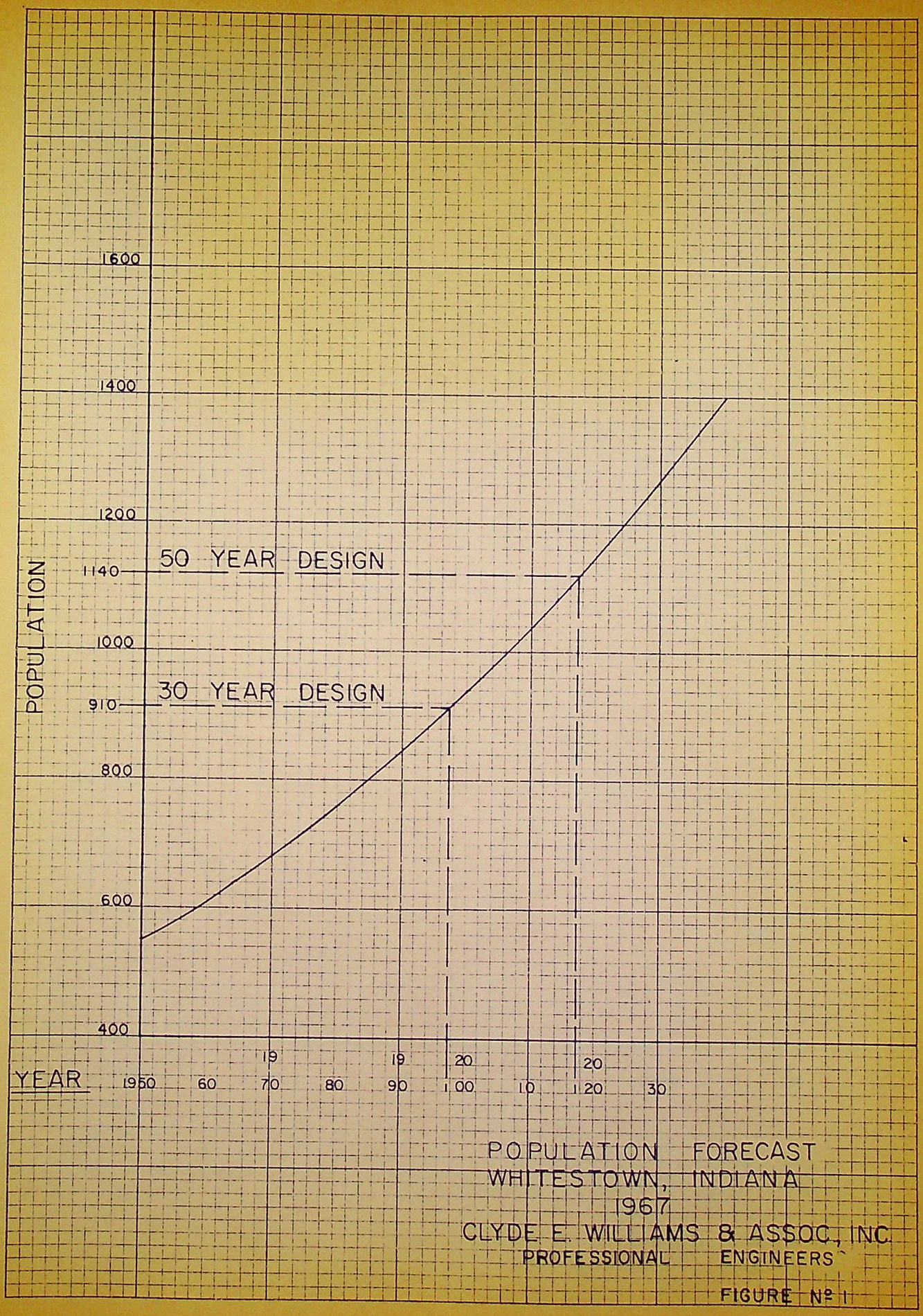
YEAR	POPULATION	PERCENT
1950	550	
1960	613	+ 11.45%
1970	687*	11.0%
1980	763*	11.0%
1990	847*	11.0%
2000	940*	11.0%
2010	1043*	11.0%
2020	1157*	11.0%

