Background Information Regarding the Jeffersontown Sewershed and the Chenoweth Run Watershed

For the

DEVELOPMENT OF PRETREATMENT PERFORMANCE MEASURES IN A WATERSHED-BASED MANAGEMENT SYSTEM

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MSD

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EXECUTIVE SUMMARY

Louisville and Jefferson County Metropolitan Sewer District (MSD) has obtained a USEPA 104(b)(3) grant to develop and evaluate pretreatment performance measures in a watershed based management system (the Project). Task 2 of this grant project is to "collect baseline information". This data is being collected to gain a better understanding of the current status of the Jeffersontown (J-Town) Sewershed/Chenoweth Run Watershed. This report documents the evaluations and findings of the background information for this project. This report includes discussions on:

- Land use within the Chenoweth Run watershed (Section 2),
- Jeffersontown Collection System (Section 3),
- Industrial dischargers to the Jeffersontown Collection System (Section 4),
- Jeffersontown Wastewater Treatment Plant (Section 5),
- Chenoweth Run stream characteristic. [Section 6), and
- Pollution Prevention (Section 7).

Land Use

Based on the most recent (1992) land use data for the J-Town sewershed area. the current land use in the sewered area is predominantly residential and vacant. It is known. however. that there has been significant development in the area since 1992. Water sales records also indicate growth in J-Town. Zoning maps indicate that growth in residential and special land use (office space) is expected..

Collection System

MSD has a good understanding of the J-Town sewer collection system through the use of LOJIC mapping of the collection system. Five gravity trunk lines and one force main were identified in the collection system. MSD has identified industries tributary to each of the trunk lines. MSD conducted wastewater sampling in conjunction with flow metering to establish mass loadings from each of the six tributary areas, The J-Town collection system has experienced overflows resulting from excessive infiltration and inflow. MSD has prepared a Sanitary Sewer Overflow Abatement and Elimination Plan (SSOAEP) to address overflows. MSD is addressing infiltration and inflow and will repair defects deemed cost-effective in the system in an attempt to remove excessive infiltration and inflow.

Industries

The J-Town sewershed includes a large industrial park. A total of 700 industrial and commercial establishments are in the J-Town sewershed. MSD has permitted 29 of these industries (22 general permits and 7 significant industrial users). Of the seven SIUs, four are included because of MSD's conservative definitions of an SIU, and three are included because they are categorical. The location of the permitted industries relative to the collection system has been established. The MSD database of industrial flows, concentrations and loadings allowed tables to be generated summarizing the specific industrial contributions. The permitted industrial users contribute a small percentage of the J-Town WWTP influent flow and loadings. The permitted industries are generally in compliance with their discharge permits with only a few exceptions. Future data collection efforts will be initiated using a more organized approach to provide more useful data.

WWTP

The J-Town WWTP, a secondary activated sludge plant, is rated for 4 MGD average daily flow. The plant must meet KPDES permit limits slightly more stringent than secondary limits. Local pretreatment limits have been established for the industrial and commercial dischargers, but are currently under review. Influent flows and loads were reviewed and show the plant is nearing its average hydraulic capacity. The quality of the plant effluent was reviewed. With minor exceptions, the WWTP produces a high-quality effluent in comparison with KPDES Permit Limits.

Sludge generated at the wastewater treatment plant is hauled to another MSD wastewater treatment plant for further processing. but is of a high quality with respect to EPA 503 regulations. Since MSD took over operation of the J-Town Wastewater Treatment Plant. minimal process upsets have been experienced due to toxicity of the wastewater. Overall. the MSD pretreatment program appears to be doing a good job protecting the J-Town WWTP.

Stream

Chenoweth Run is a stream of reasonably high quality with respect to direct measurable impact from industrial sources (i.e. conventional pollutants and metals). Exceptions to water quality standards are observed for fecal coliform (frequent), some metals (occasional) and nitrate (occasional). In-stream metal concentrations are either observed to be below water quality standards or measured with analytical techniques with too high of detection limits to conclusively compare to water quality criteria. Kentucky Division of Water (DOW) has completed a Total Maximum Daily Load (TMDL) study focusing on phosphorus sources in Chenoweth Run. DOW is expected to impose a point source effluent limit (I .0 mg/L) for the J-town WWTP effective at the next permit re-issuance. Quarterly baseline monitoring (of water column and sediment) will provide an even stronger basis for assessment of the stream. but based on the current data. the stream does not appear to be impacted by industries in the J-Town sewershed.

However. MSD streams personnel have significant concern over the overall health of Chenoweth Run (outside of the lack of impacts from the industrial discharges). Chenoweth Run suffers from severe flow problems. siltation. pathogens. erosion. nutrient enrichment. nuisance algae. low dissolved oxygen. occasional possible metals violations. loss of riparian vegetation. and poor in-stream habitat. MSD is working to address these concerns through improvements to the collection system. enhanced nutrient removal from the J-Town WWTP. Other efforts may be considered for restoration of riparian vegetation and shade.

Pollution Prevention

Several industries in the J-Town sewershed have undertaken pollution prevention initiatives. MSD has performed a study of the sources of ammonia and phosphorous. MSD pretreatment program personnel are involved in pollution prevention training so they can help industries identify more opportunities for use ofpollution prevention. if applicable.

SECTION 1
INTRODUCTION

Louisville and Jefferson County Metropolitan Sewer District (MSD) has obtained a USEPA 104(b)(3) grant to develop and evaluate pretreatment performance measures in a watershed based management system (the Project). This report documents the evaluations and findings of the background information in the Jeffersontown Sewershed/Chenoweth Run Watershed for this project.

This project contains five distinct tasks:

Task 1 - Establishing a working team and peer review group,

Task 2 **-** Collect baseline information,

Task 3 **-** Development of performance measures,

Task 4 **-** Conceptualize the system, and

Task 5 **-** Implement and assess the proposed performance measures

This project will develop and evaluate performance measures for the pretreatment program that are intended to provide an approximate "measuring stick" and hopefully lead toward a further reduction of pollution from industrial (indirect discharge) sources. The objective of this project is to develop, implement and assess specific performance measures designed to gauge the environmental impact of a pretreatment program in a selected sewershed. This measurement will be made through the inter-relationships between commercial/industrial dischargers, the collection system, and the treatment plant influent, effluent and sludge. Consideration will also be given to non-point source contributions, but this is not the primary objective of this project. The results of this project are expected to be beneficial to other municipalities since the goal is to create methodology and measures which would be transferable in assessing the performance of other pretreatment programs.

This report will focus on the collection of background information (Task 2 of the Grant) in the Jeffersontown Sewershed/Chenoweth Run Watershed. This report will include discussions on:

- Land use within the Chenoweth Run watershed (Section 2),
- Jeffersontown Collection System (Section 3),
- Industrial dischargers to the Jeffersontown Collection System (Section 4),
- Jeffersontown Wastewater Treatment Plant (Section 5),
- Chenoweth Run stream characteristics (Section 6), and
- Pollution Prevention (Section 7).

Figure 1 - 1 shows the Chenoweth Run watershed, J-Town collection system and location of industrial users. This figure will be referred to throughout this document.

SECTION 2
LAND USE

An increase in impervious areas as well as various land use activities is directly related to degradation of water quality. This section describes the land use within the Jeffersontown (J-Town) sewershed and Chenoweth Run Watershed. This description provides background information necessary for the development of potential performance measures for the pretreatment program. It is well documented that land use is one of the most important considerations in determining the overall health of the receiving stream.

2.01 BACKGROUND

We have reviewed available land use (1992) in the J-Town sewershed and Chenoweth Run watershed. Figure 2-1 presents the 1992 land use in the Study Area. Land use within the watershed consists of significant commercial and industrial areas in the northern portion of the watershed, and residential and commercial areas in the western portion of the watershed. Figure 2-1 also includes the sanitary sewer collection network. The service area upstream of the proposed metering manhole locations is as follows:

Location	Upstream Land Use
Metering MH- 1	Primarily industrial, commercial, and residential
Metering MH-2	Primarily industrial with significant vacant land
Metering MH-3	Primarily residential with some commerical
Metering MH-4	Primarily industrial with significant vacant land
Metering MH-5	Primarily residential with small pockets of commercial and public entities
Metering MH-6	Primarily residential

Information has been obtained from the Louisville Water Company (LWC) regarding water usage to customers within the J-Town service area. Table 2-l presents a summary of the water sales provided by LWC for the J-Town sewershed. Industries (according to LWC definition) purchase about 5% of the water, residential users purchase about 50%, and commercial users purchase about 45%. The water sales to J-Town customers have been generally increasing since 1996 indicating that the study area is experiencing growth.

2.02 FUTURE DEVELOPMENT

Vacant land (as of 1992) is shown as a purple tone on Figure 2-1. Figure 2-2 delineates J-Town Zoning and Vacant Land. The zoning classification and delineation of vacant areas is not representative of current conditions. MSD should obtain the most current zoning and vacant land delineation if available.

Table 2-2 presents the zoned acreage for each use designation by tributary manhole,

2.3 SUMMARY

Land use information is available for the J-Town sewershed. Some of this information is of questionable value due to concerns over accuracy, but it is the best available at this time. Water sales records document the relative distribution of customers' water usage, and the growth occurring in the watershed. Delineation of vacant land (zoned industrial) is not readily available.

2.4 ITEMS FOR FUTURE STUDY

The following additional items should be studied under this grant project:

1. MSD should pursue the most current land use information including better accounting of vacant zoned industrial land. Existing land use information can be used if more current data is unavailable.

SECTION 3
COLLECTION SYSTEM

This section documents the sewer collection system for the J-Town Wastewater Treatment Plant (WWTP). It is important to thoroughly understand the sewer collection system and distribution of industrial users when evaluating the impacts of the pretreatment program in a watershed context.

3.01 BACKGROUND

Since September 1990, MSD owns and operates the J-Town collection system which collects anti conveys wastewater to the J-Town WWTP. Figure l-l showed a map, produced in MSD's LOJIC system, which delineates the collection system and the location of the J-Town Wastewater Treatment Plant.

The J-Town sewer collection system serves over 5,000 residential customers (51 percent of flow volume), over 700 commercial customers (44 percent of flow volume), and 29 permitted industrial customers (less than five percent of flow volume).

Figure 3-l presents a schematic of the J-Town collection system. The schematic identifies six primary trunk sewers.

The industrial dischargers that are permitted by MSD are identified in Table 3-l. The industries are listed according to discharge into each of the main trunk sewers. The majority of the industrial users discharge through trunk one. Trunks two, three, and four have a few industrial dischargers, while trunks five and six have no known industrial dischargers. Trunk six conveys residential wastewater by force main.

The J-Town collection system is a separate sanitary collection system. No combined sewers exist. The J-Town collection system has been plagued by sanitary sewer overflows at specific locations in the system. The overflows are typically the result of excessive infiltration and inflow (l/I). As a result, MSD initiated an aggressive sanitary sewer remediation program to address the problem. The plan includes upgrade to the J-Town WWTP and various Sewer i Manhole Rehabilitation Projects throughout the system over the next five years. The specifics of the program are discussed in MSD's annual Sanitary Sewer Overflow Abatement and Elimination Plan (SSOAEP), which KDOW is currently reviewing.

The SSOAEP documents the one known overflow in the J-Town sewershed. A map detailing the location of the one known overflow is included in Appendix C. Knowledge of the location of SSOs will aid in understanding the nature of wastewater (including industrial wastewater) exiting the system and affecting stream quality during wet weather. The one SSO has not been active in 1999 due to recent efforts in the collection system and at the WWTP.

3.02 PREVIOUS MONITORING

As part of the SSOAEP, MSD retained a consultant to monitor flows during September and October 1998 throughout the J-Town collection system. Twenty-four flow meters were installed at strategic locations in the collection system. Figure 3-2 contains a summary of flow data from pertinent flow monitors. The real-time flow metering information will be used in a hydraulic model (XPSWMM) of the collection system in order to address I/I issues. This information is useful in determining historical flow distribution and hydrographs of the system.

3.03 CURRENT MONITORING

As part of this Pretreatment Performance Measures project, it was determined that collection system monitoring in conjunction with industry and WWTP monitoring would provide the most useful data. Therefore, mass loading data is being collected over a one-year period. MSD identified six strategic locations in the collection system and is collecting flow metering and wastewater quality data. Table 3-2 contains a summary of the flow data from one survey (March 1999) which identifies the distribution of flow from the trunk sewers. Figure 3-3 shows the percentage of total flow coming from each trunk sewer and the pump stations. Similar figures can be prepared for pollutant loadings throughout the system. These figures represent information not previously available to MSD and will aid in evaluating performance measures. Flow data and wastewater analytical data are used to compute mass loadings from each of the five trunk sewers. Mass loadings are compared to the mass loadings of known industrial users upstream of each monitoring point and are also compared to the total wastewater treatment plant influent mass loadings. A stand-alone summary report from each quarterly survey will be generated.

To better understand the loading pattern in the collection system, MSD is installing permanent flow monitoring devices in the collection system at four strategic locations (temporary meter locations1, 2, 3, and 4). Permanent metering devices are expected to be operational by the end of 1999 and will allow real-time (stored hydrograph) data collection. MSD staff will maintain the flow meters, Manhole 5 will be monitored during sampling events and manhole 6 flows will be determined by monitoring pump run times.

3.04 SUMMARY

MSD has a better understanding of the J-Town collection system through mapping the collection system. This process required field investigations, dye tracing, and review of existing documents, MSD identified industries tributary to each of the trunk lines. MSD studied flow patterns at six key locations along the trunk sewer network. MSD conducted sampling in conjunction with flow metering to establish mass loadings from each tributary area. The J-Town collection system has experienced overflows resulting from excessive infiltration and inflow. MSD is addressing infiltration and inflow and will repair defects in the system in an attempt to remove excessive infiltration and inflow.

3.05 ITEMS FOR FUTURE STUDY

The following additional items should be investigated further in this grant project:

1. MSD should continue collection system sampling on a quarterly basis at strategic locations, At the same time collection system sampling is conducted, MSD will measure flows in the system, sample wastewater treatment plant influent and sample tributary industrial discharger's wastewater. Stand alone summary reports will be generated.

2. MSD will install permanent flow monitoring facilities at four strategic locations in the collection system. MSD staff will maintain the flow monitors and collect and analyze data.

MSD should investigate the following items outside of this grant project:

1. MSD will reduce excessive I/I deemed cost-effective as a result of their sanitary sewer evaluation. Reducing I/I should abate overflows from the sanitary sewer system. The goal is to eliminate SSOs and basement backups.

SECTION 4
INDUSTRIES

This section will further characterize the industrial users in the J-Town sewershed.

4.01 INDUSTRIES

There are over 700 industries and commercial establishments in the J-Town sewershed. Of these, 29 industries have been issued wastewater discharge permits from MSD. Most of the 700 establishments are small businesses, light manufacturing and small commercial establishments. Of the 29 permitted industries, seven industries are significant industrial users (SIUs), and the remaining 22 have been issued general discharge permits. Of the seven SIUs, all but one (Innovative Electronic Design) are located in the Industrial Park. The location of the Industrial Park relative to the J-Town sewershed is shown in Figure 4-l.

None of the seven industries that MSD has classified as SIUs meet the flow criteria of 25,000 gpd as part of the federal definition of an SIU. In 1994, MSD decided to take a more conservative approach (compared to the federal definition) to defining an SIU with some of its regional treatment plants (including J-Town). The industries that meet the MSD revised definition of SIU in the J-Town sewershed do so because they discharge process wastewater greater than 10,000 gallons per day or they are regulated by the federal definition as categorical industries. Three of the SIUs fall under the categorical classification of metal-finishing:

- DCE, Inc.
- Innovative Electronic Design
- HL Lyons Co

The other four SIUs are:

- CONDEA Vista (PVC compounding)
- Jones Plastic & Engineering Company (plastic molding and injection)
- Waukesha Cherry-Burrell Company (metal products and machinery)
- White Castle Distributing, Inc. (food processing)

A list of all J-Town current and previous permitted industries with their business activity is included in Table 4-l. A listing of all 700+ industries and commercial establishments that are located within the J-Town sewershed but are not permitted by MSD is included in Appendix A. Appendix B includes general information on each permitted industrial user compiled through inspections by MSD.

4.02 SEWERSHED INDUSTRIAL LOCATIONS

Figure l-l presented the location of permitted industrial users relative to the sewershed, specifically attributing each industry to one of the defined trunk sewers. Table 3-l cross-referenced the industries to the trunk sewers. This information will be useful when attempting to correlate collection system monitoring data and industrial discharge data.

4.03 INDUSTRIAL DISCHARGES

The MSD Industrial Waste Information System (IWIS) is a database for pretreatment information. This database has generated J-Town WWTP loading reports for all conventional pollutant parameters and all metals based on the flow and concentration information collected between January 1995 and December 1998 from the permitted dischargers. Table 4-2 presents the average daily flow and loadings from the industrial users. Table 4-3 presents the average daily flow for each industrial user and the four-year average concentration for each parameter measured at that industry. It should be noted that the number of samples collected to determine the average loadings and concentrations varied between one and 30 samples. Data in Table 4-2 and 4-3 includes MSD's special sampling efforts to determine ammonia and phosphorus loadings from all permitted industries.

Table 4-4 includes a summary of total industrial flow and pollutant contribution relative to the J-Town WWTP influent. The permitted industries contribute only about 3% of the total flow to the J-Town WWTP. This table indicates the permitted industries contribute a low percentage of the WWTP pollutant mass and flow.

Only three industries within the J-Town sewershed are monitored for surchargeable loadings (BOD and Total Suspended Solids). These industries include White Castle Distributing, Adam Matthews, Inc., and Derby Cone Co., Inc. All three are food processing industries.

4.04 COMPLIANCE STATUS

Table 4-5 presents a list of permitted industries and their compliance status. One industry, DCE, Inc., a metal finishing categorical industry, has entered an Agreed Order with MSD to reduce ammonia discharges. All other industries are generally in compliance with MSD wastewater discharge permit requirements. There have been occasional excursions for Innovative Electronic Design (lead), Winston Products Co. (various metals), CONDEA Vista (pH, Copper), H.L.Lyons (pH, Zinc), and Waukesha Cherry-Burrell (pH).

4.05 MONITORING EFFORTS

Table 4-6 presents the permitted parameters and identifies the frequency of sampling required through the industrial user permits. Table 4-7 presents the permit limits included in the industrial user permits. Table 4-8 identifies the historic (1998) data collection from the pretreatment program. MSD collects more data than required, however the data is collected in a random nature. Table 4-9 displays the more organized and integrated data collection effort implemented as part of this grant project. MSD will collect even more data than required by the pretreatment program. Data collection includes all sources in defined tributary areas during the same week of the year to allow mass-balancing of results. This more organized approach will make the data more useful.

4.06 SUMMARY

MSD's pretreatment program for the J-Town WWTP has led tc good understanding of the industries. The location of industries relative to the collection sys .n has b n established. The J-Town sewershed includes a large industrial park. A total of 700 industrial and commercial establishments are in the J-Town sewershed. MSD has permitted 29 of these industries (22 general permits and 7 significant industrial users). The seven SIUs are included because of MSD and conservative definitions of an SIU. The MSD database on industrial flows, concentrations and loadings allowed tables to be generated summarizing the specific industrial contributions. The permitted industrial users contribute a small percentage of the J-Town WWTP influent flow and loadings. The permitted industries are generally in compliance with the discharge permits with only a few exceptions. Future data collection efforts will be initiated using a more oganized approach to provide more useful data.

4.07 ITEMS FOR FUTURE STUDY

Our review has not led to any items for further study regarding industrial users.

SECTION 5
WASTEWATER TREATMENT - JEFFERSONTOWN WWTP

This section evaluates the J-Town WWTP. This evaluation provides background information and insight into potential performance measures for the pretreatment program.

5.01 BACKGROUND

The J-Town WWTP is a secondary treatment plant with a design flow of 4 mgd, and wet weather flows approaching 20 mgd. Construction to upgrade and improve the plant was recently completed. Major construction activities included adding Ultraviolet (UV) Disinfection and providing wet weather treatment capabilities such that the plant will treat excessive wet weather flows (up to 20 mgd). Wet weather treatment includes screening/grit removal and primary treatment prior to UV Disinfection and discharge. Other improvements included a new bar screen; a new influent Parshall flume (for flow measurement); and chemical phosphorus removal equipment. MSD hauls J-Town WWTP sludge to the MSD Morris Forman WWTP for further treatment.

A site plan for the J-Town WWTP is presented in Figure 5-l. The site plan is representative of the conditions after the recent upgrade. Figure 5-2 presents a schematic of the processes employed at the treatment plant. The J-Town WWTP includes bar screening, flow measurement, grit removal, extended aeration activated sludge, final clarification, effluent pumping and ultraviolet disinfection. The activated sludge plant at the facility is divided into two separate plants. Sludge wasted from the final clarifiers is aerobically digested prior to ultimate disposal at the Morris Forman WWTP. Recently, improvements have been made to allow removal of phosphorus by the addition of aluminum sulfate. The recent upgrade also added off-line equalization for peak influent flows to prevent washout of the biological process.

The J-Town WWTP has been issued a KPDES permit which specifies the effluent limits for the facility. Table 5-l presents the J-Town KPDES effluent limits. The facility must remove BOD to a concentration less than 20 mg/L, TSS to a concentration less than 30 mg/L, ammonia to a concentration less than 4 mg/L in the summer, and 10 mg/L in the winter. In addition to the concentration limits, mass effluent limits calculated using the 4 mgd rated capacity for the facility are included. The plant must also remove at least 85% of the BOD and TSS received. The facility has effluent limits for fecal colifonn, minimum and maximum pH, and dissolved oxygen. At the next permit re-issuance (6/00), the Division of Water (DOW) has indicated an effluent phosphorus limit will be imposed based on a TMDL study previously performed. The wastewater treatment plant was recently equipped to remove phosphorus by the addition of metal salts to chemically precipitate phosphorus from the wastewater.

Local limits have been established for the J-Town WWTP. Local limits are applied to all non-residential users. At the present time, the local limits are being reevaluated by MSD. Table 5-2 presents the local limits in effect at this time.

5.02 INFLUENT FLOWS AND LOADINGS

The monthly average influent flows and loadings from 1996 through 1998 are presented in Table 5-3. Based on the data in Table 5-3, the WWTP receives annual average influent flows between 3.4 and 3.6 mgd. The plant is operating close to its rated hydraulic capacity of 4 mgd. Frequently, the plant treats monthly average flows in excess of 4 mgd. The influent BOD, TSS and NH3-N concentrations are generally dilute, indicative of systems with significant infiltration and inflow. Table 5-3 also presents the influent mass loadings for non-conventional pollutants including metals, amenable cyanide, oil and grease, and phenol.

MSD has collected data on priority pollutant organics present in the J-Town influent wastewater. Table 5-4 summarizes the sample results obtained between January 1996 and December 1998. Occasionally MSD will detect an organic compound; however, none have been detected at high concentrations or continuously.

5.03 EFFLUENT QUALITY

The effluent quality from the J-Town WWTP is summarized in Table 5-5. The wastewater treatment plant routinely produces an effluent with low BOD, TSS, and NH3-N concentrations. Typically these values are well below permit limits, however certain monthly excursions occurred in 1997 and 1998. Occasionally the J-Town WWTP violates the monthly average discharge permit limit for fecal coliform of 200/100 ml. The recent upgrade included a new ultraviolet disinfection system that is expected to produce an effluent routinely meeting the KPDES fecal coliform limit.