* Estimated

4. Quantity of Sewage

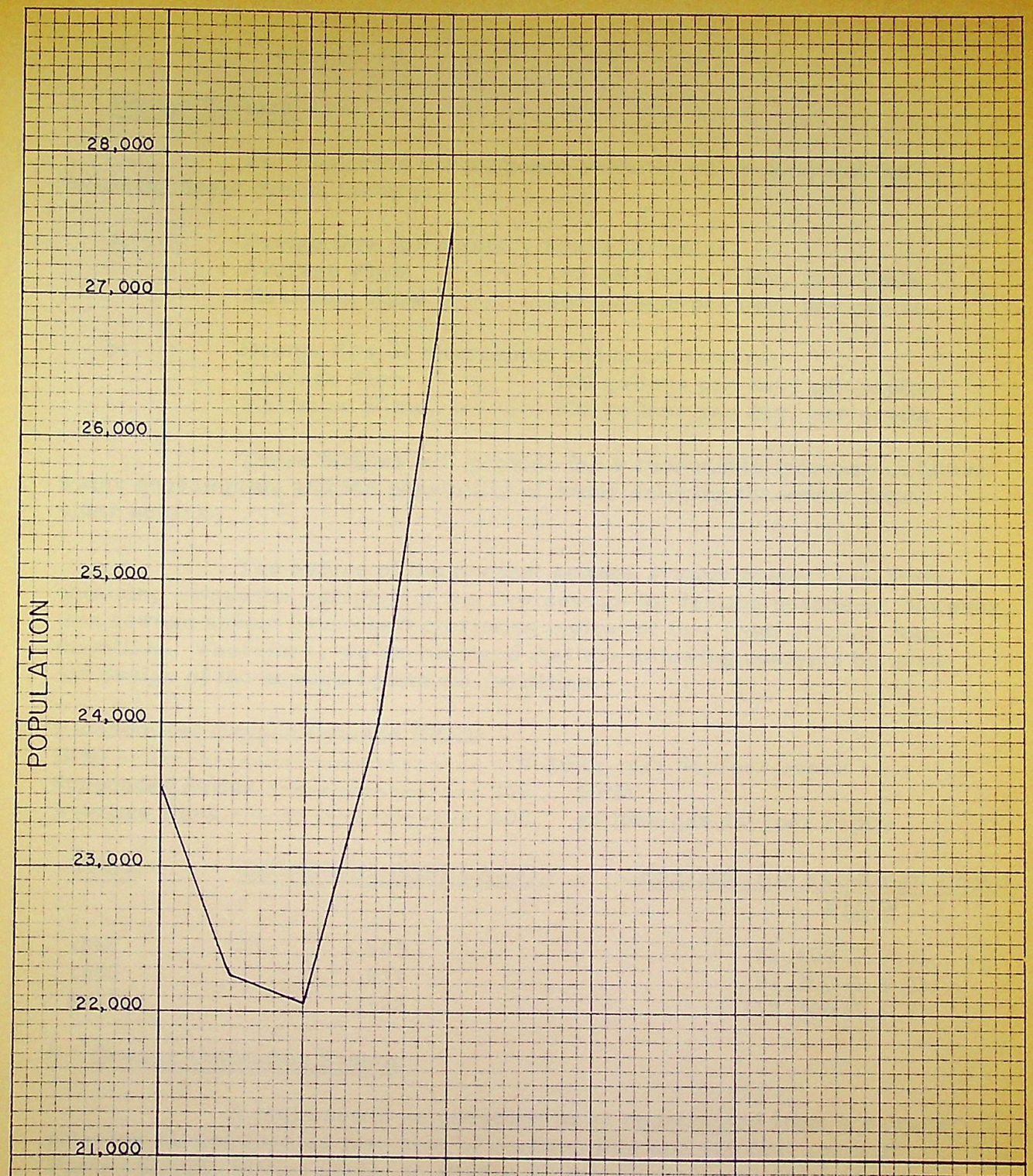
The proposed sewers are designed for the collection of sanitary wastes only. No storm water from street inlets, downspouts or footing drains will be permitted in these sewers. The prohibition of any such connections will be a part of the sewer use ordinance which the town should adopt at a later date.

To provide for infiltration, the possibility of water entering the sewers from unknown sources and to comply with modern design criteria, we are basing our design on a sewage flow of 100 gallons per day per capita.



POPULATION FORECAST
WHITESTOWN, INDIANA
1967
CLYDE E. WILLIAMS & ASSOC, INC.
PROFESSIONAL ENGINEERS

FIGURE Nº 1



POPULATION FORECAST
BOONE COUNTY, INDIANA
1967
CLYDE E. WILLIAMS & ASSOC., INC.
PROFESSIONAL ENGINEERS

FIGURE Nº 2

5. Design Factors

For designing the proposed sewers, we recommend the following basic design factors:

a. Design flow for sanitary sewer laterals:
   Average Flow - 100 gallons per day, per capita
   Maximum Flow - 400 gallons per day, per capita

b. Design flow of interceptor and trunk sewers:
   Average Flow - 100 gallons per day, per capita
   Maximum Flow - 300 gallons per day, per capita

These factors will provide for a reasonable increase in future water consumption and the possibility of water entering the sewer from other sources.

The nature of the present sewage system prevents us from obtaining composite samples of the raw sewage for testing purposes, however, this sewage should have characteristics typical of that from similar communities. Therefore, we recommend that the following analysis be used for design of the sewage treatment facilities.

Biochemical Oxygen Demand (BOD)
BOD ---------- 0.20 lb. per day/per capita
Suspended Solids ---------- 250 PPM
Average Flow ---------- 100 gallons per day/per capita

YEAR	DOMESTIC POPULATION	ESTIMATED AVERAGE DAILY FLOW
1967	665	66,500 G.P.D.
1997	912	91,200 G.P.D.
2017	1123	112,300 G.P.D.

6. Sewage Collection System

A main sewer is proposed to be constructed from a sewage pumping station located just west of Jackson Run and 480 feet south of Pierce Street, thence north, to Pierce Street, thence west along Pierce Street to Harrison Street, thence along Harrison Street to the intersection of Barnes Street and Uitts Street, thence west along Uitts Street to the railroad, thence across the railroad to Hines Street, thence south on Hines Street and terminating at the intersection of Hines Street and Pierce Street. Said sewer is 12 inches in diameter and approximately 4180 feet in length.

The main sewer will collect sewage from all parts of the town by means of branch and lateral sewers. The branch sewer, such as the sewer on Porter Avenue, receive sewage from the lateral sewers and in turn discharges into the main sewer. The main sewer transports the sewage to the lift station which then pumps it to the treatment facility for stabilization before final discharge into the receiving stream.

The collection system for Whitestown is made up of three types of sewers as stated above. A brief summary of each type is as follows:

Main Sewers are sewers which receive sewage from many tributary branches, and sewers, serving as an outlet for a large territory.

Branch Sewers are sewers which receive sewage from a rather small area, usually a few laterals and discharges into a main sewer.

Lateral Sewers are those sewers discharging into another sewer and having no other sewer tributary to it.

The sewers will be installed with wye fittings at all properties. Where sewers are located in the street right-of-way, approximately 25 feet of 6 inch sewer service pipe will be installed to the property line. Each sewer tap will be noted and recorded on the plans during construction and the locations of all the taps will be maintained as part of the permanent records kept by the town.

The final location of the proposed sewers may vary from that shown on Exhibit "A" depending upon further detailed field surveys and office studies made during design. The Town Board may also see a desire or need to reroute the sewers from that shown. Location of water mains, telephone conduits and existing sewers, as well as street conditions may also determine the final location of the proposed sewers.

7. Sewage Treatment Methods

There are three probable means of treatment of sewage for Whitestown. These are:

1. Treatment by sewage oxidation pond.
2. Treatment by trickling filter type process.
3. Treatment by mechanical aeration process.

We have outlined the advantages and disadvantages of each method of treatment and the estimated construction costs along with the

estimated annual costs of each method of treatment. The estimated costs, especially the annual costs, should be considered along with other advantages or disadvantages in selecting the treatment facilities for the town.