Table 5-6 identifies the water quality criteria based on Kentucky regulations for the J-Town WWTP discharge. Criteria presented in Table 5-6 was computed using a hardness of 211 mg/L, as determined from three years of quarterly biomonitoring results submitted to DOW. Table 5-6 is divided between current water quality criteria and proposed water quality criteria. Kentucky DOW is proposing revisions to the numerical criteria presented in 401 KAR 5:031.

The water quality criteria for Chenoweth Run presented in Table 5-6 must be met without the benefit of dilution, as the 7410 (7 day, 10 year low flow) of Chenoweth Run is 0 cfs at the wastewater treatment plant discharge. MSD does not have numerical limits for the pollutants in Table 5-6, rather MSD must pass biomonitoting, a measure of the whole effluent toxicity. Although limits are not imposed and the data was likely to be collected when the stream flow is greater than zero (affording some dilution), the water quality criteria presented in Table 5-6 can be compared to the monthly average effluent quality reported by MSD in Table 5-5.

Several parameters were measured to be below the current or proposed water quality criteria. The reported effluent concentrations of Chloride, Chromium, Nickel, Silver and Zinc are all-well below the lowest water quality criteria. A few parameters (Cadmium, Cyanide, Lead, and Mercury) were reported at concentrations above the lowest water quality standard, however based on the apparent level of detection, a more sensitive analytical procedure should be used in the future to allow more definitive conclusions to be drawn. On one occasion, Copper was measured at a level that exceeded the current and proposed water quality standard.

MSD has collected priority pollutant organic data on the effluent of the plant. The results of the organics sampling are presented in Table 5-7. Three separate parameters were detected above the reported detection limit during three years of sampling. None of the detected organics have been observed more than once.

Table 5-8 presents the J-Town WWTP effluent biomonitoring results for 1995 through 1998. The data in Table 5-8 is presented in terms of chronic toxicity units. The KPDES effluent limitation for biomonitoring is 1.0 chronic toxicity unit. In all biomonitoring performed in the last four years, only one exceedance of this standard was observed, samples collected between September 26, 1996 and October 4, 1996 exhibited toxicity at 1.21 TUc. MSD initiated a second test in that quarter and demonstrated that the effluent had <1.0 chronic toxicity unit. It is unknown why the first biomonitoring procedure that quarter showed toxicity, however MSD suspects it was laboratory error. **Overall, the data demonstrates the discharge from the J-Town WWTP does not exhibit toxicity.**

5.04 SLUDGE

Sludge from the J-Town WWTP is aerobically digested and hauled to the Morris Fonnan WWTP for further processing before ultimate disposal. Prior to 1997, sludge from the J-Town WWTP was dewatered (belt filter pressed) on site and disposed in the Outer Loop landfill. Table 5-9 presents a summary of the sludge data for the years 1996- 1997.

Although MSD presently landfills biosolids from their J-Town WWTP via the Morris Fonnan WWTP, MSD chooses to compare the biosolids quality to the quality standards for land application of the biosolids. In the event MSD chooses to beneficially reuse treatment plant biosolids, the beneficial reuse of biosolids in Kentucky falls under federal regulations 40 CFR 503 and the Kentucky regulations 45:100.

The Kentucky regulation concentrations can be compared with the Federal "503" biosolids regulations (40 CFR 503) concentrations. In addition to the five metals covered (Copper, Zinc, Nickel, Cadmium and Lead) by the Kentucky regulations, the 503 regulations also include limitations for the concentration of arsenic, mercury, selenium, and molybdenum. The 503 regulation concentrations are less stringent for cadmium, copper, lead, nickel and zinc than the Kentucky regulation. Any biosoiids to be land applied must not exceed the ceiling limits of the 503 regulations in addition to the programmatic requirements of the Kentucky regulation.

The 503 regulations have two tiers of metals concentrations. The first tier is for exceptional quality (EQ) biosolids. EQ biosolids can be disposed of in any manner including giveaway programs. The second is for ceiling concentrations for biosolids applied to the land. Table 5-10 presents the criteria from both the 503 regulations and the Kentucky Section 45 regulations.

In addition to the ceiling metals limits, biosolids to be landfanned must be processed to Significantly Reduce Pathogens (aerobic digestion, anaerobic digestion, air drying, lime stabilization, composting or other means). Biosolids disposed of through give-away programs must go through a Process to Further Reduce Pathogens if it may result in contact to humans within 12 months. These issues are treatment issues and do not apply to the quality of the biosolids generated at the treatment plant.

The quality of the J-Town WWTP sludge (Table 5-9) can be compared to the EPA 503 and Kentucky regulation ceilings. The J-Town sludge concentrations are well below the EPA 503 regulation Exceptional Quality Ceiling for all metals. The J-Town sludge concentrations are below the Kentucky 45:100 Type A and B Sludge Ceiling concentrations for all parameters except copper. The average (746 mg/Kg) and maximum (983 mg/Kg) observed copper concentrations exceed the Kentucky 45:100 Type B ceiling of 450 mg/Kg. The copper concentration should not prohibit MSD from land applying this sludge according to the requirements of a Type B sludge because Kentucky Division of Waste Management has previously allowed sludge to be land applied as a Type B sludge when the copper concentration exceeded the threshold.

5.05 PROCESS UPSETS

One tenant of the 40 CFR 403 regulations governing pretreatment programs is to prevent upset of treatment process by the discharge of industrial pollutants. Overall, the J-Town WWTP has experienced only minor toxicity or process upsets since being acquired by MSD in 1990. Recently however, an episode has occurred where a stiff white foam has developed on the aeration tanks that has inhibited the nitritication process. The discharge of pollutants from the industrial users are being evaluated at this time to determine if they are the cause of the process upset. MSD has not ruled out the possibility that the process upset is due to process concerns in lieu of receipt of a toxic substance. The process upset condition has ceased without MSD being able to verify the cause. MSD operations staff believe the foam resulted from a process operation error (wasting too much sludge) rather than a toxicity or inhibition.

Prior to implementation of the pretreatment program for the J-Town WWTP, occasional slug loads were present in the influent. Slug loads ‘of diesel fuel, cyanide and nickel had created problems. However, since implementation of the pretreatment program, minimal problems with slug discharges have been observed.

5.06 MSD WORKERS’ HEALTH AND SAFETY

The pretreatment program also aims to protect the health and safety of MSD workers from the discharge of hazardous industrial pollutants. Based upon interviews with the MSD operational staff at the J-Town WWTP, MSD has not received any wastewaters that presented a health or safety concern. The pretreatment program appears to be doing an excellent job at prohibiting discharge of pollutants that pose a health or safety threat to MSD workers.

5.07 SUMMARY

The J-Town WWTP is rated for 4 mgd average daily flow. The plant must meet KPDES limits slightly more stringent than secondary limits. Local limits have been established for the tributary industries, but are currently under review. Influent flows and loads were reviewed and show the plant is nearing its hydraulic capacity. The quality of the plant effluent was reviewed. With minor exceptions, the WWTP produces a high-quality effluent in comparison with KPDES permit limits.

Sludge generated at the wastewater treatment plant is hauled to another MSD wastewater treatment plant for further processing, but is of a high quality with respect to EPA 503 regulations. Since MSD took over operation of the J-Town Wastewater Treatment Plant, minimal process upsets have been experienced due to toxicity of the wastewater. MSD wastewater treatment plant workers' health and safety have not been affected by the receipt of hazardous industrial pollutants. Overall, the MSD pretreatment program appears to be doing a great job at the J-Town Wastewater Treatment Plant.

5.08 ITEMS OF FURTHER STUDY

The following items should be studied further under this grant project:

1. MSD should continue collecting the type of WWTP data historically collected. More sensitive analytical techniques may be warranted for certain effluent metal analyses.

SECTION 6
RECEIVING STREAM - CHENOWETH RUN

This section evaluates the receiving stream fo. .he J-Town WWTP. This evaluation provides background information and insight into potential performance measures for the pretreatment program.

6.01 BACKGROUND

As is shown on Figure l-l, the J-Town WWTP discharges into Chenoweth Run at mile point 5.2 (upstream of confluence with Floyds Fork). Chenoweth Run is a small stream tributary to Floyds Fork in southern Jefferson County. Floyds Fork runs into the Salt River and Salt River discharges to the Ohio River. The characteristics of the Chenoweth Run watershed are summarized in Table 6-1.

Table 6-1 - Chenoweth Run Watershed	
Drainage Basin	17 Sq. Miles
Stream Length	9 miles

Land use within the Chenoweth Run watershed is diversified. The stream runs through both urban and rural settings. The seven square mile drainage area above the J-Town WWTP is densely developed and includes residential areas, the Industrial Parks and much of downtown J-Town. The Chenoweth Run watershed upstream of the treatment plant contains a high percentage of impervious area with little or no runoff controls. The rest of the drainage area downstream of the J-Town plant is much less developed than the upper watershed, with some areas still in agricultural use. However, subdivisions have been developed in the lower watershed and more are either under construction or planned. The J-Town WWTP discharges to the Chenoweth Run, which is considered by the Kentucky Division of Water to be a "no-flow" (7410 = 0) stream at this point. (The J-Town WWTP, therefore, is subject to stringent water quality criteria limits.) Two other relatively small WWTPs (Chenoweth Hills and Lake of the Woods, both owned and operated by MSD) are located on Chenoweth Run tributaries and serve individual developments (see map for location).

This Pretreatment Performance Measures Grant Project will assess the effect of the pretreatment program on the stream. One primary tenant of the pretreatment program is to protect the stream from the pass through of pollutants that might adversely affect the stream. Also, the overall stream health can be directly affected by the discharge from the WWTP.

The Division of Water's 1996 report "Water Quality Study of Chenoweth Run", identified some important issues and concluded:

> "Data collected for this study and previous studies show a variety of water quality problems in Chenoweth Run. During low to moderate flows, it appears that high phosphorus concentrations are severely impacting both Chenoweth Run and Floyds Fork downstream of Chenoweth Run. The primary source of this phosphorus is the J-Town WWTP. At higher flow conditions, runoff from urban, industrial, and construction areas increases sediment concentrations, contributes to metal criteria violations, and adds nutrients and other chemicals."

A June 22, 1998 Kentucky Division of Water (KDOW) report referenced the Chenoweth Run stream in its update regarding "Ongoing Projects from Previous 303(d) Reports". The KDOW must prepare a list of impaired water bodies every other year in accordance with Section 303(d) of the Clean Water Act. That report noted that Chenoweth Run was listed (as recent as the 1996 303(d) list):

> "...because it was not meeting the aquatic life or swimming use along its nine mile length. Poor water quality in Chenoweth Run is also impacting its receiving stream, Floyds Fork, which has been the subject of previous 303(d) reports. The KDOW applied for and received a U.S. EPA TMDL [Total Maximum Discharge Load] grant to conduct a study of the stream and recommend solutions. The report was published in June 1996 and submitted to EPA for approval as a TMDL. The U.S. EPA approved this project in September 1997. Three measures are needed to achieve standards:
>
> - Phosphorus removal at the 4 million gallons per day (MGD) WWTP;
> - Creation of riparian zones and tree planting to provide shade over the stream: and,
> - Effective storm water management controls.
>
> The KDOW will be working with local agencies and citizen groups to implement these solutions. Phosphorus removal will be required at the next issuance of the discharge permit for the J-Town facility in June 2000."

The June 1996 DOW report on Chenoweth Run also cited the negative impact on stream quality resulting from runoff from urban, industrial and construction areas on sediment metal concentrations, nutrients and other chemicals. Better storm water runoff controls are recommended by DOW to reduce these concerns. Although this stressor to the stream is not under control of the pretreatment program, better control of pollutants in runoff will improve the stream water quality.

Nuisance growth of algae has been identified as a concern in Chenoweth Run. In order to improve the problem, DOW recommended imposing a limitation for phosphorus discharged from the J-Town WWTP and restoration of riparian vegetation, A limit of 1 mg/L has been discussed, however the official limit will be established in the next permit reissuance. MSD recently added a phosphorus removal system at the J-Town plant that is expected to reduce phosphorus in the WWTP effluent to less than 1 mg/l.

MSD stream personnel contend that the most significant impact on Chenoweth Run is high flows causing erosion and siltation. The next most significant impact is the removal of riparian vegetation. Nutrients are a concern, but are not deemed the most significant concern. MSD does not believe the algae problem will be solved by the reduction of phosphorus from the J-Town WWTP point source discharge alone. Chenoweth Run is nitrogen limited and MSD is concerned that the phosphorus concentration will not be reduced enough to prevent algae. Also, the soils in the area have been shown to contain a high level of phosphorus. Metals may be acid-leached from the soils and subsoils as part of the natural geology. Therefore, MSD plans to investigate other options and sources for addressing the algae problem such as riparian restoration (creation of additional shade).

6.02 POLLUTANTS OF CONCERN

The impact of the pretreatment program can be measured in the WWTP effluent. The impact of the WWTP effluent on the receiving stream can in turn be measured in both the water column and the sediment during non-wet weather periods. The pretreatment program aims to prevent introduction of pollutants that interfere with the operation of treatment works, interfere with disposal (reuse) of biosolids, and pass through the WWTP to the stream. The industrial users in the J-Town system are limited on their discharge of metals (local limits) and conventional pollutants by the Wastewater Discharge Regulations. The list of pollutants of concern was developed based on the potential impacts of the pretreatment program industrial users on the water column and sediment. For the water column, pollutants of concern include metals, organics, nutrients, and inorganics. For the sediment, the pollutants of concern are metals. The stream biology may be used as an indicator of the overall health of the stream, and thus has some correlation to the pretreatment program's success. The industrial pretreatment program/WWTP discharge is not the only contributor of pollutants to the stream. Stormwater runoff will also contribute the same pollutants of concern to the stream environment, and is believed to be the primary contributor.

6.03 EXISTING STREAM DATA

Prior to 1999, MSD and. the United States Geological Survey (USGS) have worked together to collect stream data. Since 1999, MSD has collected all stream water quality data. For this report, the Louisville office of USGS provided all stream data collected since 1988. MSD streams personnel indicate some data in the data set (1988-1991) needs to be reviewed for data entry errors. A review is anticipated soon. Figure 6-l identifies the six locations on Chenoweth Run where USGS has collected stream samples. Table 6-2 provides a description of the USGS stream sampling locations and identifies the period of data collection. Data has been tabulated for four of the stream sampling sites (just upstream of the WWTP, the WWTP effluent, just downstream of the WWTP, and several miles downstream of the WWTP discharge at Gelhaus Lane) and is presented in Tables 6-3 (low flow conditions) and 6-4 (high flow conditions). Stream **data** in Tables 6-3 and 6-4 is presented in terms of the average, minimum value, maximum value, and number of samples for each parameter. The number of samples collected varied by site and parameter. The discharge of the treatment plant can dominate the flow in Chenoweth Run during moderate to low stream flow conditions and can be insignificant during high stream flow conditions.

The USGS data set includes a statistically significant number of results for the Gelhaus lane site. The other sampling locations may not have a statistically significant number of results and the results may not have been gathered at the same time. Thus, drawing conclusions from the data is difficult. Based on our review of the data, the following observations can be made:

- During low flow conditions (Table 6-3), the discharge from the J-Town WWTP is increasing the average stream concentrations of total phosphorus, copper, nickel and zinc. The WWTP effluent appears to have little effect or actually reduces in-stream concentrations for other parameters in Table 6-3.

- During high flow conditions (Table 6-4), the discharge from the J-Town WWTP and/or sanitary sewer overflows are increasing the average stream concentrations of total phosphorus and nickel. The WWTP effluent appears to have little effect or actually reduces in-stream concentrations for other parameters in Table 6-4.

- The wet weather events appear to impact the stream quality by increasing the concentration of many pollutants (BOD, TSS, NH3-N, As, Cr, Cu, Fe, Pb, Ni, Zn, Fecal Coliform and Fecal Streptococci) as seen when comparing Table 6-3 **and 6-4.**

A report prepared for MSD entitled "Water Quality in Jefferson County, Kentucky - A watershed synthesis report, 1991 - 1998" has been published. That report presented results regarding samples collected from Chenoweth Run (at Gelhaus Lane). Table 6-5 presents the data collected for the sampling site on Chenoweth Run at Gelhaus Lane (downstream from the WWTP discharge about 2.6 miles). Data is presented in terms of the number of data points, the minimum, median, mean and maximum. The number of data points below detection limit are indicated. Results measured below the detection limit make drawing conclusions difficult when the detection limit is higher than the stream standard. The number of exceedances of stream criteria are indicated and also expressed in terms of the percent of total samples in exceedance for that parameter. Based on this information, Chenoweth Run at Gelhaus Lane is generally healthy, with one observed violation of dissolved oxygen, three exceedances of nitrate and 37 violations of fecal coliform. The significant fecal coliform violations indicate the problems in Chenoweth Run are wet weather influenced and primarily the result of failing septic tanks in the rural reaches of the stream and sanitary sewer overflows in the urban (sewered) reaches. The J-Town treatment plant effluent is continuously disinfected and thus is not expected to cause the observed violations of fecal coliform. The concern over failing septic systems is well documented. The data suggests nutrients (NO_3, NH_3, TP) and copper are affecting the stream due to point sources (dry weather), while zinc and iron are affecting the stream due to non-point sources (wet weather). **Based on the data reviewed, pretreatment program parameters (metals) are not impacting the water quality of the stream at the downstream Gelhaus Lane sampling site.**

6.04 STREAM SAMPLING

For this project, sampling will be conducted at upstream and downstream locations on Chenoweth Run to provide background data to be **used** in establishing performance measures for the pretreatment program. Background data will **be** collected for a one year period (which began in March 1999) and will include sampling of the water column and the sediment. Sampling will typically take place under dry-weather conditions to eliminate the impact of stormwater runoff on stream health, and thus determine the direct impact of the pretreatment program on the stream. Stream sampling will **be** conducted upstream and downstream of the WWTP discharge. The flow in Chenoweth Run will be measured whenever samples are collected to allow mass to be computed. During the proposed quarterly sampling events, the water column will be sampled on a daily basis for metals, nutrients, inorganics and conventional pollutant parameters. One sample each quarter will be analyzed for priority pollutant organic At least one sediment sample will also be collected during each quarterly sampling event and analyzed for metals.

The results of the quarterly stream sampling will be compiled, evaluated, and reported. No sampling results were available at the time of this writing.

Table 6-6 presents the parameters being sampled in Chenoweth Run during this study.

6.05 WATER QUALITY CRITERIA

The quality of the water in the stream is regulated by Kentucky Regulations 401KAR5:031 Surface Water Standards. This regulation identifies water quality standards such as nutrient limits, minimum criteria applicable for all surface waters, use classifications and associated criteria, aquatic life criteria, domestic water supply use criteria, recreational waters criteria, etc. The use classification for Chenoweth Run is warm water aquatic habitat, primary contact recreation and secondary contact recreation. The water quality standards currently in place as well as the proposed changes to the water quality standards (pending approval through the Kentucky Division of Water's triennial review of their water quality standards) at Gelhaus Lane were determined. Both the current and the proposed values at Gelhaus Lane are shown in Table 6-7. Numbers in the last column for current and proposed criteria are the lowest water quality criteria. Many of the criteria are calculated on the basis of the instream hardness of Chenoweth Run. The mean hardness is established as 238 mg/l as $CaCO_3$ from the stream data presented in Table 6-5.

The concentrations in Table 6-7 can be compared to the historical data collected at Gelhaus Lane. Fecal coliform stream criteria is 200/100 ml (monthly average) and 400/100 ml (daily max in one out of five samples), nitrate water quality criteria is 10 mg/L. The results of this comparison are presented in Tables 6-8 and 6-9. Much of the metals data is somewhat inconclusive since the water quality limit is below the detection limit (Beryllium, Cadmium, Cyanide, Chromium, Mercury, Lead, and Selenium).

Table 6-8 presents a summary of the number of times the water quality criteria were exceeded in the stream during low flows based on the USGS data presented in Tables 6-3. The cadmium, lead and mercury exceedances are apparently due to the use of analytical procedures that did not provide low enough detection limits. Occasional exceedances for iron were observed but do not appear to be the result of the treatment plant discharge. Fecal Coliform exceedances of the Primary Contact Recreation Standard Criteria are numerous, even upstream of the WWTP discharge.

Table 6-9 presents a summary of the number of times the water quality criteria were exceeded in the stream during high flows based on the USGS data presented in Tables 6-4. The lead and mercury exceedances are apparently du to the use of analytica. ocedures that did not provide low enough detection limits, Occasional exceedances for iron, copper and zinc were observed but do not appear to be the result of the treatment plant discharge. Fecal Coliform exceedances of the Primary Contact Recreation Standard Criteria are numerous, even upstream of the WWTP discharge.

6.06 CONCLUSIONS

Chenoweth Run is a stream of reasonably high quality with respect to impacts from the pretreatment program. Exceptions to water quality standards are observed for fecal coliform (frequent), some metals (occasional) and nitrate (occasional). Metal concentrations are either observed to be below water quality standards or measured with analytical techniques with too high of detection limits to conclusively compare to water quality criteria. DOW has concern over the phosphorus concentrations in Chenoweth Run and has imposed a point source effluent limit for the J-town WWTP effective at the next permit reissuance. Quarterly baseline monitoring (of water column and sediment) will provide a more comprehensive assessment of the stream, but based on the current data, the stream does not appear to be impacted by industries in the J-Town collection system.

MSD streams personnel have significant concern over the overall health of Chenoweth Run (outside of the lack of impacts from the pretreatment program). Chenoweth Run suffers from severe flow problems, siltation, pathogens, erosion, nutrient enrichment, nuisance algae, low dissolved oxygen, occasional metals violations, loss of riparian vegetation, and poor in-stream habitat. MSD is working to address these concerns through improvements to the collection system, enhanced nutrient removal from the J-Town WWTP, and restoration of riparian vegetation and shade.

6.07 ITEMS FOR FUTURE STUDY

The following items should be investigated further in this Grant project:

1. Continue to collect samples of the WWTP effluent and Chenoweth Run upstream and downstream of the WWTP during non-wet weather influenced conditions to establish baseline conditions.

2. Future stream samples should be analyzed with the most sensitive analytical method to demonstrate stream quality meets water quality criteria.

3. Sediment sampling should be initiated to assess the impact of the pretreatment program on sediment quality.

4. Review streams data from the USGS database for accuracy. Revisit evaluation of data if warranted.

Items outside of this Grant project MSD should study include:

1. MSD should begin gathering **data** to be used in a more comprehensive TMDL study on Chenoweth Run. Loadings of various pollutants (phosphorus, nitrogen, metals, etc.) from all sources should be established. Some examples of background sources

of pollution may include phosphorus and fecal coliform from springs along Chenoweth Run.

SECTION 7
POLLUTION PREVENTION

This section evaluates past pollution prevention effor conducted in the J-Town WWTP sewershed. This evaluation provides background informauon on previous efforts, identification of potential future efforts, all of which may provide insight into potential performance measures for the pretreatment program.