Modern sewage treatment works can be designed to provide almost any degree of treatment to sewage wastes. The results that can be obtained by the commonly used processes are summarized briefly as follows:

a. Preliminary Treatment consists of the removal of very coarse particles or solids by screening devices. It is considered to be 5 to 10 percent treatment.

b. Primary Treatment consists of the removal and disposal of floating solids and solids that will settle out of the sewage within a reasonable time. It is considered to be 30 to 55 percent treatment with the average approximately 40 percent.

c. Intermediate Treatment consists of the partial removal or stabilization of the dissolved or colloidal solids by chemical or biological processes, and can provide any degree of treatment between primary and complete treatment.

d. Complete or Final Treatment is primary treatment followed by biological or oxidation processes to remove or stabilize the dissolved and colloidal solids which are not removed in the primary process. For a complete oxidation process, it is considered 90 to 98 percent treatment with the average less than 95 percent.

The sewage treatment facilities should be capable of producing an effluent that will not pollute the receiving stream to the extent that property values of present and potential users of the stream and adjacent lands are affected, or such that any hazard to public health will be created. To meet these requirements the degree of treatment necessary is dependent upon local conditions, such as the quantity of dilution water in the receiving stream, the use and development of adjacent lands, the location of the treatment facility, the extent to which the receiving stream and its waters are used, and other less important factors.

Due to the lack of water available in the Jackson Run for dilution during the dry season, a rather high degree of treatment will have to be provided. This treatment can be provided by a sewage oxidation pond or a mechanical treatment plant.

Sewage Oxidation Ponds

Sewage oxidation ponds consist of a shallow excavation or the construction of a series of earth dikes for the storage of raw sewage under conditions that favor the growth of algae. Bacterial decomposition of the organic matter which settles from the raw sewage produces soluble organic nutrients, principally carbon dioxide and ammonia. The carbon dioxide and ammonia are utilized by the algae which with the aid of sunshine produces free oxygen. This oxygen is used by the bacteria in bacterial oxidation of organic matter, which produces more carbon dioxide and ammonia repeating the cycle.

Sewage oxidation ponds can provide almost any degree of treatment from partial to almost complete stabilization of the effluent. Odor problems are slight with some odors occuring during the transition period when the ice thaws off the ponds. During other periods of the year the ponds are practically odor free under most conditions.

The ease of operation along with low operation and maintenance costs make sewage oxidation ponds a popular means of sewage treatment for small communities, provided suitable sites are available for the construction of the ponds.

A suitable site for a sewage oxidation pond would be a tract of land large enough for construction of the required ponds with an area provided for future expansion. Normally the State Board of Health requires one acre for each 100 people and this requirement plus allowances for industrial wastes will determine the size of the ponds. However, additional acreage is required to provide expansion to accommodate increases in population. Also, additional area is required for the construction of embankments and dikes.

Based on these requirements a tract of land providing not less than 15 acres will be required. The tract should be relatively flat to avoid excessive grading and excavation costs. Suitable soils should be available so the ponds can be properly sealed and sites with large rock formations should be avoided due to excessive excavation and sealing costs involved.

The site for a sewage oxidation pond must be isolated from populated areas and wells, yet close enough to the sewer system to avoid the high costs for sewers, force mains, pump stations and high pumping costs to conduct the sewage to the pond site. Sites for oxidation ponds should be located downstream so the effluent from the pond does not pass through the town. We have located one site where an oxidation pond may be located.

This site is fairly isolated from any dwellings and is parallel to Jackson Run. The proposed site is outside of the corporate limits and far enough away from any developed area. The proposed pond site, access road and approximate distances from existing dwellings are shown on the map in the back of this report.

Some of the advantages of sewage oxidation ponds are: 1. Low first cost where land prices and construction costs are reasonable. 2. Relatively low operating costs which are due in part to simplified operation and maintenance. 3. A rather high degree of treatment is provided under ideal conditions.

Some of the disadvantages are: 1. A potential hazard to public health. 2. Possible high cost of construction due to land values and construction costs. 3. Devaluation of property values adjacent to the oxidation pond. 4. Some industrial wastes may not be treated satisfactorily. 5. Objectional odor problems which may prevail under certain conditions at times. 6. The proximity of the pond to residences or developed areas may be objectionable. 7. Expansion may be costly or impossible due to high land costs or land suitable for a pond being not available.

Trickling Filter Process Sewage Treatment Plant

Trickling filter sewage treatment plants are relatively simple to operate and while construction costs of filter plants in the smaller sizes are slightly higher than construction costs of other types of treatment plants the savings in maintenance and operating costs more than compensate for the additional investment required for the filter plant.

With the trickling filter plant, the sewage is collected in a combination clarifier and digester. In the clarifier the settleable solids are removed by sedimentation and are deposited in the lower compartment which serves as a digester. Scums and other floatable solids are removed by a scum skimmer and pumped to the digester compartment.

After removal of the solids by sedimentation the sewage effluent is discharged to the trickling filter which consists of a bed of coarse rock, over which the sewage effluent is applied by a rotary distributor and allowed to trickle through the interstices in the rock bed to the underdrain system, the required oxygen being supplied by the air in the interstices in the filter rock media. The sewage effluent discharges from the trickling filter to a final clarifier which removes

the suspended solids discharged by the filter. Part of the sewage effluent from the final clarifier is recirculated through the trickling filter to accomplish a higher degree of treatment. A rather high degree of treatment can be accomplished with this type of plant, while maintenance and power consumption costs are relatively low.

Some of the advantages of the filter type sewage treatment plant are: 1. Small tracts of land are required for construction sites. 2. Plants may be constructed reasonably close to developed areas. 3. Low operation and maintenance costs. 4. Will successfully treat most industrial wastes when combined with sanitary sewage. 5. Will provide a relatively high degree of treatment and has ability to handle shock loads.

Some of the disadvantages of the filter type sewage treatment plant are: 1. Construction costs of small plants may be slightly higher than the cost of a stabilization pond under certain conditions. 2. Construction costs are slightly higher than the mechanical aeration process treatment plants. 3. Some industrial wastes cannot be successfully treated in large concentrations.

Mechanical Aeration Sewage Treatment Plant

In the Mechanical Aeration process, oxygen is supplied to the sewage by mechanical means. The sewage, as it enters the mechanical aeration plant, goes through almost the same process as in the trickling filter plant, such as grinding, grit removal and primary settling. The main difference is the method in which oxygen is applied to the sewage to promote aerobic digestion. The sewage passes from the primary settling tank, where most of the solids have been removed, to an aeration tank. In the aeration tank, air is continually blown into the effluent from the sides and bottom of the tank, resulting in bacteriological action that substantially completes the treatment process.

From the aeration tank, the treated sewage goes to the final settling tank where the remaining solids are settled out. A portion of the settled solids are returned to the aeration tank to support the bacteriological action of the incoming sewage. This sludge is coated with aerobic bacteria which keeps the bacteria in the tank sufficiently populous and hastens the stabilization process.

Some of the advantages of the mechanical aeration process sewage treatment plants are: 1. Small tracts of land are required for construction sites. 2. The construction costs may be somewhat lower than the filter type plant. 3. The degree of treatment

provided compares favorably with other methods of treatment. 4. This type of plant can readily treat some industrial wastes which are not adaptable to treatment by other processes.

Some of the disadvantages of the mechanical aeration process of treatment are: 1. High cost of operation due to the high rate of power consumption in relation to the quantity of wastes treated; this may be offset somewhat by the lower construction costs. 2. Higher maintenance costs due to the mechanical equipment involved in the process.

8. Estimated Costs

The estimated cost of the sanitary sewerage system and treatment facilities recommended to the town is summarized and presented here in tabular form. It is well to bear in mind that these costs are preliminary only and are subject to revision when field surveys are made and plans completed. However, we believe those estimates are sufficiently accurate for the purpose of this report.