7.01 BACKGROUND

MSD's Industrial Waste Department staff has a representative assigned the duty of considering pollution prevention initiatives and collection of information for use by the MSD industrial inspection staff and MSD. The MSD representative also participates on a multi-agency committee dealing with pollution prevention within Jefferson County.

7.02 PREVIOUS POLLUTION PREVENTION EFFORTS

MSD has undertaken a few pollution prevention evaluations within the Jeffersontown sewershed. MSD evaluated industrial sources of phosphorus and ammonia loadings to the treatment plant. A summary of the data collected is presented in Section 4. The focus of this investigation was to identify significant mass dischargers of phosphorus and ammonia and encourage a reduction of the mass discharge if possible. MSD initiated these efforts because at the next KPDES permit reissuance, the Kentucky Division of Water is expected to continue to apply an ammonia effluent limit and impose a new phosphorus effluent limits for the J-Town Wastewater Treatment Plant.

Each industry within Jefferson County that manufactures or stores hazardous materials must prepare and submit a Hazardous Materials Spill Prevention and Control (HMPC) Plan. The focus of these plans is to require secondary containment for storage of hazardous materials and to prepare a contingency plan for how to mitigate a hazardous material spill, The HMPC Plan requires companies to submit an inventory of all reportable hazardous materials to emergency response agencies and document training of personnel for hazardous materials handling and post emergency notification procedures.

MSD has not conducted formal pollution prevention initiatives in the Jeffersontown sewershed. As a result of the pretreatment program, Jones Plastic initiated an oil recovery process that significantly reduced the oil in their discharge to MSD. Similarly, Beechmont Press installed silver recovery units to reduce their discharge of silver to MSD. Winston Products has eliminated their plating process.

7.03 FUTURE POLLUTION PREVENTION INITIATIVES

MSD plans to develop a questionnaire for their industrial inspectors to use in collecting information on previous pollution prevention initiatives of their industrial dischargers. Within the next year. ıis questionnaire will be used to establish better understanding of past efforts by industrial dischargers.

MSD has developed a list of specific pollution prevention initiatives planned for pilot testing in the MSD service area. The pilot pollution prevention efforts will likely take place within the Chenoweth Run watershed/Jeffersontown sewershed. Table 7-l identifies the future pollution prevention initiatives.

Table 7-l
Potential Future MSD Pollution Prevention Initiatives

Industry	Pollutant of Concern for Pollution Prevention
Dry Cleaners	Perchloroethylene (PERC)
Hospitals/Dentists	Mercury and Silver
Printing Industries	Mercury, silver and copper
Auto Shop Repairs/Dealers	Oil and Grease - Hydrocarbon
Hotels and Motels	Hypochlorites
Restaurants	Fats, oils, and greases
Photo Development Shops	Silver

A cursory review of the background information (MSD data) collected for streams and sludge to date has identified certain target pollutants that may be passing through the treatment plant or collecting in the sludge at elevated concentrations. Table 7-2 identifies these pollutants of concern.

Table 7-2
Environmental Pollutants of Concern

Sink/Concern	Pollutant
Streams(‘) (due to treatment plant discharge)	TP (2)
Streams (due to storm water runoff)	Fe. Cu, Zn, TP (2)
WWTP Sludge (metals of elevated concentration which may impact ultimate use of sludge)	Cu

(1) Pollutants (Be, Cd, CN, Cr, Hg, Pb, Se) were not measured with a low enough detection limit to assess concern.

(2) Phosphorus removal is planned for the J-Town WWTP, other “non-point” sources of phosphorus should be evaluated.

7.04 SUMMARY

Several industries in the J-Town sewershed have undertaken pollution prevention initiatives. MSD industrial inspection staff has performed a study of the sources of ammonia and phosphorus. MSD plans more pollution prevention efforts in this sewershed on a pilot basis targeting specific pollutants at specific industries.

7.05 AREAS OF FUTURE STUDY

Through the review of previous pollution prevention efforts in the J-Town sewershed, we recommend the certain initiatives to further understand previous efforts and potentially reduce pollutant discharge. Items under this Grant project are:

1. Survey all industrial dischargers to the J-Town WWTP regarding their previous pollution prevention efforts, summarizing their efforts into a concise memorandum.

2. Further identify pollutants discharged to the environment (into the stream or the sludge) that are a cause for concern, review possible sources for these pollutants and initiate specific pollution prevention initiatives for any industries known to discharge those pollutants.

Items outside this Grant project:

1. Consider pollution prevention efforts for any commercial or residential users known or suspected of discharging pollutants of concern.

2. Initiate on a pilot scale the industry specific pollution prevention efforts as identified in Table 7-l

Table 2-1
J'Town Annual Louisville Water Company
Account and Water Volume Totals
(reporting period 1994-1998)

Calendar Year	Residential				Commercial				Industrial				Total		% Increase	
	Accounts	% of Total	Water Sales (1000 gal)	% of Total	Accounts	% of Total	Water Sales (1000 gal)	% of Total	Accounts	% of Total	Water Sales (1000 gal)	% of Total	Accounts	Water Sales (1000 gal)	Accounts	Water Sales (1000 gal)
1994	4,092	86%	293,931	44%	637	13%	305,688	46%	40	1%	66,307	10%	4,769	665,926		
1995	4,319	86%	309,584	46%	654	13%	327,690	48%	40	1%	41,852	6%	5,013	679,126	5.1%	2.0%
1996	4,599	87%	309,444	46%	674	13%	322,095	48%	40	1%	37,931	6%	5,313	669,470	6.0%	-1.4%
1997	4,834	87%	346,289	49%	690	12%	315,406	45%	40	1%	39,682	6%	5,564	701,377	4.7%	4.8%
1998	5,076	87%	376,658	51%	744	13%	327,004	44%	39	1%	37,104	5%	5,859	740,766	5.3%	5.6%

Based on Louisville Water Company records.

Commercial, includes Public Authority Users

Table z-z
Landuse and Zoning Acreage
(Tributary to Metering Manholes, Acreage in 1000s)

Current Landuse	MH-1	MH-2	MH-3	MH-4	MH-5	Totals
Single Family Residential	281	3	808	87	350	1529
Multi Family Residential			60		35	95
Commercial	230	17	117		6	370
Industrial	563	63	9	182		817
Parks & Open Space	3	2	13		6	24
Public & Semi Public	8	1	42		10	61
Vacant / Undeveloped	240	73	59	408	202	982
Total	1325	160	1110	677	611	3883

* This total under Landuse is including the Vacant/Undeveloped land.

Zoning	MH-1	MH-2	MH-3	MH-4	MH-5	Totals
Commercial-Industrial	72	3	145	9	42	271
Special	730	137	13	540		1420
Residential	440	8	930	70	512	1960
Industrial	20	12	8	57		97
Office	30		14	0.7	0.9	45.6
Total	1300	160	1110	677	555	3802

*Special refers to either planned research office space or waterfront area.

*Landuse and Zoning Data was last updated in 1992.

*Information from Manhole #6 is not shown, since it is entirely residential.

Table 3-1
Industries and Associated Trunk Sewers

Trunk Sewer #	Industry (1)	Map Designation
1	Adam Matthews	1
	Beechmont Press	2
	Brandeis Machinery and Supply	3
	Clarke American	5
	Construction Machinery Co.	7
	Courier Carton	8
	Cummins Cumberland Inc.	22
	Derby Cone	9
	Dispenser's Optical	10
	Image Printer	11
	Jones Plastics & Engineering	5
	Kroger Co.	13
	KTTR. Inc.	12
	Louisville Tractor	14
	Overnite Transportation Co.	21
	Southern Standard Cartron	18
	T. M. C. Truck Repair	19
	Waukesha Cherry-Burrell	7
	Winston Products	9
2	Budget Car & Truck Rental	4
	Clarke Detroit Deisel	6
	Midland Communications Pkg	15
	Ryder Truck & Car Rental	17
	White Castle Distributing	8
3	**Innovative Electronic Design**	4
4	**Condea Vista Co.**	1
	DCE, Inc.	2
	H. L. Lyons	3
	Print-Tex	16
5	none	none
6	none	none

(1) Significant Industrial Users shown in **bold type**

Trunk Sewer #	Manhole #	Location Description
1	28563	manhole 50 yards behind 2617 Old Hickory
2	28554	manhole 50 yards down the hill behind 2701 Grassland Dr
3	31742	manhole 50 yards behind 10116 Merionethe Drive
4	29386	manhole 50 yards behind Vista Polymers, the left of RR
5	28140	manhole 15 inches in ditchline by ballpark at Ruckreigel and Old Taylorsville Rd.
6	NA	pump station located across from 4800 Chenoweth Run

Table 3-2
J'Town Flow Metering
(reporting period March I April 1999)
All flows in mgd

End Date	MH1	MH2	MH3	MH4	MH5	M6 (1)	ΣMH(1-6)	WWTP Flow
24-Mar	1.28	0.33	1.08	0.40	0.59	0.21	3.90	3.90
25-Mar	1.24	0.21	0.77	0.35	0.06	0.47	3.10	3.10
26-Mar	1.18	0.51	0.69	0.33	0.26	0.43	3.40	3.40
27-Mar	1.02	0.09	0.58	0.38	0.37	0.36	2.80	2.80
28-Mar	0.67	0.08	0.69	0.27	0.62	0.36	2.70	2.70
29-Mar	0.83	0.07	0.84	0.30	0.99	0.38	3.40	3.40
30-Mar	0.80	0.42	0.77	0.29	0.39	0.32	3.00	3.00
31-Mar	0.67	0.34	0.74	0.30	0.29	0.36	2.70	2.70
1-Apr	0.69	0.16	0.74	0.24	0.33	0.44	2.60	2.60
2-Apr	0.83	0.15	0.82	0.30	0.26	0.35	2.70	2.70
Average	**0.92**	**0.24**	**0.77**	**0.32**	**0.42**	**0.37**	**3.03**	**3.03**
% of Influent	30%	8%	25%	10%	14%	12%	100%	100%

PDR Ave	0.64	0.06	0.99	0.2	0.35		2.23	
% of total	29%	3%	44%	9%	16%			

(1) M6 is the combination of Pump Stations Chenoweth Run. Lakelet, and Tucker Station,

10/28/99

Table 4-1

JEFFERSTONTOW PERMITTED INDUSTRY

INDUSTRY NAME	PERMIT #	BUSINESS ACTIVITY
General Discharge Permit		
Neff Packaging Solutions, Inc.	1029	Printing, cutting & glueing of paper produces., i.e., boxes for packaging of small prod
Overnite Transportation Company, Inc.	2682	Heavy Truck maintenance, fueling and washing bay for company trucks.
Winston Products Company	6020	Metal Fabrication
Budget Car & Truck Rental	9602	Retail, sales and service of automobiles.
Louisville Tractor	2240	Retails, sales and service of farm and consumer equipment.
Ryder Truck Rental Inc.	9725	Truck rental
Dispensers Optical Service Corporation	1201	Grind and shape commercial, industrial safety glasses.
Cummins Cumberland Inc.	9606	Big engine parts and repair.
Clarke Detroit Diesel - Allison	850	Repairing and overhauling of largeer engines.
Construction Machinery Corporation	9605	Heavy Equipment Distributor
RussTech Admixtures, Inc.	9637	Concrete admixture manufacturing
Midland Communications	6317	Screen Printing
Print-Tex U.S.A.	5420	Screen Printing
Adam Matthews, Inc.	9600	Food processing
Beechmont Press	388	Commercial printing
Bramco	9601	Sales and service of construction and mining equipment
Derby Cone Company, Inc.	1165	Food Processing
The Kroger Company	9138	Warehouse and Distribution.
KTTR, Inc.	9763	Truck and trailer repair
Clarke American	9604	Printing
Vivid Impact	9491	Printing
Southern Standard Carton, Inc.	3300	Manufacturer of printed folding cartons.
	22	
Significant Industrial User Permit		
CONDEA Vista Company	9406	Polyvinyl Chloride Compound (PVC) production lines
DCE, Inc.	9607	Metal Finishing
Jones Plastic & Engineering Corp.	9609	Plastic Molding, Injection
H.L. Lyons Co.	9636	Metal finishing, fabrications and assembly.
Innovative Electronic Design	7107	Manufactures computer audio systems.
Waukesha Cherry-Burrell	9302	metal products and machinery
White Castle Distributing, Inc.	4792	Food Processing
	7	

Table 4-2
J'Town WWTP Average Industrial Flow (GPD) and Pollutant Loading (lb/day)
(reporting period 1996-1998)

Company	Trunk Sewer #	Flow	BOD	COD	TSS	OGH	NH3-N	P	Cd	Cr	Cu	Pb	Ni	Ag	Zn
Adam Matthews	1	3000	75.8	135.2	52.48	0.11	0.103	0.212	ND	ND	ND	ND	ND	ND	ND
Beechmont Press	1	3495	12.2	40.27	2.6	0.37	4.31	0.169	0.00009	0.0005	0.0058	0.00064	0.00053	0.01074	ND
Brandeis Machine & Supplies	1	7722	30.5	106.47	81.2	0.62	1.21	0.685	0.0002	0.00089	0.0163	0.00302	0.00095	0.00024	0.0472
Construction Machinery	1	550	ND	ND	ND	0.02	0.049	0.024	ND	ND	ND	ND	ND	ND	ND
Courier Carton	1	555	4.53	11.87	1.39	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cummins Cumberland	1	4793	16.4	32.51	6.92	1.28	0.508	1.134	0.0003	0.00087	0.0073	0.00365	0.00031	0.00014	0.0135
Derby Cone Company, Inc.	1	5213	186.1	405.9	220.13	1.66	0.418	0.086	ND	ND	ND	ND	ND	ND	ND
Dispensers Optical Service	1	5246	9.87	21.94	6.92	0.12	0.117	0.071	0.0011	0.00017	0.002	0.00154	0.00035	0.00017	0.0055
Jones Plastic & Engineering Corp.	1	12644	37.7	134.08	55.73	2.98	0.886	0.138	0.0005	0.00163	0.0167	0.00289	0.00148	0.00037	0.0807
Kroger Co Warehouse	1	4848	10.8	21.07	3.69	0.09	0.19	0.138	0.00009	0.00015	0.0021	0.0011	0.00033	0.00015	0.0293
MetoKote	1	5172	4.14	12.34	0.655	0.14	0.15	0.279	0.00007	0.00038	0.00026	0.00079	0.00054	0.0002	0.0029
Southern Standard Carton	1	8138	33	87.98	21.61	0.44	1.21	0.163	0.0002	0.0005	0.0342	0.00226	0.00081	0.00057	0.0274
Waukesha Cherry-Burrell	1	10300	74.3	132.43	32.74	0.51	0.646	0.131	0.0003	0.0024	0.0058	0.00232	0.00218	0.00065	0.011
Winston Products	1	1521	0.15	0.37	0.33	0.017	0.033	0.00017	0.00004	0.00059	0.0005	0.00014	0.00152	0.00007	0.0004
Clarke Detroit Diesel - Allison	2	1474	3.3	11.13	1.43	0.15	0.114	0.178	0.0001	0.00067	0.0034	0.00244	0.00056	0.00005	0.0218
Midland Communications	2	2269	6.17	13	3.21	0.15	1.144	0.178	0.00004	0.00015	0.0052	0.00042	0.00021	0.00053	0.0024
Ryder Truck Rental	2	3906	3.83	9.36	6.03	0.26	0.171	0.461	0.0004	0.00057	0.0034	0.0013	0.0006	0.00016	0.0108
White Castle Distributing	2	3448	260.7	404.03	134.51	0.16	ND	ND	ND	ND	ND	ND	ND	ND	ND
Innovative Electronic Design	3	357	0.02	0.13	0.05	0.009	0.001	0.00005	0.000008	0.00001	0.00025	0.00033	0.00003	0.00002	0.0001
CONDEA Vista	4	12914	1.18	6	2.01	0.62	0.311	0.201	0.0002	0.00032	0.0062	0.00116	0.00061	0.00024	0.0071
DCE, Inc.	4	3733	9.96	21.43	8.28	0.23	1.72	0.557	0.00006	0.00081	0.004	0.00064	0.00068	ND	0.0056
H.L. Lyons Co.	4	14210	7.14	27.3	11.87	0.43	0.434	0.435	0.0002	0.00162	0.0049	0.00174	0.00162	0.00044	0.0109
Print-Tex International	4	1404	34.1	51.86	4.26	0.61	ND	ND	0.00006	0.00026	0.0013	0.00044	0.00021	0.00016	0.006
Print-Tex U.S.A.	4	824	2.83	8.27	1.02	0.08	ND	ND	0.00002	0.00014	0.00077	0.00017	0.00009	0.00006	0.0006

Non detects were entered as 1/2 the detection limit.
ND = No Data

Table 4-3
J'Town WWTP Average Industrial Flow (gpd) and Pollutant Concentrations (mg/L)
(reporting period 1996-1996)

Company	Trunk Sewer #	Flow	BOD	COD	TSS	OGH	NH3-N	P	Cd	Cr	Cu	Pb	Ni	Ag	Zn
Adam Matthews	1	3000	3030	5404	2098	4	4.1	8.47	ND	ND	ND	ND	ND	ND	ND
Beechmont Press	1	3495	419	1382	89	13	147.9	5.80	0.00309	0.0172	0.199	0.022	0.018	0.36846	ND
Brandeis Machine & Supplies	1	7722	474	1653	1261	10	18.8	10.64	0.00311	0.0138	0.253	0.047	0.015	0.00373	0.733
Construction Machinery	1	550	ND	ND	ND	4	10.7	5.23	ND	ND	ND	ND	ND	ND	ND
Courier Carton	1	555	979	2564	300	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cummins Cumberland	1	4793	410	813	173	32	12.7	28.37	0.0075	0.0218	0.183	0.091	0.008	0.0035	0.338
Derby Cone Company, Inc.	1	5213	4280	9336	5063	38	9.6	1.98	ND	ND	ND	ND	ND	ND	ND
Dispensers Optical Service	1	5246	226	501	158	3	2.7	1.62	0.0251	0.0039	0.046	0.035	0.008	0.00389	0.126
Jones Plastic & Engineering Corp.	1	12644	358	1271	528	28	8.4	1.31	0.0047	0.0155	0.158	0.027	0.014	0.00351	0.765
Kroger Co Warehouse	1	4848	267	521	91	2	4.7	3.41	0.0022	0.0037	0.052	0.027	0.008	0.00371	0.725
MetoKote	1	5172	96	286	15	3	3.5	6.47	0.0016	0.0088	0.006	0.018	0.013	0.00464	0.067
Southern Standard Carton	1	8138	486	1296	318	6	17.8	2.40	0.0029	0.0074	0.504	0.033	0.012	0.0084	0.404
Waukesha Cherry-Burrell	1	10300	865	1542	381	6	7.5	1.52	0.0035	0.0279	0.068	0.027	0.025	0.00757	0.128
Winston Products	1	1521	12	29	26	1	2.6	0.01	0.0032	0.0465	0.039	0.011	0.120	0.00552	0.032
Clarke Detroit Diesel - Allison	2	1474	268	905	116	12	9.3	14.48	0.008	0.055	0.277	0.198	0.046	0.00407	1.773
Midland Communications	2	2269	326	687	170	8	60.5	9.41	0.002	0.008	0.275	0.022	0.011	0.02801	0.127
Ryder Truck Rental	2	3906	118	287	185	8	5.2	14.15	0.012	0.017	0.104	0.040	0.018	0.00491	0.332
White Castle Distributing	2	3448	9066	14050	4678	6	ND	ND	ND	ND	ND	ND	ND	ND	ND
Innovative Electronic Design	3	357	7	44	17	3	0.3	0.02	0.003	0.003	0.084	0.111	0.010	0.00672	0.034
CONDEA Vista	4	12914	11	56	19	6	2.9	1.87	0.002	0.003	0.058	0.011	0.006	0.00223	0.066
DCE, Inc.	4	3733	320	688	266	7	55.2	17.89	0.002	0.026	0.128	0.021	0.022	0.0000	0.180
H.L. Lyons Co.	4	14210	60	230	100	4	3.7	3.67	0.002	0.014	0.041	0.015	0.014	0.00371	0.092
Print-Tex International	4	1404	2912	4429	364	52	ND	ND	0.005	0.022	0.111	0.038	0.018	0.01366	0.512
Print-Tex U.S.A.	4	824	412	1203	148	12	ND	ND	0.003	0.020	0.112	0.025	0.013	0.00873	0.087

Non detects were entered as 1/2 the detection limit
ND = NO DATA

Table 4-4
Permitted Industrial User Pollutant Mass and Flow Contribution to the J'Town Treatment Plant (1/1/96-12/31/98)

Parameter	% of J'town Influent
Flow	3%
Ammonia	3%
BOD5	18%
Cadmium	4%
Chromium	4%
COD	1%
Copper	2%
Lead	5%
Nickel	3%
O&G-H	11%
Silver	2%
TSS	11%
Phosphorus	3%
Zinc	5%

Table 4-5
Compliance Status of J'Town SIUs
(reporting period 1995-1998)

(Continued from ge 1)

Industry	Co. No.	Status	Date	Violation
Metokote Corporation	9537	SNC	1/1/95-6/30/95	Lead
		C	7/1/95-12/31/95	
		C	1/1/96-6/1/96	
		C	7/1/96-12131196	
		C	1/1/97-6/30/97	
		C	7/1/97-12/31/97	
		C	1/1/98-6/30/98	
		C	7/1/98-12/31/98	
Regional Hospital Services	9608	C	1/1/95-6/30/95	
Waukesha Cherry-Burrell	9302	C	1/1/95-6/30/95	
		C	7/1/95-12/31/95	
		I	1/1/96-6/30/96	pH
		I	7/1/96-7/31/96	pH
		C	1/1/97-6/30/97	
		C	7/1/97-12/31/97	
		C	1/1/98-6/30/98	
		C	7/1/98-12/31/98	
White Castle Distributing, Inc.	4792	C	1/1/97-6/30/97	
		C	1/1/98-6/30/98	
		C	7/1/98-12/31/98	
Winston Products Company	6020	C	1/1/95-6/30/95	
		C	7/1/95-12/31/95	
		I	1/1/96-6/1/96	Nickel. Copper. Chromium
		C	7/1/96-7/31/96	
		C	1/1/97-6/30/97	
		C	7/1/97-12/31/97	
		C	1/1/98-6/30/98	
		C	7/1/98-12/31/98	

Compliance Status: (C) **Compliance. (I) - Infrequent** NonCompliance,
(SNC) Signifigant **Noncompliance. No Data - Company to be sampled next period**

Table 4-5
Compliance Status of J'Town SIUs
(reporting period 19951998)