ESTIMATED COST OF SEWERS

1.	4180 LF	12" Sewer @ $7.50	=	$31,350.00
2.	7060 LF	10" Sewer @ $6.50	=	45,890.00
3.	11,160 LF	8" Sewer @ $5.50	=	61,380.00
4.	68 (ea)	Std. Manhole @ $400.00	=	27,200.00
5.	38 (ea)	12" x 6" Wyes @ $12.00	=	456.00
6.	60 (ea)	10" x 6" Wyes @ $10.00	=	600.00
7.	135 (ea)	8" x 6" Wyes @ $8.00	=	1,080.00
8.	5000 (ea)	6" Sewer @ $4.00	=	20,000.00
9.	1900 LF	6" Force Main @ $4.50	=	8,550.00
10.	1 (ea)	Railroad Crossing @ $1500.00	=	1,500.00
11.	Lump Sum	Sewage & Communitor Pumping Station	=	20,000.00
12.	Lump Sum	Sewage Pumping Station	=	10,000.00
13.	Lump Sum	Construction Contingency 5%	=	11,500.00
		ESTIMATED CONST. COST =		$240,506.00

ESTIMATED COST OF SEWAGE TREATMENT FACILITIES

SEWAGE OXIDATION POND

1. Grading 15 acres @ $3000.00	$45,000.00
2. Piping and Control Structures	8,000.00
3. Construction Contingency @ 5%	2,700.00
4. Land and Right-of-way (allow)	12,000.00
ESTIMATED CONSTRUCTION COST	$67,700.00

TRICKLING FILTER PLANT

1. Treatment Plant	$85,000.00
2. Construction Contingency @ 5%	4,500.00
3. Land and right-of-way (allow)	5,000.00
ESTIMATED CONSTRUCTION COST	$94,500.00

MECHANICAL AERATION PLANT

1. Treatment Plant	$80,000.00
2. Construction Contingency @ 5%	4,000.00
3. Land and right-of-way (allow)	5,000.00
ESTIMATED CONSTRUCTION COST	$89,000.00

ESTIMATED PROJECT COSTS

In order to properly evaluate the various methods of sewage treatment, we are presenting the total estimated costs of the project with sewage treatment by means of:

Plan I - Sewage Oxidation Pond
Plan II - Trickling Filter Plant
Plan III - Mechanical Aeration Plant

PLAN I

Collection System	=	$240,500.00
Sewage Oxidation Pond	=	68,800.00
Engineering	=	22,900.00
Inspection	=	8,000.00
Administrative & Accounting	=	5,000.00
Legal	=	5,800.00
Advertising, Printing & Miscellaneous	=	1,600.00
Interest Reserve @ 5%	=	17,600.00
ESTIMATED TOTAL PROJECT COST	=	$369,900.00

PLAN II

Collection System	=	$240,500.00
Trickling Filter Plant	=	94,500.00
Engineering	=	24,600.00
Inspection (allow)	=	8,000.00
Administrative & Accounting	=	5,000.00
Legal	=	6,100.00
Advertising, Printing & Misc.	=	1,600.00
Interest Reserve @ 5%	=	19,000.00
ESTIMATED TOTAL PROJECT COST	=	$399,300.00

PLAN III

Collection System	=	$240,500.00
Mechanical Aeration Plant	=	89,000.00
Engineering	=	24,200.00
Inspection	=	8,000.00
Administrative & Accounting	=	5,000.00
Legal	=	6,000.00
Advertising, Printing & Misc.	=	1,600.00
Interest Reserve @ 5%	=	18,700.00
ESTIMATED TOTAL PROJECT COST	=	$393,000.00

Municipal sewerage works are generally financed by issuance of bonds. Either general obligation or revenue bonds can be issued by the community to finance the total cost of the sewerage improvement project. The annual revenue required to retire the bond issue must also provide for annual operating and maintenance costs. The simplest and most equitable type of sewer service charge is a rate structure based on the amount of water used by each service connected to the sewer system. The amount of the sewer charge is proportional to the amount of water used by the customer and the rate is determined through the use of meters. In the rate structure there is usually an allowance for special water use as not all water used by the customer reaches the sanitary sewers.

Since Whitestown operates its own water utility, a savings could be realized by combining the operation of both the water and sewer utilities. By coordinating the operation of the utilities, the same personnel and facilities could be used for billing and collecting both water and sewer service charges. The annual revenues required for the operation of the sewage utility will be in addition to the present costs to the town for the water works maintenance and operation. The estimated annual operation and maintenance costs of the different proposed project plans are tabulated as follows.

ITEM	PLAN I	PLAN II	PLAN III
Personnel	$1,300.00	$2,300.00	$2,800.00
Billing Costs	600.00	600.00	600.00
Power Costs	800.00	1,400.00	2,200.00
Maintenance	500.00	800.00	1,200.00
Chemicals	200.00	800.00	400.00
	$3,400.00	$5,900.00	$7,200.00

The revenue for the retirement of bonds should be approximately 130 percent of the actual interest and principal payments to provide the investment safty factor necessary to attract bond buyers. The surplus from these excess revenues can be used to retire the bond issue at an earlier date or be used for future improvements to the system.

The estimated annual revenue required for operation, maintenance and retirement of 35 year revenue bonds at 5 percent interest is tabulated below for the various project plans without Federal Aid.

ITEM	PLAN I	PLAN II	PLAN III
PROJECT COST	$370,000.00	$400,000.00	$393,000.00
Interest & Amort.	22,600.00	24,400.00	24,000.00
Bond Coverage @ 30%	6,800.00	7,300.00	7,200.00
Operating Costs	3,400.00	5,900.00	7,200.00
Estimated Annual Costs	$32,800.00	$37,600.00	$38,400.00

On the basis of 233 proposed sewer connections and the estimated annual revenues required for operation and construction of the **various plans**, we have estimated the required monthly rates as follows:

PLAN	ANNUAL REVENUE REQUIRED	RATE PER MONTH
I	$32,800.00	$11.73
II	$37,600.00	$13.45
III	$38,400.00	$13,73

Effect of Federal Aid on Sewer Rate Structures

Public Law 660 was enacted by Congress to encourage and assist municipalities in the construction of sewage disposal facilities.

These facilities may consist of sewage pumping stations, force mains, interceptor sewers and sewage treatment facilities. However there is no provision for granting aid in the construction of sanitary sewer laterals.

These Federal funds are apportioned to various communities according to a priority based on pollution abatement need and the municipalities ability to finance the project. The amount of these Federal funds is limited each year and not all applicants will receive a grant. Before any consideration is given to granting available funds, a set of approved plans and specifications of the proposed project must be on file with the Indiana Stream Pollution Control Board. The normal grant under Public Law 660 is 30 percent of the eligible project costs, less land costs and interest reserves. The land costs and interest reserve fund are not eligible for Federal Aid.

Another means of possible financial aid in constructing the proposed sewerage project is the FHA (Farmers Home Administration). The Federal Government in 1965, enacted Public Law No. 89-240 which amended the Consolidated Farmers Home Administration Act of 1961. The Secretary of Agriculture was authorized "to make or insure loans to public and quasi-public agencies and corporations not operated for profit with respect to water supply, water systems and waste disposal systems serving rural areas and to make grants to aid in rural comcunity development planning and in connection with the construction of such community facilities to increase the annual aggregate of insured loans thereunder and for other purposes."

The amended act further states that the Secretary of Agriculture is authorized to make grants to finance specific projects for the development, storage, treatment, purification, or distribution of water or the collection, treatment, or disposal of waste in rural areas. Whitestown qualifies for consideration for Federal Aid as Public Law 89-240 states that rural areas, for the purposes of water and waste disposal projects, shall not include any area in any city or town which has a population in excess of 5,500 inhabitants.

In lieu of a bond issue, a low interest FHA loan is an alternate method of underwriting the cost of the improvement program. The current interest rate charged against FHA Federal loans is 4 1/2% which is considerably lower than interest charged on monies borrowed through private sources. Usually a grant that could be allocated to a community for aid in construction of a sewage works project, if sewer rates are unusually high, can range as high as 50% of the project costs.

A community can receive grants from several sources at the same time, but in no case will the grants exceed 50% of the project costs. The FHA has given grants to communities to help establish what they consider an equitable monthly sewer service rate. The amount of the grant would depend upon the size of the project, monies available to the town from other sources and the need of the community.