Industry	Co. No	Status	Date	Violation
CONDEA Vista Company	9406	C	1/1/95-6/30/95	
		c	7/1/95-12/31/95	
		C	1/1/96-6/1/96	
		C	7/1/96-12/31/96	
		C	1/1/97-6/30/97	
		I	7/1/97-12/31/97	pH
		c	1/1/98-6/30/98	
		I	7/1/98-12/31/98	Copper
DCE. Inc.	9607	C	1/1/95-6/30/95	
		C	7/1/95-12/31/95	
		C	1/1/96-6/1/96	
		C	7/1/96-12/31/96	
		C	1/1/97-6/30/97	
		SNC	7/1/97-12/31/97	Ammonia Nitrogen
		C	1/1/98-6/30/98	
			7/1/98-12/31/98	Ammonia Nitrogen
H.L. Lyons co.	9636	c	1/1/95-6/30/95	
		c	7/1/95-12/31/95	
		C	1/1/96-6/1/96	
		C	7/1/96-12/31/96	
		C	1/1/97-6/30/97	
		c	7/1/97-12/31/97	
		c	1/1/98-6/30/98	
		I	7/1/98-12/31/98	pH, Zinc
Innovative Electronic Design	7107	R	1/1/95-6/30/95	Failure to submit SMR, missing parameters
		c	7/1/95-12/31/95	
		I	1/1/96-6/1/96	Lead
		C	7/1/96-12/31/96	
		I	1/1/97-6/30/97	Lead
		C	7/1/97-12/31/97	
		C	1/1/98-6/30/98	
		I	7/1/98-12/31/98	
Jones Plastic&Engineering Corp.	9609	C	1/1/95-6/30/95	
		c	7/1/95-12/31/95	
		c	1/1/96-6/1/96	
		C	7/1/96-12/31/96	
		C	1/1/97-6/30/97	
		C	7/1/97-12/31/97	
		C	1/1/98-6/30/98	
			7/1/98-12/31/98	

Compliance Status: (C) **Compliance.** (I) **Infrequent** NonCompliance,
(SNC) Signifigant **Noncompliance. No Data -Company to be sampled next period**

Table 4-6
J'Town Industrial Monitoring Parameters and Frequency

unk wer #	Industry	Flow, total	pH	BOD	COD	TSS	NH3-N	O&G	O&G-H	Cadmium	Chromium	Copper	Lead	Nickel	Silver	Zinc	Phosphorus	Cyanide, Tot	TTO (organics)
1	**Adam Matthews**																		
	MSD Compliance		Y					Y	Y								Y		
	MSD QCT	Y		Y	Y	Y													
	Beechmont Press																		
	MSD Compliance		Y				Y		Y	Y	Y	Y	Y	Y	Y	Y			
	SMR Compliance	Q	Q	Q	Q	Q				Q	Q	Q	Q	Q	Q	Q			
	Brandeis Machinery & Supply																		
	MSD Compliance		Y				Y		Y	Y	Y	Y	Y	Y	Y	Y	Y		
	SMR Compliance	B	B	B	B	B			B	B	B	B	B	B		B			
	Cummins Cumberland Inc																		
	MSD Compliance		Y				Y		Y	Y	Y	Y	Y	Y	Y	Y	Y		
	SMR Compliance	Q	Q	Q	Q	Q			Q				Q			Q			
	Derby Cone Co. Inc																		
	MSD Compliance		Y					Y											
	MSD QCT	Y		Y	Y	Y													
	SMR Compliance	B	B	B	B	B			B										
	Dispensers Optical Service																		
	MSD Compliance		Y						Y	Y	Y	Y	Y	Y	Y	Y			
	SMR Compliance	Q		Q	Q	Q			Q	Q		Q	Q			Q			
	Jones Plastic & Engineering																		
	MSD Compliance		Y						Y	Y	Y	Y	Y	Y	Y	Y			
	MSD QCT	Y		Y	Y	Y													
	SMR Compliance	Q	Q	Q	Q	Q			Q	Q	Q	Q	Q	Q		Q			
	Kroger Company																		
	MSD Compliance		Y				Y		Y				Y			Y			
	SMR Compliance	Q	Q	Q	Q	Q			Q				Q			Q			
	Print-Tex USA																		
	SMR Compliance	B	B	B	B	B			B	B	B	B	B	B	B	B			
	Southern Standard Carton																		
	MSD Compliance		Y						Y	Y	Y	Y	Y	Y	Y	Y			
	MSD QCT	Y		Y	Y	Y													
	SMR Compliance	B	B	B	B	B			B					B		B			
	Waukesha Cherry-Burrell																		
	MSD Compliance		Y						Y	Y	Y	Y	Y	Y	Y	Y			
	MSD QCT	Y		Y	Y	Y													
	SMR Compliance	Q	Q						Q	Q	Q	Q	Q	Q	Q	Q			
	Winston Products Co																		
	MSD Compliance		Y				Y		Y				Y	Y	Y	Y			
	MSD Organics																		Y
	SMR Compliance	B	B	B	B	B			B				B	B	B	B			
2	**Clarke Detroit Diesel - Allison**																		
	MSD Compliance		Y					Y			Y	Y	Y	Y	Y	Y	Y		
	SMR Compliance	Q	Q	Q	Q	Q		Q	Q	Q	Q	Q	Q	Q		Q			
	Midland Communications																		
	SMR Compliance	B	B			B			B			B	B	B	B	B			
	Ryder Truck Rental																		
	MSD Compliance		Y						Y	Y	Y	Y	Y	Y	Y	Y			
	SMR Compliance	B	B	B	B	B			B	B	B	B	B	B	B	B			
	White Castle Distributing, Inc																		
	MSD Compliance		Y						Y										
	MSD QCT	Y		Y	Y	Y													
	SMR Compliance	B	B	B	B	B			B										
3	**Innovative Electronic Design**																		
	MSD Compliance	Y	Y						Y	Y	Y	Y	Y	Y	Y	Y		Y	
	MSD Organics	Y																	Y
	SMR Compliance	Q	Q	Q	Q	Q			Q	Q	Q	Q	Q	Q	Q	Q		Q	
	SMR Organics	Y																	Y
4	**CONDEA Vista Co**																		
	MSD Compliance		Y						Y	Y	Y	Y	Y			Y	Y		
	MSD QCT	Y		Y	Y	Y													
	SMR Compliance	Q	Q	Q	Q	Q			Q	Q	Q	Q	Q			Q			
	DCE, Inc																		
	MSD Compliance		Y				Y		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
	MSD Organics	Y																	Y
	SMR Addt'l Compliance	Y																	Y
	SMR Compliance	Q	Q	Q	Q	Q			Q	Q	Q	Q	Q	Q	Q	Q		Q	
	H. L. Lyons																		
	MSD Compliance		Y						Y	Y	Y	Y	Y	Y	Y	Y		Y	
	MSD Organics	Y																	Y
	SMR Compliance	Q	Q	Q	Q	Q			Q	Q	Q	Q	Q	Q	Q	Q		Q	
	SMR Organics	Y																	Y

Q -Quarterly, B -Biannually, Y -Yearly, if blank there was no monitoring required.
QCT = Quality Charge Testing

Table 4-7

J'Town Industrial User Permit Limitations

Trunk Sewer #	Company	pH SU Min-Max	O&G(H) mg/L Max	NH3-N mg/L Max	As mg/L Max	Cd mg/L Max	Cd Ave	Cr mg/L Max	Cr Ave	Cu mg/L Max	Cu Ave	Pb mg/L Max	Pb Ave	Hg mg/L Max	Ni mg/L Max	Ni Ave	Ag mg/L Max	Ag Ave	Zn mg/L Max	Zn Ave	CN, Amenable mg/L Max	CN, Amenable Ave	Temperature deg F Max	Flash Point deg F Max
1	Adam Matthews, Inc.	6-10	100	50	0.82	0.15		5		0.92		0.25		0.002	1.5		0.4		3.4		0.15		150	140
1	Beechmont Press	6-10	100	50	0.82	0.15		5		0.92		0.25		0.002	1.5		0.4		3.4		0.15		150	140
1	Brandeis Machinery & Supply	6-10	100	50	0.82	0.15		5		0.92		0.25		0.002	1.5		0.4		3.4		0.15		150	140
1	Construction Machinery Corp.	6-10	100	50	0.82	0.15		5		0.92		0.25		0.002	1.5		0.4		3.4		0.15		150	140
1	Courier Carton	6-10	100	50	0.82	0.15		5		0.92		0.25		0.002	1.5		0.4		3.4		0.15		150	140
1	Cummins Cumberland Inc.	6-10	100	50	0.82	0.15		5		0.92		0.25		0.002	1.5		0.4		3.4		0.15		150	140
1	Derby Cone Company, Inc.	6-10	100	50	0.82	0.15		5		0.92		0.25		0.002	1.5		0.4		3.4		0.15		150	140
1	Dispensers Optical Service Corp.	6-10	100	50	0.82	0.15		5		0.92		0.25		0.002	1.5		0.4		3.4		0.15		150	140
1	Jones Plastic & Engineering Corp.	6-10	100	50	0.82	0.15		5		0.92		0.25		0.002	1.5		0.4		3.4		0.15		150	140
1	Kroger Co.	6-10	100	50	0.82	0.15		5		0.92		0.25		0.002	1.5		0.4		3.4		0.15		150	140
1	Overnight Transportation Co.	6-10	100	50	0.82	0.15		5		0.92		0.25		0.002	1.5		0.4		3.4		0.15		150	140
1	Southern Standard Carton, Inc.	6-10	100	50	0.82	0.15		5		0.92		0.25		0.002	1.5		0.4		3.4		0.15		150	140
1	T.M.C. Truck Repair	6-10	100	50	0.82	0.15		5		0.92		0.25		0.002	1.5		0.4		3.4		0.15		150	140
1	Waukesha Cherry-Burrell	6-10	100	50	0.82	0.15		5		0.92		0.25		0.002	1.5		0.4		3.4		0.15		150	140
1	Winston Products Company	6-10	100	50	0.82	0.15		5		0.92		0.25		0.002	1.5		0.4	0.24	2.61	1.48	0.15		150	140
2	Clarke Detroit Diesel - Allison	6-10	100	50	0.82	0.15		5		0.92		0.25		0.002	1.5		0.4		3.4		0.15		150	140
2	Midland Communications	6-10	100	50	0.82	0.15		5		0.92		0.25		0.002	1.5		0.4		3.4		0.15		150	140
2	Ryder Truck Rental, Inc.	6-10	100	50	0.82	0.15		5		0.92		0.25		0.002	1.5		0.4		3.4		0.15		150	140
2	White Castle Distributing, Inc.	6-10	100	50	0.82	0.15		5		0.92		0.25		0.002	1.5		0.4		3.4		0.15		150	140
3	Innovative Electronic Design	6-10	100	50	0.82	0.5	0.32	2.77	1.71	0.92	2.07	0.25	0.43	0.002	1.5	2.38	0.4	0.24	2.61	1.48	0.15		150	140
4	CONDEA Vista Co.	6-10	100	50	0.82	0.15		5		0.92		0.25		0.002	1.5		0.4		3.4		0.15		150	140
4	DCE, Inc.	6-10	100	50	0.82	0.15	0.26	2.77	1.71	0.92	2.07	0.25	0.43	0.002	1.5	1.41	0.4	0.24	2.61	1.48	0.15		150	140
4	H. L. Lyons Co.	6-10	100	50	0.82	0.15	0.15	0.28	0.17	0.34	0.21	0.07	0.04	0.002	0.4	0.24	0.04	0.02	0.26	0.15	0.15		150	140
4	Print-Tex International	6-10	100	50	0.82	0.15		5		0.92		0.25		0.002	1.5		0.4		3.4		0.15		150	140
4	Print-Tex U.S.A.	6-10	100	50	0.82	0.15		5		0.92		0.25		0.002	1.5		0.4		3.4		0.15		150	140

Table 4-8
Previous Pretreatment Program Monitoring

#	COMPANY NAME	J	F	M	A	M	J	J	A	S	O	N	D
	Adam Matthews										X		
	Beechmont Press					X							
	Brandeis Machinery							X					
	Courier Carton				X								
	Cummins Cumberland Inc									X			
1	Derby Cone				X								
	Dispenser's Optical						X						
	JONES PLASTICS & ENGINEERING			**X**									
	Southern Standard Carton					X							
	WAUKESHA CHERRY-BURRELL											**X**	
	WINSTON PRODUCTS												**X**
	Midland Communications Pkg			X									
	Clarke Detroit Diesel	X											
2	Ryder Truck & Car Rental					X							
	WHITE CASTLE DISTRIBUTING										**X**		
3	**INNOVATIVE ELECTRONIC DESIGN**	**X**											
	H L LYONS									**X**			
4	**CONDEA VISTA CO**	**X**											
	DCE, INC					**X**							
	WWTP Influent			**X**			X			X			X
	WWTP Effluent			**X**			X			X			X
	WWTP Biosolids			**X**			X			X			X

* **Bold Represents Required Monitoring**

Table 4-9
New Pretreatment Program Monitoring

#	COMPANY NAME	J	F	M	A	M	J	J	A	S	O	N	D
	Adam Matthews			X									
	Beechmont Press			X									
	Brandeis Machinery			X									
	Courier Carton			X									
	Cummins Cumberland Inc			X									
1	Derby Cone			X									
	Dispenser's Optical			X									
	JONES PLASTICS & ENGINEERING			**X**									
	Southern Standard Carton			X									
	WAUKESHA CHERRY-BURRELL			**X**									
	WINSTON PRODUCTS			**X**									
	Midland Communications Pkg						X						
	Clarke Detroit Diesel						X						
2	Ryder Truck & Car Rental						X						
	WHITE CASTLE DISTRIBUTING						**X**						
3	**INNOVATIVE ELECTRONIC DESIGN**									**X**			
	H L LYONS												**X**
4	**CO**NDEA VISTA CO												**X**
	DCE, INC												**X**
	WWTP Influent			**X**			X			X			X
	WWTP Effluent			**X**			X			X			X
	WWTP Biosolids			**X**			X			X			X
	Chenoweth Run Upstream			X			X			X			X
	Chenoweth Run Downstream			X			X			X			X
	Collection System #1			X			X			X			X
	Collection System #2			X			X			X			X
	Collection System #3			X			X			X			X
	Collection System #4			X			X			X			X
	Collection System #5			X			X			X			X

A. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

During the period beginning on the effective date of this permit and lasting through the term of this pe
is authorized to discharge from outfall(s) serial number(s): 001, Municipal Discharge.

Such discharges shall be limited and monitored by the permittee as specified below:

EFFLUENT CHARACTERISTICS	DISCHARGE LIMITATIONS				MONITORING REQUIREMENTS		
	lbs/day		Other Units(Specify)				
	Monthly Avg.	Weekly Avg.	Monthly Avg.	Weekly Avg.	Measurement Frequency	Sample Type	Sampli Locati
Flow, Design (4.0 mgd)	N/A	N/A	Report	Report	Continuous	N/A	Influe Efflue
Biochemical Oxygen Demand (5 day), Carbonaceous	667	1001	20 mg/l	30 mg/l	3/Week	Composite	Influe Efflue
Total Suspended Solids	1001	1501	30 mg/l	45 mg/l	3/Week	Composite	Influe Efflue
Fecal Coliform Bacteria, N/100	N/A	N/A	200	400	3/Week	Grab	Efflue
Ammonia (as N)	133 334	200 500	4 mg/l* 10 mg/l**	6 mg/l* 15 mg/l**	3/Week	Composite	Efflue
Dissolved Oxygen shall not be less than 7 mg/l					3/Week	Grab	Efflue
Total Residual Chlorine (TRC)	N/A	N/A	0.010 mg/l	0.019 mg/l***	3/Week	Grab	Efflue
Biomonitoring shall not exceed 1.00 chronic toxicity unit(s)				See PART IV, Pages IV-1 and IV-2			Efflue
Phosphorus, Total	N/A	N/A	Report	Report	2/Month	Composite	Efflue
Additional Parameters			See PART I, Page I-2			Composite	Efflue

In addition to the specified limits, the monthly average effluent $CBOD_5$ and suspended solids concentration shall not e
15 percent of the respective monthly average influent concentration (85% removal).

The pH of the effluent shall not be less than 6.0 standard units nor greater than 9.0 standard units and shall be moni
three times per week by grab sample.

There shall be no discharge of floating solids or visible foam in other than trace amounts.

The effluent shall not cause a visible sheen on the receiving water.

* Effective May 1 - October 31
** Effective November 1 - April 30
*** Daily maximum limitation

Jeffersontown WWTP effective date 7/1/95-6/30/00

Table 5-2
J'Town Pretreatment Local Limits

Parameter	Limit
Total arsenic	0.62 mg/l
Total cadmium	0.15 mg/l
Total chromium	5.0 mg/l
Total copper	0.92 mg/l
Amenable cyanide	0.15 mg/l
Total lead	0.25 mg/l
Total mercury	0.0015 mg/l
Total nickel	1.5 mg/l
Total silver	0.40 mg/l
Total zinc	3.4 mg/l
Ammonia	50 mg/l
pH, minimum	6
pH, maximum	10

Table 5-3
J'Town Average WWTP Influent Flows and Loadings (lbs/day)
(reporting period 96 / 98)

	Flow	BOD	TSS	NH3	Cd	Cr	Cu	CN-A	Pb	Hg	Ni	Ag	Zn	O&G-H	O&G	Phenols
Month	mgd	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)	(lbs/day)
Jan-96	4.12	3848	3938													
Feb-96	3.62	3985	4117	450	0.20	0.20	2.75	0.03	0.17	0.008	0.42	0.37	4.30	56	618	0.56
Mar-96	5.46	4844	5684													
Apr-96	4.66	4212	5074													
May-96	5.06	3470	3732	347	0.61	0.22	2.69	0.17	0.35	0.009	0.26	0.78	3.08	87	867	0.87
Jun-96	3.30	3216	3850													
Jul-96	2.57	3924	3693													
Aug-96	1.64	2153	2475	356	0.06	0.11	1.01	0.06	0.60	0.006	0.23	0.12	1.71	30	405	0.59
Sep-96	2.70	3143	3588													
Oct-96	3.00	3968	4617													
Nov-96	3.08	3899	4471													
Dec-96	4.19	3409	5172	340	0.10	0.18	1.65	0.10	0.13	0.005	0.39	0.31	2.20	26	655	0.45
1996 Avg	**3.62**	**3673**	**4201**	**373**	**0.24**	**0.18**	**2.02**	**0.09**	**0.31**	**0.01**	**0.32**	**0.39**	**2.82**	**49.78**	**636.27**	**0.61**
Jan-97	4.05	2967	4657													
Feb-97	4.06	3212	4824													
Mar-97	5.40	3688	3747	317	0.09	0.23	1.77	0.18	0.27	0.00	0.54	0.23	2.31	45	860	0.91
Apr-97	3.04	3660	4690													
May-97	3.29	4165	4519													
Jun-97	4.91	3305	4817	2	0.05	0.21	2.29	0.10	0.52	0.01	0.26	0.39	2.50	52	309	0.28
Jul-97	2.64	3664	4734													
Aug-97	2.61	3388	4264													
Sep-97	2.61	3038	3917	452	0.04	0.11	2.07	0.09	0.44	0.00	0.22	0.28	3.05	196	1306	0.74
Oct-97	2.31	3154	4701	488												
Nov-97	2.45	3125	4025	479												
Dec-97	3.02	4532	4995	570	0.05	0.15	1.59	0.10	0.40	0.01	0.15	0.15	1.26	50	806	0.83
1997 Avg	**3.37**	**3491**	**4491**	**385**	**0.06**	**0.17**	**1.93**	**0.12**	**0.41**	**0.00**	**0.29**	**0.26**	**2.28**	**85.76**	**820.23**	**0.69**
Jan-98	3.85	4326	5586	558												
Feb-98	4.09	3797	4439	426												
Mar-98	3.91	4352	5392	551	0.09	0.16	1.86	0.09	0.18	0.01	0.34	0.46	2.61	46	665	0.73
Apr-98	3.83	3328	3734	471	0.12	0.20	0.64	0.12	0.15	0.01	0.44	0.20	1.16	87	464	0.44
May-98	3.56	3392	4270													
Jun-98	3.78	3720	5296	523												
Jul-98	3.23	3879	5630	466												
Aug-98	2.80	5581	6025	556												
Sep-98	2.11	3502	3871	431												
Oct-98	2.36	3573	3605	475	0.09	0.48	9.83	0.10	0.79	0.02	0.50	1.29	9.72	136	2377	0.56
Nov-98	2.40	2762	3223	442												
Dec-98	3.51	4128	5708	550												
1998 Avg	**3.29**	**3862**	**4732**	**495**	**0.10**	**0.28**	**4.11**	**0.10**	**0.37**	**0.01**	**0.43**	**0.65**	**4.50**	**90**	**1169**	**0.58**

Table 5-4
(Page 1 of 4)
J'Town WWTP Influent Organics Data
(reporting period 1996 - 1998)

Priority Pollutants	Detection Limit (ug/L)	No. Samples	Oberved at Greater than Detection Limit
Phenol	0.010	6	3 @ 0.016-0.046
Acenaphthene	10.000	10	
Acenaphthylene	10.000	10	
Acrolein	10.000	10	
Acrylonitrile	10.000	10	
Aldrin	0.003	1	
	0.004	1	
	0.005	1	
	0.006		
	0.012	1	
	0.043		
"	0.057	1	
"	0.100	1	
"	0.203	2	
Anthracene	10.000	10	
Benzene	5.000	10	
Benzidine	10.000	10	
Benzo(A)Anthracene	10.000	10	
Benzo(A)Pyrene	10.000	10	
Benzo(B)Fluoranthene	10.000	10	
Benzo(G,H,I)Perylene	10.000	10	
Benzo(K)Fluoranthene	10.000	10	
Bis(2-Chloroethoxy)Methane	10.000	10	
Bis(2-Chloroethyl)Ether	10.000	10	
Bis(2-Chloroisopropyl)Ether	10.000	10	
* Bis(2-Ethylhexyl)Phthalate(DEHP)	10.000	6	4 @ 11.000-45.000
Bromodichloromethane	5.000	10	
Bromoform	5.000	10	
Bromomethane	5.000	10	
* Butyl Benzyl Phthalate	10.000	10	
Carbon Tetrachloride	5.000	10	
Chlordane	3.100	9	
	6.200	1	
Chlorobenzene	5.000	9	1 @ 44.000
Chloroethane	5.000	10	
Chloroform	5.000	9	1 @ 7.000
Chrysene	10.000	10	
Cis-1,2-Dichloroethylene	5.000	2	
* Di-N-Butylphthalate	10.000	10	
* Di-N-Octylphthalate	10.000	10	
Debenzo[A,H]Anthracene	10.000	10	
Dieldrin	0.001	1	
	0.002	2	
	0.003	1	
	0.004		
	0.014	1	
	0.016		

* Phthalate Esters

Table 5-4
(Page 2 of 4)
J'Town WWTP Influent Organics Data
(reporting period 1996 - 1998)