Under Public Law 660 the sewage pumping station, force main and sewage treatment facilities (except land and right-of-way costs) are eligible for Federal Grant participation. Portions of the project eligible for Federal Grant participation are tabulated as follows:

PLAN I - SEWAGE OXIDATION POND

Pumping Station & Communitor -	=	$20,000.00
Pumping Station	=	10,000.00
1900 LF 6" Force Main	=	8,550.00
Sewage Oxidation Pond	=	53,000.00
Construction Contingency @ 5%	=	4,600.00
Construction Cost Eligible for Federal Aid		$96,150.00
Engineering and Inspection	=	11,900.00
Administrative & Accounting	=	1,900.00
Legal	=	2,200.00
Advertising	=	600.00
Portion Eligible for Federal Grant		$112,750.00

AMOUNT OF FEDERAL GRANT

$112,750.00 x 30% = $33,800.00

Based on the above computations, a 30 percent Federal Grant would reduce the project cost to the town on Plan I from $370,000.00 to $336,200.00. Project costs to the town for Plans II and III would be $356,000.00 and $351,400.00 respectively.

With Federal Grant participation in the amount of 30 percent of the eligible portions of the project, the estimated annual costs are tabulated as follows, using a 5% interest rate for a 35 year bond issue with 30 percent bond coverage.

ITEM	PLAN I	PLAN II	PLAN III
PROJECT COST	$336,200.00	$356,000.00	$351,400.00
Interest & Amort. @ 5%	$20,500.00	$21,700.00	$21,500.00
Bond Coverage @ 30%	6,150.00	6,500.00	6,500.00
Operating Costs	3,400.00	5,900.00	7,200.00
Total Annual Cost	$30,050.00	$34,100.00	$35,200.00

The estimated monthly rates with a 30 percent Federal Grant is tabulated as follows:

PLAN	ANNUAL REVENUE REQUIRED	RATE PER MONTH
I	$30,000.00	$10,75
II	$34,100.00	$12.20
III	$35,200.00	$12.59

A possible method of financing the sewerage improvement would entail the 30 percent Federal Grant under Public Law 660 and the remaining principal with a 4% FHA insured loan for a period of 40 years. The required annual revenues and estimated monthly rate for Plan I is tabulated below:

Total Project Cost	$370,000.00
Cost of project with 30% Grant	$336,200.00
Interest & Amort. - 4 1/2% FHA - 40 Years	18,200.00
Annual Operating Costs	3,400.00
Annual Revenue Required	21,600.00
Monthly Rate (average)	$7.75

These figures illustrate the revenues required to construct and operate the sewage utility. The actual rates for sewage are established by a utility accountant after plans are completed, construction bids received and funds available from other sources are applied to the project. The services of an accountant are required only if a town elects to finance the project through the sale of revenue bonds. The FHA does not require a town which has been granted Federal Aid to utilize the services of an accountant.

SUMMARY OF RECOMMENDATIONS

In the preceding pages of this report, we have outlined the deficiencies of the existing sewers and the need for sewage treatment facilities and a collection system. To accomplish the necessary improvement program, we recommend the following:

(1) That a program be adopted for the construction of the sewage collection system as shown on Exhibit "A" and to provide means

for the disposal of sanitary wastes and abate pollution of the Jackson Run.

(2) That the town determine if land is available for an oxidation pond which can be purchased at a reasonable price with land available for future expansion. The site should meet with the Indiana State Board of Health's approval and should be isolated enough so that it will not affect the values of adjoining lands. This is essential to determine the feasibility of an oxidation pond for treatment of sewage and to properly evaluate the cost of treatment facilities.

(3) That the town make application to the Indiana Stream Pollution Control Board for aid in constructing the proposed sewers and sewage treatment facilities.

(4) That the town contact the County FHA supervisor for Federal assistance in financing the project.

ENGINEERING SERVICES AVAILABLE FOR:

AERIAL PHOTOGRAPHY

AIR POLLUTION CONTROL

AIRPORTS

BRIDGES

CITY PLANNING

DAMS

DRAINAGE SYSTEMS

ELEVATED AND GROUND STORAGE TANKS

GOLF COURSES

INDUSTRIAL WASTE TREATMENT

SOIL INVESTIGATIONS

STORM AND SANITARY SEWERS

STREETS AND HIGHWAYS

SURVEYING

SWIMMING POOLS

TOPOGRAPHICAL MAPPING

URBAN RENEWAL

WATER DISTRIBUTION SYSTEMS

WATER SUPPLY AND TREATMENT