Priority Pollutants	Detection Limit (ug/L)	No. Samples	Oberved at Greater than Detection Limit
* Diethylphthalate	10.000	9	1 @ 12.000
* Dimethylphthalate	10.000	10	
Endosulfan Sulfate	0.001	4	
"	0.002	1	
"	0.004	1	
"	0.015	1	
"	0.023	1	
	0.122	2	
Ethylbenzene	5.000	10	
Fluoranthene	10.000	10	
Heptachlor	0.001	5	
"	0.002	1	
"	0.013	1	
"	0.014	1	
"	0.045	2	
Heptachlor Epoxide	0.001	6	
	0.003	1	
"	0.006	1	
"	0.047	2	
Hexachlorobenzene	10.000	10	
Hexachlorobutadiene	10.000	10	
Hexachlorocyclopentadiene	10.000	10	
Hexachloroethane	10.000	10	
Indeno[1,2,3-CD]Pyrene	10.000	10	
Isophorone	10.000	10	
Methyl Chloride (Chlloromethane)	5.000	10	
Methylene Chloride	5.000	6	4 @ 7.000-316.000
Naphthalene	10.000	10	
Nitrobenzene	10.000	10	
Pentachlorophenol	50.000	10	
Phenanthrene	10.000	10	
Pyrene	10.000	10	
Tetrachloroethylene	5.000	7	1 @ 26.000
Toluene	5.000	8	2 @ 16.000-30.000
Toxaphene	6.250	9	1 @ 12.500
Trichloroethylene (TCE)	5.000	10	
Vinyl Chloride	5.000	10	
1,1,1-Trichloroethane (TCA)	5.000	10	
1,1,2,2-Tetrachloroethane	5.000	10	
1,1,2-Trichloroethane (TCA)	5.000	8	
1,1-Dichlorobenzene	5.000	2	
1,1-Dichloroethane	5.000	10	
1,1-Dichloroethylene	5.000	8	
1,2,4-Trichlorobenzene	10.000	10	
1,2-Dichlorobenzene	5.000	10	
1,2-Dichloroethane	5.000	8	
1,2-Dichloropropane	5.000	9	
1,2-Diphenylhydrazine	10.000	10	
Trans-1,2-Dichloroethylene	5.000	10	
1,2-Dichlorobenzene	5.000	10	
1,4-Dichlorobenzene	5.000	9	1 @ 20.000
2,4,6-Trichlorophenol	10.000	10	
2,4-Dichlorophenol	10.000	10	
2,4-Dimethylphenol	10.000	8	
2,4-Dinitrophenol	10.000	10	
2,4-Dinitrotoluene	10.000	10	

* Phthalate Esters

J'Town WWTP Influent Organics Data
(reporting period 1996 - 1998)

Priority Pollutants	Detection Limit (ug/L)	No. Samples	Oberved at Greater than Detection Limit
2,6-Dinitrotoluene	10.000	10	
2-Chloroethylvinylether	5.000	10	
2-Chloronaphthalene	10.000	10	
2-Chlorophenol	10.000	10	
2-Nitrophenol	10.000	10	
3,3'-Dichlorobenzidine	10.000	9	
4,6-Dinitro-O-Cresol (2-Methyl-4,6-Dinitrophenol)	50.000	10	
4-Bromophenylphenylether	10.000	10	
4-Chlorophenylphenylether	10.000	10	
4-Nitrophenol	50.000	10	
4-Chloro-3-methylphenol	10.000	10	
N-Nitroso-dimethylamine	10.000	10	
N-Nitroso-dipropylamine	10.000	10	
N-Nitroso-diphenylamine	10.000	10	
4,4'-DDD	0.003	1	
	0.006	1	
	0.007	1	
	0.008		
	0.011	1	
	0.043	1	
	0.074	1	
"	0.119	1	
	0.392	2	
4,4'-DDE	0.001	1	
	0.00[illegible]		
	0.003	1	
	0.004		
	0.006	1	
	0.0		
	0.022		
	0.047		
	0.063	2	
4,4'-DDT	0.003	1	1 @ 0.2500
	0.004	2	
	0.006		
	0.018	1	
	0.046	1	
	0.076	1	
	0.126	2	
Alpha-Endosulfan	0.002	2	3 @ 1.00022400
	0.007	1	
	0.033	1	
	0.041	1	
	0.096	2	

* Phthalate Esters

Table 5-4
(Page 4 of 4)
J'Town WWTP Influent Organics Data
(reporting period 1996 - 1998)

Priority Pollutants	Detection Limit (ug/L)	No. Samples	Oberved at Greater than Detection Limit
Beta-Endosulfan	0.001	5	
"	0.004	1	
	0.012	1	
	0.018	1	
	0.087	2	
Endrin	0.130	2	
	0.180	1	
	0.243		
	0.926	1	
	1.850	1	
	2.950	1	
Endrin Aldehyde	0.001	4	1 @ 0.7976
	0.002	2	
	0.004	1	
	0.019	1	
	0.028	1	
Alpha-BHC	0.001	5	1 @ 0.0110
	0.002	1	
	0.006	1	
	0.010	2	
	[illegible]		
Beta-BHC	0.001	2	
	0.002	2	
	0.023	1	
	0.057	2	
Delta-BHC	0.001	5	
	0.002	1	
"	0.011	1	
"	0.012	1	
"	0.022	2	
Lindane	0.001	1	
"	0.002	1	
PCB Arochlor 1242	6.000	9	1 @ 12.000
cis-1,3-Dichloropropene	5.000	10	
trans-1,3-Dichloropropene	5.000	10	
Chlorodibromomethane	5.000	10	
Gamma-BHC	0.001	2	1 @ 0.1700
"	0.004	1	
"	0.007	1	
"	0.011	1	
"	0.022	2	

* Phthalate Esters

Table 5-5
J'Town WWTP Effluent Quality
(reporting period 96 / 98)

Month	Flow (mgd)	BOD (mg/l)	TSS (mg/l)	NH3 (mg/l)	TP (mg/l)	pH su	Fec Col (no/100ml)	Cd (mg/l)	Cl (mg/l)	Cr (mg/l)	Cu (mg/l)	CN-A (mg/l)	Pb (mg/l)	Hg (mg/l)	Ni (mg/l)	Ag (mg/l)	Zn (mg/l)	O&G-H (mg/l)	O&G (mg/l)
Jan-96		2.2	3.8	0.6		7.0	45												
Feb-96	3.4	2.6	3.4	1.8	3.0	7.0	4	0.004	72	0.007	0.016	0.001	0.005	0.0002	0.015	0.007	0.07	1.00	3
Mar-96		2.6	3.7	1.0		6.9	12												
Apr-96		2.2	4.5	1.0		6.9	7												
May-96	5.2	2.9	6.3	1.6	0.9	6.9	23	0.002		0.005	0.009	0.004	0.005	0.0002	0.006	0.005	0.03	1.00	1
Jun-96		1.4	3.1	0.5		6.9	8												
Jul-96	2.2	1.1	2.1	0.7		6.9	11												
Aug-96	1.8	1.0	1.9	0.8	7.4	6.9	17	0.004	64	0.007	0.014	0.004	0.04	0.0004	0.015	0.007	0.06	1.00	2
Sep-96		1.0	2.4	2.1		6.9	10												
Oct-96	3.2	1.6	3.0	0.5		6.9	19												
Nov-96		2.2	4.3	0.7		6.9	16												
Dec-96	3.1	2.1	5.8	0.9	1.4	7.0	21	0.004	53	0.007	0.017	0.004	0.005	0.0002	0.015	0.007	0.05	1.00	4
1996 Avg	**3.1**	**1.9**	**3.7**	**1.0**	**3.2**	**6.9**	**16**	**0.004**	**63**	**0.007**	**0.014**	**0.003**	**0.014**	**0.0003**	**0.013**	**0.007**	**0.05**	**1.00**	**2.5**
Jan-97		2.4	4.1	1.1		6.9	16												
Feb-97		2.2	4.4	1.1		6.9	4												
Mar-97	5.4	2.9	4.2	0.5	1.3	7.1	35	0.002	36	0.005	0.009	0.004	0.005	0.0001	0.007	0.005	0.03	1.00	1
Apr-97		2.7	5.7	2.3		6.9	3												
May-97		1.8	2.9	0.7		6.9	12												
Jun-97	3.1	1.7	5.0	0.9	2.2	7.1	9	0.002	48	0.007	0.012	0.004	0.02	0.0003	0.006	0.005	0.06	1.00	3
Jul-97		1.2	1.1	1.0		6.9	7												
Aug-97		1.1	1.5	1.3		6.9	13												
Sep-97	2.6	1.1	3.3	2.0	3.0	7.0	24	0.002	75	0.005	0.017	0.004	0.02	0.0001	0.006	0.005	0.09	1.00	4
Oct-97		1.2	2.5	0.3		6.9	27												
Nov-97		1.2	2.0	0.1		6.9	3												
Dec-97	3.5	*35.0	*32.9	3.6	0.2	7.0	12	0.002	46	0.011	0.028	0.009	0.005	0.0002	0.006	0.005	0.04	5.00	5
1997 Avg	**3.6**	**1.8**	**3.3**	**1.2**	**1.7**	**6.9**	**14**	**0.002**	**51**	**0.007**	**0.017**	**0.005**	**0.013**	**0.000**	**0.006**	**0.005**	**0.06**	**2.00**	**3**
Jan-98	4.0	3.1	9.2	3.1		6.9	8												
Feb-98	4.1	*31.1	14.1	2.5		6.9	55												
Mar-98	3.9	3.4	*38.1	4.7	3.6	7.0	3	0.004	70	0.007	0.011	0.007	0.005	0.0002	0.015	0.007	0.05	2.00	5
Apr-98	3.8	1.5	4.0	7.6		6.9	5												
May-98	3.5	20.0	*60.7	3.5		6.9	37												
Jun-98	3.8	1.0	2.6	1.7			134												
Jul-98	3.2	4.0	5.3	2.1			101												
Aug-98	2.8	2.0	5.5	1.9			9												
Sep-98	2.1	2.0	3.3	*4.2			11												
Oct-98	2.2	3.0	6.5	3.5	2.8	7.8	5	0.004	82	0.007	0.01513	0.007	0.005	0.0002	0.015	0.007	0.06	1.50	3
Nov-98	2.4	2.0	8.0	2.5			2												
Dec-98	3.5	3.0	5.5	2.6			23												
1998 Avg	**3.3**	**4.1**	**6.4**	**3.2**	**3.2**	**7.1**	**33**	**0.004**	**76**	**0.007**	**0.013**	**0.007**	**0.005**	**0.000**	**0.015**	**0.007**	**0.06**	**1.75**	**4**
KPDES Permit Limit		20	30	4/10	NA	6.0 to 9.0	<200	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

A star means data exceeds KPDES Permit Limit.
Refering to NH-3, a limit of 4 applies May-October months, and a limit of 10 applies November-April months.
NA = Not Applicable

Table 5-6
Water Quality Criteria for J'Town WWTP Effluent Discharged to Chenoweth Run

	CURRENT				PROPOSED			
Parameter	Human Health Requirements (mg/L)	Warm Water Aquatic Habitat Acute Criteria (mg/L)	Warm Water Aquatic Habitat Chronic Criteria (mg/L)	Minimum Current	Human Health Requirements (mg/L)	Warm Water Aquatic Habitat Acute Criteria (mg/L)	Warm Water Aquatic Habitat Chronic Criteria (mg/L)	Minimum Proposed
As			0.05	0.05			0.05	0.05
As(III)		0.34	0.19	0.19		0.36	0.15	0.15
Be	0.000117		0.011	0.000117	NA		NA	NA
Cd		0.009	0.002	0.002		0.0105	0.0044	0.0044
Cr(III)	670	3.201	0.3815	0.3815	NA	3.325	0.1589	0.1589
Cr(VI)		0.016	0.011	0.011		0.016	0.011	0.011
Cu		0.0358	0.0224	0.0224		0.0283	0.0177	0.0177
CN, Amenable		0.022	0.005	0.005		0.022	0.0052	0.0052
Fe		4	1	1		4	1	1
Pb		0.2112	0.0082	0.0082		0.2112	0.0082	0.0082
Hg	0.000146	0.0024	0.000012	0.000012	0.000051	0.0017	0.00091	0.000015
Ni	4.6	2.667	0.2965	0.2965	4.6	0.8824	0.00981	0.0981
Se		0.002	0.005	0.005		0.002	0.005	0.005
Ag		0.0147		0.0147		0.0147		0.0147
Zn	NA	0.2203	0.1995	0.1995	69	0.2256	0.2256	0.2256

Table 5-7
J'Town WWTP Effluent Organics Data
(reporting period 1996119981

Priority Pollutants	Detection Limit (ug/L)	No. Samples	Observed at greater than Detection Limit
Phenol	0.010	7	
"	0.015	1	
Acenaphthene	10.000	8	
Acenaphthylene	10.000	8	
Acrolein	10.000	9	
Acrylonitrile	10.000	8	
Aldrin	0.003	1	1 @ 0.4666
"	0.004	1	
"	0.005	1	
"	0.006	1	
"	0.028	1	
"	0.043	1	
"	0.203	1	
Anthracene	10.000	8	
Benzene	5.000	8	
Benzidine	10.000	8	
Benzo(A)Anthracene	10.000	8	
Benzo(A)Pyrene	10.000	8	
Benzo(B)Fluoranthene	10.000	8	
Benzo(G,H,I)Perylene	10.000	8	
Benzo(K)Fluoranthene	10.000	8	
Bis(2-Chloroethoxy)Methane	10.000	8	
Bis(2-Chloroethyl)Ether	10.000	8	
Bis(2-Chloroisopropyl)Ether	10.000	8	
* Bis(2-Ethylhexyl)Phthalate(DEHP)	10.000	8	
Bromodichloromethane	5.000	8	
Bromoform	5.000	8	
Bromomethane	5.000	8	
* Butyl Benzyl Phthalate	10.000	8	
Carbon Tetrachloride	5.000	8	
Chlordane	3.100	8	
Chlorobenzene	5.000	8	
Chloroethane	5.000	8	
Chloroform	4.000	1	
"	5.000	7	
Chrysene	10.000	8	
Cis-1,2-Dichloroethylene	5.000	1	
* Di-N-Butylphthalate	10.000	8	
* Di-N-Octylphthalate	10.000	8	
Debenzo[A,H]Anthracene	10.000	8	
Dieldrin	0.001	1	
"	0.002	2	
"	0.003	1	
"	0.004	1	
"	0.008	1	
"	0.043	1	
"	0.118	1	
* Diethylphthalate	10.000	8	
* Dimethylphthalate	10.000	a	

* Phthalate Esters

Table 6-7
J'Town WWTP Effluent Organics Data
(reporting period 1996 / 1996)

Priority Pollutants	Detection Limit (ug/L)	No. Samples	Observed at greater than Detection Limit
Endosulfan Sulfate	0.001	4	
"	0.002	1	
"	0.011	1	
"	0.015	1	
"	0.122	1	
Ethylbenzene	5.000	8	
Fluoranthene	10.000	8	
Heptachlor	0.001	4	
"	0.002	1	
"	0.007	1	
"	0.014	1	
"	0.045	1	
Heptachlor Epoxide	0.001	5	
"	0.003	2	
"	0.047	1	
Hexachlorobenzene	10.000	8	
Hexachlorobutadiene	10.000	8	
Hexachlorocyclopentadiene	10.000	8	
Hexachloroethane	10.000	8	
Indeno[1,2,3-CD]Pyrene	10.000	8	
Isophorone	10.000	8	
Methyl Chloride (Chloromethane)	5.000	8	
Methylene Chloride	5.000	7	1 @ 7.000
Naphthalene	10.000	8	
Nitrobenzene	10.000	8	
Pentachlorophenol	50.000	8	
Phenanthrene	10.000	8	
Pyrene	10.000	8	
Tetrachloroethylene	5.000	7	
Toluene	5.000	8	
Toxaphene	6.250	8	
Trichloroethylene (TCE)	5.000	8	
Vinyl Chloride	5.000	8	
1,1,1-Trichloroethane (TCA)	5.000	8	
1,1,2,2-Tetrachloroethane	5.000	8	
1,1,2-Trichloroethane (TCA)	5.000	7	
1,1-Dichlorobenzene	5.000	1	
1,1-Dichloroethane	5.000	8	
1,1-Dichloroethylene	5.000	7	
1,2,4-Trichlorobenzene	10.000	8	
1,2-Dichlorobenzene	5.000	8	
1,2-Dichloroethane	5.000	8	
1,2-Dichloropropane	5.000	8	
1,2-Diphenylhydrazine	10.000	8	
Trans-1,2-Dichloroethylene	5.000	8	
1,2-Dichlorobenzene	5.000	8	
1,4-Dichlorobenzene	5.000	8	
2,4,6-Trichlorophenol	10.000	8	

* Phthalate Esters

Table 5-7
J'Town WWTP Effluent Organics Data
(reporting period 1996 / 1998)

Priority Pollutants	Detection Limit (ug/L)	No. Samples	Observed at greater than Detection Limit
2,4-Dichlorophenol	10.000	8	
2,4-Dimethylphenol	10.000	8	
2,4-Dinitrophenol	10.000	8	
2,4-Dinitrotoluene	10.000	8	
2,6-Dinitrotoluene	10.000	8	
2-Chloroethylvinylether	5.000	8	
2-Chloronaphthalene	10.000	8	
2-Chlorophenol	10.000	8	
2-Nitrophenol	10.000	8	
3,3'-Dichlorobenzidine	10.000	8	
4,6-Dinitro-O-Cresol (2-Methyl-4,6-Dinitrophenol)	50.000	8	
4-Bromophenylphenylether	10.000	8	
4-Chlorophenylphenylether	10.000	8	
4-Nitrophenol	50.000	8	
4-Chloro-3-methylphenol	10.000	8	
N-Nitroso-dimethylamine	10.000	8	
N-Nitroso-dipropylamine	10.000	8	
N-Nitroso-diphenylamine	10.000	8	
4,4'-DDD	0.003	1	
"	0.006	1	
"	0.007	1	
"	0.008	1	
"	0.011	1	
"	0.037	1	
"	0.392	1	
4,4'-DDE	0.001	1	
	0 no2	1	
	0.003	1	
"	0.004	1	
"	0.006	1	
"	0.022	1	
	0.024	1	
"	0.083	1	
4,4'-DDT	0.003	1	
"	0.004	2	
"	0.005	1	
"	0.008	1	
"	0.024	1	
	0.076	1	
	0 126	1	

*** Phthatate Esters**

Table 5-7
J'Town WWTP Effluent Organics Data
(reporting period 1996 / 1998)

Priority Pollutants	Detection Limit (ug/L)	No. Samples	Observed at greater than Detection Limit
Alpha-Endosulfan	0.002	4	
"	0.003	1	
"	0.016	1	
"	0.041	1	
"	0.096	1	
Beta-Endosulfan	0.001	6	
"	0.012	1	
"	0.087	1	
Endrin	0.130	1	
"	0.180	1	
"	0.243	1	
"	0.276	1	
"	0.313	1	
"	0.341	1	
"	0.463	1	
"	2.950	1	
Endrin Aldehyde	0.001	4	
"	0.002	1	
"	0.004	1	
"	0.009	1	
"	0.028	1	
Alpha-BHC	0.001	5	
"	0.005	1	
"	0.006	1	
"	0.010	1	
Beta-BHC	0.001	1	
"	0.002	2	
"	0.003	2	
"	0.012	1	
"	0.016	1	
"	0.057	1	
Delta-BHC	0.001	2	1 @ 0.4694
"	0.002	1	
"	0.006	1	
"	0.009	1	
"	0.011	1	
"	0.181	1	
Lindane	0.001	1	
"	0.002	1	
PCB Arochlor 1242	6.000	8	
cis-1,3-Dichloropropene	5.000	8	
trans-1,3-Dichloropropene	5.000	8	
Chlorodibromomethane	5.000	8	
Gamma-BHC	0.001	2	
"	0.004	1	
"	0.006	1	
"	0.007	1	
"	0.022	1	

* Phthalate Esters

Table 5-8
Summary of J'Town WWTP Effluent Biomonitoring Data
(reporting period 1995-1998)

Begin Date	End Date	Ceriodaphnia Dubia (TUc)	Pimephales Promelas(TUc)
3/16/95	3/22/95	ND	<1.0
6/5/95	6/9/95	ND	<1.0
7/9/95	7/26/95	<1.0	<1.0
10/22/95	10/27/95	<1.0	<1.0
1/14/96	1/19/96	<1.0	<1.0
6/16/96	6/21/96	<1.0	<1.0
9/29/96	10/4/96	ND	1.21*
10/22/96	10/28/96	ND	<1.0
11/20/96	11/25/96	ND	<1.0
1/12/97	1/17/97	ND	<1.0
5/16/97	5/21/97	ND	<1.0
7/29/97	8/4/97	ND	<1.0
10/16/97	10/21/97	ND	<1.0
1/18/98	1/23/98	ND	<1.0
6/5/98	6/8/98	ND	<1.0
6/21/98	6/26/98	ND	<1.0
9/13/98	9/18/98	ND	<1.0
12/13/98	12/18/98	ND	<1.0

* Exceedence of Permit Limit
ND = No Data
TUc = Chronic Toxicity Unit

Table 5-9
J'Town WWTP Sludge Data

Year	As (mg/Kg)	Cd (mg/Kg)	Cu (mg/Kg)	Pb (mg/Kg)	Hg (mg/Kg)	Mo (mg/Kg)	Ni (mg/Kg)	Se (mg/Kg)	Zn (mg/Kg)
96									
1st quarter	< 4	9.3	535	25	0.74	8.37	26	< 4	273
2nd quarter	< 4	6.7	521	34	1.26	9.16	29	< 4	310
3rd quarter	< 4	2.9	983	41	0.04	10.5	31	< 4	410
4th quarter	4	2.6	916	32.6	1.05	12.2	26	< 4	394
97									
1st quarter	6	1.7	546	26	0.54	6.4	27	< 2	264
2nd quarter	< 2	2.1	976	34	0.61	8.4	28	< 2	362
3rd quarter	ND	ND	ND	ND	ND	ND	ND	ND	ND
4th quarter	ND	ND	ND	ND	ND	ND	ND	ND	ND
98									
1st quarter	ND	ND	ND	ND	ND	ND	ND	ND	ND
2nd quarter	ND	ND	ND	ND	ND	ND	ND	ND	ND
3rd quarter	ND	ND	ND	ND	ND	ND	ND	ND	ND
4th quarter	ND	ND	ND	ND	ND	ND	ND	ND	ND
Average	< 4	4.2	746	32.1	0.71	9.2	28	< 4	336
Maximum	6	9.3	983	41	1.26	12.2	31	< 4	410

ND = No Data

Table 5-10
Federal 503 regulations ceilings and Kentucky 45:100 regulation concentrations for Biosolids

Metal	Federal 503 Regulation Ceiling Concentrations for Exceptional Quality Biosolids (mg/kg)	Federal 503 Regulation Ceiling Concentrations for Land Application (mg/kg)	Kentucky 45:100 Regulations Type A Sludge Concentrations for Land Application (mg/kg)	Kentucky 45:100 Regulations Type B Sludge Ceiling Concentrations for Land Application (mg/kg)
Arsenic	41	75	-	-
Cadmium	39	85	>10	10
Copper	1500	4300	>450	450
Lead	300	840	>250	250
Mercury	17	57	-	-
Molybdenum	-	75	-	-
Nickel	420	420	>50	50
Selenium	36	100	-	-
Zinc	2800	7500	>900	900

Table 6-2

Water-quality-sampling sites in the Cbenowetb Run Basin, Jefferson County, Kentucky (DRAFT).

[USGS, U.S. Geological Survey; WWTP, wastewater-treatment plant]

Site identifier (Figure 6-2)	USGS station number	Location	Latitude[1]	Longitude[1]	Period of record used
CR5	03298129	Chenoweth Run at Old Watterson Trail at Jeffersontown	381205	X53341	1995-97
401	03298135	Chenoweth Run at Ruckriegel Parkway at Jeffersontown	381141	X53326	1996-97
CR4	03298138	Jeffersontown WWTP Effluent at Chenoweth Run	3x1133	853318	1995-96
402	03298 140	Chenoweth Run at Taylorsville Road near Jeffersontown	381115	X5331 1	1995-97
CR2	03298145.	Chenoweth Run at Easum Road	381003	853305	1995-96
16	03298150	Chenoweth Run at Gelhaus Lane	380936	X53232	198X-97
403	03298160	Chenoweth Run at Seatonville Road	380758	x53131	1996-97

[1] Degree, minute, and second symbols omitted.

Table 6-3
USGS Stream Data - Chenoweth Run
Low Flow

Sampling Site	nstantaneous Flow (cfs)	Specific conductance (us/cm)	Dissolved Oxygen (mg/l)	BOD5 (mg/l)	pH (s. u.)	TSS (mg/l)	NH-3 (mg/l)	NH3 (mg/l as NH4)	NO2+NO3 (mg/l as N)	Total Phosphate (mg/l as PO4)	Total Phosphorus (mg/l as P)	Dissolved Phosphorus (mg/l as P)	Ortho Phosphorus total (mg/l)	Total Hardness (mg/l as CaCO3)	Chloride (mg/l)	Arsenic, total (ug/l)	Cadmium, total (ug/l)	Chromium, total recoverable (ug/l)	Copper, total recoverable (ug/l)	Iron, total recoverable (ug/l)	Lead, total recoverable (ug/l)	Mercury total recoverable (ug/l)	Nickel, total recoverable (ug/l)	Selenium, total (ug/l)	Silver, total recoverable (ug/l)	Zinc, total recoverable (ug/l)	Fecal coliform (colonies/ 100ml)	Fecal Streptococci (N/ 100 ml)
Upstream of WWTP at Ruckriegel Parkway (USGS Site# 3298135) Feb 96-Sept 97																												
Avg	17.9	824	9.3	3.6	7.6	70	0.15	0.19	1.2	0.72	0.09	0.0	0.24	ND	36	3	1	1.8	5	2899	10	0.1	3.1	2.50	3	29.9	3672	11693
Min	0.8	246	6.8	0.5	7.2	3	0.03	0.04	0.6	0.01	0.01	0.0	0.00	ND	10.8	2.5	1	1.5	1	94	10	0.1	2.5	2.5	3	1.5	2	371
Max	52.9	9425	13.8	7	8	400	0.44	0.57	2	2.64	0.23	0.1	0.86	ND	101	2.5	1	5	12	13000	10	0.1	8	2.5	3	57	18500	27000
Count	26	26	26	17	26	17	17	17	14	8	17	13	8	ND	11	13	13	13	13	13	13	13	13	13	13	13	13	12
J town WWTP Effluent (USGS Site# 3298138) Jan 95-Jan 96																												
Avg	4.3	876	8	5	7.4	6.69	0.45	0.58	9.5	8.0	2.43	2.6	2.6	173	88	1	1.8	5	12.5	152	3	0.1	8.8	1	0.8	46	772	1459
Min	0.9	572	4	1	6.5	1	0.03	0.04	0.88	8.0	0.86	1.2	2.6	173	88	1	0.5	2	8	47	3	0.1	5.5	1	0.5	28	0.5	10
Max	7.6	1220	9.9	10	8.8	18	1.7	2.189	19	8.0	4	3.8	2.6	173	88	1	3	8	17	257	3	0.1	12	1	1	63	3300	12700
Count	13	15	15	16	16	16	16	16	15	1	12	9	1	1	1	2	2	2	2	2	1	2	2	1	2	2	14	13
Downstream of WWTP at Taylorsville Rd. (USGS Site# 3298140) Jan 95-Sept 97																												
Avg	7.1	722.5	10.3	5.2	7.3	209.1	0.38	0.49	5.55	3.21	1.37	1.0	1.0	195.3	57.3	5.8	1.1	1.8	16.1	9544.9	21.9	0.11	7.1	2.5	2.9	67.8	3056	11001
Min	4.02	187.00	7.40	1.00	6.60	1.00	0.02	0.03	1.20	0.46	0.34	0.03	0.15	188.00	1.70	1.00	1.00	1.50	7.00	90.00	10.00	0.05	2.50	2.50	1.00	25.00	0.50	12.00
Max	12.8	1138	14.2	17	8.2	1370	1.8	2.318	15	7.359	3.53	4.1	2.4	209	160	16	3	8	30	25000	40	0.3	20	2.5	3	148	15000	58000
Count	11	23	15	31	15	33	33	33	32	14	31	23	14	4	20	19	19	19	19	19	18	19	19	18	19	19	22	21
2.6 Miles Downstream of WWTP at Gelhaus Lane (USGS Site# 3298150) Jan 91-Dec 97																												
Avg	13.2	595.8	49.8	50.2	8.0	21.6	0.15	0.19	4.31	3.22	1.27	0.9	1.1	200.4	35.3	3.5	2.0	3.8	6.9	1104.7	14.7	0.17	8.9	2.9	3.3	52.3	1151.1	1828.0
Min	1.7	255.0	7.8	1.0	6.6	1.0	0.0	0.0	0.3	0.5	0.2	0.3	0.2	125.6	6.0	2.5	1.0	1.5	1.0	68.0	2.5	0.1	2.5	2.5	2.5	13.0	3.0	8.0
Max	37	809	188	162	9	518	1	1	14	8	4	2	3	292	65	12	3	24	18	15800	30	1	51	13	5	147	15600	46200
Count	75	75	65	70	75	72	70	70	66	62	69	4	62	22	6	28	28	28	28	28	28	29	28	28	28	28	69	68

(1) Data provided by United States Dept of Interior - Geological Survey

Process Date 2/15/99

District Code 21

Preliminary Copy subject to Revision

Table 6-4
USGS Stream Data - Chenoweth Run
High Flow

Upstream of WWTP at Ruckriegel Parkway (USGS Site# 3298135) Feb 96-Sept 97

Sampling Site	Instantaneous Flow (cfs)	Specific conductance (us/cm)	Dissolved Oxygen (mg/l)	BOD5 (mg/l)	pH (s. u.)	TSS (mg/l)	NH-3 (mg/l)	NH3 (mg/l as NH4)	NO2+NO3 (mg/l as N)	Total Phosphate (mg/l as PO4)	Total Phosphorus (mg/l as P)	Dissolved Phosphorus (mg/l as P)	Ortho Phosphorus total (mg/l)	Total Hardness (mg/l as CaCO3)	Chloride (mg/l)	Arsenic, total (ug/l)	Cadmium, total (ug/l)	Chromium, total recoverable (ug/l)	Copper, total recoverable (ug/l)	Iron, total recoverable (ug/l)	Lead, total recoverable (ug/l)	Mercury total recoverable (ug/l)	Nickel, total recoverable (ug/l)	Selenium, total (ug/l)	Silver, total recoverable (ug/l)	Zinc, total recoverable (ug/l)	Fecal coliform (colonies/ 100ml)	Fecal Streptococci (N/ 100 ml)
Avg	190.3	426	10.8	5.28	7.6	462.8	0.41	0.52	2.04	0.50	0.34	0.07	0.164	ND	28	4	1.2	4.3	12.3	11005	23.3	0.15	8.3	3	92.7	2.9	4300	51750
Min	70	142	7.7	1.8	7.4	124	0.04	0.05	1.4	0.123	0.12	0.02	0.04	ND	6	2.5	1	1.5	11	7800	10	0.1	6	3	67	2.5	2000	38000
Max	386	1632	12.2	10	7.8	984	2.2	2.8	2.63	0.859	0.55	0.16	0.28	ND	49	7	2	10	14	16700	40	0.3	11	3	132	5	6600	65500
Count	11	11	11	10	11	10	10	10	8	5	10	9	5	ND	7	6	6	6	6	6	6	6	6	6	6	6	2	2

J'town WWTP Effluent (USGS Site# 3298138) Jan 95-Jan 96

Data shown on table 6-3

Downsteam of WWTP at Taylorsville Road(USGS Site# 3298140) Jan 95-Sept 97

Sampling Site	Instantaneous Flow (cfs)	Specific conductance (us/cm)	Dissolved Oxygen (mg/l)	BOD5 (mg/l)	pH (s. u.)	TSS (mg/l)	NH-3 (mg/l)	NH3 (mg/l as NH4)	NO2+NO3 (mg/l as N)	Total Phosphate (mg/l as PO4)	Total Phosphorus (mg/l as P)	Dissolved Phosphorus (mg/l as P)	Ortho Phosphorus total (mg/l)	Total Hardness (mg/l as CaCO3)	Chloride (mg/l)	Arsenic, total (ug/l)	Cadmium, total (ug/l)	Chromium, total recoverable (ug/l)	Copper, total recoverable (ug/l)	Iron, total recoverable (ug/l)	Lead, total recoverable (ug/l)	Mercury total recoverable (ug/l)	Nickel, total recoverable (ug/l)	Selenium, total (ug/l)	Silver, total recoverable (ug/l)	Zinc, total recoverable (ug/l)	Fecal coliform (colonies/ 100ml)	Fecal Streptococci (N/ 100 ml)
Avg	80.94	559.2	9.98	4.16	7.55	118.2	0.192	0.2472	2.72	ND	0.4575	0.3225	ND	ND	ND	4	0.5	5	10	9390	16	0.05	13	0.5	38	1	2692	41275
Min	25.4	478	7.8	1.8	7.1	18	0.04	0.052	1.2	ND	0.34	0.12	ND	ND	ND	4	0.5	5	10	9390	16	0.05	13	0.5	38	1	700	21000
Max	211	811	12.8	5	8	234	0.39	0.502	4.6	ND	0.71	0.58	ND	ND	ND	4	0.5	5	10	9390	16	0.05	13	0.5	38	1	7400	70000
Count	5	5	5	5	4	5	5	5	5	ND	4	4	ND	ND	ND	1	1	1	1	1	1	1	1	1	1	1	5	4

2.6 Miles Downstream of WWTP at Gelhaus Lane (USGS Site# 3298150) Jan 91-Dec 97

Sampling Site	Instantaneous Flow (cfs)	Specific conductance (us/cm)	Dissolved Oxygen (mg/l)	BOD5 (mg/l)	pH (s. u.)	TSS (mg/l)	NH-3 (mg/l)	NH3 (mg/l as NH4)	NO2+NO3 (mg/l as N)	Total Phosphate (mg/l as PO4)	Total Phosphorus (mg/l as P)	Dissolved Phosphorus (mg/l as P)	Ortho Phosphorus total (mg/l)	Total Hardness (mg/l as CaCO3)	Chloride (mg/l)	Arsenic, total (ug/l)	Cadmium, total (ug/l)	Chromium, total recoverable (ug/l)	Copper, total recoverable (ug/l)	Iron, total recoverable (ug/l)	Lead, total recoverable (ug/l)	Mercury total recoverable (ug/l)	Nickel, total recoverable (ug/l)	Selenium, total (ug/l)	Silver, total recoverable (ug/l)	Zinc, total recoverable (ug/l)	Fecal coliform (colonies/ 100ml)	Fecal Streptococci (N/ 100 ml)
Avg	184.33	398.64	22.87	18.12	7.69	445.56	0.2348	0.3023	2.4473	1.2208	0.8336	0.3228	0.3981	158.34	37.294	6.05	1.05	9.25	18.3	10306	21.5	0.175	13.55	3	63.2	2.5	8200	26046
Min	40.4	162	7.51	4	6.3	14	0.06	0.077	0.68	0.368	0.14	0.07	0.12	137.57	8.6	2.5	1	1.5	4	1480	10	0.05	2.5	3	24	2.5	380	2500
Max	739	850	98	104	8.56	2720	0.55	0.708	5.1	2.852	4.8	0.83	0.93	179.11	96	31	2	82	73	24600	90	0.7	70	3	225	2.5	38400	60000
Count	29	28	20	25	28	25	25	25	22	16	25	18	16	2	17	20	20	20	20	20	20	20	20	20	20	20	14	13

District Code 21

Table 6- 5
Water Quality Draft Report in Jefferson County, KY.
Chenoweth Run @ Gelhaus Ln.

	Streamflow (cubic m/sec)	Water Temp (degrees C)	Dissolved Oxygen (mg/l)	% Dissolved Oxygen Saturation	pH	Specific Electrical Conductance (uS/cm)	Total Suspended Solids (mg/l)	Total Dissolved Solids (mg/l)	Total Volatile Solids (mg/l)	Biological Oxygen Demand (mg/l)
# of cases	79	78	78	78	79	79	79	78	79	77
Min	0.038	3.1	7.7	83	6.3	226	1	164	0	2
Median	0.297	14.5	11.6	114	8.1	592	5	389	2	2
Mean	0.756	14.5	12.0	117.1	8.0	585.4	12.8	392.7	5.0	2.4
Max	20.921	29.3	18.9	188	9	850	300	568	60	6
% data bdl	0%	0%	0%	0%	0%	0%	0%	0%	0%	39%
# Violations	0	0	1	0	0	0	0	0	0	0

	Chemical Oxygen Demand (mg/l)	Fecal Coli-form Bacteria (colonies/100ml)	Fecal Strep Bacteria(col/100 ml)	Total Ammonia Nitrogen (mg/l)	Nitrate Nitrogen (mg/l)	Nitrite Nitrogen (mg/l)	Organic Nitrogen (mg/l)	Total Phosphorus (mg/l)	Soluble Reactive Phosphorus (mg/l)	Total Alkalinity (mg/l)
# of cases	76	79	79	78	75	79	76	76	77	79
Min	10	3	8	0.01	0.14	0.01	0.04	0.14	0.12	90
Median	15.5	300	430	0.1	3.1	0.07	0.52	0.81	0.69	179
Mean	17.3	2797	3377	0.15	3.7	0.10	0.55	1.19	0.92	170
Max	55	40400	46200	0.76	12.4	0.42	1.7	4.2	2.72	237
% data bdl	22%	0%	0%	0%	0%	22%	0%	0%	0%	0%
# Violations	0	37	0	0	3	0	0	0	0	0

	Total Hardness (mg/l)	Arsenic (mg/l)	Barium (mg/l)	Berrylium (mg/l)	Calcium (mg/l)	Cadmium (mg/l)	Chlorde (mg/l)	Cyanide (mg/l)	Chromium (mg/l)	Copper (mg/l)
# of cases	24	29	29	29	29	29	10	27	29	29
Min	143.5	0.005	0.029	0	35.8	0.002	21.7	0.001	0.003	0.002
Median	235.8	0.005	0.045	0.001	56.9	0.002	40.7	0.01	0.003	0.005
Mean	237.6	0.005	0.048	0	56.9	0.003	38.5	0.006	0.005	0.005
Max	302.0	0.011	0.082	0.00	102	0.007	60.5	0.01	0.011	0.008
% data bdl	0%	93%	0%	97%	0%	97%	0%	96%	93%	41%
# Violations	0	0	0	0	0	1	0	0	0	0

	Iron (mg/l)	Mercury (mg/l)	Magnesium (mg/l)	Nickel (mg/l)	Lead (mg/l)	Selenium (mg/l)	Silver (mg/l)	Zinc (mg/l)	2,4-D (ug/l)	2,4,5,T (ug/l)
# of cases	29	29	29	29	29	29	29	29	27	27
Min	0.068	0.0001	11.7	0.005	0.005	0.005	0.005	0.005	0.02	0.01
Median	0.194	0.0002	21.3	0.005	0.02	0.005	0.006	0.024	0.05	0.01
Mean	0.394	0.0003	20.3	0.01	0.021	0.005	0.006	0.032	0.11	0.02
Max	2.22	0.0009	26.6	0.067	0.053	0.005	0.008	0.103	0.9	0.05
% data bdl	0%	76%	0%	90%	100%	100%	100%	7%	52%	85%
# Violations	0	0	0	0	0	0	0	0	0	0

Data provided in **Water Quality in Jefferson Co, KY**, *A watershed synthesis report, 1991-1998* - Draft report prepared for MSD

Table 6-6
Chenoweth Run Sampling

Parameter	Performance Measures Grant Project
WATER COLUMN Conventional Pollutants	7 composite samples each quarter (BOD, COD<TSS, pH, Chloride, O&G, Fecal Coliform, Hardness)
Nutrients	7 composite samples each quarter (Ammonia, OrthoPhosphate, total phosphorus, TKN, Nitrate)
Metals	7 composite samples each quarter (As, Cd, Cr. Cu. CN. Pb, Hg, Ni, Fe, Se, Ag. Zn, Be. MO. Th)
Organics	1 composite sample each quarter (VOC, SemiVolitiles)
Other	
SEDIMENT COLUMN Nutrients	1 grab sample each quarter (Ammonia)
Metals	1 grab sample each quarter (As, Cd, Cr, Cu. CN, Pb. Hg. Ni. Fe, Se, Ag. Zn. Be. Th)
Organics	1 grab sample each quarter (Phthalate Esters)
STREAM FLOW	Measured daily during sampling both upstream and downstream.

Table 6-7
Water Quality Criteria for Chenoweth Run at Gelhaus Lane

	CURRENT				PROPOSED			
Parameter	Human Health Requirements (ug/L)	Warm Water Aquatic Habitat Acute Criteria (ug/L)	Warm Water Aquatic Habitat Chronic Criteria (ug/L)	Minimum Current	Human Health Requirements (ug/L)	Warm Water Aquatic Habitat Acute Criteria (ug/L)	Warm Water Aquatic Habitat Chronic Criteria (ug/L)	Minimum Proposed
As			50	50			50	50
As(III)		340	190	190		360	150	150
Be	0.117		11	0.117	NA		NA	NA
Cd		10.4	2.2	2.2		12.0	4.9	4.9
Cr(III)	670,000	3532.6	421.1	421.1	NA	3669.4	175.4	175.4
Cr(VI)		16	11	11		16	11	11
Cu		40.1	24.8	24.8		31.7	19.6	19.6
CN		22	5	5		22	5.2	5.2
Fe		4000	1000	1000		4000	1000	1000
Pb		246.2	9.6	9.6		246.2	9.6	9.6
Hg	0.146	2.4	0.012	0.012	0.015	1.7	0.91	0.015
Ni	4,600	2953.5	328.3	328.3	4,600	977.1	108.6	108.6
Se		20	5	5		20	5	5
Ag		18		18		18		18
Zn	NA	244	221	221	69,000	249.8	249.8	249.8

USGS Stream Data - Chenoweth Run
Comparison to Water Quality Criteria - Low Flow Conditions

Sampling Site	Instantaneous Flow (cfs)	Specific conducuance (us/cm)	Dissolved Oxygen (mg/l)	BOD5 (mg/l)	pH (s. u.)	TSS (mg/l)	NH-3 (mg/l)	NH3 (mg/l as NH4)	NO2+NO3 (mg/l as N)	Total Phosphate (mg/l as PO4)	Total Phosphorus (mg/l as P)	Dissolved Phosphorus (mg/l as P)	Ortho Phosphorus total (mg/l)	Total Hardness (mg/l as CaCO3)	Chloride (mg/l)	Arsenic, total (ug/l)	Cadmium, total (ug/l)	Chromium, total recoverable (ug/l)	Copper, total recoverable (ug/l)	Iron, total recoverable (ug/l)	Lead, total recoverable (ug/l)	Mercury total recoverable (ug/l)	Nickel, total recoverable (ug/l)	Selenium, total (ug/l)	Silver, total recoverable (ug/l)	Zinc, total recoverable (ug/l)	Fecal coliform (colonies/ 100ml)	Fecal Streptococci (N/ 100 ml)
Current Criteria			5												600	50	2.2	11	24.8	1000	9.6	0.01	328	5	18	221	200	
Upstream of WWTP at Ruckriegel Parkway (USGS Site# 3298135) Feb 96-Sept 97																												
Exceedences			0												0	0	0	0	0	7	13	13	0	0	0	0	12	
Data Points	26	26	26	17	26	17	17	17	14	8	17	13	8	ND	11	13	13	13	13	13	13	13	13	13	13	13	13	12
% Exceedences			0												0	0	0	0	0	54	100	100	0	0	0	0	92	
J'town WWTP Effluent (USGS Site# 3298138) Jan 95-Jan 96																												
Exceedences			0												0	0	1	0	0	0	0	2	0	0	0	0	7	
Data Points	13	15	15	16	16	16	16	16	15	1	12	9	1	1	1	2	2	2	2	2	1	2	2	1	2	2	14	13
% Exceedences			0												0	0	50	0	0	0	0	100	0	0	0	0	50	
Downstream of WWTP at Taylorsville Rd. (USGS Site# 3298140) Jan 95-Sept 97																												
Exceedences			0												0	0	1	0	1	13	18	19	0	0	0	0	16	
Data Points	11	23	15	31	15	33	33	33	32	14	31	23	14	4	20	19	19	19	19	19	18	19	19	18	19	19	22	21
%Exceedences			0												0	0	5	0	5	68	100	100	0	0	0	0	73	
2.6 Miles Downstream of WWTP at Gelhaus Lane (USGS Site# 3298150) Jan 91-Dec 97																												
Exceedences			0												0	0	13	1	0	2	25	29	0	1	0	0	36	
Data Points	75	75	65	70	75	72	70	70	66	62	69	4	62	22	6	28	28	28	28	28	28	29	28	28	28	28	69	68
% Exceedences			0												0	0	46	4	0	7	89	100	0	4	0	0	52	
Proposed Criteria			5												600	50	4.9	11	19.6	1000	9.6	0.05	109	5	18	250	200	
Upstream of WWTP at Ruckriegel Parkway (USGS Site# 3298135) Feb 96-Sept 97																												
Exceedences			0												0	0	0	0	0	7	13	13	0	0	0	0	12	
Data Points	26	26	26	17	26	17	17	17	14	8	17	13	8	ND	11	13	13	13	13	13	13	13	13	13	13	13	13	12
% Exceedences			0												0	0	0	0	0	54	100	100	0	0	0	0	92	
J'town WWTP Effluent (USGS Site# 3298138) Jan 95-Jan 96																												
Exceedences			0												0	0	0	0	0	0	0	0	0	0	0	0	7	
Data Points	13	15	15	16	16	16	16	16	15	1	12	9	1	1	1	2	2	2	2	2	1	2	2	1	2	2	14	13
% Exceedences			0												0	0	0	0	0	0	0	0	0	0	0	0	50	
Downstream of WWTP at Taylorsville Rd. (USGS Site# 3298140) Jan 95-Sept 97																												
Exceedences			0												0	0	0	0	5	13	18	14	0	0	0	0	16	
Data Points	11	23	15	31	15	33	33	33	32	14	31	23	14	4	20	19	19	19	19	19	18	19	19	18	19	19	22	21
% Exceedences			0												0	0	0	0	26	68	100	74	0	0	0	0	73	
2.6 Miles Downstream of WWTP at Gelhaus Lane (USGS Site# 3298150) Jan 91-Dec 97																												
Exceedences			0												0	0	0	1	0	2	25	25	0	1	0	0	36	
Data Points	75	75	65	70	75	72	70	70	66	62	69	4	62	22	6	28	28	28	28	28	28	29	28	28	28	28	69	68
% Exceedences			0												0	0	0	4	0	7	89	86	0	4	0	0	52	

(1) Data provided by United States Dept of Interior - Geological Survey

Table 6- 9
USGS Stream Data - Chenoweth Run
Comparison to Water Quality Criteria - High Flow Conditions

Sampling Site	Instantaneous Flow (cfs)	Specific conductance (us/cm)	Dissolved Oxygen (mg/l)	BOD5 (mg/l)	pH (s. u.)	TSS (mg/l)	NH-3 (mg/l)	NH3 (mg/l as NH4)	NO2+NO3 (mg/l as N)	Total Phosphate (mg/l as PO4)	Total Phosphorus (mg/l as P)	Dissolved Phosphorus (mg/l as P)	Ortho Phosphorus total (mg/l)	Total Hardness (mg/l as CaCO3)	Chloride (mg/l)	Arsenic total	Cadmium, total (ug/l)	Chromium, total recoverable (ug/l)	Copper, total recoverable (ug/l)	Iron, total recoverable (ug/l)	Lead, total recoverable (ug/l)	Mercury total recoverable (ug/l)	Nickel, total recoverable (ug/l)	Silver, total recoverable (ug/l)	Zinc, total recoverable (ug/l)	Selenium, total (ug/l)	Fecal coliform (colonies/ 100ml)	Fecal Streptococci (N/ 100 ml)
Current Criteria			**5**												**600**	**50**	**2.2**	**11**	**24.8**	**1000**	**9.6**	**0.012**	**328.3**	**5**	**18**	**221**	**200**	
Upstream of WWTP at Ruckriegel Parkway (USGS Site# 3298135) Feb 96-Sept 97																												
Exceedences			0												0	0	0	0	0	6	6	6	0	0	6	0	2	
Data Points	11	11	11	10	11	10	10	10	8	5	10	9	5	ND	7	6	6	6	6	6	6	6	6	6	6	6	2	2
% Exceedences			0												0	0	0	0	0	100	100	100	0	0	100	0	100	
J'town WWTP Effluent (USGS Site# 3298138) Jan 95-Jan 96																												
NO Data Available																												
Downstream of WWTP at Taylorsville Rd. (USGS Site# 3298140) Jan 95-Sept 97																												
Exceedences			0												0	0	0	0	0	1	1	1	0	0	1	0	5	
Data Points	5	5	5	5	4	5	5	5	5	ND	4	4	ND	ND	ND	1	1	1	1	1	1	1	1	1	1	1	5	4
% Exceedences			0													0	0	0	0	100	100	100	0	0	100	0	100	
2.6 Miles Downstream of WWTP at Gelhaus Lane (USGS Site# 3298150) Jan 91-Dec 97																												
Exceedences			0												0	0	0	3	3	20	20	20	0	0	20	0	14	
Data Points	29	28	20	25	28	25	25	25	22	16	25	18	16	2	17	20	20	20	20	20	20	20	20	20	20	20	14	13
% Exceedences			0												0	0	0	15	15	100	100	100	0	0	100	0	100	
Proposed Criteria															**600**	**50**	**4.9**	**11**	**19.6**	**1000**	**9.6**	**0.051**	**108.6**	**5**	**18**	**249.8**	**ZOO**	
Upstream of WWTP at Ruckriegel Parkway (USGS Site# 3298135) Feb 96-Sept 97																												
Exceedences			0												0	0	0	0	0	6	6	6	0	0	6	0	2	
Data Points	11	11	11	10	11	10	10	10	8	5	10	9	5	ND	7	6	6	6	6	6	6	6	6	6	6	6	2	2
% Exceedences			0												0	0	0	0	0	100	100	100	0	0	100	0	100	
J'town WWTP Effluent (USGS Site# 3298138) Jan 95-Jan 96																												
No Data Available																												
Downstream of WWTP at Taylorsville Rd. (USGS Site# 3298140) Jan 95-Sept 97																												
Exceedences			0												0	0	0	0	0	1	1	0	0	0	1	0	5	
Data Points	5	5	5	5	4	5	5	5	5	ND	4	4	ND	ND	ND	1	1	1	1	1	1	1	1	1	1	1	5	4
% Exceedences			0													0	0	0	0	100	100	0	0	0	100	0	100	
2.6 Miles Downstream of WWTP at Gelhaus Lane (USGS Site# 3298150) Jan 91-Dec 97																												
Exceedences			0												0	0	0	3	7	20	20	16	0	0	20	0	14	
Data Points	29	28	20	25	28	25	25	25	22	16	25	18	16	2	17	20	20	20	20	20	20	20	20	20	20	20	14	13
% Exceedences			0												0	0	0	15	35	100	100	80	0	0	100	0	100	

(1) Data provided by United States Dept of Interior Geological Survey

Figure 1-1 Chenoweth Run Watershed/Jeffersontown Sewershed

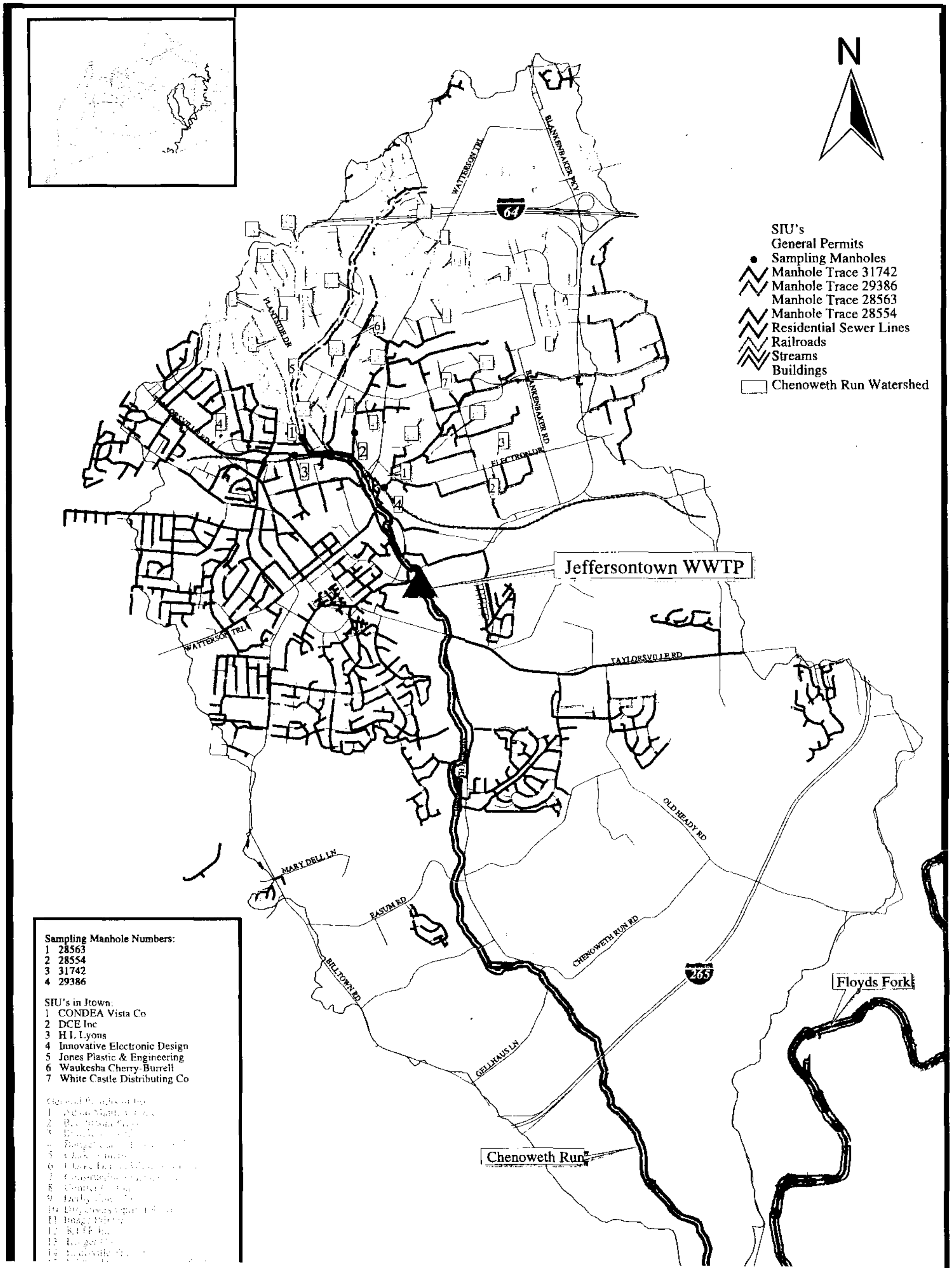


Figure 2-1 *J'town Land Use*

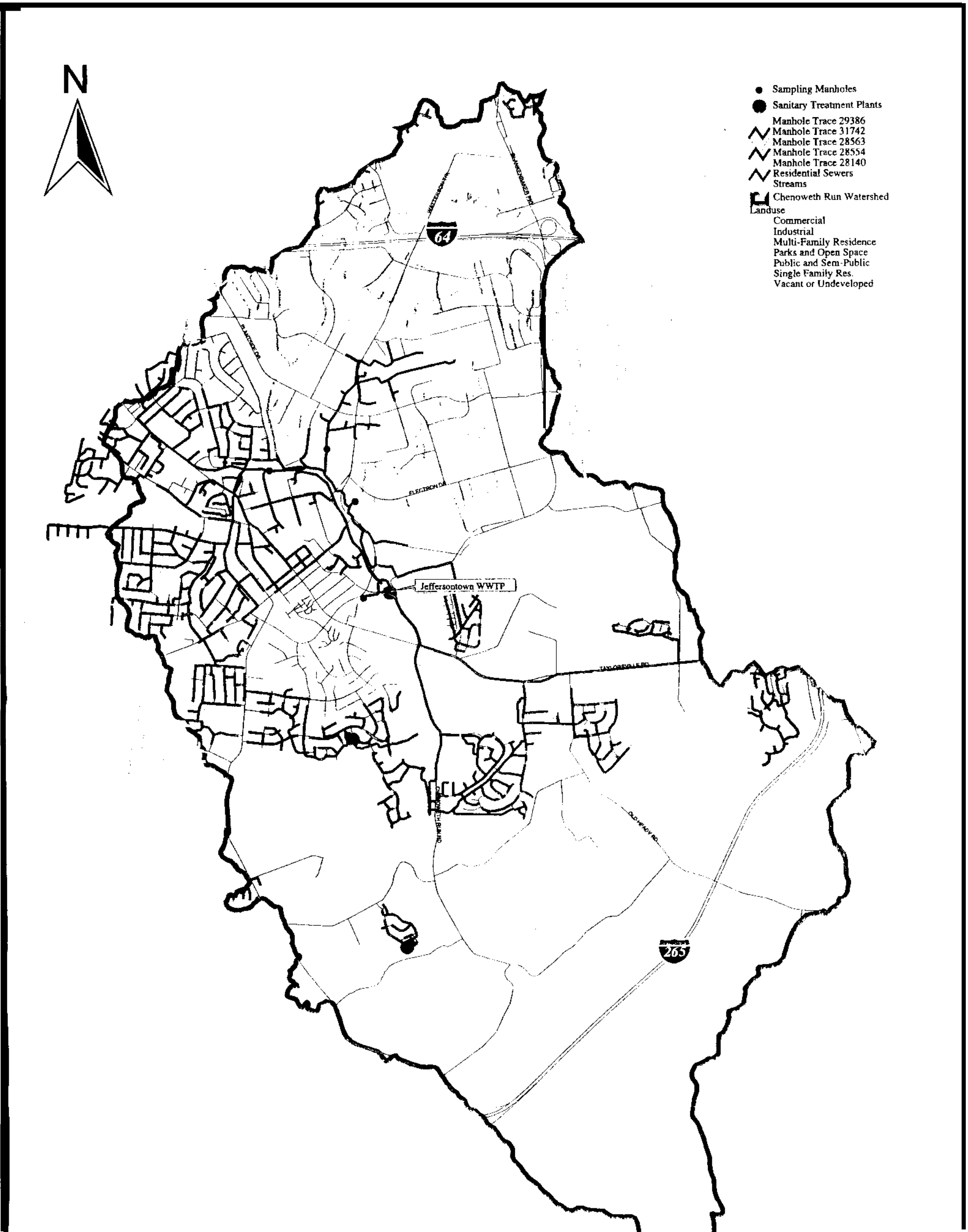
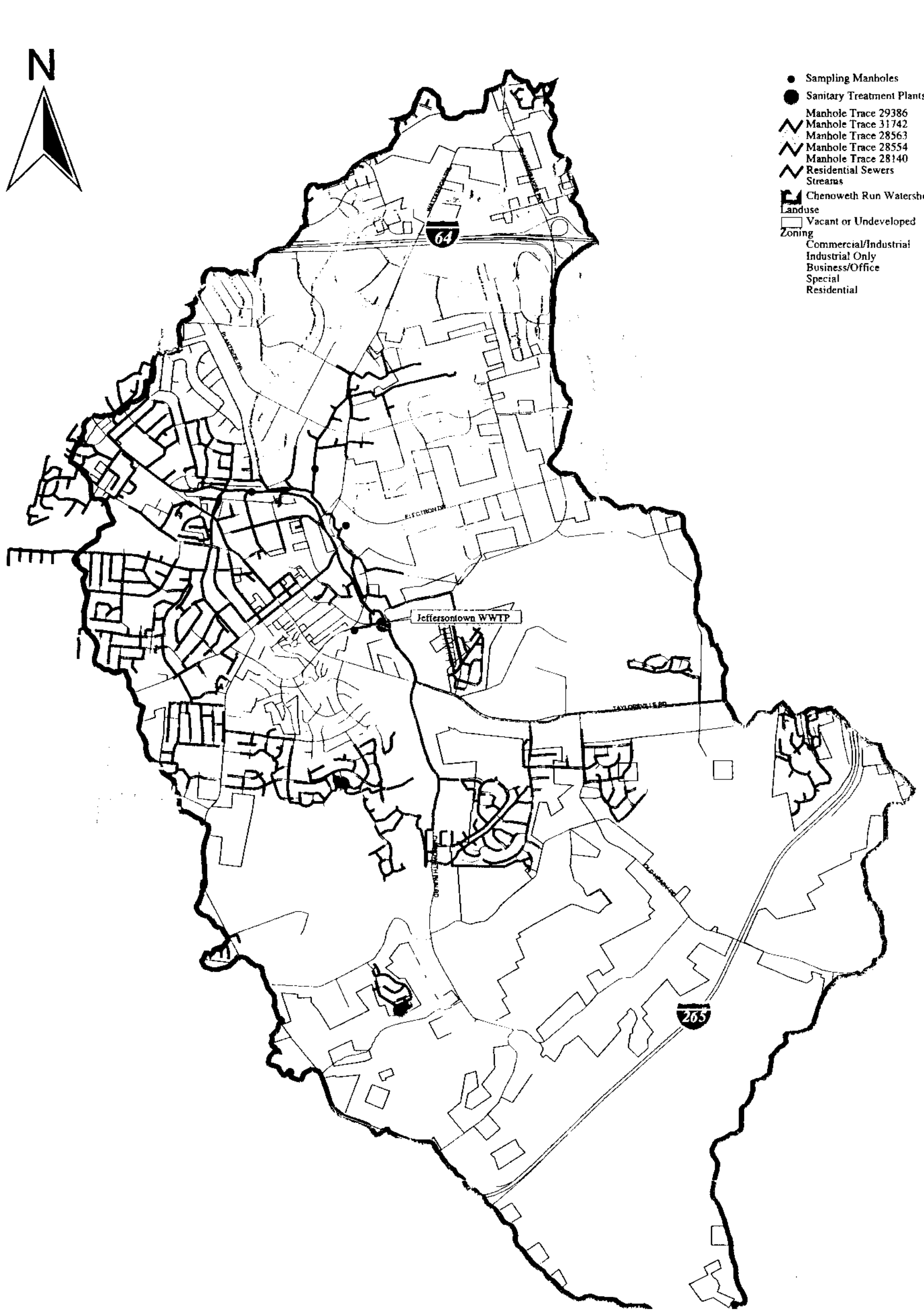


Figure 2-2 *J'town Zoning & Vacant Land Use*



Jeffersontown Sewer Collection System Schematic

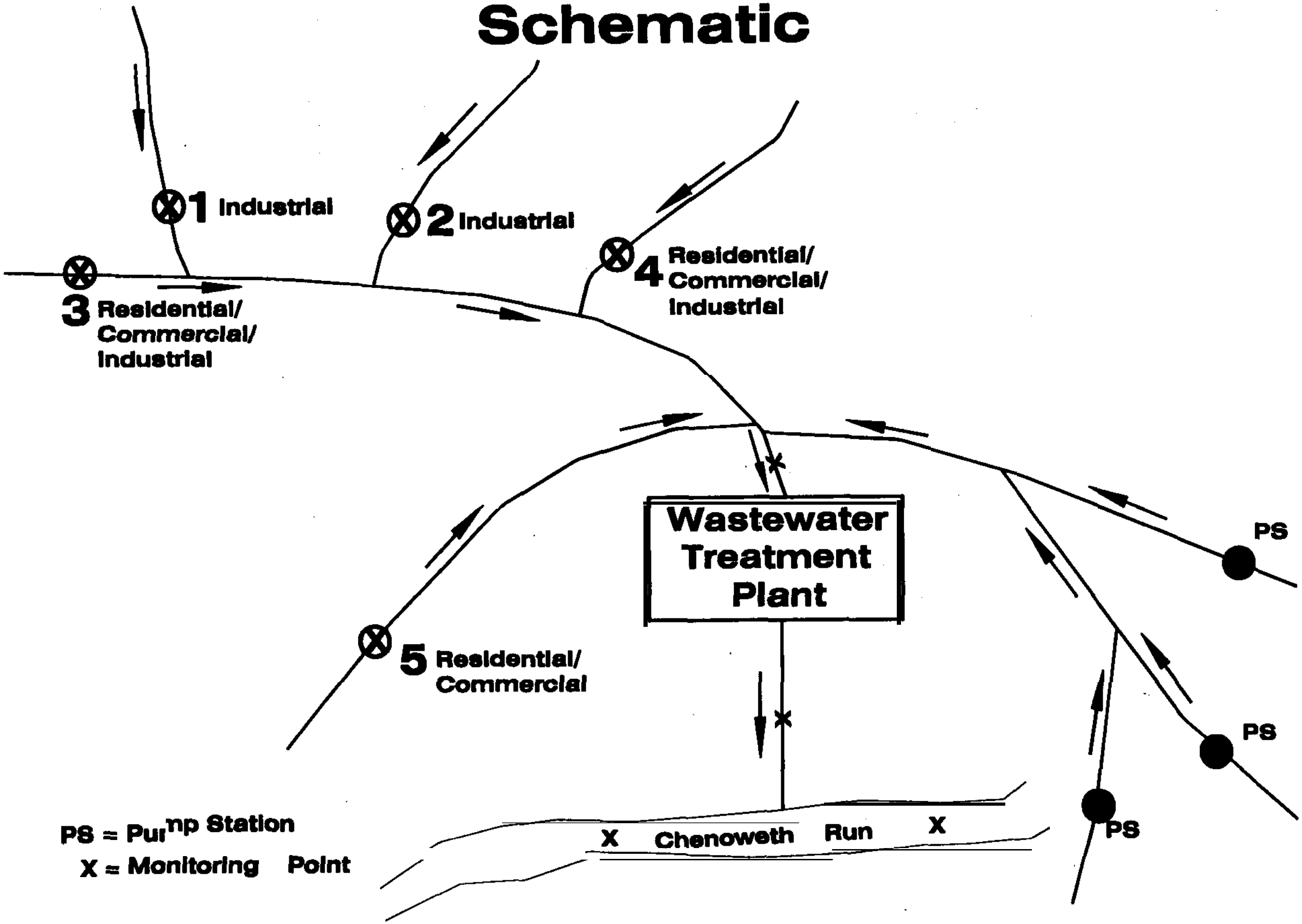


Figure 3-1

Figure 3-2
Flow Monitoring Survey
(reporting period 9/1/98 - 10/21/98)
(All Flow in mgd)

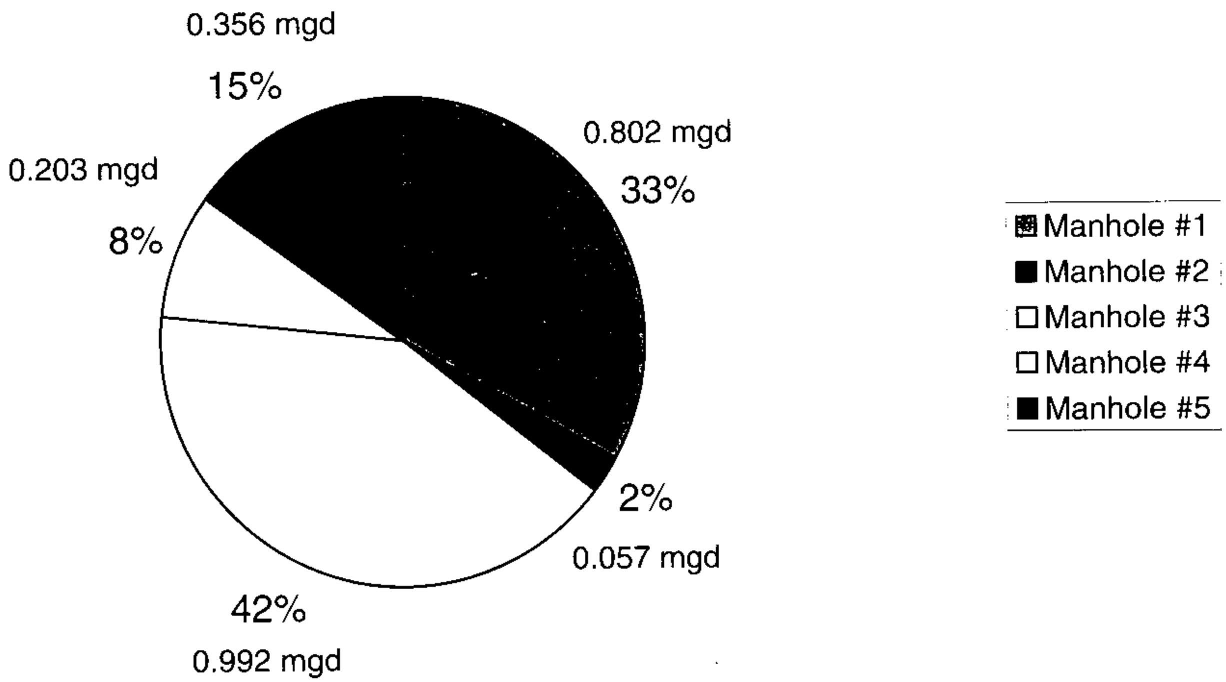


Figure 3-

Collection System low Dist

eporting period 3/2 '99-4/2/9

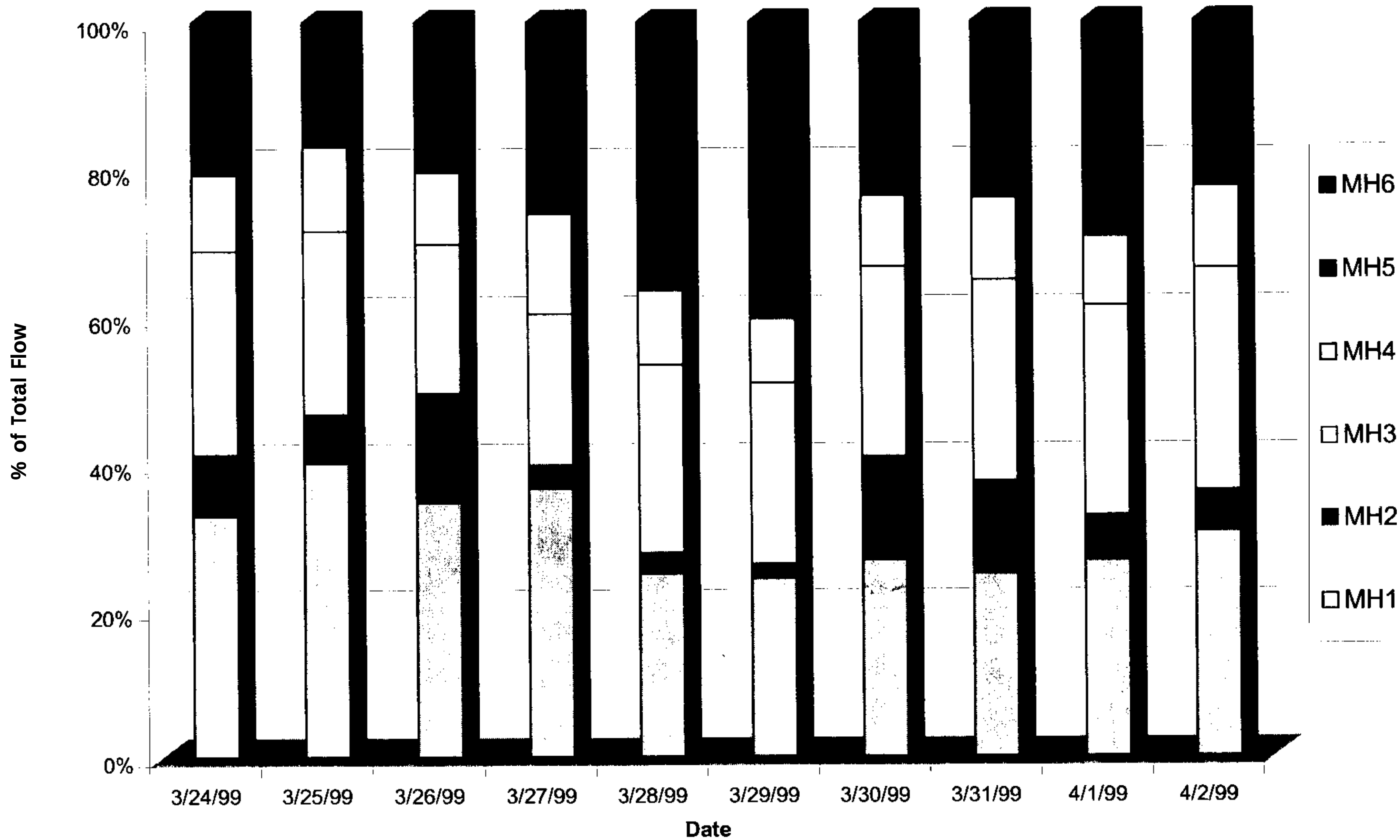


Figure 4-1 *Industrial Park*

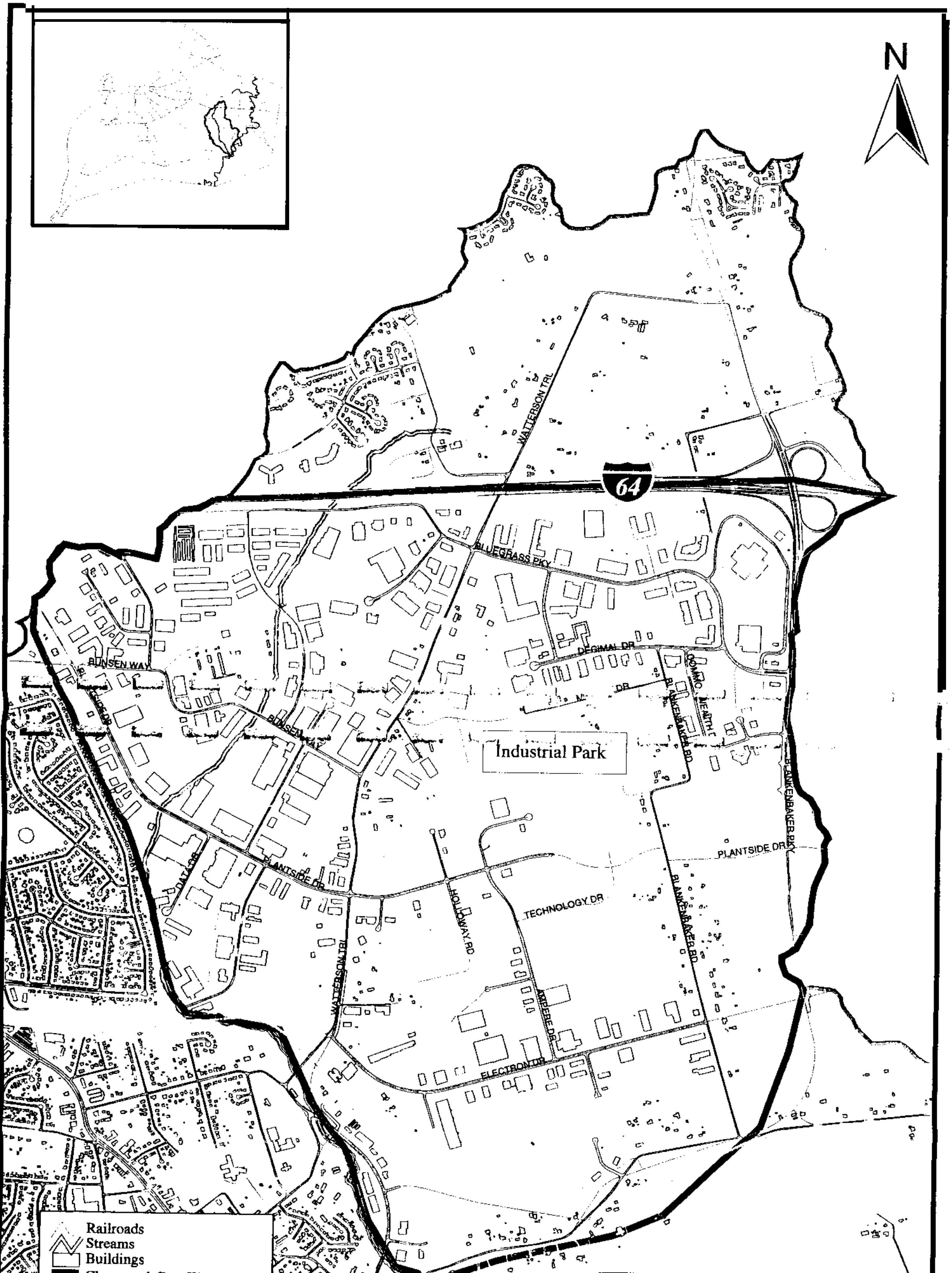
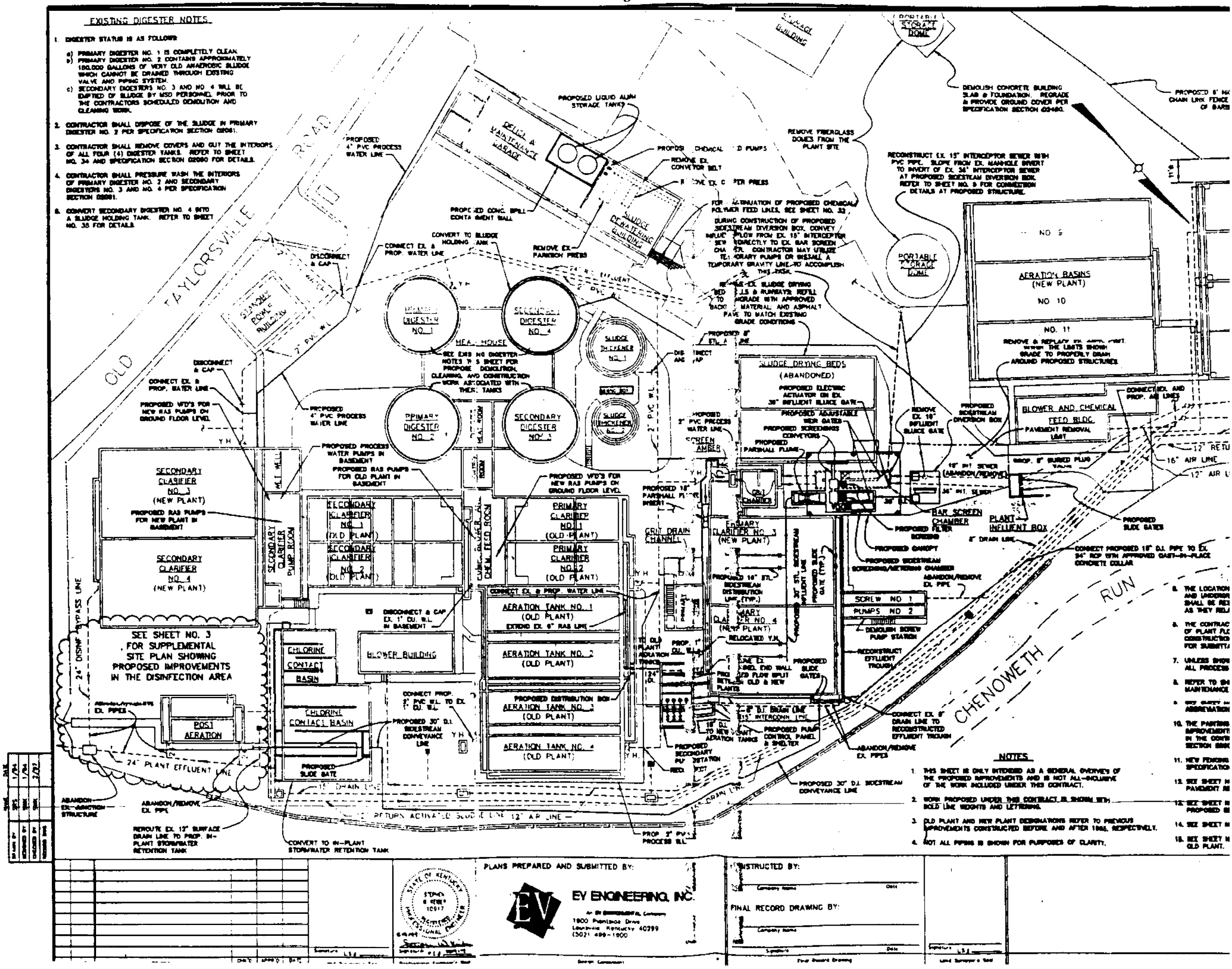


Figure 5-1



EXISTING DIGESTER NOTES
1. DIGESTER STATUS IS AS FOLLOWS:
a) PRIMARY DIGESTER NO. 1 IS COMPLETELY CLEAN.
b) PRIMARY DIGESTER NO. 2 CONTAINS APPROXIMATELY 100,000 GALLONS OF VERY OLD ANAEROBIC SLUDGE WHICH CANNOT BE DRAINED THROUGH EXISTING VALVE AND PIPING SYSTEM.
c) SECONDARY DIGESTERS NO. 3 AND NO. 4 WILL BE EMPTIED OF SLUDGE BY MSD PERSONNEL PRIOR TO THE CONTRACTORS SCHEDULED DEMOLITION AND CLEANING WORK.
2. CONTRACTOR SHALL DISPOSE OF THE SLUDGE IN PRIMARY DIGESTER NO. 2 PER SPECIFICATION SECTION 02081.
3. CONTRACTOR SHALL REMOVE COVERS AND CUT THE INTERIORS OF ALL FOUR (4) DIGESTER TANKS. REFER TO SHEET NO. 34 AND SPECIFICATION SECTION 02080 FOR DETAILS.
4. CONTRACTOR SHALL PRESSURE WASH THE INTERIORS OF PRIMARY DIGESTER NO. 2 AND SECONDARY DIGESTERS NO. 3 AND NO. 4 PER SPECIFICATION SECTION 02081.
5. CONVERT SECONDARY DIGESTER NO. 4 INTO A SLUDGE HOLDING TANK. REFER TO SHEET NO. 35 FOR DETAILS.
OLD TAYLORSVILLE ROAD
CHENOWETH RUN
PRIMARY DIGESTER NO. 1
PRIMARY DIGESTER NO. 2
SECONDARY DIGESTER NO. 3
SECONDARY DIGESTER NO. 4
HEAT HOUSE
SLUDGE THICKENER NO. 1
SLUDGE DRYING BEDS (ABANDONED)
SLUDGE DEWATERING BUILDING
PORTABLE STORAGE DOME
AERATION BASINS (NEW PLANT)
NO. 9
NO. 10
NO. 11
BLOWER AND CHEMICAL FEED BLDG.
SECONDARY CLARIFIER NO. 3 (NEW PLANT)
SECONDARY CLARIFIER NO. 4 (NEW PLANT)
SECONDARY CLARIFIER NO. 1 (OLD PLANT)
SECONDARY CLARIFIER NO. 2 (OLD PLANT)
PRIMARY CLARIFIER NO. 1 (OLD PLANT)
PRIMARY CLARIFIER NO. 2 (OLD PLANT)
PRIMARY CLARIFIER NO. 3 (NEW PLANT)
PRIMARY CLARIFIER NO. 4 (NEW PLANT)
SECONDARY CLARIFIER PUMP ROOM
AERATION TANK NO. 1 (OLD PLANT)
AERATION TANK NO. 2 (OLD PLANT)
AERATION TANK NO. 3 (OLD PLANT)
AERATION TANK NO. 4 (OLD PLANT)
CHLORINE CONTACT BASIN
BLOWER BUILDING
POST AERATION
BAR SCREEN CHAMBER
PLANT INFLUENT BOX
SCREW PUMPS NO. 1
PUMPS NO. 2
GRIT DRAIN CHANNEL
SEE SHEET NO. 3 FOR SUPPLEMENTAL SITE PLAN SHOWING PROPOSED IMPROVEMENTS IN THE DISINFECTION AREA
24" PLANT EFFLUENT LINE
24" DISINF. BYPASS LINE
NOTES
1. THIS SHEET IS ONLY INTENDED AS A GENERAL OVERVIEW OF THE PROPOSED IMPROVEMENTS AND IS NOT ALL-INCLUSIVE OF THE WORK INCLUDED UNDER THIS CONTRACT.
2. WORK PROPOSED UNDER THIS CONTRACT IS SHOWN WITH BOLD LINE WEIGHTS AND LETTERING.
3. OLD PLANT AND NEW PLANT DESIGNATIONS REFER TO PREVIOUS IMPROVEMENTS CONSTRUCTED BEFORE AND AFTER 1985, RESPECTIVELY.
4. NOT ALL PIPING IS SHOWN FOR PURPOSES OF CLARITY.
PLANS PREPARED AND SUBMITTED BY:
EV ENGINEERING, INC.
1900 Plantside Drive
Louisville, Kentucky 40299
(502) 499-1900
CONSTRUCTED BY:
FINAL RECORD DRAWING BY:
STATE OF KENTUCKY
PROFESSIONAL ENGINEER

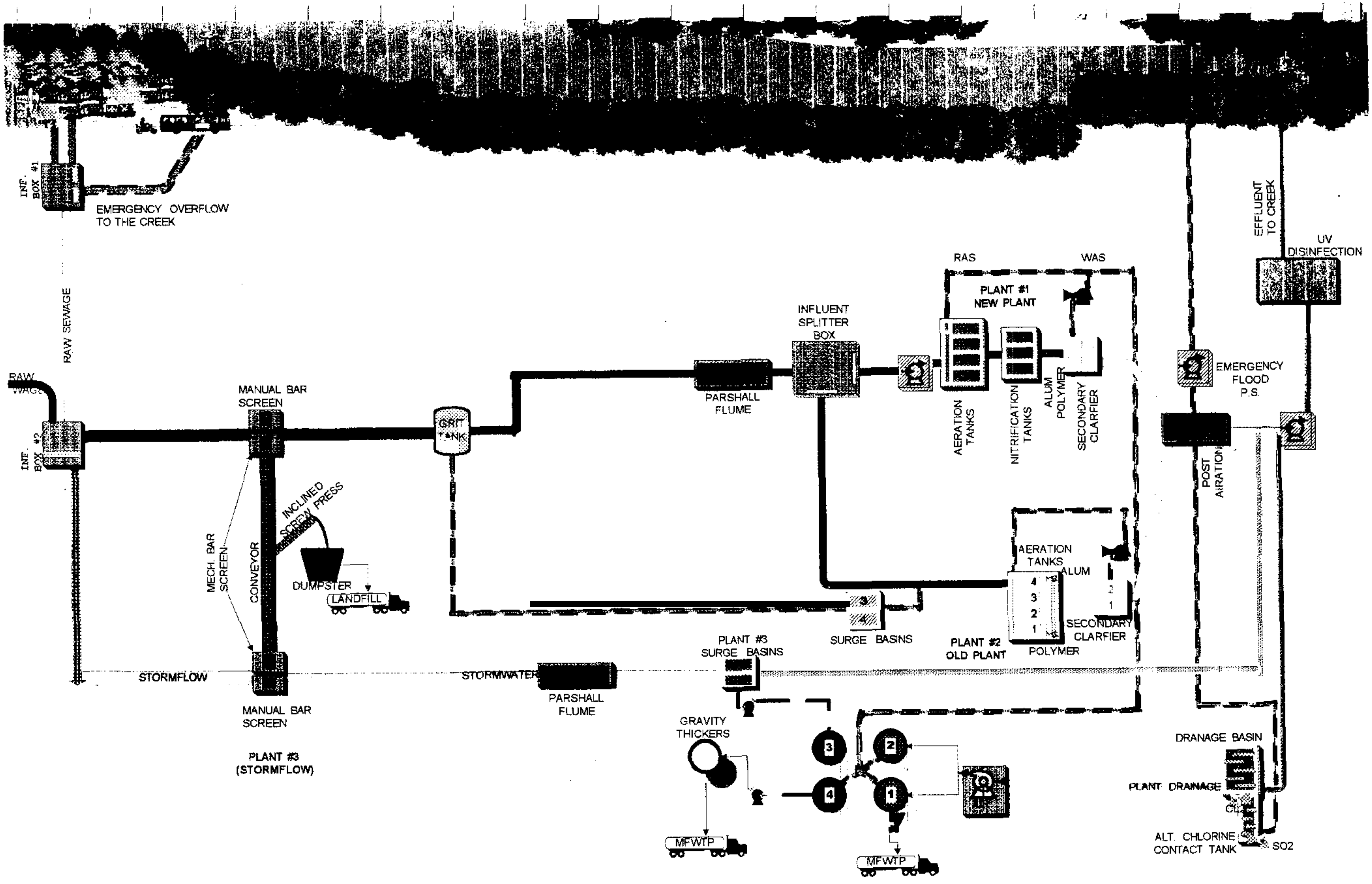


Figure 5-1

PROCESS FLOW DIAGRAM
JEFFERSONTOWN W.T.P.

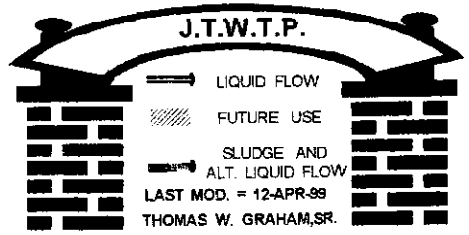
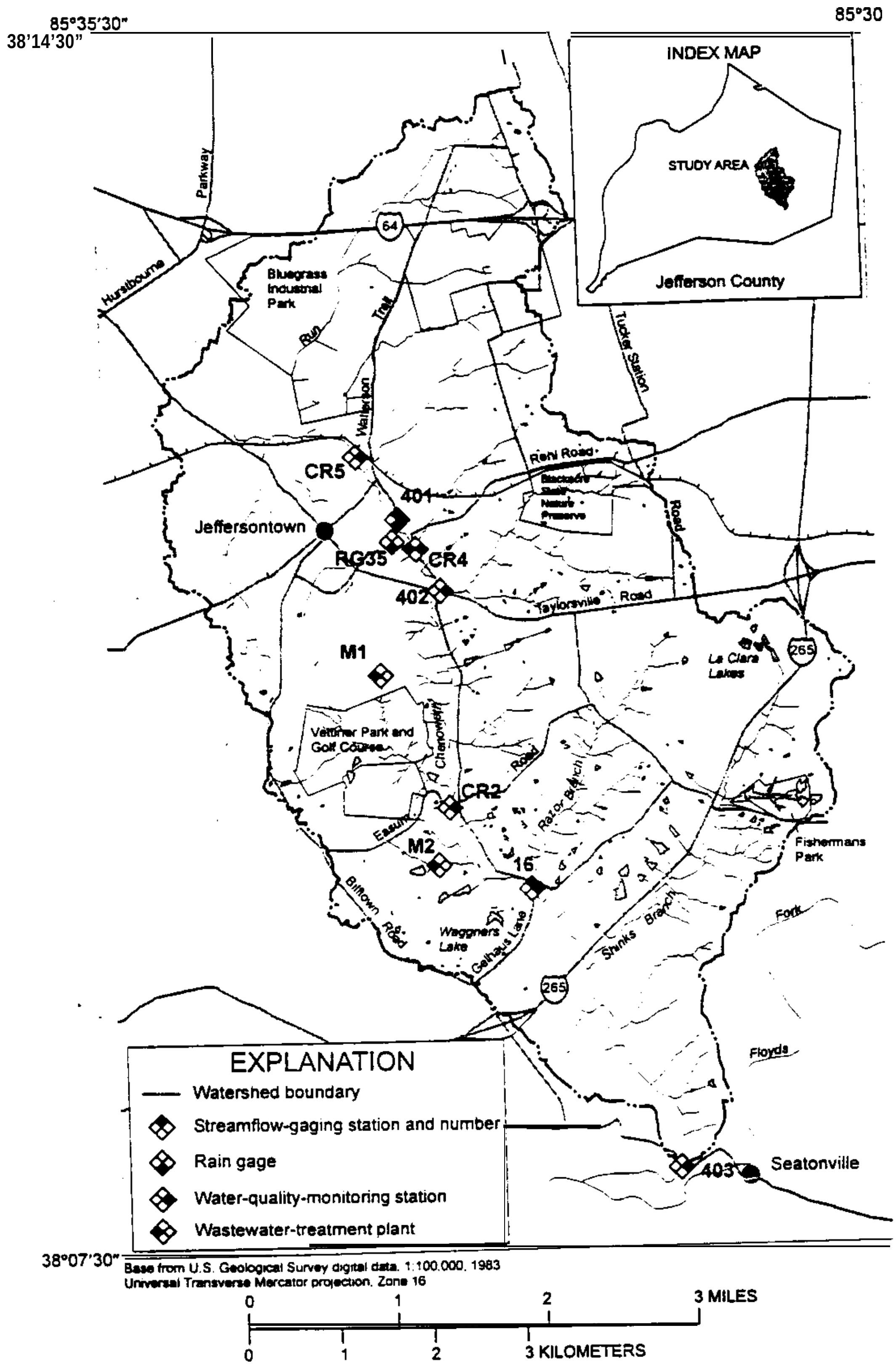


Figure 6-1

USGS Stream Sampling on Chenoweth Run



Locations of the streamflow-gaging, water-quality-monitoring. rainfall-gaging stations. and wastewater-treatment plants in the Chenoweth Run Basin. Jefferson County, Kentucky.